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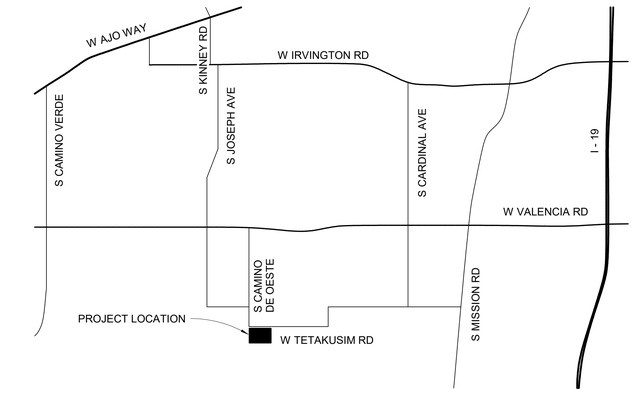
Pascua Yaqui Tribe - Health Services Center II - Volume I

CONSTRUCTION DOCUMENTS



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not to scale

north

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* DRAWINGS PROVIDED FOR REFERENCE ONLY

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cover sheet

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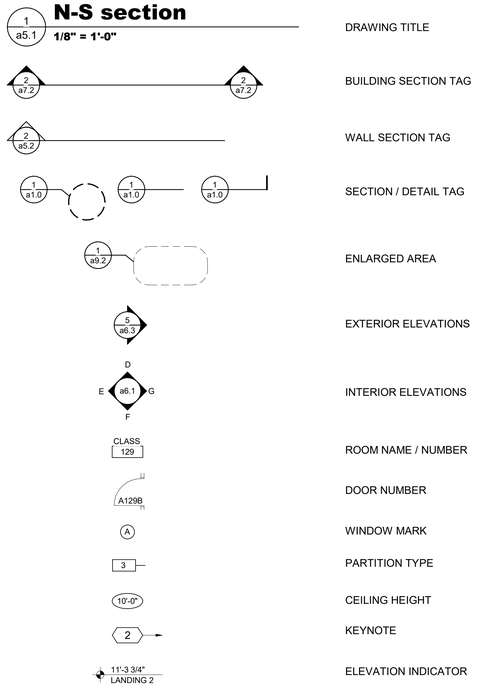
abbreviations

AB	ANCHOR BOLT
ABC	AGGREGATE BASE COURSE
ABI	ADDITIVE BID ITEM
ACT	ACOUSTICAL CEILING TILE
ADJ	ADJUSTABLE
AFF	ABOVE FINISH FLOOR
AFG	ABOVE FINISH GRADE
ALT	ALTERNATE
ALUM	ALUMINUM
AP	ACCESS PANEL
BD	BOARD
BET	BUILDING ENTRANCE TERMINAL
BFF	BELOW FINISHED FLOOR
BL	BASELINE
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BM	BEAM, BENCHMARK
BO	BOTTOM OF
BOS	BOTTOM OF STEEL
BOT	BOTTOM
BSMT	BASEMENT
BUR	BUILT-UP ROOFING
C	CONDUIT
CA	COMPRESSED AIR
CAB	CABINET
CER	CERAMIC
CI	CAST IRON
CJ	CONTROL JOINT
CLG	CEILING
CLKG	CAULKING
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
COND	CONDITION
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS
COT	CITY OF TUCSON
CPT	CARPET
CT	CERAMIC TILE
CTR	CENTER
CU	COPPER
CW	COLD WATER
DAFS	DIRECT APPLIED FINISH SYSTEM
DBL	DOUBLE
DET	DETAILS
DIA	DIAMETER
DIM	DIMENSION
DISP	DISPENSER
DN	DOWN
DR	DOOR
DS	DOWNSPOUT
DTL	DETAIL
DWG	DRAWING
E	EAST
EA	EACH
EDF	ELECTRIC DRINKING FOUNTAIN
EF	EXHAUST FAN
EIFS	EXTERIOR INSULATION FINISH SYSTEM
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRICAL
ENCL	ENCLOSURE
EQ	EQUAL
ES	EXPOSED STRUCTURE
ESD	ELECTROSTATIC DISCHARGE
EXIST	EXISTING
EXP	EXPANSION, EXPOSED
EXT	EXTERIOR
FA	FIRE ALARM
FCO	FLOOR CLEAN OUT
FD	FLOOR DRAIN
FDN	FOUNDATION
FEC	FIRE EXTINGUISHER CABINET
FF	FINISH FLOOR
FFE	FINISH FLOOR ELEVATION
FIN	FINISH
FL	FLOOR
FLUOR	FLUORESCENT
FOC	FACE OF CONCRETE
FOCMU	FACE OF CMU
FOS	FACE OF STUDS
FP	FIRE PROTECTION
FR	FRAME
FT	FOOT, FEET
FTG	FOOTING
FURR	FURRING
G	GAS
GA	GAUGE
GALV	GALVANIZED
GB	GRAB BAR
GI	GALVANIZED IRON
GL	GLASS
GND	GROUND
GR	GRADE
GWB	GYPSUM WALL BOARD
HB	HOSE BIBB
HC	HOLLOW CORE
HDWD	HARDWOOD
HDWE	HARDWARE
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HR	HOUR
HSA	HEADED STUD ANCHOR
HVAC	HEATING VENTILATING AND AIR CONDITIONING
HW	HOT WATER
ID	INSIDE DIAMETER
INSUL	INSULATION
INT	INTERIOR
JAN	JANITOR
JB	JUNCTION BOX
JT	JOINT
LAM	LAMINATE
LBS	POUNDS
LN	LINOLEUM
LT	LIGHT(ING)
LV	LAB VENT
LW	LAB WASTE
MAS	MASONRY
MAX	MAXIMUM
MB	MACHINE BOLT
MDF	MEDIUM DENSITY FIBERBOARD
MECH	MECHANICAL
MEMB	MEMBRANE
MFR	MANUFACTURER
MIN	MINIMUM
MIR	MIRROR
MISC	MISCELLANEOUS
MO	MASONRY OPENING
MTD	MOUNTED
MTL	METAL
N	NORTH
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NP	NON-POTABLE
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
OH	OVERHEAD
OPNG	OPENING
OPP	OPPOSITE
ORD	OVERFLOW ROOF DRAIN
P-LAM	PLASTIC LAMINATE
PART	PARTITION
PCF	POUNDS PER CUBIC FOOT
PL	PLATE
PLF	POUNDS PER LINEAR FOOT
PLYWD	PLYWOOD
PR	PAIR
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POINT
PTD	PAPER TOWEL DISPENSER
QT	QUARRY TILE
R	RISER, RUBBER BASE
RA	RETURN AIR
RAD	RADIUS
RD	ROOF DRAIN
REF	REFERENCE
REINF	REINFORCED
REQD	REQUIRED
RESIL	RESILIENT
RM	ROOM
RO	ROUGH OPENING
ROW	RIGHT-OF-WAY
RWL	RAIN WATER LEADER
S	SOUTH
SC	SOLID CORE, SEALED CONCRETE
SCHED	SCHEDULE
SD	SOAP DISPENSER
SECT	SECTION
SHT	SHEET
SHTG	SHEATHING
SIM	SIMILAR
SJ	SAWCUT JOINT
SPEC	SPECIFICATION
SQ	SQUARE
SS	STAINLESS STEEL
STA	STATION
STC	SOUND TRANSMISSION CLASS
STD	STANDARD
STL	STEEL
STO	STOREFRONT
STRUCT	STRUCTURAL
SUSP	SUSPENDED
SV	SHEET VINYL
SWT	SWITCH
T	TEMPERED GLASS
T&G	TONGUE AND GROOVE
TB	TOWEL BAR
TEL	TELEPHONE
THK	THICK
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING
TOP	TOP OF PARAPET
TOS	TOP OF STEEL
TOW	TOP OF WALL
TPD	TOILET PAPER DISPENSER
TRANS	TRANSFORMER
TTB	TELEPHONE TERMINAL BOARD
TYP	TYPICAL
UG	UNDERGROUND
UL	UNDERWRITER'S LABORATORY
UNO	UNLESS NOTED OTHERWISE
V	VENT
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VIF	VERIFY IN FIELD
VTR	VENT THROUGH ROOF
W	WEST
W/	WITH
W/O	WITHOUT
WC	WATER CLOSET
WCO	WALL CLEAN OUT
WD	WOOD
WP	WATERPROOF
WR	WATER RESISTANT
WSCT	WAINSCOT
WT	WEIGHT
WWF	WELDED WIRE FABRIC

symbols legend



general project notes

A THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE EXISTENCE AND LOCATION OF ALL UNDERGROUND OR CONCEALED UTILITIES IN ADVANCE OF ANY CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE TO HIRE A PRIVATE UTILITY LOCATING SERVICE TO LOCATE ALL UNDERGROUND UTILITIES ON OR NEAR THE PROJECT SITE.

B CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ANY OR ALL EXISTING CONDITIONS PRIOR TO THE START OF CONSTRUCTION. ANY UTILITIES FOUND TO BE IN THE WAY OF THE NEW CONSTRUCTION SHALL BE REMOVED, RELOCATED OR REPLACED AS DIRECTED. REFER TO PLUMBING, ELECTRICAL, MECHANICAL AND/OR CIVIL PLANS FOR SPECIFIC REQUIREMENTS.

C IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REMOVE ALL ABANDONED (RETIRED) UTILITIES THAT INTERFERE WITH THE CONSTRUCTION PROJECT. THE CONTRACTOR'S AND LOCAL UTILITY AND TRAFFIC CREWS SHALL COORDINATE WORK SCHEDULES SO AS TO PREVENT ANY CONFLICTING WORK CONDITIONS.

D CONTRACTOR SHALL REPAIR ANY AND ALL UTILITIES DAMAGED DURING THE COURSE OF CONSTRUCTION IN ACCORDANCE WITH LOCAL SPECIFICATIONS, AT NO ADDITIONAL COST.

E CONTRACTOR TO NOTIFY "BLUE STAKE" @ 1-800-782-5348, AT LEAST 48-HOURS IN ADVANCE OF ANY EXCAVATION.

F ALL ITEMS REMOVED SHALL BE TEMPORARILY STORED IN A LOCATION APPROVED BY THE OWNER, AND THE OWNER SHALL REVIEW ALL ITEMS PRIOR TO ANY DISPOSAL. ANY ITEM WHICH IS DEEMED SALVAGEABLE SHALL REMAIN THE OWNER'S PROPERTY, AND WILL BE REMOVED TO STORAGE FACILITIES DESIGNATED BY THE OWNER FOR FUTURE USE. IF THE OWNER DEEMS AN ITEM AS NON-SALVAGEABLE, THE CONTRACTOR SHALL DISPOSE OF IT.

G THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OF ANY DEBRIS RESULTING FROM THE DEMOLITION AND CONSTRUCTION. AT NO TIME SHALL ANY OF THIS MATERIAL OBSTRUCT THE NORMAL OPERATION.

H CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ANY OR ALL EXCESS EXCAVATION AND CONSTRUCTION RELATED DEBRIS, AT THE END OF EACH WORK DAY.

I THE CONTRACTOR IS ADVISED THAT DAMAGE TO ANY PORTION OF THIS PROJECT'S BUILDING(s) & SURROUNDING AREA AS A RESULT OF THIS PROJECT IS TO BE REPAIRED AT THE CONTRACTOR'S EXPENSE.

J IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSPECT THE JOB SITE TO FAMILIARIZE HER/HIM SELF WITH ALL THE EXISTING CONDITIONS THAT COULD AFFECT THE INSTALLATION OF ANY WORK SET FORTH IN THESE PLANS.

K THE JOB SITE, AT THE COMPLETION OF CONSTRUCTION, SHALL BE CLEANED OF ANY DEBRIS OR SPOILS RESULTING FROM THE CONSTRUCTION.

L THE CONTRACTOR IS RESPONSIBLE TO FIELD VERIFY ALL EXISTING RECORDED DIMENSIONS INDICATED AND ALL EXISTING CONDITIONS THAT IMPACT NEW CONSTRUCTION.

M THE CONTRACTOR SHALL ESTABLISH ALL QUANTITIES BASED ON ACTUAL CONDITIONS. THESE DRAWINGS ARE NOT TO BE SCALED

N BLOCK WALLS ARE DIMENSIONED TO FACE OF BLOCK. DIMENSIONS ARE NOMINAL THICKNESS. BLOCK WALL OPENINGS ARE DIMENSIONED TO ROUGH OPENING.

O METAL STUD PARTITIONS ARE DIMENSIONED TO FACE OF STUD. ALL ROUGH OPENINGS ARE LOCATED 4" TO NEAREST ADJACENT WALL UNLESS DIMENSIONED OTHERWISE.

P COMPLY WITH ALL APPLICABLE CODES, RULES AND REGULATIONS. OBTAIN AND PAY FOR ALL PERMITS AND LICENSES REQUIRED.

Q REFER TO BUILDING CODE ANALYSIS SHEETS FOR ADDITIONAL CODE REQUIREMENTS.

R THE CONTRACTOR SHALL NOTIFY THE ARCHITECT AT LEAST 72 HOURS IN ADVANCE OF ANY CONSTRUCTION THAT REQUIRES SPECIAL/REQUIRED INSPECTION(s).

S REFERENCE ALL ARCHITECTURAL, CIVIL, LANDSCAPING, MECHANICAL, PLUMBING, AND ELECTRICAL SHEETS FOR SCOPE OF WORK & COORDINATION.

T ALL MATERIALS REQUIRED SHALL BE OF A GRADE AND QUALITY CONSISTENT WITH THE INTENDED USE AS SPECIFIED & APPROVED BY THE ARCHITECT.

U ALL EQUIPMENT OR MATERIALS NOT SHOWN OR SPECIFIED ON THE PLANS OR IN THE SPECIFICATIONS, BUT ARE REQUIRED TO COMPLETE THE INSTALLATION SHALL BE SUPPLIED BY THE CONTRACTOR AS PART OF THE CONTRACT WORK.

V FIRE AND SMOKE SEAL ALL PENETRATIONS AROUND PIPE/CONDUIT AT ALL FLOOR, WALL, DECK & ROOF PENETRATIONS. SEE CODE ANALYSIS SHEET FOR LOCATIONS OF ALL FIRE-RATED WALLS.

W ALL PENETRATIONS THROUGH FIRE RESISTIVE FLOORS OR WALLS SHALL BE PROTECTED BY MATERIALS AND INSTALLATION DETAILS THAT CONFORM TO THE UNDERWRITER LABORATORIES LISTING FOR THROUGH PENETRATION FIRE STOP SYSTEMS. THE CONTRACTOR SHALL SUBMIT MANUFACTURERS SHOP DRAWINGS AND DATA SHEETS FOR ALL PENETRATIONS.

X ALL RATED DOOR/WINDOW FRAME ASSEMBLIES SHALL BE LISTED AND LABELED BY APPROVING AGENCY AND HAVE APPROPRIATE HARDWARE PER INTERNATIONAL BUILDING CODE, SECTION(s) 1004 & 1005.

Y UNLESS OTHERWISE NOTED ALL BLOCKING OR BACKING MATERIAL SHALL BE SOLID WOOD FOR ALL WALL MOUNTED ITEMS.

Z INSTALL A CONTINUOUS BEAD OF SEALANT AT ALL GAPS/SEAMS BETWEEN IMMOVABLE EQUIPMENT AND WALLS.

AA ALL TERMINATIONS OF CARPET, TILE, OR VCT TO ANOTHER FLOOR MATERIAL SHALL HAVE TRANSITION OR REDUCER STRIPS - SEE SPECS.

BB ALL INTERIOR FINISHES SHALL CONFORM TO THE REQUIREMENTS OF CHAPTER 8 OF THE 2012 INTERNATIONAL BUILDING CODE.

CC PROVIDE AN ESCUTCHEON AT EACH PIPE PENETRATION @ FLOOR AND/OR WALL SURFACES, TYPICAL.

DD ALL CORES INTO WALLS AND SLABS SHALL BE PRIOR APPROVED BY THE ARCHITECT AND STRUCTURAL ENGINEER.

EE INSTALL GYPSUM BOARD CONTROL JOINTS AT ALL LOCATIONS INDICATED OR IF NOT INDICATED AS ACCORDING TO THE REQUIREMENTS THAT ARE ESTABLISHED IN THE SPECIFICATIONS.

FF FIRE LANES SHALL BE MAINTAINED IN A CONDITION TO ASSURE ACCESS TO ALL BUILDINGS DURING CONSTRUCTION.

GG ALL NEW ROOFING SYSTEMS TO HAVE A CLASS "A" FIRE RATING PER SPECIFICATION SECTION 075216.

HH SMOKING WITHIN THE BUILDING / CAMPUS IS PROHIBITED.

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www.swaimaia.com

REGISTERED ARCHITECT
CERTIFICATE NUMBER
37165
KEVIN A. BARBER
DATE SIGNED 11/16/18
ARIZONA U.S.A.

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

abbreviations and symbols

g1.1

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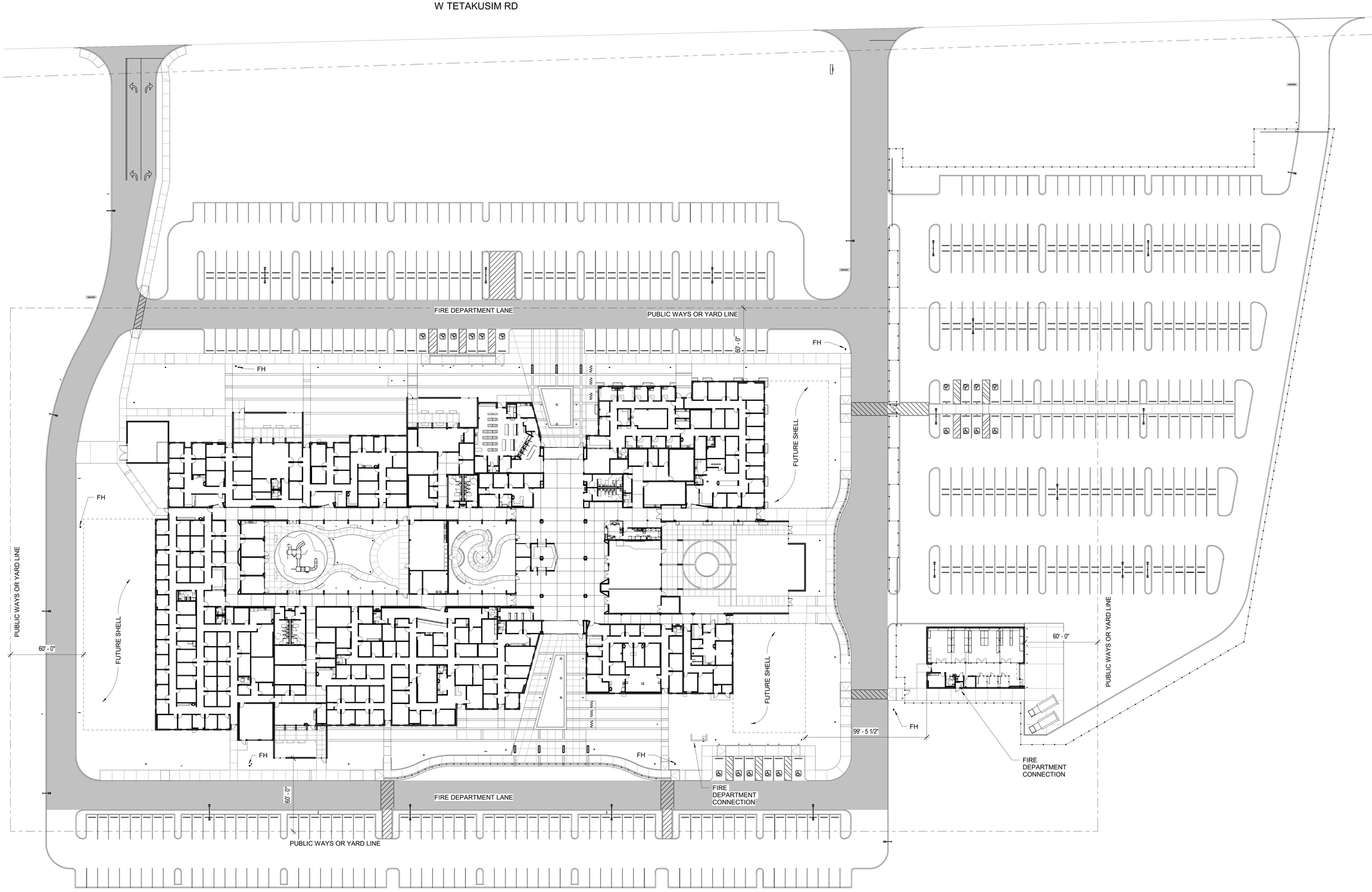

1 / g1.2 **site code analysis**
1" = 30'-0"

north

site occupancy legend

FH FIRE HYDRANTS

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site code analysis

g1.2

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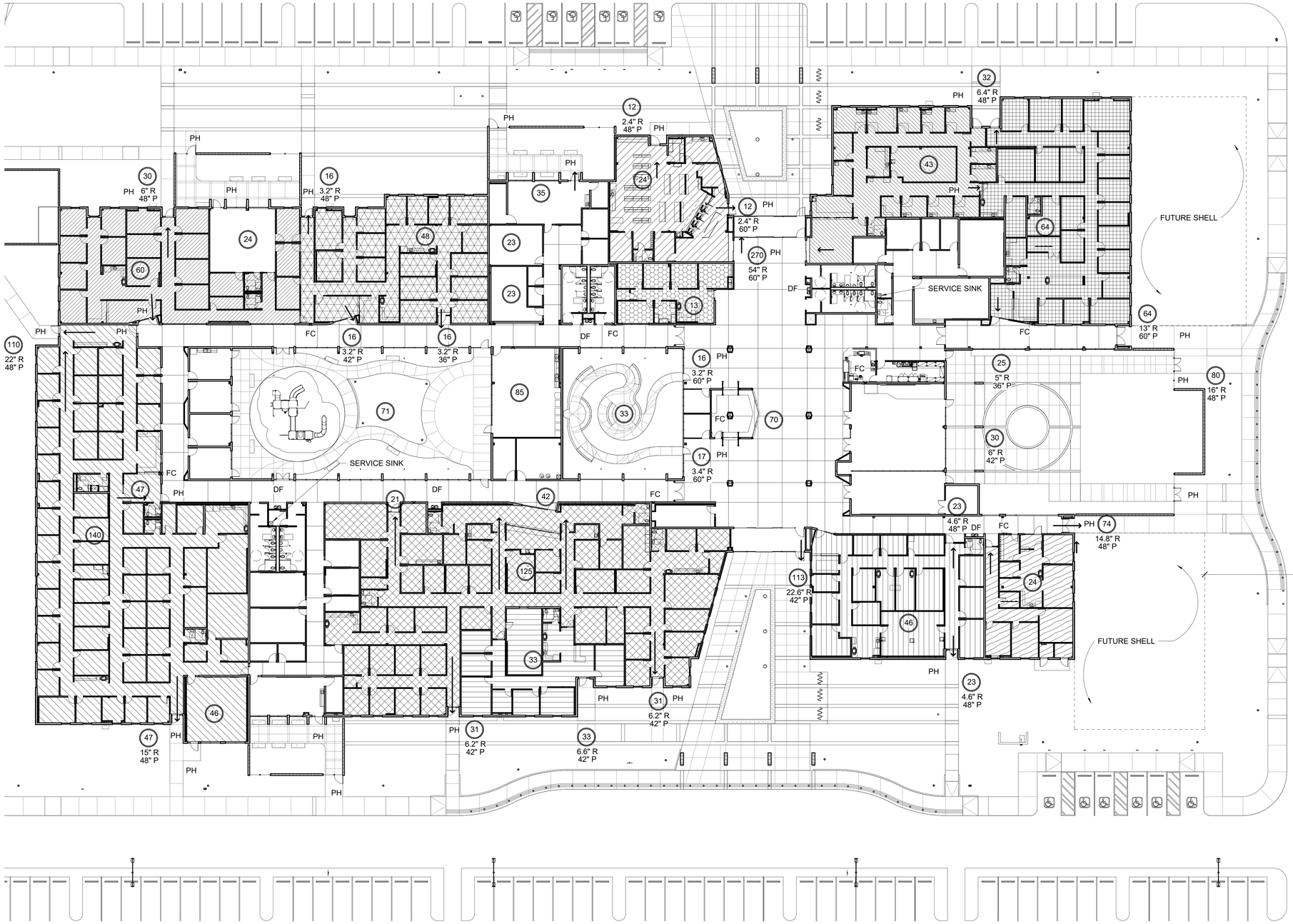

code analysis
1 g1.3 1" = 20'-0"

north

2012 IBC CODE ANALYSIS

GENERAL

OCCUPANCY: B & S-1

AREA SEPARATION: FULLY SPRINKLERED, NONE REQUIRED.

OCCUPANCY SEPARATION (TABLE 508.3.3): NONE REQUIRED, FULLY SPRINKLERED.

TYPE OF CONSTRUCTION(TABLE 503): TYPE VB, FULLY SPRINKLERED.

ALLOWABLE FLOOR AREA (TABLE 507.3): 9,000 SF @ B & S. 1 STORY

ALLOWABLE HEIGHT (TABLE 503): 40', TWO STOREY. ACTUAL HEIGHT: 33' - 0" ONE STOREY

BUILDING ELEMENTS (TABLE 601): 0 HRS.

INCIDENTAL USES (TABLE 509) INCIDENTAL USES ARE LESS THAN 10% OF AREA, NO FIRE SEPARATION REQUIRED. SMOKE SEPARATION REQUIRED.

FIRE RATING AT EXTERIOR WALLS (TABLE 602): > 10<30 FOR GROUP B; NO RATING REQUIRED.

ALLOWABLE FLOOR AREA INCREASE (SECTION 506)

AREA INCREASED TO UNLIMITED PER 2012 IBC, SECTION 507.3

INTERIOR WALL AND CEILING FINISHES (TABLE 803.9)

CORRIDORS AND ROOMS: MINIMUM CLASS C

ACTUAL GROSS BUILDING AREA

MAIN BUILDING 99,091 TOTAL SF (UNLIMITED SF. ALLOWABLE)

WAREHOUSE BUILDING 3,950 TOTAL SF (UNLIMITED SF. ALLOWABLE)

OCCUPANT LOAD (TABLE 1004.1.2)

MAIN BUILDING 99,091/ 100 = 991
WAREHOUSE BLDG. 3,950/ 100 = 40

TOTAL OCCUPANT LOAD = 1,031

EXIT WIDTH REQUIREMENT (PER TABLE 1005.3.2)

EGRESS: # OF OCCUPANTS x .2" PER OCCUPANT = REQUIRED WIDTH REFER TO LEGEND AND NOTATIONS AT FLOOR PLANS ON THIS SHEET FOR NUMBER OF OCCUPANTS EXITING, AND REQUIRED/PROVIDED WIDTHS

PLUMBING FIXTURES (TABLE 2902.1) - ACCESSIBILITY PER 1109.2 & ICC/ANSI 117.1

ALL FACILITIES ARE WITHIN 500 FOOT PATH OF TRAVEL FROM ANY POINT IN BUILDING (SECTION 2902.4.1).

BUILDING OCCUPANCY = 1,031

W/C MEN	515/50 = 12 REQUIRED, 21 PROVIDED (8 UNI-SEX)
W/C WOMEN	516/50 = 12 REQUIRED, 21 PROVIDED (9 UNI-SEX)
LAVS MEN	515/80 = 8 REQUIRED, 14 PROVIDED
LAVS WOMEN	516/80 = 8 REQUIRED, 15 PROVIDED
DRINKING FOUNTAINS	1,031/100 = 11 REQUIRED, 12 PROVIDED
SERVICE SINK	1 REQUIRED, 3 PROVIDED

occupancy legend

(X)	OCCUPANT LOAD
→	EXITING DIRECTION
→ (30)	EXITING LOAD AND DIRECTION
5" R	EXIT WIDTH REQUIRED
72"P	EXIT WIDTH PROVIDED
PH	PANIC HARDWARE PROVIDE AT BOTH PAIRS OF DOORS
FC	F.E.C. OR WALL MOUNTED FIRE EXTINGUISHER
DF	DRINKING FOUNTAINS

WAREHOUSE SPACE

OCCUPANCY:	S-1
ALLOWABLE AREA (WITHOUT INCREASE):	9,000 SF
ACTUAL AREA:	3,956 SF
BUILDING HEIGHT:	21' - 0"
FIRE SPRINKLER AND FIRE ALARM INSTALLED	

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building code analysis

g1.3

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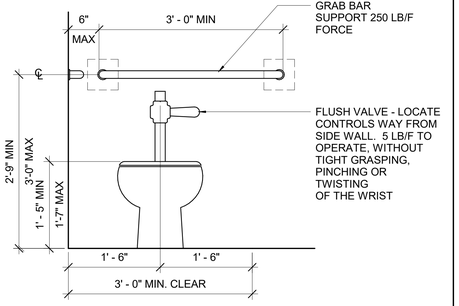
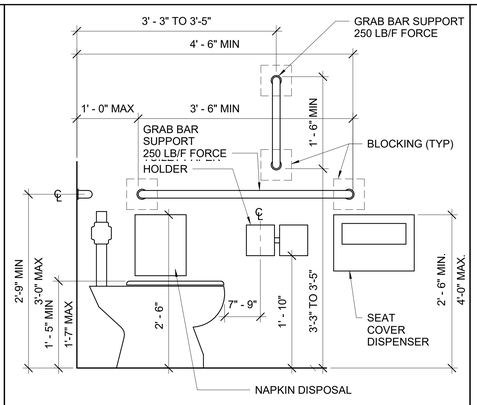
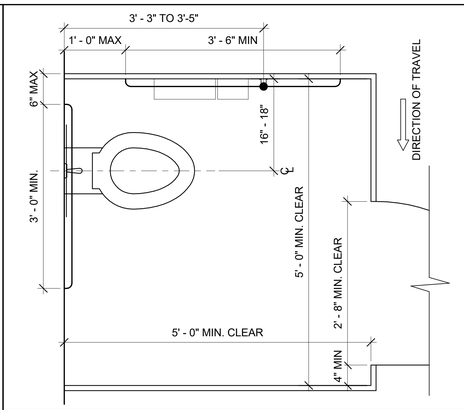


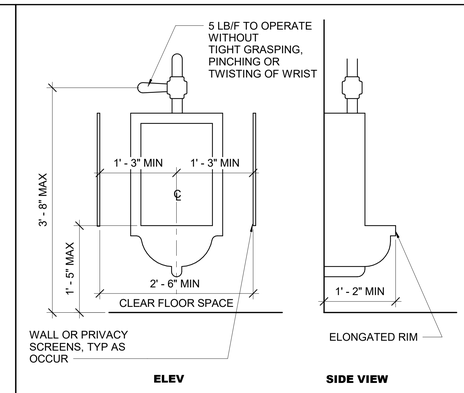
1 accessible wc - front elevation
g1.4 1" = 1'-0"



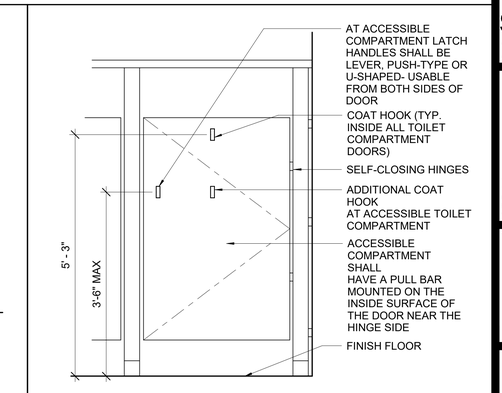
2 accessible wc - side elevation
g1.4 1" = 1'-0"



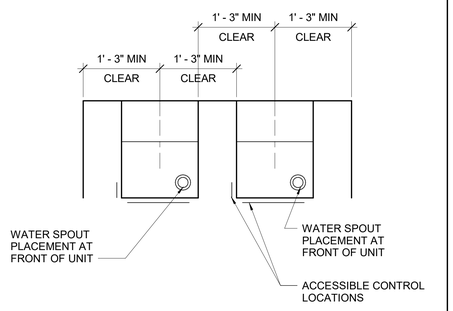
3 standard accessible stall
g1.4 1" = 1'-0"



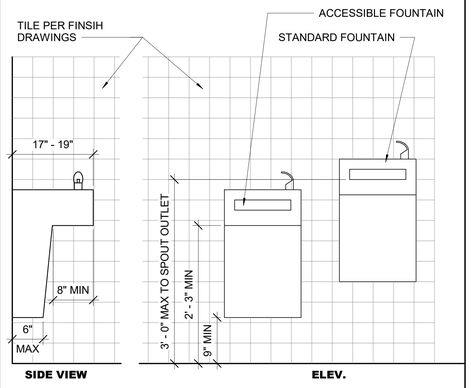
4 accessible urinal
g1.4 1" = 1'-0"



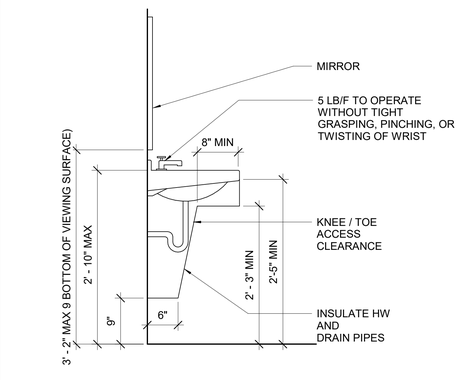
5 coathooks at toilet partition
g1.4 3/4" = 1'-0"



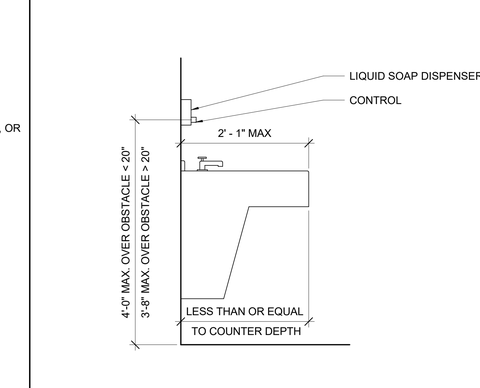
6 typical drinking fountain - plan
g1.4 1" = 1'-0"



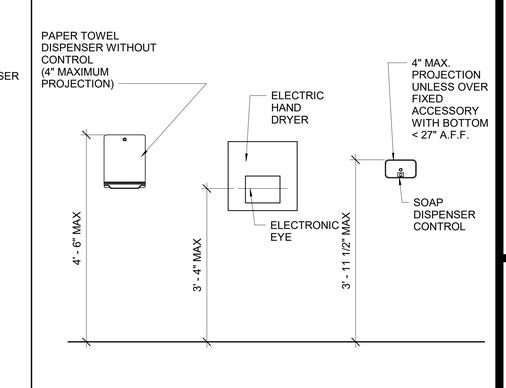
7 typical drinking fountain - elevation
g1.4 1" = 1'-0"



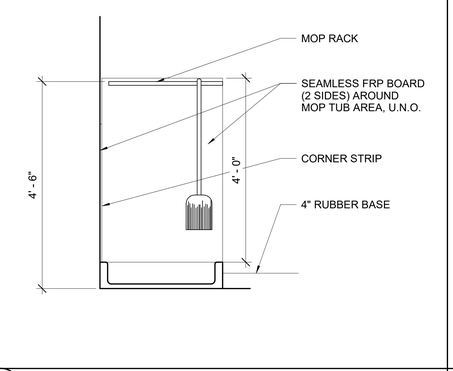
8 typical accessible lavatory
g1.4 1" = 1'-0"



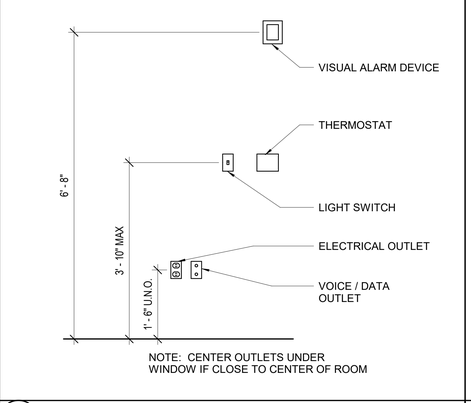
9 typical accessible accessories
g1.4 1" = 1'-0"



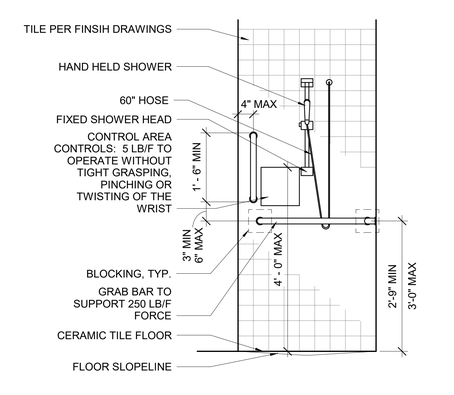
10 accessible restroom accessories
g1.4 3/4" = 1'-0"



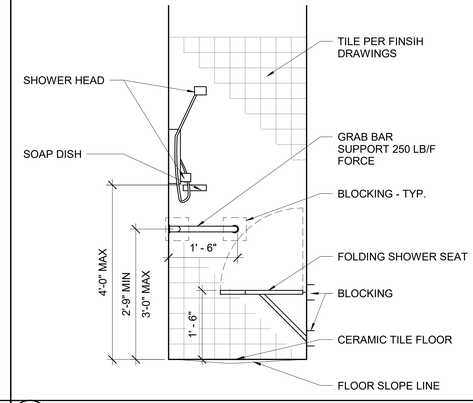
11 typical mop rack
g1.4 3/4" = 1'-0"



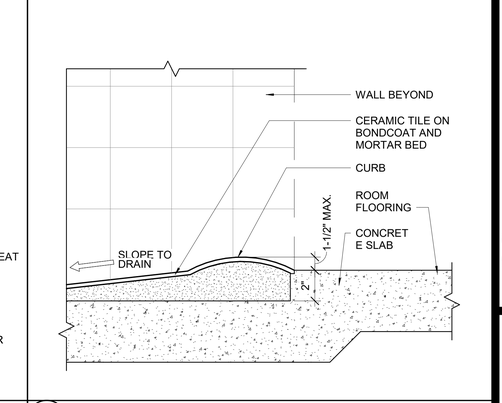
12 electrical devices
g1.4 3/4" = 1'-0"



13 accessible shower
g1.4 3/4" = 1'-0"



14 accessible shower 2
g1.4 3/4" = 1'-0"



15 accessible shower curb section
g1.4 3" = 1'-0"

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accessibility review details

g1.4

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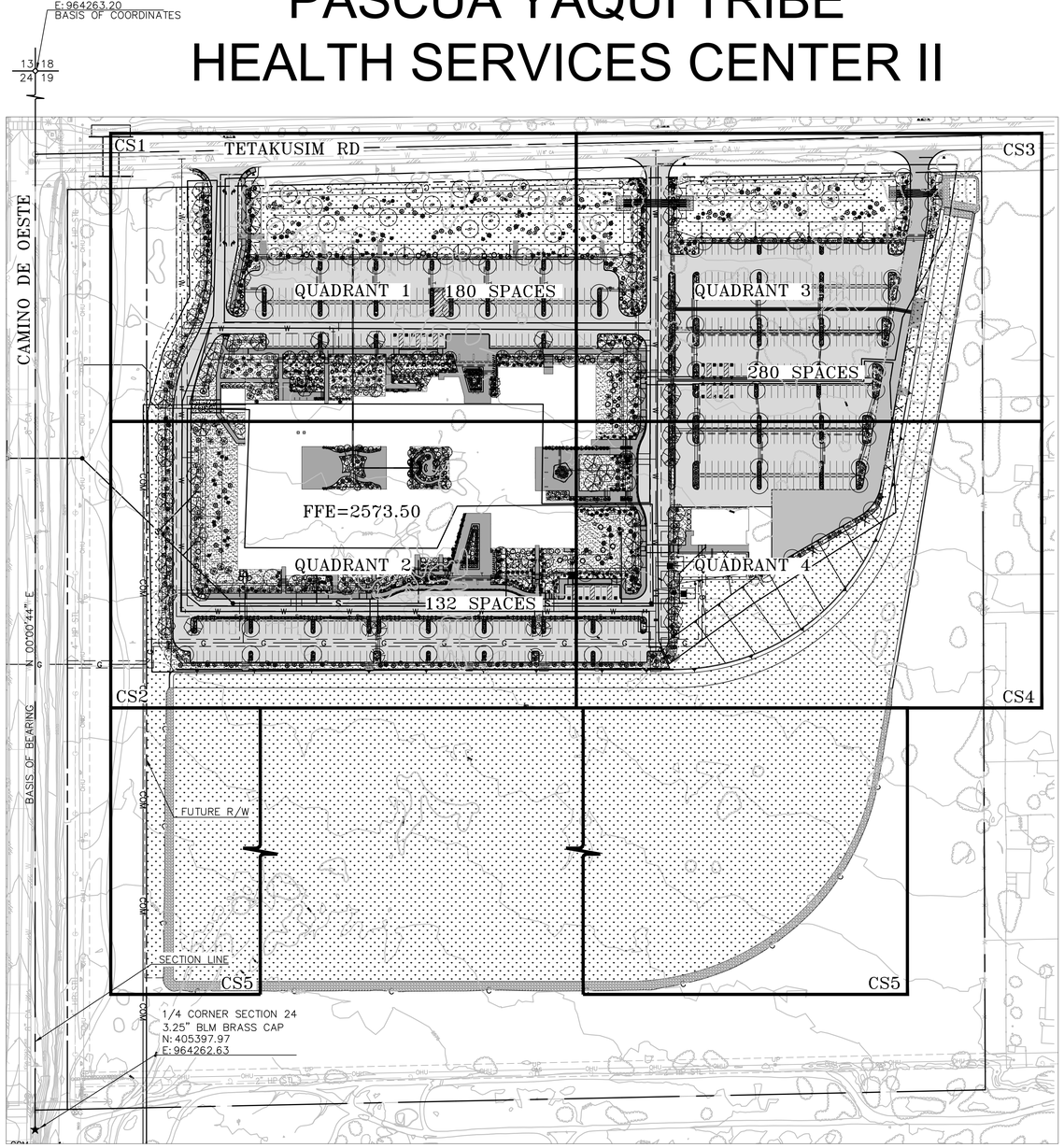
PASCUA YAQUI TRIBE
HEALTH SERVICES CENTER II

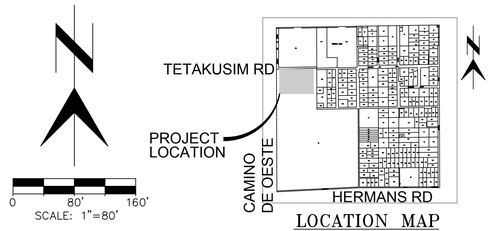
CONSTRUCTION GENERAL NOTES:

1. WATER LINES, APPURTENANCES, AND OTHER UTILITIES AS SHOWN HEREIN ARE INFORMATIONAL ONLY.
2. ALL CONSTRUCTION AND TEST METHODS SHALL BE IN CONFORMANCE WITH PIMA COUNTY/CITY OF TUCSON STANDARD SPECIFICATIONS FOR PUBLIC IMPROVEMENTS (PC/COT) 2003 EDITION.
3. ALL WORK SHALL CONFORM TO GRADING STANDARDS, CHAPTER 18.81 OF PIMA COUNTY ZONING CODE.
4. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATIVE REGULATIONS, IN PARTICULAR, SHORING OF TRENCHES.
5. CONTRACTOR SHALL OBTAIN ALL PERMITS REQUIRED BY GOVERNMENTAL AGENCIES.
6. A COPY OF APPROVED PLANS SHALL BE KEPT IN AN EASILY ACCESSIBLE LOCATION ON THE SITE AT ALL TIMES DURING CONSTRUCTION.
7. IF UNANTICIPATED CONDITIONS ARE ENCOUNTERED DURING THE COURSE OF CONSTRUCTION AND ARE BEYOND THE SCOPE OF THE DESIGN, THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND ARCHITECT.
8. UPON COMMENCEMENT OF WORK, TRAFFIC CONTROL DEVICES SHALL BE POSTED AND MAINTAINED BY THE CONTRACTOR UNTIL SUCH TIME AS THE WORK IS COMPLETED. ALL WARNING SIGNS, BARRICADES, ETC. SHALL BE IN ACCORDANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES ADOPTED BY THE STATE OF ARIZONA PURSUANT TO A.R.S. 28-650.
9. A RIGHT-OF-WAY USE PERMIT IS REQUIRED FOR CONSTRUCTION IN PUBLIC RIGHT-OF-WAY AND DRAINAGE WAYS.
10. ALL WEATHER ACCESS SHALL BE PROVIDED TO THE SITE.
11. UTILITY LOCATIONS SHOWN ON THE PLANS ARE BASED ON A SEARCH OF AVAILABLE RECORDS AND INFORMATION PROVIDED BY THE UTILITY COMPANIES OR AGENCIES. UTILITY LOCATIONS SHOWN ARE APPROXIMATE, AND THERE MAY BE EXISTING UTILITIES, WHICH ARE NOT SHOWN ON THE PLANS; THEREFORE, THE POSSIBILITY OF CONFLICTS WITH UTILITIES IN SERVICE EXISTS. THE CONTRACTOR SHALL CALL "BLUE STAKE" AT 1-800-STAKE-IT, AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION, TO REQUEST VERIFICATION OF THE LOCATIONS OF ALL UTILITIES WITHIN THE WORK AREA. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR COSTS INCURRED AS A RESULT OF DAMAGE TO UTILITIES CAUSED BY HIS OPERATIONS.
12. ALL MATERIALS BROUGHT TO THE SITE MUST BE TESTED AND APPROVED THROUGH CONTRACTOR OPERATOR, IN ADDITION TO STANDARD TESTS.
13. CONTRACTOR SHALL ADJUST ALL VALVE BOXES TO FINISH GRADE. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE OTHER ITEMS OF WORK, EXCEPT WHEN THE BIDDING SCHEDULE CONTAINS SPECIFIC ITEMS ON A UNIT BASIS.
14. THE CONTRACTOR SHALL PRESERVE ALL STAKES SET FOR THE LINES, LEVELS OR MEASUREMENTS OF THE WORK IN THEIR PROPER PLACES UNTIL AUTHORIZED TO REMOVE THEM BY THE ENGINEER. ANY EXPENSES INCURRED IN REPLACING ANY STAKES WHICH THE CONTRACTOR OR HIS SUBORDINATES MAY HAVE FAILED TO PRESERVE SHALL BE CHARGED TO THE CONTRACTOR.
15. THE CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL REGULATIONS AND REQUESTS BY PIMA COUNTY REGARDING DUST CONTROL.
16. PRIOR TO GRADING, ALL ORGANIC MATTER SHALL BE REMOVED WITHIN THE CLEARING LIMITS FOR NECESSARY GRADING TO A DEPTH OF SIX(6) INCHES AND HAULED FROM THE SITE.
17. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FURNISH, HAUL AND APPLY ALL WATER REQUIRED FOR COMPACTION AND FOR THE CONTROL OF DUST FROM CONSTRUCTION ACTIVITY.
18. OMISSIONS OR CONFLICTS BETWEEN VARIOUS ELEMENTS OF THE DRAWINGS, NOTES, AND DETAILS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND RESOLVED BEFORE PROCEEDING WITH THE WORK.
19. THE CONTRACTOR SHALL PROVIDE FORTY-EIGHT (48) HOURS NOTICE WHEN HE SHALL REQUIRE THE SERVICES OF THE ENGINEER OR ANY OTHER PERSON PROPERLY AUTHORIZED FOR SUCH PURPOSE FOR LAYING OUT ANY PORTION OF THE WORK. HE SHALL ALSO DIG ALL STAKE HOLES NECESSARY TO GIVE LINE AND LEVELS AND SHALL PROVIDE ASSISTANCE CALLED FOR BY THE ENGINEER OR HIS ASSISTANTS UPON ANY PART OF THE WORK WHENEVER SO REQUESTED.

EARTHWORK QUANTITIES

THE QUANTITIES LISTED BELOW ARE FOR PERMIT PURPOSES ONLY. THE CONTRACTOR SHALL MAKE HIS OWN DETERMINATION OF THE QUANTITIES INVOLVED AND BASE HIS BID ON HIS OWN ESTIMATE.
CUT = 61,993 CY
FILL = 62,828 CY
GROUND COMPACTION (0.15' @ 563,667 SF) = 3,132 CY
SHRINK (15%) = 11,640 CY
NET (BORROW) = 15,607 CY





LOCATION MAP

A PORTION OF SECTION 19,
TOWNSHIP 15 SOUTH, RANGE 13 EAST
GILA AND SALT RIVER MERIDIAN
PIMA COUNTY, ARIZONA
SCALE: 1"=2000' Mile

OWNER/DEVELOPER

PASCUA YAQUI TRIBE
7474 S. CAMINO DE OESTE
TUCSON, AZ 85757
PHONE: (520)879-5935
ATTN: IAN GEITNER

ARCHITECT

SWAIM ASSOCIATES, LTD.
7350 E. SPEEDWAY BLVD. #210
TUCSON, AZ 85710
PHONE: (520)326-3700
ATTN: KEVIN BARBER

CIVIL ENGINEER

KIMLEY-HORN
333 E. WETMORE RD. #280
TUCSON, AZ 85705
PHONE: (520)615-9191
ATTN: TIM RHINE, PE, PTOE

ENGINEER'S DESIGN NOTES:

1. PRIOR TO BIDDING THE WORK, THE CONTRACTOR SHALL THOROUGHLY SATISFY THEMSELVES AS TO ACTUAL SITE CONDITIONS, AND EARTHWORK QUANTITIES. NO CLAIM SHALL BE MADE AGAINST THE DESIGN ENGINEER FOR ANY EXCESS OR DEFICIENCY THEREIN, ACTUAL OR RELATIVE.
2. THE ENGINEER MAKES NO REPRESENTATION OR GUARANTEE REGARDING EARTHWORK QUANTITIES OR THAT THE EARTHWORK FOR THIS PROJECT WILL BALANCE DUE TO THE VARYING FIELD CONDITIONS, CHANGING SOIL TYPES, ALLOWABLE CONSTRUCTION TOLERANCES AND CONSTRUCTION METHODS THAT ARE BEYOND THE CONTROL OF THE ENGINEER. ON-SITE GRADING SHALL BE BALANCED AT ROUGH GRADE INCLUDING APPROPRIATE ALLOWANCE FOR RETAINING WALLS, FOUNDATION DIRT, TRENCH SPOILS AND FINISH GRADING MATERIAL.
3. THE DESIGN ENGINEER SHALL NOT BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES FOR SAFETY PRECAUTIONS OR PROGRAMS. THE DESIGN ENGINEER SHALL NOT BE RESPONSIBLE FOR THE CONTRACTOR'S FAILURE TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

ENGINEER'S DESIGN NOTES (CONT'D):

4. ALL CONDUITS (BOX CULVERT, REINFORCED CONCRETE PIPE, DIP, PVC, HDPE, AND/OR CORRUGATED METAL PIPE, ETC.) SHOWN ON THESE PLANS ARE DESIGNED FOR STANDARD HIGHWAY LOADINGS. THE STANDARD SATISFACTORY MINIMUM COVER REQUIREMENTS AS ESTABLISHED BY THE CONDUIT MANUFACTURER MAY NOT ALWAYS BE ADEQUATE DURING CONSTRUCTION. WHEN CONSTRUCTION EQUIPMENT, FREQUENTLY HEAVIER THAN TRAFFIC LOADS FOR WHICH THE CONDUIT HAS BEEN DESIGNED, IS TO BE DRIVEN OVER OR CLOSE TO THE BURIED CONDUIT, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ADEQUATE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE CONDUIT. THE ADEQUACY OF THE COVER REQUIREMENTS FOR CONDUITS SHALL BE ANALYZED AND CHECKED BY THE CONTRACTOR TO ADDRESS LOADING CONDITIONS IMPOSED BY CONSTRUCTION ACTIVITY, ANY CONDUIT DAMAGED BY CONSTRUCTION ACTIVITY SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
5. UNLESS THE PLANS SPECIFICALLY DICTATE TO THE CONTRARY, ON-SITE DIRECTIONAL SIGNAGE SHALL BE LOCATED OUT OF THE PEDESTRIAN AND AUTOMOBILE ROUTES, AND SHALL BE LOCATED BETWEEN THREE TO FIVE FEET BEHIND THE NEAREST BACK OF CURB. SIGN HEIGHT, LOCATION, AND STRUCTURE SHALL BE SUCH THAT THE SIGNS POSE NO THREAT TO PUBLIC SAFETY.
6. UNLESS THE PLANS SPECIFICALLY DICTATE TO THE CONTRARY, ON-SITE DIRECTIONAL SIGNAGE SHALL BE ORIENTED SO THEY ARE READILY VISIBLE TO THE ONCOMING TRAFFIC FOR WHICH THEY ARE INTENDED. FIELD ADJUSTMENTS OF LOCATION AND ORIENTATION OF THE SIGNS ARE TO BE MADE TO ACCOMPLISH THIS.

ENGINEER'S DESIGN NOTES (CONT'D):

7. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO VERIFY THE PRESENCE AND LOCATION OF ANY AND ALL EXISTING OVERHEAD AND/OR UNDERGROUND UTILITIES THAT MAY INTERFERE WITH THE CONSTRUCTION, WHETHER OR NOT SAID UTILITIES ARE SHOWN ON THE CONSTRUCTION PLANS FOR THIS PROJECT. CONTRACTOR SHALL ADEQUATELY PROTECT AND MAINTAIN SUCH UTILITIES.
8. ALL EXISTING UTILITIES SHOWN ARE LOCATED ACCORDING TO THE INFORMATION AVAILABLE TO THE ENGINEER AT THE TIME THE DRAWINGS WERE PREPARED AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR THE ENGINEER. GUARANTEE IS NOT MADE THAT ALL EXISTING UNDERGROUND UTILITIES ARE SHOWN OR THAT THE LOCATION OF THOSE SHOWN ARE ACCURATE. THE LOCATIONS SHOWN ARE FOR BIDDING PURPOSES ONLY. FINDING THE ACTUAL LOCATION OF ANY EXISTING UTILITIES IS THE CONTRACTOR'S RESPONSIBILITY AND SHALL BE DONE BEFORE HE COMMENCES ANY WORK IN THE VICINITY. FURTHERMORE, THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES DUE TO THE CONTRACTORS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.THE OWNER OR ENGINEER WILL ASSUME NO LIABILITY FOR ANY DAMAGES SUSTAINED OR COST INCURRED BECAUSE OF THE OPERATIONS IN THE VICINITY OF EXISTING UTILITIES OR STRUCTURES, NOR FOR TEMPORARY BRACING AND SHORING OF SAME. IF IT IS NECESSARY TO SHORE, BRACE, SWING OR RELOCATE A UTILITY, THE UTILITY COMPANY OR DEPARTMENT AFFECTED SHALL BE CONTACTED BY THE CONTRACTOR AND THEIR PERMISSION OBTAINED REGARDING THE METHOD TO USE FOR SUCH WORK.

ENGINEER'S DESIGN NOTES (CONT'D):

9. THE CONTRACTOR SHALL EXPOSE ALL REQUIRED UTILITY CONNECTION POINTS A MINIMUM OF 10 FEET TO VERIFY APPROPRIATE HORIZONTAL LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION STAKING. ANY VARIATION OF CONNECTION LOCATIONS FOUND IN THE FIELD SHALL BE REPORTED TO THE DESIGN ENGINEER AND OWNER PRIOR TO THE START OF CONSTRUCTION STAKING.
10. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING RELOCATIONS AND INSTALLATIONS OF FRANCHISE UTILITIES NECESSARY FOR ON AND OFF SITE CONSTRUCTION.
11. NOTHING CONTAINED IN THE CONTRACT DOCUMENTS SHALL CREATE, NOR SHALL BE CONSTRUED TO CREATE, ANY CONTRACTUAL RELATIONSHIP BETWEEN THE DESIGN ENGINEER AND THE CONTRACTOR OR ANY SUBCONTRACTOR.
12. THE CONTRACTOR SHALL MAKE NO CLAIM AGAINST THE OWNER/DEVELOPER OR THE ENGINEER REGARDING ALLEGED INACCURACY OF CONSTRUCTION STAKES SET BY THE ENGINEER UNLESS ALL SURVEY STAKES SET BY THE ENGINEER ARE MAINTAINED INTACT AND CAN BE VERIFIED AS TO THEIR ORIGIN.
13. THE ENGINEER AND APPLICABLE AGENCY MUST APPROVE, PRIOR TO CONSTRUCTION, ANY ALTERATION OR VARIANCE FROM THESE PLANS, ANY VARIATIONS FROM THESE PLANS SHALL BE PROPOSED ON CONSTRUCTION FIELD PRINTS AND TRANSMITTED TO THE ENGINEER.
14. ANY INSPECTION BY THE TRIBE, COUNTY, OR THE ENGINEER SHALL NOT, IN ANY WAY, RELIEVE THE CONTRACTOR FROM ANY OBLIGATION TO PERFORM THE WORK IN STRICT COMPLIANCE WITH ALL NATIONAL AND LOCAL APPLICABLE CODES AND AGENCY REQUIREMENTS.
15. CONTRACTOR SHALL LOCATE ALL EXISTING PROPERTY MONUMENTS PRIOR TO CONSTRUCTION. ANY MONUMENTS DISTURBED DURING THE CONSTRUCTION OF THIS PROJECT SHALL BE REPLACED BY REGISTERED LAND SURVEYOR AT THE CONTRACTOR'S EXPENSE.
16. REMOVAL AND REPLACEMENT QUANTITIES ARE APPROXIMATE. THE EXACT LOCATION OF REMOVAL LIMITS SHALL BE VERIFIED IN THE FIELD AND APPROVED BY THE INSPECTOR PRIOR TO THE START OF CONSTRUCTION.
17. THE CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN ALL REQUIRED CONSTRUCTION PERMITS AND BONDS PRIOR TO CONSTRUCTION.
18. THE CONTRACTOR SHALL HAVE AVAILABLE AT THE JOB SITE AT ALL TIMES ONE COPY OF THE CONTRACT DOCUMENTS INCLUDING PLANS, SPECIFICATIONS, AND SPECIAL CONDITIONS, COPIES OF ANY REQUIRED CONSTRUCTION PERMITS, AND STORMWATER MANAGEMENT PLANS AND INSPECTION REPORTS. (SWMP) (IF APPLICABLE).
19. ANY DISCREPANCIES ON THE DRAWINGS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER BEFORE COMMENCING WORK. NO FIELD CHANGES OR DEVIATIONS FROM DESIGN ARE TO BE MADE WITHOUT PRIOR APPROVAL OF THE OWNER AND NOTIFICATION TO THE ENGINEER. NO CONSIDERATION WILL BE GIVEN TO CHANGE ORDERS FOR WHICH THE OWNER AND ENGINEER WERE NOT CONTACTED PRIOR TO CONSTRUCTION OF THE EFFECTED ITEM.
20. CONTRACTOR SHALL VERIFY BENCHMARKS AND DATUMS PRIOR TO COMMENCING CONSTRUCTION OR STAKING OF IMPROVEMENTS AND SHALL REPORT ANY DISCREPANCIES TO THE OWNER AND ENGINEER. CONSTRUCTION SHALL NOT COMMENCE UNTIL THE DISCREPANCY, IF IDENTIFIED, IS RESOLVED TO THE OWNER'S AND ENGINEER'S SATISFACTION.
21. CONTRACTOR SHALL THOROUGHLY CHECK COORDINATION OF CIVIL, LANDSCAPE, MEP, ARCHITECTURAL, AND OTHER PLANS PRIOR TO COMMENCING CONSTRUCTION. OWNER AND ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCY PRIOR TO COMMENCING WITH CONSTRUCTION.
22. IN ACCORDANCE WITH AAC R18-4-119, ALL MATERIALS ADDED AFTER JANUARY 1, 1993 WHICH MAY COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NATIONAL SANITATION FOUNDATION STANDARDS 60 AND 61.
23. CONTRACTOR SHALL NOTIFY OWNER AND ENGINEER OF AREAS OF SUSPECTED NON BLUE STAKED IDENTIFIED UTILITIES IN THE PROJECT AREA PRIOR TO COMMENCING CONSTRUCTION OR EXCAVATION. CONTRACTOR SHALL UTILIZE AN APPROVED SUBSURFACE INVESTIGATION METHOD BY THE OWNER, ENGINEER, AND JURISDICTION TO IDENTIFY UTILITY AND POTENTIAL CONFLICTS.
24. ALL WORK PERFORMED WITHOUT THE APPROVAL OF THE OWNER AND MATERIAL NOT IN CONFORMANCE WITH ALL NATIONAL AND LOCAL CODES AND SPECIFICATIONS ISSUED BY THE OWNER IS SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.
25. CONTRACTOR SHALL UNCOVER ALL EXISTING SEWER LINES BEING TIED INTO, TO VERIFY THEIR LOCATION VERTICALLY AND HORIZONTALLY. THE CONTRACTOR SHALL VERIFY THAT THE EXISTING SEWER STUB FORM THE POINT OF CONNECTION TO THE SEWER MAIN HAS THE REQUIRED NEGATIVE SLOPE. PRIOR TO COMMENCING SEWER INSTALLATION, THE CONTRACTOR SHALL VERIFY THAT THE NEW SEWER SYSTEM AS DESIGNED SHALL HAVE THE REQUIRED NEGATIVE SLOPE AS INDICATED ON THE PLANS FOR PROPER OPERATION. CONTRACTOR SHALL NOTIFY THE ENGINEER AND OWNER OF ANY SEWER SLOPE DEFICIENCIES PRIOR TO COMMENCING INSTALLATION.
26. CONTRACTOR SHALL PROVIDE TEST RESULTS FOR ALL WATER AND SEWER TESTING FOR BOTH PUBLIC AND PRIVATE, (INCLUDING VIDEO TEST FOR SEWER) TO THE OWNER AND PROJECT ENGINEER.
27. THE CONTRACTOR SHALL SUBMIT "AS-BUILT" PLANS TO THE OWNER FOR REVIEW AND ACCEPTANCE PRIOR TO SUBMITTING TO THE TOWN FOR FINAL ACCEPTANCE.

PARKING, LOADING, AND BICYCLE STORAGE CALCULATIONS

PROPOSED USE	SQUARE FOOTAGE	PARKING RATIO	TOTAL PARKING		TOTAL HANDICAP PARKING		TOTAL BIKE PARKING	
			REQUIRED	PROVIDED	REQUIRED	PROVIDED	REQUIRED	PROVIDED
MEDICAL & DENTAL OFFICES (MAIN BUILDING)	97,121 SF	1/200	486	592	11	20	40	40
MEDICAL & DENTAL OFFICES (WAREHOUSE)	4,013 SF	1/200	20		1			

Contact Arizona 811 at least two full working days before you begin excavation
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Kimley»Horn

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Registered Professional Engineer (Civil)
60430
TIMOTHY J. RHINE
Date Signed 11/16/18
ARIZONA, U.S.A.
Expires 09/30/21

job
1717

date
11.16.18

revisions

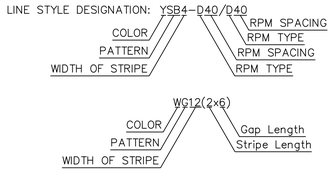
Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

COVER SHEET/GENERAL NOTES

CV1

PAVEMENT MARKING GENERAL NOTES:

1. ALL EQUIPMENT/MATERIALS AND CONSTRUCTION SHALL MEET OR EXCEED THE REQUIREMENTS CONTAINED IN THE CURRENT PIMA ASSOCIATION OF GOVERNMENTS (PAG) STANDARD SPECIFICATIONS AND THE STANDARD DETAILS FOR PUBLIC IMPROVEMENTS, THE SPECIAL PROVISIONS AND THE APPROVED PLANS. ALL PAVEMENT MARKING SHALL BE INSTALLED IN ACCORDANCE WITH THE PC/COT PAVEMENT MARKING DESIGN MANUAL.
2. THE STRIPING CONTRACTOR SHALL CONTACT THE PIMA COUNTY PAVEMENT MARKING SUPERVISOR (520–724–2624) AT LEAST 3 WORKING DAYS IN ADVANCE OF ANY PAVEMENT MARKING LAYOUT BEING INSTALLED TO SCHEDULE INSPECTION AND APPROVAL OF PAVEMENT MARKING.
3. UPON APPROVAL OF THE PAVEMENT MARKING LAYOUT, THE PIMA COUNTY PAVEMENT MARKING SUPERVISOR WILL ISSUE WRITTEN AUTHORIZATION TO THE CONTRACTOR TO PROCEED WITH INSTALLING ALL PAVEMENT MARKINGS AND ASSOCIATED REFLECTIVE RAISED PAVEMENT MARKINGS.
4. THE PERMANENT PAVEMENT MARKINGS MAY BE MODIFIED AS DIRECTED AND APPROVED BY THE TRAFFIC ENGINEER OR BY HIS DESIGNEE.
5. THE POSTED SPEED FOR CARDINAL AVENUE IS 35 MPH. THE POSTED SPEED FOR ALASKA STREET, CANADA STREET, HILDRETH AVENUE, AND MIDVALE AVENUE IS 25 MPH.
6. ALL LANE DIMENSIONS ARE MEASURED FROM THE CENTER OF LANE LINE, CENTER OF DOUBLE LANE LINE, OR EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.
7. THE PAVEMENT MARKING DRAWINGS ARE SCHEMATIC ONLY. THE CONTRACTOR SHALL FOLLOW ALL DIMENSIONS, APPLICABLE MARKING DETAILS, AND SPECIFIED PIMA COUNTY STANDARDS WHEN INSTALLING PAVEMENT STRIPING, SYMBOLS, LEGENDS, AND MARKERS.
8. PAINTED LAYOUT STRIPING SHALL BE 15 MIL (0.015") THICK, WATER BASED PAINT PLACED ON THE FINAL PAVEMENT SURFACE WITH 8 POUNDS PER GALLON OF AASHTO M 247–13 TYPE I GLASS BEADS WITH ADHESION/MOISTURE PROOF COATING. PAINTED LAYOUT STRIPING SHALL BE INSTALLED WITHIN FIVE (5) WORKING DAYS OF THE FINAL PAVEMENT SURFACE BEING COMPLETED.
9. PAINTED SYMBOLS AND LEGENDS SHALL BE APPLIED AT THE SAME TIME AS THE PAINTED STRIPING, WITH THE EXCEPTION OF BIKE LANE SYMBOLS AND WORDS (SUCH AS STOP, AHEAD, ONLY, ETC.).
10. THE FINAL LONGITUDINAL STRIPING SHALL BE 90 MIL (0.090") THICK RIBBON EXTRUDED THERMOPLASTIC REFLECTORIZED STRIPING PLACED OVER THE PAINTED LAYOUT STRIPING WITH A SINGLE DROP OF 10 POUNDS PER 100 SQUARE FEET OF AASHTO M 247–13 GLASS BEADS. THE FINAL LONGITUDINAL STRIPING SHALL BE PLACED WITHIN 21 TO 30 CALENDAR DAYS OF THE FINAL PAVEMENT SURFACE BEING COMPLETED. ALL PREVIOUSLY EXEMPTED LONGLINE MARKINGS SHALL BE APPLIED DURING THE FINAL LONGITUDINAL STRIPING.
11. ALL FINAL TRANSVERSE STRIPING SHALL BE HOT–SPRAYED THERMOPLASTIC 90 MILS (0.090") THICK INCLUDING SYMBOLS AND LEGENDS WITH THE EXCEPTION OF BIKE LANE SYMBOLS WHICH MAY BE EXTRUDED THERMOPLASTIC OR COLD PREFORMED THERMOPLASTIC.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LAYOUT AND INSTALLATION OF PAVEMENT MARKINGS ON THE FINAL SURFACE COURSE FOLLOWING ONE CONTROL LINE PER DIRECTION OF TRAVEL CONSISTING OF CONTROL POINTS THAT HAVE BEEN SET TO NO MORE THAN 50 FEET APART ON CURVE SECTIONS AND 200 FEET IN TANGENT SECTIONS WHERE THE PAVEMENT MARKING PATTERN DOES NOT CHANGE.
13. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE FINAL SURFACE COURSE IS PLACED SO THAT THE CONSTRUCTION JOINT IS NO MORE THAN ONE FOOT OFFSET FROM THE FINAL STRIPING.
14. ALL RAISED PAVEMENT MARKERS (RPMS) SHALL BE INSTALLED SO THAT THE REFLECTIVE FACE OF EACH MARKER IS FACING THE DIRECTION OF TRAFFIC AND IS PERPENDICULAR TO THE DIRECTION OF TRAFFIC FLOW. TYPE C PAVEMENT MARKERS SHALL BE INSTALLED SO THAT THE CLEAR REFLECTIVE FACE OF EACH MARKER IS FACING APPROACHING TRAFFIC AND PERPENDICULAR TO THE DIRECTION OF TRAFFIC FLOW.
15. ALL RAISED PAVEMENT MARKERS (RPMS) SHALL BE INSTALLED PER THE CURRENT EDITION OF THE PC/COT PAVEMENT MARKING MANUAL.
16. BLUE RAISED PAVEMENT MARKERS SHALL BE PLACED ADJACENT TO FIRE HYDRANTS AS SHOWN ON SHEET 7–1 OF THE PC/COT PAVEMENT MARKING MANUAL.
17. ALL REMOVAL OF EXISTING PAVEMENT MARKINGS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH SECTION 701 OF THE PAG STANDARD SPECIFICATIONS. PAINTING OVER EXISTING STRIPING DOES NOT CONSTITUTE APPROVED STRIPING OBLITERATION.
18. UNLESS OTHERWISE NOTED, ALL PAVEMENT MARKINGS SHALL BE INSTALLED BY THE CONTRACTOR.
19. UPON FINAL INSPECTION, A WRITTEN ACCEPTANCE OR ITEMIZED PUNCHLIST OF MISSING OR UNACCEPTABLE PAVEMENT MARKINGS SHALL BE SUBMITTED TO THE CONTRACTOR AND PIMA COUNTY BY THE TRAFFIC ENGINEER OR DESIGNATED REPRESENTATIVE.
20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL STRIPING UNTIL PROJECT IS APPROVED FOR "CONSTRUCTION ACCEPTANCE" BY PIMA COUNTY (FULLY OPEN TO TRAFFIC, ALL PUNCHLIST ITEMS ARE COMPLETED, AND ONE YEAR WARRANTIES BEGIN).
21. THE PC/COT PAVEMENT MARKING MANUAL IS AVAILABLE ONLINE AT: HTTP://WEBCMS.PMA.GOV/USERFILES/SERVERS/SERVER_6/FILE/GOVERNMENT/TRANSPORTATION/ROADWAY DESIGN/PAVEMENT MARKING DESIGN MANUAL 2008.PDF



SEE 2008 PC/COT PAVEMENT MARKING DESIGN MANUAL OR 2010 REVISIONS FOR FURTHER DESCRIPTIONS

SIGNING GENERAL NOTES:

1. ALL EQUIPMENT, MATERIALS AND CONSTRUCTION SHALL MEET OR EXCEED THE REQUIREMENTS CONTAINED IN THE CURRENT PIMA ASSOCIATION OF GOVERNMENTS (PAG) STANDARD SPECIFICATIONS AND THE STANDARD DETAILS FOR PUBLIC IMPROVEMENTS, THE SPECIAL PROVISIONS AND THE APPROVED PLANS.
2. ALL SIGNS SHALL BE IN COMPLIANCE WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE LATEST EDITION OF THE PIMA COUNTY/CITY OF TUCSON TRAFFIC SIGNING DESIGN MANUAL, THE PAG STANDARD SPECIFICATIONS, THE PIMA COUNTY SUPPLEMENTAL SPECIFICATIONS, ANY REQUIRED SPECIAL PROVISIONS, AND THESE PLANS.
3. SIGNS MAY BE MODIFIED AND LOCATIONS ADJUSTED TO FIT CONDITIONS IN THE FIELD AT THE DISCRETION OF THE TRAFFIC ENGINEER.
4. THE POSTED SPEED FOR CARDINAL AVENUE IS 35 MPH. THE POSTED SPEED FOR ALASKA STREET, CANADA STREET, HILDRETH AVENUE, AND MIDVALE AVENUE IS 25 MPH. SIGN PLACEMENT SHALL BE BASED ON THE POSTED SPEED LIMIT.
5. POST LENGTHS INDICATED ON SIGN SHEETS ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY ACTUAL POST LENGTHS.
6. ALL PERFORATED POSTS SHALL BE INSTALLED IN A CONCRETE FOUNDATION, UNLESS OTHERWISE DIRECTED BY THE TRAFFIC ENGINEER.
7. ALL SIGN STATION LOCATIONS ARE APPROXIMATE, THE CONTRACTOR SHALL VERIFY ACTUAL SIGN LOCATIONS WITH THE TRAFFIC ENGINEER PRIOR TO THE INSTALLATION OF ANY SIGNS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL WORK WITH ARIZONA 811 FOR INSTALLING ALL TRAFFIC SIGNS IN THE FIELD AND FOR MAINTAINING ALL SIGNING UNTIL PROJECT IS APPROVED FOR "CONSTRUCTION ACCEPTANCE" BY PIMA COUNTY (FULLY OPEN TO TRAFFIC, ALL PUNCH LIST ITEMS ARE COMPLETED, AND ONE YEAR WARRANTEES BEGIN).
9. ALL SIGNS SHALL HAVE TYPE XI SHEETING, OR AN EQUIVALENT. ALL WARNING SIGNS HAVING YELLOW BACKGROUNDS SHALL USE FLUORESCENT YELLOW SHEETING. ALL SCHOOL SIGNS SHALL USE FLORESCENT YELLOW/GREEN SHEETING, TYPE XI. ALL GROUND MOUNTED SIGNS SHALL HAVE AN ANTI GRAFFITI COATING APPLIED TO SIGN FACE, 3M #1160 FILM OR EQUIVALENT.
10. A 3" X 2" PRESSURE SENSITIVE, UV RESISTANT LABEL INDICATING THE SIGN MANUFACTURERS NAME AND DATE OF MANUFACTURE SHALL BE PLACED IN THE UPPER RIGHT CORNER OF THE BACK OF ALL SIGNS EXCEPT STREET NAME SIGNS AT THE TIME OF INSTALLATION. STREET NAME SIGNS SHALL INCLUDE A SIGN IDENTIFICATION DECAL AS SHOWN ON PIMA COUNTY SIGNING DETAIL 9–22A.
11. ALL NEW SIGNS SHALL HAVE 0.080 GAUGE, RADIUS CORNER, ALUMINUM BACKING UNLESS OTHERWISE NOTED.
12. PRIOR TO DISTURBING ANY TRAFFIC SIGNS, A SIGN CONDITION INVENTORY OF ALL EXISTING SIGNING SHALL BE CONDUCTED BY THE CONTRACTOR AND PROVIDED TO THE PIMA COUNTY SIGN SHOP SUPERVISOR (520–724–2630). INVENTORY SHALL INDICATE CURRENT SIGN LOCATION AND CONDITION, INCLUDING ANY EXISTING DAMAGE OR DEFICIENCIES.
13. ANY SIGNS AND POSTS BEING RE–USED ON THIS PROJECT SHALL BE STOCKPILED IN A MANNER TO AVOID DAMAGE AND MAINTAIN THE INTEGRITY OF THE SIGNS. SAFE STORAGE OF STOCKPILE AND PAYMENT FOR DAMAGE TO THE STOCKPILE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
14. ALL SIGNS AND POSTS NOT BEING RE–USED ON THIS PROJECT SHALL BE DISMANTLED, STACKED AND DELIVERED TO THE OWNER (CITY OR COUNTY) BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR THE SAFE STORAGE AT THE CONSTRUCTION SITE UNTIL DELIVERY, AND THE SAFE UNLOADING OF THE SALVAGED MATERIAL. NOTIFICATION OF DELIVERY SHALL BE MADE AT LEAST 2 WORKING DAYS PRIOR TO DELIVERY. PIMA COUNTY SIGN SHOP 1313 S. MISSION ROAD (520–724–2630). NO FRIDAY DELIVERIES.

ENGINEER'S PAVING NOTES

1. COMPACTION SHALL COMPLY WITH PC/COT DIVISION 300, 400, AND PROJECT SPECIFICATIONS.
2. CONSTRUCTION SHALL CONFORM TO THE LATEST APPLICABLE PIMA ASSOCIATION OF GOVERNMENTS (PAG) STANDARD SPECIFICATIONS AND DETAILS.
3. ALL WORK AND MATERIALS SHALL COMPLY WITH ALL TOWN/COUNTY REGULATIONS AND CODES AND O.S.H.A. STANDARDS.
4. CONTRACTOR SHALL REFER TO THE ARCHITECTURAL PLANS FOR EXACT LOCATIONS AND DIMENSIONS OF EXIT PORCHES, PRECISE BUILDING DIMENSIONS, AND EXACT BUILDING UTILITY ENTRANCE LOCATIONS.
5. REFER TO ARCHITECTURAL PLANS FOR SITE LIGHTING ELECTRICAL DESIGN, LAYOUT AND LOCATION.
6. THE CONTRACTOR IS RESPONSIBLE FOR PREPARING ALL AS–BUILTS AS REQUIRED BY THE OWNER AND ANY GOVERNMENT JURISDICTION NECESSARY TO OBTAIN ANY FILL PERMITS, APPROVALS, CERTIFICATES OF OCCUPANCY, ETC.
7. ANY AND ALL NIGHT WORK SHALL CONFORM TO APPLICABLE PASCUA YAQUI TRIBE REGULATIONS.

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS PROJECT IS NORTH 00°00'44" EAST, ALONG THE EAST LINE OF THE NORTHEAST 1/4 OF SECTION 24, TOWNSHIP 15 SOUTH, RANGE 12 EAST, GILA AND SALT RIVER MERIDIAN, PIMA COUNTY, ARIZONA BETWEEN THE FOUND 3.25" DIAMETER BLM BRASS CAP (DISTURBED – ADJUSTED TO FIT PCDOT REFERENCES) MARKING THE EAST 1/4 CORNER OF SAID SECTION 24 AND THE FOUND 2" DIAMETER BRASS CAP SET IN HANDWELL AND STAMPED "T15S, R12E, R13E, 13/24, PCDOT" MARKING THE NORTHEAST CORNER OF SAID SECTION 24, AS SHOWN ON SHEET 9 OF 17 OF THE PIMA COUNTY DEPARTMENT OF TRANSPORTATION AND FLOOD CONTROL DISTRICT AS–BUILT PLAN FOR CAMINO DE OESTE ROADWAY IMPROVEMENTS FROM CALLE TETAKUSIM TO LOS REALES ROAD, WORK ORDER NO. 4PYCDO, DATED DECEMBER 12, 2010.

BASIS OF ELEVATIONS

THE BASIS OF ELEVATIONS FOR THIS SURVEY IS NAVD88. THE PRIMARY BENCHMARK IS PIMA COUNTY DEPARTMENT OF TRANSPORTATION OPUS CONTROL POINT 15S12E_N25 WHICH IS A FOUND #4 REBAR WITH BRASS TAG STAMPED "PCDOT REF 16" AT THE SOUTHWEST CORNER OF THE INTERSECTION OF CAMINO DE OESTE AND LOS REALES ROAD; +/–12 FEET SOUTH OF THE SOUTH EDGE OF PAVEMENT AND +/–105 FEET WEST–SOUTHWEST OF THE 2"BRASS CAP SET IN HANDWELL AND STAMPED "T15S, R12E, R13E, 13/24, PCDOT" MARKING THE NORTHEAST CORNER OF SECTION 24, T15S, R12E, G.&S.R.M. THE ELEVATION IS 2559.04 FEET. THE LOCAL BENCHMARK IS THE SOUTHEAST CORNER OF THE CONCRETE MAILBOX PAD AT THE SOUTHEAST CORNER OF THE INTERSECTION OF CAMINO DE OESTE AND TETAKUSIM ROAD. THE ELEVATION IS 2567.22 FEET.

BASIS OF COORDINATES

THE BASIS OF COORDINATES FOR THIS SURVEY IS 408041.40 NORTH AND 964263.20 EAST ON THE FOUND 2" DIAMETER BRASS CAP SET IN HANDWELL AND STAMPED "T15S, R12E, R13E, 13/24, PCDOT" MARKING THE NORTHEAST CORNER OF SECTION 24, TOWNSHIP 15 SOUTH, RANGE 12 EAST, GILA AND SALT RIVER MERIDIAN, PIMA COUNTY, ARIZONA, AS SHOWN ON SHEET 9 OF 17 OF THE PIMA COUNTY DEPARTMENT OF TRANSPORTATION AND FLOOD CONTROL DISTRICT AS–BUILT PLAN FOR CAMINO DE OESTE ROADWAY IMPROVEMENTS FROM CALLE TETAKUSIM TO LOS REALES ROAD, WORK ORDER NO. 4PYCDO, DATED DECEMBER 12, 2010. NOTE: PRIOR TO CONSTRUCTION, SHEET 9 OF 17 OF THE PIMA COUNTY DEPARTMENT OF TRANSPORTATION AND FLOOD CONTROL DISTRICT AS–BUILT PLAN FOR CAMINO DE OESTE ROADWAY IMPROVEMENTS SHOWS THAT THIS CORNER WAS ORIGINALLY MONUMENTED BY A 1/2"DIAMETER PIN.

GRADING AND DRAINAGE NOTES:

1. WHEN HAUL PERMITS ARE REQUIRED, THEY MUST BE OBTAINED PRIOR TO OR CONCURRENTLY WITH THE GRADING AND DRAINAGE PERMIT.
2. EXCAVATING CONTRACTOR MUST GIVE LOCATION FOR WASTING EXCESS EXCAVATION AND A LETTER FROM OWNER GIVING PERMISSION FOR DUMPING PRIOR TO STARTING ON–SITE CONSTRUCTION. CONTRACTOR MUST COORDINATE TIME AND ROUTE OF DELIVERY OF BORROW MATERIALS WITH OWNER.
3. STAKING FINISHED FLOOR ELEVATIONS IS THE RESPONSIBILITY OF THE CONTRACTOR.
4. AN APPROVED GRADING AND DRAINAGE PLAN SHALL BE ON THE JOB SITE AT ALL TIMES. DEVIATIONS FROM THE PLAN MUST BE PRECEDED BY AN APPROVED PLAN REVISION.
5. GRADING AND DRAINAGE PLAN APPROVAL INCLUDES THE CONSTRUCTION OF ALL SURFACE IMPROVEMENTS SHOWN ON THE APPROVED PLAN, INCLUDING, BUT NOT LIMITED TO, RETENTION AREAS, SEDIMENTATION BASINS, AND/OR OTHER DRAINAGE FACILITIES, DRAINAGE PATTERNS, WALLS, CURBS, ASPHALT PAVEMENT, AND BUILDING FLOOR ELEVATIONS.
6. ALL RAMPS MUST MEET ADA ACCESSIBILITY GUIDELINES (ADAAG) STANDARDS.

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Registered Professional Engineer
60430
TIMOTHY J. RHINE
Date Signed 11/16/18
ARIZONA, U.S.A.
Expires 09/30/21

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

GENERAL NOTES

GN1

Contact Arizona 811 at least two full working days before you begin excavation
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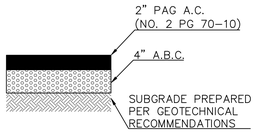
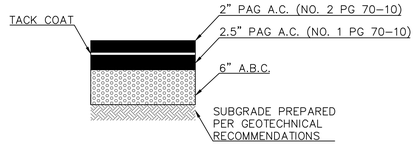
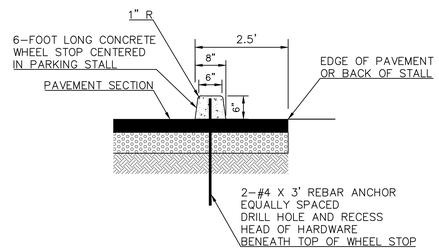


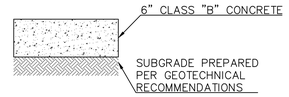
AUTOS/LIGHT TRUCKS DRIVES AND PARKING AREAS ASPHALT PAVEMENT DETAIL (DT A) N.T.S.



TRUCK DRIVES ASPHALT PAVEMENT DETAIL (DT B) N.T.S.

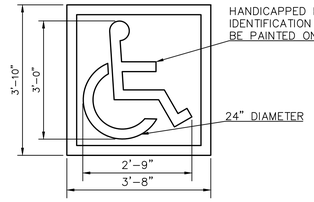


6-FOOT CONCRETE WHEEL STOP DETAIL (DT C) N.T.S.



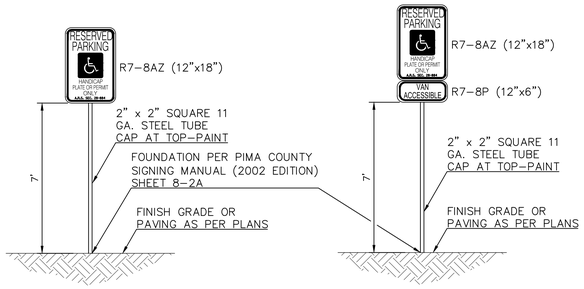
NOTE:
1. SEE PAG STD. DTL. 206 FOR ADDITIONAL INFORMATION.

DRIVEWAY APRON DETAIL (DT D) N.T.S.



NOTE:
1. LOCATE AT EDGE OF PARKING SPACE
2. 2 COATS OF PAINT MINIMUM

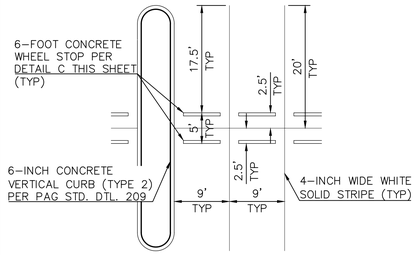
INTERNATIONAL ACCESSIBLE PARKING SYMBOL DETAIL (DT E) N.T.S.



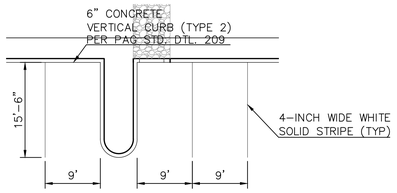
ADA ACCESSIBLE PARKING

ADA VAN ACCESSIBLE PARKING

MOUNTED ADA ACCESSIBLE PARKING SIGN AND SIGN POST DETAIL (DT F) N.T.S.

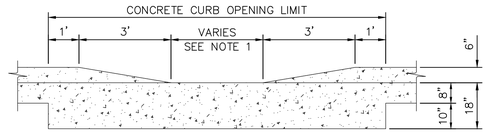


STANDARD PARKING STALL



EDGE PARKING STALL

PARKING STALL DETAIL (DT G) N.T.S.



NOTE:
1. REFER TO CIVIL SITE PLAN SHEETS FOR DEPRESSED OPENING WIDTH.
2. REFER TO DETAIL P ON SHEET DT3 WHERE SPILLWAY SHOWN ON PLANS.

CURB OPENING DETAIL (DT H) N.T.S.



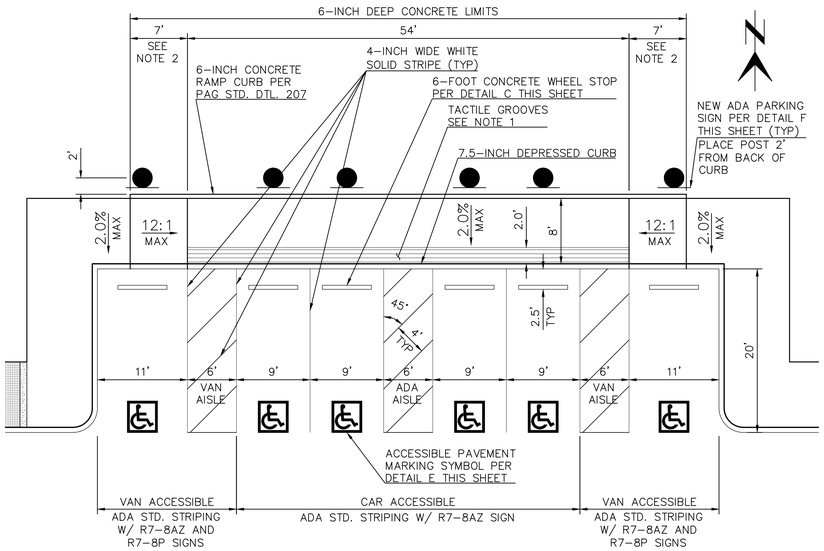
1.5" Radius, 0.4" Border, 0.4" Indent, Red on White;
[NO] C; [PARKING] B 40% spacing;
[LOADING] C; [ZONE] C;
Standard Arrow Custom 7.8" X 2.0" 0°;

RIGHT ARROW

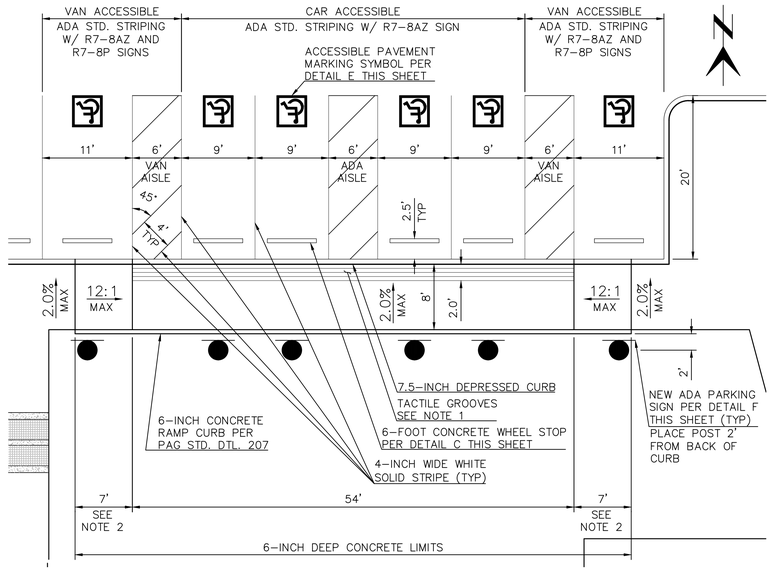
1.5" Radius, 0.4" Border, 0.4" Indent, Red on White;
[NO] C; [PARKING] B 40% spacing;
[LOADING] C; [ZONE] C;
Standard Arrow Custom 7.8" X 2.0" 180°;

LEFT ARROW

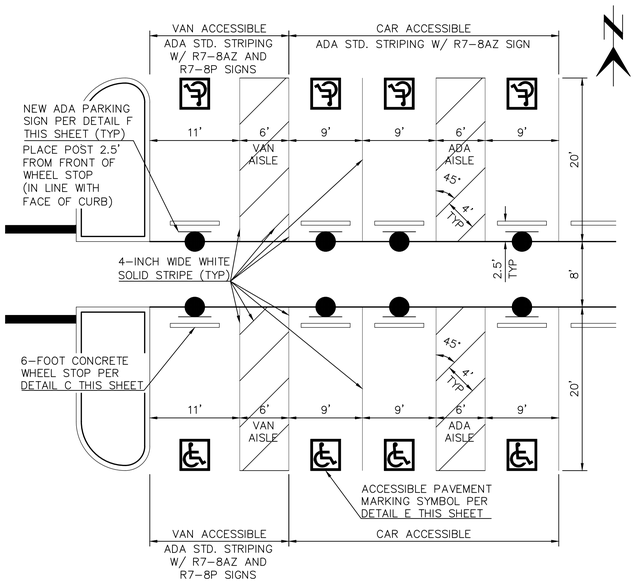
LOADING ZONE SIGN DETAIL (DT I) N.T.S.



SOUTH LOCATION



NORTH LOCATION



EAST LOCATION

NOTE:
1. PLACE GROOVES IN CONCRETE 1" APART, ¼" WIDE, ⅛" DEEP. GROOVES MAY BE SAWCUT OR TOOLED.
2. TRANSITION FROM 6-INCH VERTICAL CURB TO 7.5-INCH DEPRESSED CURB.
3. CONSTRUCT RAMPS AND WINGS WITH 6-INCH DEEP CONCRETE.
4. SEE PAG STD. DTL. 207 FOR ADDITIONAL INFORMATION.

HANDICAP PARKING DETAIL (DT J) N.T.S.

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Registered Professional Engineer (Civil)
60430
TIMOTHY J. RHINE
Date Signed 11/16/18
ARIZONA, U.S.A.
Expires 09/30/21

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DETAIL SHEET

DT1

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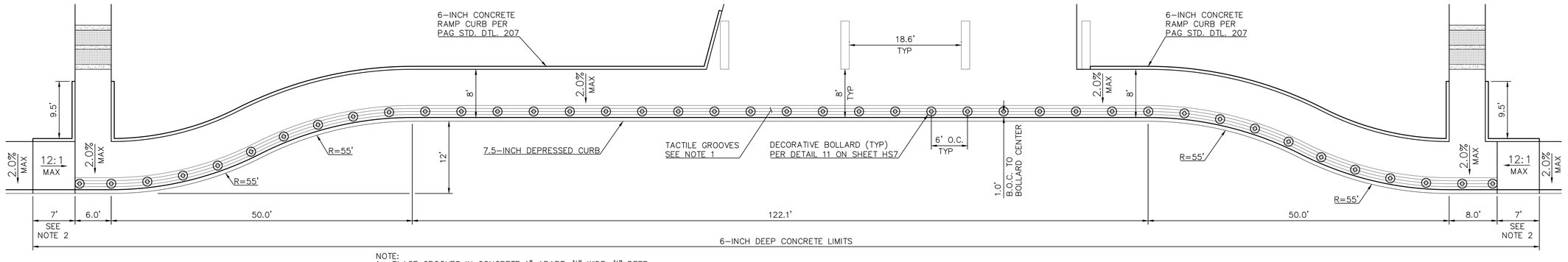
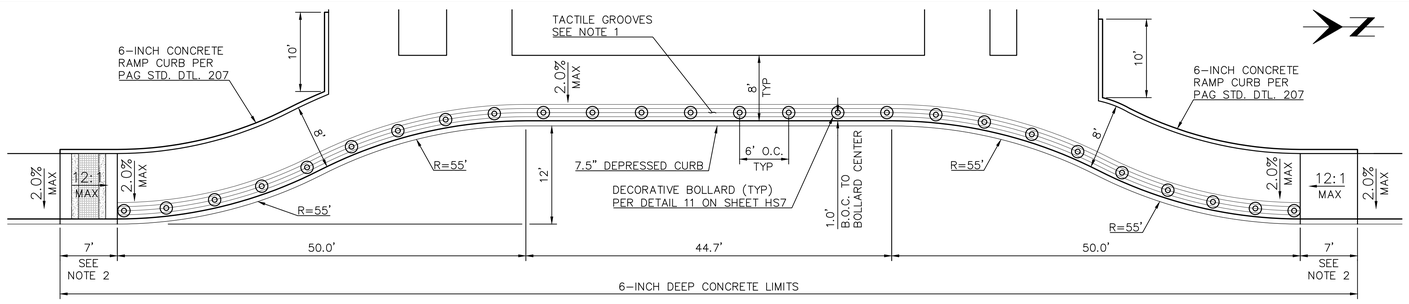


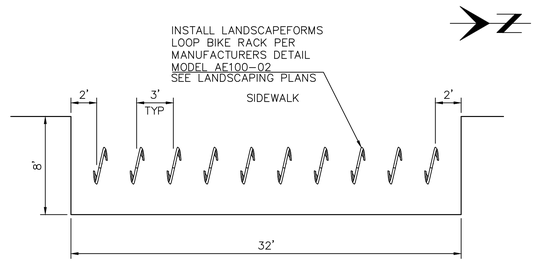
NOTE:
1. PLACE GROOVES IN CONCRETE 1" APART, ¼" WIDE, ⅛" DEEP. GROOVES MAY BE SAWCUT OR TOOLED.
2. TRANSITION FROM 6-INCH VERTICAL CURB TO 7.5-INCH DEPRESSED CURB.
3. CONSTRUCT DROPOFF AREA WITH 6-INCH DEEP CONCRETE.

DT K SOUTH DROPOFF DETAIL
N.T.S.

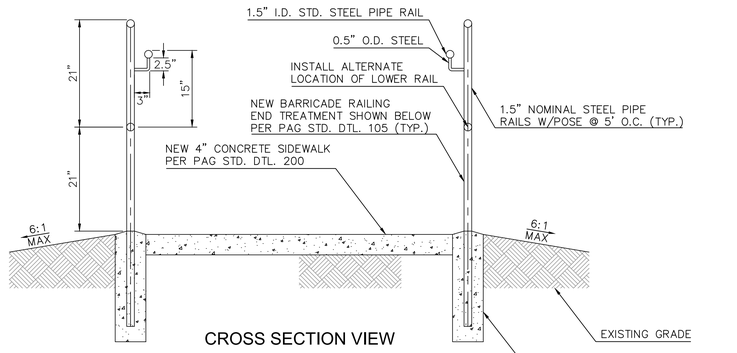


NOTE:
1. PLACE GROOVES IN CONCRETE 1" APART, ¼" WIDE, ⅛" DEEP. GROOVES MAY BE SAWCUT OR TOOLED.
2. TRANSITION FROM 6-INCH VERTICAL CURB TO 7.5-INCH DEPRESSED CURB.
3. CONSTRUCT DROPOFF AREA WITH 6-INCH DEEP CONCRETE.

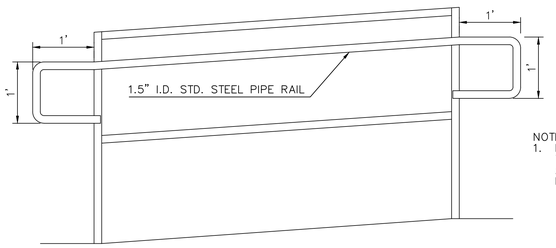
DT L EAST DROPOFF DETAIL
N.T.S.



DT M BIKE RACK LAYOUT DETAIL
N.T.S.



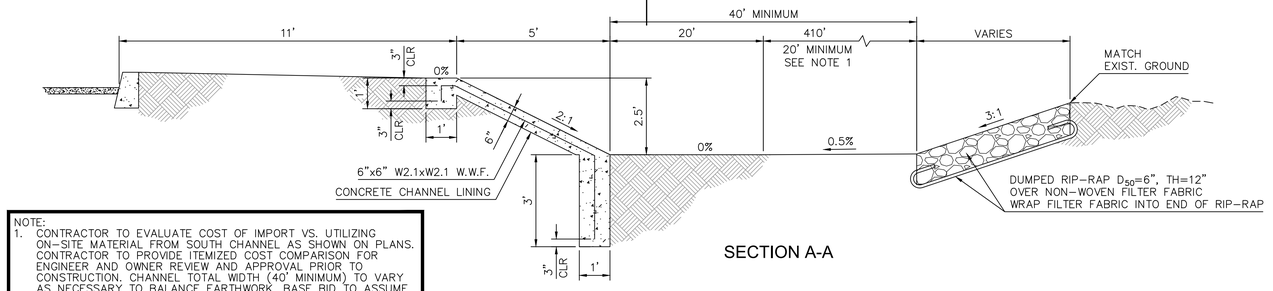
CROSS SECTION VIEW



NOTE:
1. INSTALLATION AND MATERIALS FOR THE ADA ACCESSIBILITY MODIFICATION ARE INCLUDED IN THE COST OF THE BARRICADE RAILING ITEM.

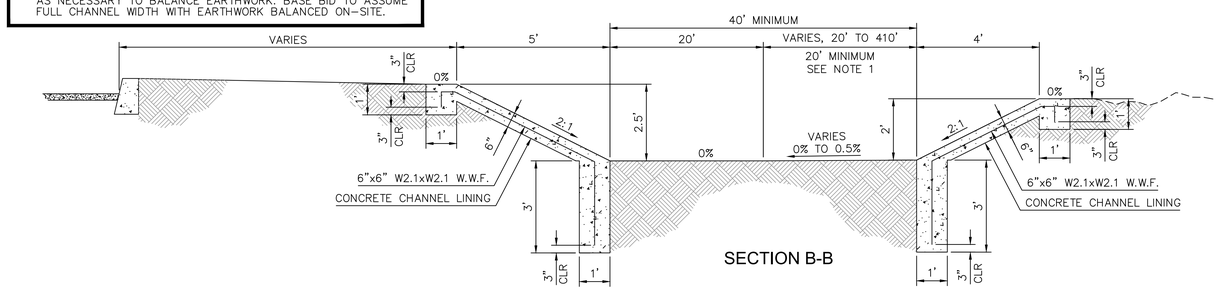
ADA ACCESSIBILITY MODIFICATION TO BARRICADE RAILING PAG STD. DTL. 105 END TREATMENT

DT N ADA ACCESSIBLE BARRICADE RAILING DETAIL
N.T.S.

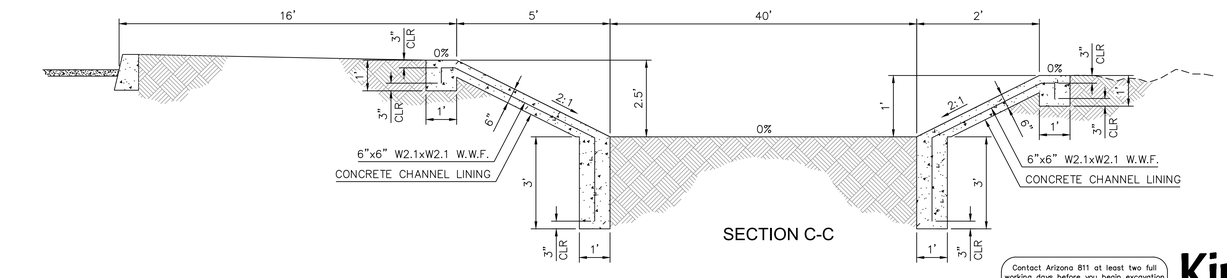


SECTION A-A

NOTE:
1. CONTRACTOR TO EVALUATE COST OF IMPORT VS. UTILIZING ON-SITE MATERIAL FROM SOUTH CHANNEL AS SHOWN ON PLANS. CONTRACTOR TO PROVIDE ITEMIZED COST COMPARISON FOR ENGINEER AND OWNER REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. CHANNEL TOTAL WIDTH (40' MINIMUM) TO VARY AS NECESSARY TO BALANCE EARTHWORK. BASE BID TO ASSUME FULL CHANNEL WIDTH WITH EARTHWORK BALANCED ON-SITE.



SECTION B-B



SECTION C-C

DT O CHANNEL CROSS SECTIONS DETAIL
N.T.S.

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Registered Professional Engineer (Civil)
60430
TIMOTHY J. RHINE
Date Signed 11/16/18
ARIZONA, U.S.A.
Expires 09/30/21

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date
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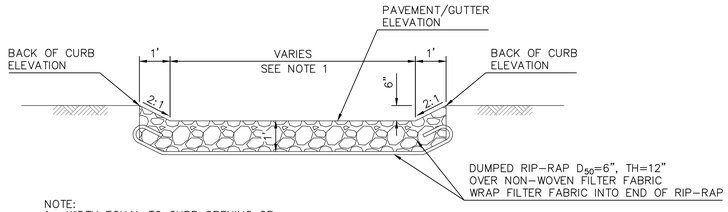
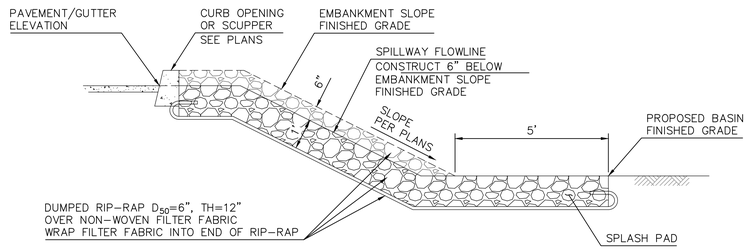
DETAIL SHEET

DT2

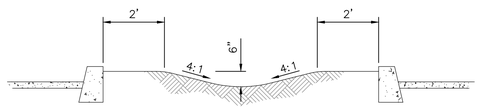


NOTE:
1. WIDTH EQUAL TO CURB OPENING OR SCUPPER OPENING WIDTH.

DT P SPILLWAY SECTION
N.T.S.



DT Q SPILLWAY PROFILE
N.T.S.



DT R LANDSCAPE GRADING DETAIL
N.T.S.

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DETAIL SHEET

DT3

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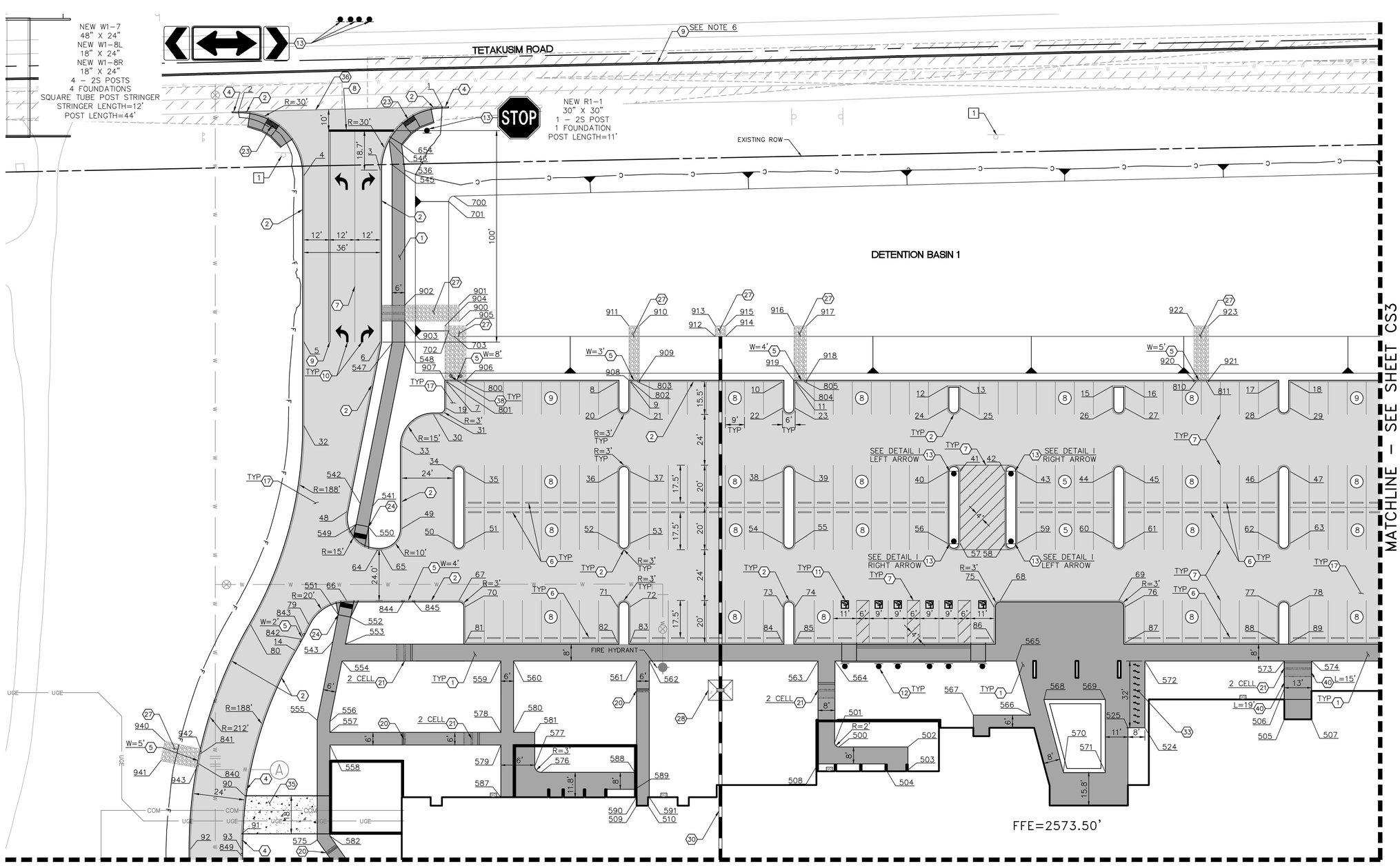

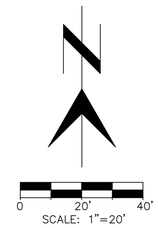

CONSTRUCTION NOTES:

1. INSTALL 4-INCH THICK CONCRETE SIDEWALK PER PAG STD. DTL. 200.
2. INSTALL CONCRETE VERTICAL CURB (TYPE 2) PER PAG STD. DTL. 209.
4. INSTALL CONCRETE CURB TERMINAL SECITON PER PAG STD. DTL. 212.
5. INSTALL CURB OPENING PER DETAIL H ON SHEET DT1.
6. INSTALL 6-FOOT WHEEL STOP PER DETAIL C ON SHEET DT1.
7. INSTALL 4-INCH WIDE WHITE SOLID STRIPE.
8. INSTALL 12-INCH WIDE WHITE SOLID STRIPE.
9. INSTALL 4-INCH WIDE DOUBLE YELLOW SOLID STRIPE.
10. INSTALL NEW PAVEMENT ARROWS PER SHEET NOS. 2-9 AND 4-12 OF THE PC/COT PAVEMENT MARKING DESIGN MANUAL.
11. INSTALL ACCESSIBLE PAVEMENT MARKING SYMBOL PER DETAIL E ON SHEET DT1.
12. INSTALL ACCESSIBLE PARKING SIGN PANEL, POST, AND FOUNDATION PER DETAIL F ON SHEET DT1.
13. INSTALL SIGN PANEL, POST, AND FOUNDATION LISTED.
17. INSTALL PAVEMENT PER DETAIL A ON SHEET DT1.
20. INSTALL TYPE 1 SCUPPER PER PAG STD. DTL. 204.
21. INSTALL TYPE 2 SCUPPER PER PAG STD. DTL. 205.
23. CONSTRUCT TYPE 1 ADA RAMP WITH DETECTABLE WARNING STRIP PER PAG STD. DTL. 207.
24. CONSTRUCT TYPE 2 ADA RAMP WITH TACTILE GROOVES PER PAG STD. DTL. 207.
27. INSTALL RIP-RAP, D50=6" TH=1', LOCATION PER PLAN.
28. INSTALL TYPE 4 CATCH BASIN PER PAG STD. DTL. 309 INCLUDING BEDDING AND BACKFILL.
30. INSTALL 18-INCH PP STORM DRAIN PIPE.
33. INSTALL LANDSCAPEFORMS LOOP BIKE RACK PER MANUFACTURERS DETAIL MODEL AE100-02. REFER TO DETAIL M ON SHEET DT2 FOR LAYOUT.
35. INSTALL CONCRETE DRIVEWAY SECTION PER DETAIL D ON SHEET DT1.
36. SAWCUT CLEAN EDGE FOR DRIVEWAY POUR.
38. INSTALL BOLLARD AT 6-FEET O.C. REFER TO ARCHITECTURAL PLANS.
40. INSTALL HANDRAIL PER DETAIL N ON SHEET DT2. COLOR TO BE DETERMINED.

DEMOLITION NOTES:

1. REMOVE EXISTING SIGN.

GENERAL NOTES:

1. CUT/FILL SLOPES ARE 3:1 MAX OR FLATTER.
2. CONTRACTOR SHALL PROTECT EXISTING STRUCTURES IN PLACE UNLESS NOTED OTHERWISE.
3. COORDINATE WITH LANDSCAPING PLANS PRIOR TO CONSTRUCTION.
4. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
5. ALL SIDEWALK DIMENSIONS DO NO INCLUDE CURB WIDTHS.
6. STRIPE TETAKUSIM WITH 90 MIL DOUBLE YELLOW THERMOPLASTIC TO INDICATE NO PASSING ZONE ALONG ROADWAY. (TYP.)

NOTE:
7. CONTRACTOR TO EVALUATE COST OF IMPORT VS. UTILIZING ON-SITE MATERIAL FROM SOUTH CHANNEL AS SHOWN ON PLANS. CONTRACTOR TO PROVIDE ITEMIZED COST COMPARISON FOR ENGINEER AND OWNER REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. CHANNEL TOTAL WIDTH (40' MINIMUM) TO VARY AS NECESSARY TO BALANCE EARTHWORK. BASE BID TO ASSUME FULL CHANNEL WIDTH WITH EARTHWORK BALANCED ON-SITE.

LEGEND:

- PAVEMENT PER DETAIL A ON SHEET DT1.
- PAVEMENT PER DETAIL B ON SHEET DT1.
- SIDEWALK
- CONCRETE DRIVEWAY
- PRUNE EXISTING VEGETATION WITHIN SIGHT TRIANGLE
- NUMBER OF PARKING SPACE IN ROW (XX)
- POINT NUMBER - SEE SHEET CS6 (XX)

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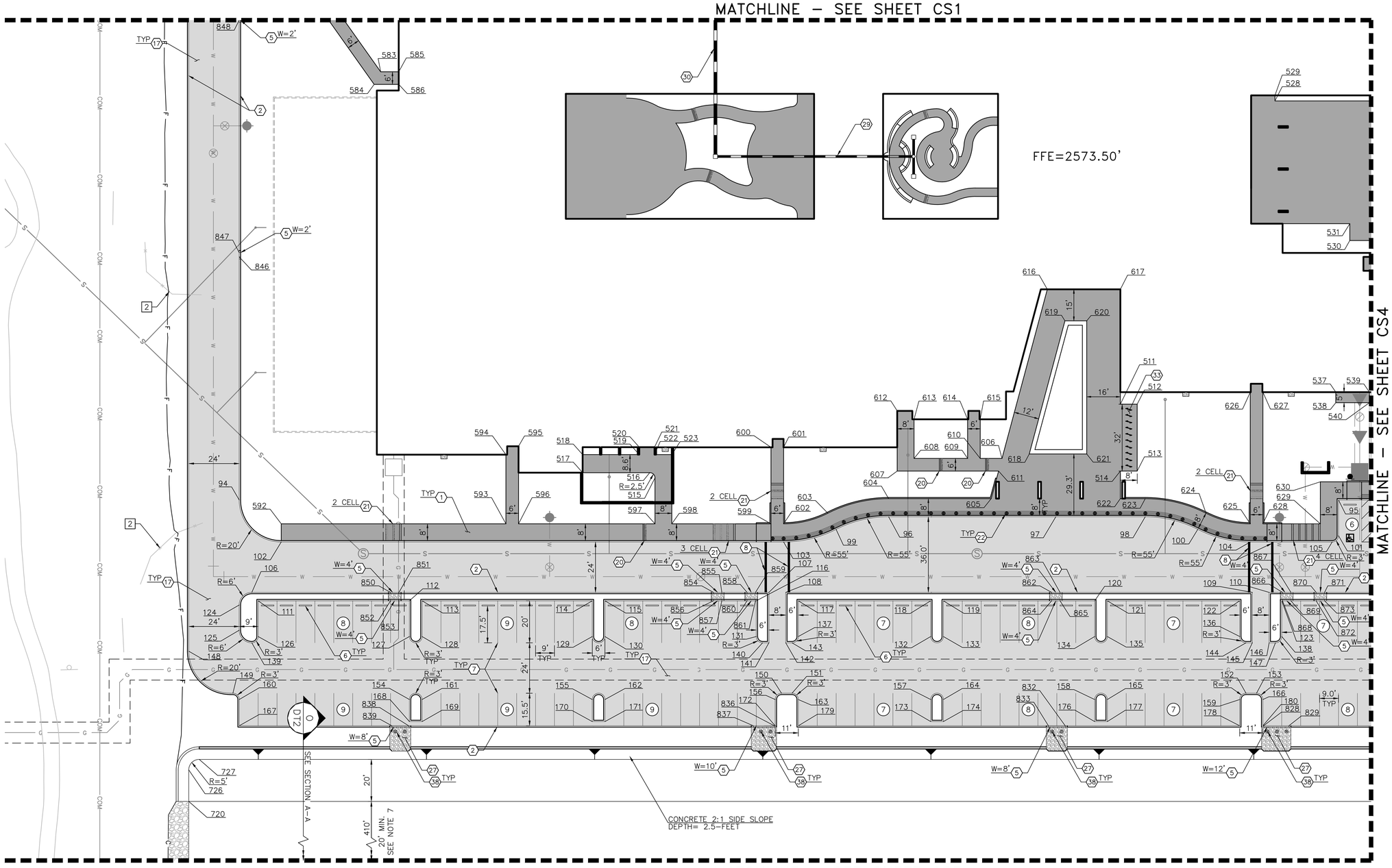
CIVIL SITE PLAN - QUADRANT 1

CS1



CONSTRUCTION NOTES:

1. INSTALL 4–INCH THICK CONCRETE SIDEWALK PER PAG STD. DTL. 200.
2. INSTALL CONCRETE VERTICAL CURB (TYPE 2) PER PAG STD. DTL. 209.
5. INSTALL CURB OPENING PER DETAIL H ON SHEET DT1.
6. INSTALL 6–FOOT WHEEL STOP PER DETAIL C ON SHEET DT1.
7. INSTALL 4–INCH WIDE WHITE SOLID STRIPE.
8. INSTALL 12–INCH WIDE WHITE SOLID STRIPE.
17. INSTALL PAVEMENT PER DETAIL A ON SHEET DT1.
20. INSTALL TYPE 1 SCUPPER PER PAG STD. DTL. 204.
21. INSTALL TYPE 2 SCUPPER PER PAG STD. DTL. 205.
22. INSTALL DECORATIVE BOLLARD PER DETAIL 11 ON SHEET HS7.
27. INSTALL RIP–RAP, D50=6" TH=1', LOCATION PER PLAN.
29. INSTALL 12–INCH PP STORM DRAIN PIPE.
30. INSTALL 18–INCH PP STORM DRAIN PIPE.
33. INSTALL LANDSCAPEFORMS LOOP BIKE RACK PER MANUFACTURERS DETAIL MODEL AE100–02. REFER TO DETAIL M ON SHEET DT2 FOR LAYOUT.
38. INSTALL BOLLARD AT 6–FEET O.C. REFER TO ARCHITECTURAL PLANS.

DEMOLITION NOTES:

1. REMOVE EXISTING SIGN.
2. REMOVE BASEBALL EQUIPMENT/FENCING.

GENERAL NOTES:

1. CUT/FILL SLOPES ARE 3:1 MAX OR FLATTER.
2. CONTRACTOR SHALL PROTECT EXISTING STRUCTURES IN PLACE UNLESS NOTED OTHERWISE.
3. COORDINATE WITH LANDSCAPING PLANS PRIOR TO CONSTRUCTION.
4. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
5. ALL SIDEWALK DIMENSIONS DO NO INCLUDE CURB WIDTHS.
6. STRIPE TETAKUSIM WITH 90 MIL DOUBLE YELLOW THERMOPLASTIC TO INDICATE NO PASSING ZONE ALONG ROADWAY. (TYP.)

NOTE:
7. CONTRACTOR TO EVALUATE COST OF IMPORT VS. UTILIZING ON–SITE MATERIAL FROM SOUTH CHANNEL AS SHOWN ON PLANS. CONTRACTOR TO PROVIDE ITEMIZED COST COMPARISON FOR ENGINEER AND OWNER REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. CHANNEL TOTAL WIDTH (40' MINIMUM) TO VARY AS NECESSARY TO BALANCE EARTHWORK. BASE BID TO ASSUME FULL CHANNEL WIDTH WITH EARTHWORK BALANCED ON–SITE.

LEGEND:

- PAVEMENT PER DETAIL A ON SHEET DT1.
- PAVEMENT PER DETAIL B ON SHEET DT1.
- SIDEWALK
- CONCRETE DRIVEWAY
- PRUNE EXISTING VEGETATION WITHIN SIGHT TRIANGLE
- NUMBER OF PARKING SPACE IN ROW (XX)
- POINT NUMBER – SEE SHEET CS6 XX

0 20' 40'
SCALE: 1"=20'

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Date Signed 11/16/18
ARIZONA, U.S.A.
Expires 09/30/21

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

CIVIL SITE PLAN - QUADRANT 2

CS2

Contact Arizona 811 at least two full working days before you begin excavation
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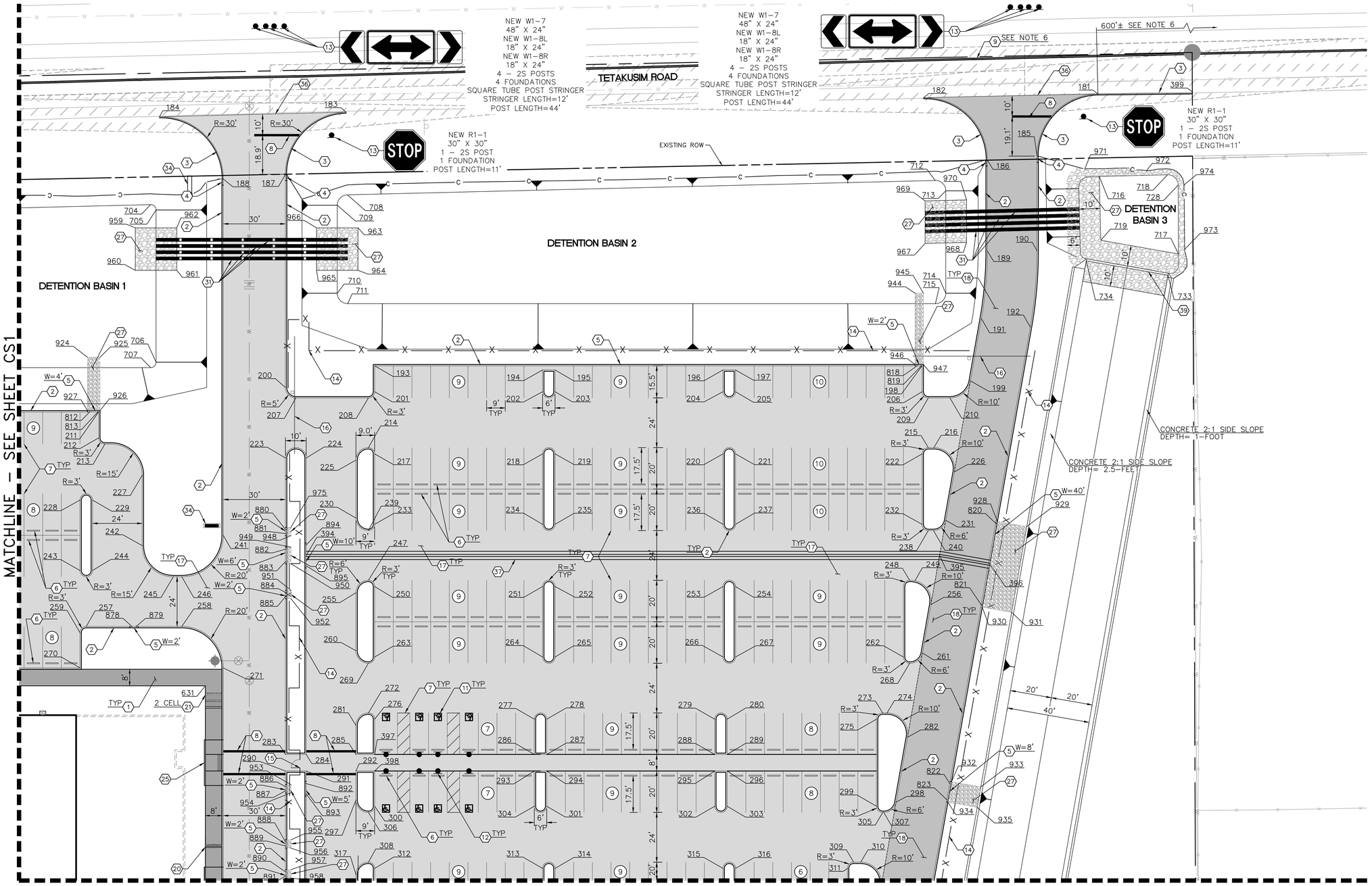
TUCSON, AZ 85705 PHONE: 520–615–9191



CONSTRUCTION NOTES:

1. INSTALL 4-INCH THICK CONCRETE SIDEWALK PER PAG STD. DTL. 200.
2. INSTALL CONCRETE VERTICAL CURB (TYPE 2) PER PAG STD. DTL. 209.
3. INSTALL CONCRETE HEADER CURB PER PAG STD. DTL. 213.
4. INSTALL CONCRETE CURB TERMINAL SECITON PER PAG STD. DTL. 212.
5. INSTALL CURB OPENING PER DETAIL H ON SHEET DT1.
6. INSTALL 6-FOOT WHEEL STOP PER DETAIL C ON SHEET DT1.
7. INSTALL 4-INCH WIDE WHITE SOLID STRIPE.
8. INSTALL 12-INCH WIDE WHITE SOLID STRIPE.
9. INSTALL 4-INCH WIDE DOUBLE YELLOW SOLID STRIPE.
11. INSTALL ACCESSIBLE PAVEMENT MARKING SYMBOL PER DETAIL E ON SHEET DT1.
12. INSTALL ACCESSIBLE PARKING SIGN PANEL, POST, AND FOUNDATION PER DETAIL F ON SHEET DT1.
13. INSTALL SIGN PANEL, POST, AND FOUNDATION LISTED.
14. INSTALL DECORATIVE STEEL FENCING. REFER TO ARCHITECTURAL PLANS.
15. INSTALL DECORATIVE STEEL PEDESTRIAN GATE. REFER TO ARCHITECTURAL PLANS.
16. INSTALL DECORATIVE STEEL VEHICLE GATE. REFER TO ARCHITECTURAL PLANS.
17. INSTALL PAVEMENT PER DETAIL A ON SHEET DT1.
18. INSTALL PAVEMENT PER DETAIL B ON SHEET DT1.
20. INSTALL TYPE 1 SCUPPER PER PAG STD. DTL. 204.
21. INSTALL TYPE 2 SCUPPER PER PAG STD. DTL. 205.
25. CONSTRUCT TYPE 3 ADA RAMP WITH TACTILE GROOVES PER PAG STD. DTL. 207.
27. INSTALL RIP-RAP, D50=6" TH=1', LOCATION PER PLAN.
31. INSTALL 24-INCH PP STORM DRAIN PIPE.
34. NEW MONUMNET SIGN. REFER TO ARCHITECTURAL PLANS.
36. SAWCUT CLEAN EDGE FOR DRIVEWAY POUR.
37. INSTALL VALLEY GUTTER PER PAG STD. DTL. 208.
39. INSTALL 1'X3' CONCRETE CUT-OFF WALL.

DEMOLITION NOTES:

1. REMOVE EXISTING SIGN.

GENERAL NOTES:

1. CUT/FILL SLOPES ARE 3:1 MAX OR FLATTER.
2. CONTRACTOR SHALL PROTECT EXISTING STRUCTURES IN PLACE UNLESS NOTED OTHERWISE.
3. COORDINATE WITH LANDSCAPING PLANS PRIOR TO CONSTRUCTION.
4. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
5. ALL SIDEWALK DIMENSIONS DO NO INCLUDE CURB WIDTHS.
6. STRIPE TETAKUSIM WITH 90 MIL DOUBLE YELLOW THERMOPLASTIC TO INDICATE NO PASSING ZONE ALONG ROADWAY. (TYP.)

NOTE:
7. CONTRACTOR TO EVALUATE COST OF IMPORT VS. UTILIZING ON-SITE MATERIAL FROM SOUTH CHANNEL AS SHOWN ON PLANS. CONTRACTOR TO PROVIDE ITEMIZED COST COMPARISON FOR ENGINEER AND OWNER REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. CHANNEL TOTAL WIDTH (40' MINIMUM) TO VARY AS NECESSARY TO BALANCE EARTHWORK. BASE BID TO ASSUME FULL CHANNEL WIDTH WITH EARTHWORK BALANCED ON-SITE.

LEGEND:

- PAVEMENT PER DETAIL A ON SHEET DT1.
- PAVEMENT PER DETAIL B ON SHEET DT1.
- SIDEWALK
- CONCRETE DRIVEWAY
- PRUNE EXISTING VEGETATION WITHIN SIGHT TRIANGLE
- NUMBER OF PARKING SPACE IN ROW (XX)
- POINT NUMBER - SEE SHEET CS6 (XX)

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Registered Professional Engineer (Civil)
60430
TIMOTHY J. RHINE
Date Signed 11/16/18
ARIZONA, USA
Expires 09/30/21

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revisions

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Health Services Center II
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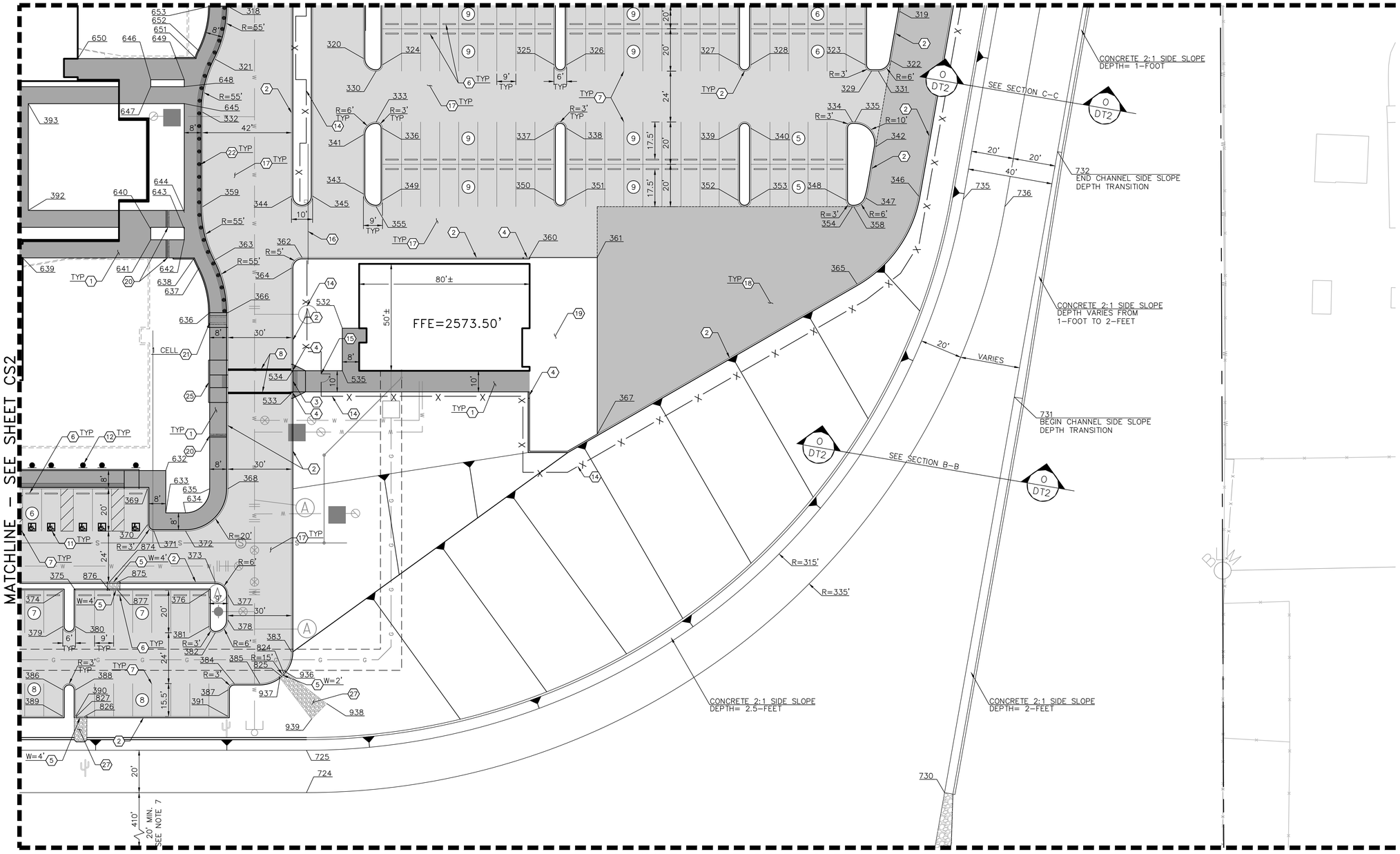
CIVIL SITE PLAN - QUADRANT 3

CS3



CONSTRUCTION NOTES:

1. INSTALL 4–INCH THICK CONCRETE SIDEWALK PER PAG STD. DTL. 200.
2. INSTALL CONCRETE VERTICAL CURB (TYPE 2) PER PAG STD. DTL. 209.
3. INSTALL CONCRETE HEADER CURB PER PAG STD. DTL. 213.
4. INSTALL CONCRETE CURB TERMINAL SECITON PER PAG STD. DTL. 212.
5. INSTALL CURB OPENING PER DETAIL H ON SHEET DT1.
6. INSTALL 6–FOOT WHEEL STOP PER DETAIL C ON SHEET DT1.
7. INSTALL 4–INCH WIDE WHITE SOLID STRIPE.
8. INSTALL 12–INCH WIDE WHITE SOLID STRIPE.
11. INSTALL ACCESSIBLE PAVEMENT MARKING SYMBOL PER DETAIL E ON SHEET DT1.
12. INSTALL ACCESSIBLE PARKING SIGN PANEL, POST, AND FOUNDATION PER DETAIL F ON SHEET DT1.
14. INSTALL DECORATIVE STEEL FENCING. REFER TO ARCHITECTURAL PLANS.
15. INSTALL DECORATIVE STEEL PEDESTRIAN GATE. REFER TO ARCHITECTURAL PLANS.
16. INSTALL DECORATIVE STEEL VEHICLE GATE. REFER TO ARCHITECTURAL PLANS.
17. INSTALL PAVEMENT PER DETAIL A ON SHEET DT1.
18. INSTALL PAVEMENT PER DETAIL B ON SHEET DT1.
19. INSTALL CONCRETE SECTION. REFER TO ARCHITECTURAL PLANS.
20. INSTALL TYPE 1 SCUPPER PER PAG STD. DTL. 204.
21. INSTALL TYPE 2 SCUPPER PER PAG STD. DTL. 205.
22. INSTALL DECORATIVE BOLLARD PER DETAIL 11 ON SHEET HS7.
25. CONSTRUCT TYPE 3 ADA RAMP WITH TACTILE GROOVES PER PAG STD. DTL. 207.
27. INSTALL RIP–RAP, D50=6" TH=1', LOCATION PER PLAN.

GENERAL NOTES:

1. CUT/FILL SLOPES ARE 3:1 MAX OR FLATTER.
2. CONTRACTOR SHALL PROTECT EXISTING STRUCTURES IN PLACE UNLESS NOTED OTHERWISE.
3. COORDINATE WITH LANDSCAPING PLANS PRIOR TO CONSTRUCTION.
4. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
5. ALL SIDEWALK DIMENSIONS DO NO INCLUDE CURB WIDTHS.
6. STRIPE TETAKUSIM WITH 90 MIL DOUBLE YELLOW THERMOPLASTIC TO INDICATE NO PASSING ZONE ALONG ROADWAY. (TYP.)

NOTE:
7. CONTRACTOR TO EVALUATE COST OF IMPORT VS. UTILIZING ON–SITE MATERIAL FROM SOUTH CHANNEL AS SHOWN ON PLANS. CONTRACTOR TO PROVIDE ITEMIZED COST COMPARISON FOR ENGINEER AND OWNER REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. CHANNEL TOTAL WIDTH (40' MINIMUM) TO VARY AS NECESSARY TO BALANCE EARTHWORK. BASE BID TO ASSUME FULL CHANNEL WIDTH WITH EARTHWORK BALANCED ON–SITE.

LEGEND:

- PAVEMENT PER DETAIL A ON SHEET DT1.
- PAVEMENT PER DETAIL B ON SHEET DT1.
- SIDEWALK
- CONCRETE DRIVEWAY
- PRUNE EXISTING VEGETATION WITHIN SIGHT TRIANGLE
- NUMBER OF PARKING SPACE IN ROW (XX)
- POINT NUMBER – SEE SHEET CS6 XX

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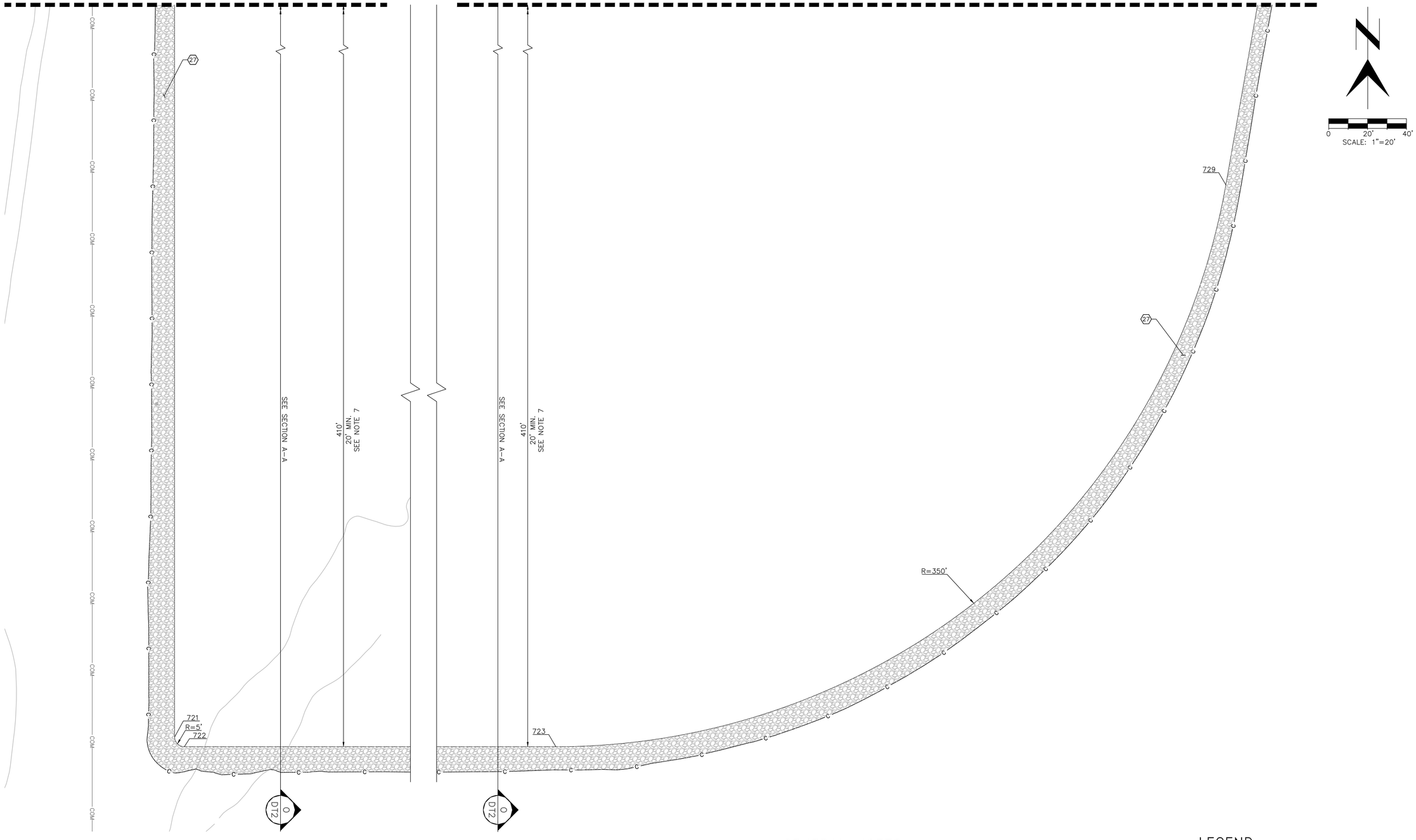
CIVIL SHEET - QUADRANT 4

CS4



GENERAL NOTES:

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2. CONTRACTOR SHALL PROTECT EXISTING STRUCTURES IN PLACE UNLESS NOTED OTHERWISE.
3. COORDINATE WITH LANDSCAPING PLANS PRIOR TO CONSTRUCTION.
4. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
5. ALL SIDEWALK DIMENSIONS DO NO INCLUDE CURB WIDTHS.
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LEGEND:

- PAVEMENT PER DETAIL A ON SHEET DT1.
- PAVEMENT PER DETAIL B ON SHEET DT1.
- SIDEWALK
- CONCRETE DRIVEWAY
- PRUNE EXISTING VEGETATION WITHIN SIGHT TRIANGLE
- NUMBER OF PARKING SPACE IN ROW (XX)
- POINT NUMBER – SEE SHEET CS6 XX

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Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

CIVIL SITE PLAN - CHANNEL

CS5

POINT TABLE

POINT #	NORTHING	EASTING	DESCRIPTION
1	406742.99	964574.67	P
2	406740.73	964478.38	P
3	406713.00	964545.40	P
4	406710.52	964509.40	P
5	406631.66	964509.40	P
6	406631.66	964545.40	P
7	406612.96	964576.63	P
8	406612.96	964657.63	P
9	406612.96	964663.63	P
10	406612.96	964735.63	P
11	406612.96	964741.63	P
12	406610.96	964813.63	P
13	406610.96	964819.63	P
14	406485.94	964504.94	P
15	406610.96	964891.63	P
16	406610.96	964897.63	P
17	406612.96	964969.63	P
18	406612.96	964975.63	P
19	406600.46	964576.63	P
20	406600.46	964657.63	P
21	406600.46	964663.63	P
22	406600.46	964735.63	P
23	406600.46	964741.63	P
24	406600.46	964813.63	P
25	406600.46	964819.63	P
26	406600.46	964891.63	P
27	406600.46	964897.63	P
28	406600.46	964969.63	P
29	406600.46	964975.63	P
30	406597.46	964570.63	P
31	406597.46	964573.63	P
32	406592.04	964509.40	P
33	406582.46	964555.63	P
34	406570.46	964579.63	P
35	406570.46	964585.63	P
36	406570.46	964657.63	P
37	406570.46	964663.63	P
38	406570.46	964735.63	P
39	406570.46	964741.63	P
40	406570.46	964813.63	P
41	406570.46	964819.63	P
42	406570.46	964840.63	P
43	406570.46	964846.63	P
44	406570.46	964891.63	P
45	406570.46	964897.63	P
46	406570.46	964969.63	P
47	406570.46	964975.63	P
48	406551.38	964529.47	P
49	406543.46	964555.63	P
50	406536.46	964579.63	P
51	406536.46	964585.63	P
52	406536.46	964657.63	P
53	406536.46	964663.63	P
54	406536.46	964735.63	P
55	406536.46	964741.63	P
56	406536.46	964813.63	P
57	406536.46	964819.63	P
58	406536.46	964840.63	P
59	406536.46	964846.63	P
60	406536.46	964891.63	P

POINT TABLE

POINT #	NORTHING	EASTING	DESCRIPTION
61	406536.46	964897.63	P
62	406536.46	964969.63	P
63	406536.46	964975.63	P
64	406533.46	964544.18	P
65	406533.46	964545.63	P
66	406509.46	964529.49	P
67	406509.46	964582.63	P
68	406509.46	964838.63	P
69	406509.46	964894.63	P
70	406506.46	964585.63	P
71	406506.46	964657.63	P
72	406506.46	964663.63	P
73	406506.46	964735.63	P
74	406506.46	964741.63	P
75	406506.46	964835.63	P
76	406506.46	964897.63	P
77	406506.46	964969.63	P
78	406506.46	964975.63	P
79	406498.30	964511.55	P
80	406497.95	964484.16	P
81	406489.46	964585.63	P
82	406489.46	964657.63	P
83	406489.46	964663.63	P
84	406489.46	964735.63	P
85	406489.46	964741.63	P
86	406489.46	964835.63	P
87	406489.46	964897.63	P
88	406489.46	964969.63	P
89	406489.46	964975.63	P
90	406417.12	964481.41	P
91	406399.09	964479.84	P
92	406391.85	964455.70	P
93	406391.85	964479.70	P
94	406158.48	964479.70	P
95	406158.48	965002.70	P
96	406150.48	964788.66	P
97	406150.48	964868.22	P
98	406150.48	964910.78	P
99	406144.48	964763.68	P
100	406144.48	964935.76	P
101	406141.48	965002.70	P
102	406138.48	964499.70	P
103	406138.48	964738.70	P
104	406138.48	964960.74	P
105	406138.48	964999.70	P
106	406114.48	964485.70	P
107	406114.48	964731.70	P
108	406114.48	964739.70	P
109	406114.48	964961.70	P
110	406114.48	964969.70	P
111	406110.48	964488.70	P
112	406110.48	964560.70	P
113	406110.48	964566.70	P
114	406110.48	964647.70	P
115	406110.48	964653.70	P
116	406110.48	964725.70	P
117	406110.48	964745.70	P
118	406110.48	964808.70	P
119	406110.48	964814.70	P
120	406110.48	964886.70	P

POINT TABLE

POINT #	NORTHING	EASTING	DESCRIPTION
121	406110.48	964892.70	P
122	406110.48	964955.70	P
123	406110.48	964975.70	P
124	406108.48	964479.70	P
125	406096.48	964479.70	P
126	406093.48	964488.70	P
127	406093.48	964560.70	P
128	406093.48	964566.70	P
129	406093.48	964647.70	P
130	406093.48	964653.70	P
131	406093.48	964725.70	P
132	406093.48	964808.70	P
133	406093.48	964814.70	P
134	406093.48	964886.70	P
135	406093.48	964892.70	P
136	406093.48	964955.70	P
137	406093.48	964745.70	P
138	406093.48	964975.70	P
139	406090.48	964485.70	P
140	406090.48	964728.70	P
141	406090.48	964731.70	P
142	406090.48	964739.70	P
143	406090.48	964742.70	P
144	406090.48	964958.70	P
145	406090.48	964961.70	P
146	406090.48	964969.70	P
147	406090.48	964972.70	P
148	406086.48	964455.70	P
149	406066.48	964476.70	P
150	406066.48	964737.70	P
151	406066.48	964742.70	P
152	406066.48	964958.70	P
153	406066.48	964963.70	P
154	406063.48	964560.70	P
155	406063.48	964647.70	P
156	406063.48	964734.70	P
157	406063.48	964808.70	P
158	406063.48	964886.70	P
159	406063.48	964955.70	P
160	406063.48	964479.70	P
161	406063.48	964566.70	P
162	406063.48	964653.70	P
163	406063.48	964745.70	P
164	406063.48	964814.70	P
165	406063.48	964892.70	P
166	406063.48	964966.70	P
167	406050.98	964479.70	P
168	406052.98	964560.70	P
169	406052.98	964566.70	P
170	406052.98	964647.70	P
171	406052.98	964653.70	P
172	406050.98	964734.70	P
173	406052.98	964808.70	P
174	406052.98	964814.70	P
176	406052.98	964886.70	P
177	406052.98	964892.70	P
178	406050.98	964955.70	P
179	406050.98	964745.70	P
180	406050.98	964966.70	P
181	406766.41	965538.50	P

POINT TABLE

POINT #	NORTHING	EASTING	DESCRIPTION
182	406764.59	965454.39	P
183	406757.62	965175.95	P
184	406755.37	965085.95	P
185	406736.42	965509.13	P
186	406734.60	965485.13	P
187	406727.63	965146.70	P
188	406725.38	965116.70	P
189	406690.71	965485.13	P
190	406690.71	965509.13	P
191	406658.06	965482.28	P
192	406653.89	965505.91	P
193	406635.23	965189.70	P
194	406633.23	965270.70	P
195	406633.23	965276.70	P
196	406633.23	965357.70	P
197	406633.23	965363.70	P
198	406635.23	965453.70	P
199	406628.00	965476.98	P
200	406624.73	965146.70	P
201	406622.73	965189.70	P
202	406622.73	965270.70	P
203	406622.73	965276.70	P
204	406622.73	965357.70	P
205	406622.73	965363.70	P
206	406622.73	965453.70	P
207	406619.73	965151.70	P
208	406619.73	965186.70	P
209	406619.73	965456.70	P
210	406619.73	965467.13	P
211	406612.96	965056.63	P
212	406600.46	965056.63	P
213	406597.46	965059.63	P
214	406595.73	965186.70	P
215	406595.73	965456.70	P
216	406595.73	965459.37	P
217	406592.73	965189.70	P
218	406592.73	965270.70	P
219	406592.73	965276.70	P
220	406592.73	965357.70	P
221	406592.73	965363.70	P
222	406592.73	965453.70	P
223	406590.73	965146.70	P
224	406590.73	965156.70	P
225	406589.73	965180.70	P
226	406584.00	965469.22	P
227	406582.46	965077.63	P
228	406570.46	965047.63	P
229	406570.46	965053.63	P
230	406561.73	965180.70	P
231	406560.69	965465.11	P
232	406558.73	965453.70	P
233	406558.73	965189.70	P
234	406558.73	965270.70	P
235	406558.73	965276.70	P
236	406558.73	965357.70	P
237	406558.73	965363.70	P
238	406555.73	965456.70	P
239	406555.73	965186.70	P
240	406555.73	965459.20	P
241	406553.46	965116.70	P

POINT TABLE

POINT #	NORTHING	EASTING	DESCRIPTION
242	406548.46	965077.63	P
243	406536.46	965047.63	P
244	406536.46	965053.63	P
245	406533.46	965092.63	P
246	406533.46	965096.70	P
247	406531.73	965186.70	P
248	406531.73	965447.70	P
249	406531.73	965450.37	P
250	406528.73	965189.70	P
251	406528.73	965270.70	P
252	406528.73	965276.70	P
253	406528.73	965357.70	P
254	406528.73	965363.70	P
255	406525.73	965180.70	P
256	406520.00	965457.93	P
257	406509.46	965050.63	P
258	406509.46	965096.70	P
259	406506.46	965047.63	P
260	406497.73	965180.70	P
261	406496.69	965453.82	P
262	406494.73	965444.70	P
263	406494.73	965189.70	P
264	406494.73	965270.70	P
265	406494.73	965276.70	P
266	406494.73	965357.70	P
267	406494.73	965363.70	P
268	406491.73	965447.70	P
269	406491.73	965186.70	P
270	406489.46	965047.63	P
271	406489.46	965116.70	P
272	406467.73	965186.70	P
273	406467.73	965434.70	P
274	406467.73	965436.80	P
275	406464.73	965431.70	P
276	406464.73	965189.70	P
277	406464.73	965266.70	P
278	406464.73	965272.70	P
279	406464.73	965353.70	P
280	406464.73	965359.70	P
281	406461.73	965180.70	P
282	406456.00	965446.65	P
283	406447.73	965146.70	P
284	406447.73	965156.70	P
285	406447.73	965180.70	P
286	406447.73	965266.70	P
287	406447.73	965272.70	P
288	406447.73	965353.70	P
289	406447.73	965359.70	P
290	406439.73	965146.70	P
291	406439.73	965156.70	P
292	406439.73	965180.70	P
293	406439.73	965266.70	P
294	406439.73	965272.70	P
295	406439.73	965353.70	P
296	406439.73	965359.70	P
297	406425.73	965180.70	P
298	406424.69	965441.13	P
299	406422.73	965431.70	P
300	406422.73	965189.70	P
301	406422.73	965272.70	P

POINT TABLE

POINT #	NORTHING	EASTING	DESCRIPTION
302	406422.73	965353.70	P
303	406422.73	965359.70	P
304	406422.73	965266.70	P
305	406419.73	965434.70	P
306	406419.73	965186.70	P
307	406419.73	965435.22	P
308	406395.73	965186.70	P
309	406395.73	965420.70	P
310	406395.73	965424.10	P
311	406392.73	965417.70	P
312	406392.73	965189.70	P
313	406392.73	965270.70	P
314	406392.73	965276.70	P
315	406392.73	965357.70	P
316	406392.73	965363.70	P
317	406389.73	965180.70	P
318	406386.35	965116.70	P
319	406384.00	965433.95	P
320	406361.73	965180.70	P
321	406361.37	965110.70	P
322	406360.69	965429.84	P
323	406358.73	965417.70	P
324	406358.73	965189.70	P
325	406358.73	965270.70	P
326	406358.73	965276.70	P
327	406358.73	965357.70	P
328	406358.73	965363.70	P
329	406355.73	965420.70	P
330	406355.73	965186.70	P
331	406355.73	965423.93	P
332	406336.39	965104.70	P
333	406331.73	965186.70	P
334	406331.73	965411.70	P
335	406331.73	965412.82	P
336	406328.73	965189.70	P
337	406328.73	965270.70	P
338	406328.73	965276.70	P
339	406328.73	965357.70	P
340	406328.73	965363.70	P
341	406325.73	965180.70	P
342	406320.00	965422.67	P
343	406297.73	965180.70	P
344	406296.73	965146.70	P
345	406296.73	965156.70	P
346	406296.72	965442.93	P
347	406295.85	965418.03	P
348	406294.73	965408.70	P
349	406294.73	965189.70	P
350	406294.73	965270.70	P
351	406294.73	965276.70	P
352	406294.73	965357.70	P
353	406294.73	965363.70	P
354	406291.73	965411.70	P
355	406291.73	965186.70	P
358	406291.73	965412.33	P
359	406291.65	965104.70	P
360	406267.73	965259.15	P
361	406267.73	965291.15	P
362	406267.73	965151.70	P
363	406266.67	965110.70	P

POINT TABLE

POINT #	NORTHING	EASTING	DESCRIPTION
364	406262.73	965146.70	P
365	406255.17	965413.84	P
366	406241.69	965116.70	P
367	406184.34	965291.15	P
368	406158.48	965116.70	P
369	406158.48	965078.70	P
370	406141.48	965078.70	P
371	406138.48	965081.70	P
372	406138.48	965096.70	P
373	406114.48	965110.70	P
374	406110.48	965038.70	P
375	406110.48	965044.70	P
376	406110.48	965107.70	P
377	406108.48	965116.70	P
378	406096.48	965116.70	P
379	406093.48	965038.70	P
380	406093.48	965044.70	P
381	406093.48	965107.70	P
382	406090.48	965110.70	P
383	406081.48	965146.70	P
384	406066.48	965119.70	P
385	406066.48	965131.70	P
386	406063.48	965038.70	P
387	406063.48	965116.70	P
388	406063.48	965044.70	P
389	406050.98	965038.70	P
390	406050.98	965044.70	P
391	406050.98	965116.70	P
392	406289.96	965022.40	P
393	406340.41	965022.40	P
394	406543.73	965156.70	P
395	406543.73	965462.12	P
396	406539.46	965486.37	P
397	406447.73	965189.70	P
398	406439.73	965189.70	P
399	406767.37	965584.02	P
500	406440.19	964762.27	TSW
501	406442.19	964760.25	TSW
502	406440.19	964794.94	TSW
503	406428.69	964794.12	TSW
504	406428.69	964785.00	TSW
505	406453.27	964972.90	TSW
506	406467.68	964972.82	TSW
507	406453.27	964985.73	TSW
508	406432.19	964752.41	TSW
509	406412.43	964666.63	TSW
510	406412.43	964672.01	TSW
511	406204.03	964898.93	TSW
512	406204.03	964906.93	TSW
513	406172.23	964906.93	TSW
514	406172.23	964898.93	TSW
515	406168.96	964677.51	TSW
516	406171.46	964675.01	TSW
517	406171.46	964643.10	TSW
518	406180.06	964643.10	TSW
519	406180.06	964670.05	TSW
520	406183.59	964670.05	TSW
521	406183.59	964677.29	TSW
522	406180.06	964677.29	TSW
523	406180.06	964685.51	TSW

LEGEND:

EG	EXISTING GRADE
GB	GRADE BREAK
HP	HIGH POINT
LP	LOW POINT
P	PAVEMENT
TC	TOP OF CURB
TSW	TOP OF SIDEWALK
BA	BASIN
CO	CURB OPENING
RR	RIP RAP

Contact Arizona 811 at least two full working days before you begin excavation

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Registered Professional Engineer
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TIMOTHY J. RHINE
Date Signed 11/16/18
ARIZONA, U.S.A.
Expires 09/30/21

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

CIVIL SITE PLAN - POINT TABLES

CS6

POINT TABLE

POINT #	NORTHING	EASTING	DESCRIPTION
524	406449.27	964906.96	TSW
525	406449.27	964898.96	TSW
528	406348.41	964972.47	TSW
529	406351.04	964972.47	TSW
530	406281.96	965008.08	TSW
531	406289.96	965008.08	TSW
532	406234.34	965170.73	TSW
533	406204.25	965147.33	TSW
534	406214.25	965147.33	TSW
535	406214.25	965170.73	TSW
536	406712.89	964557.03	TSW
537	406209.77	965001.43	TSW
538	406204.77	965001.43	TSW
539	406209.77	965017.43	TSW
540	406204.77	965017.43	TSW
541	406554.12	964541.86	TSW
542	406555.29	964535.98	TSW
543	406490.00	964523.02	TSW
545	406715.56	964551.03	TSW
546	406727.07	964549.62	TSW
547	406631.11	964551.03	TSW
548	406630.52	964557.03	TSW
549	406545.48	964534.03	TSW
550	406544.31	964539.91	TSW
551	406502.75	964525.55	TSW
552	406501.58	964531.43	TSW
553	406488.83	964528.90	TSW
554	406480.83	964527.32	TSW
555	406452.80	964515.63	TSW
556	406452.21	964521.63	TSW
557	406447.10	964521.63	TSW
558	406441.10	964521.63	TSW
559	406480.83	964602.47	TSW
560	406480.83	964608.47	TSW
561	406480.83	964666.63	TSW
562	406480.83	964672.63	TSW
563	406480.83	964752.41	TSW
564	406480.83	964760.41	TSW
565	406480.83	964846.08	TSW
566	406455.27	964852.93	TSW
567	406455.27	964825.86	TSW
568	406462.44	964859.27	TSW
569	406462.44	964888.26	TSW
570	406428.32	964868.41	TSW
571	406428.32	964888.26	TSW
572	406480.83	964906.96	TSW
573	406480.83	964972.80	TSW
574	406480.83	964985.80	TSW
575	406396.18	964515.63	TSW
576	406428.19	964621.47	TSW
577	406431.19	964618.47	TSW
578	406447.10	964602.47	TSW
579	406441.10	964602.47	TSW
580	406447.10	964608.47	TSW
581	406447.10	964618.47	TSW
582	406398.09	964521.63	TSW
583	406362.27	964546.99	TSW
584	406356.27	964543.89	TSW
585	406362.27	964555.59	TSW
586	406356.27	964555.59	TSW

POINT TABLE

POINT #	NORTHING	EASTING	DESCRIPTION
587	406416.43	964602.47	TSW
588	406428.19	964665.85	TSW
589	406420.17	964665.85	TSW
590	406416.43	964666.63	TSW
591	406416.43	964672.63	TSW
592	406147.11	964499.70	TSW
593	406147.11	964606.60	TSW
594	406180.02	964606.60	TSW
595	406184.02	964612.60	TSW
596	406147.11	964612.60	TSW
597	406147.11	964677.51	TSW
598	406147.11	964685.51	TSW
599	406147.11	964732.70	TSW
600	406183.52	964732.70	TSW
601	406183.52	964738.70	TSW
602	406147.11	964738.70	TSW
603	406152.17	964759.77	TSW
604	406159.11	964788.66	TSW
605	406159.11	964837.48	TSW
606	406178.23	964842.60	TSW
607	406172.23	964792.76	TSW
608	406178.23	964800.76	TSW
609	406178.23	964826.26	TSW
610	406178.23	964832.26	TSW
611	406172.23	964840.99	TSW
612	406200.86	964792.76	TSW
613	406196.86	964800.76	TSW
614	406196.86	964826.26	TSW
615	406196.86	964832.26	TSW
616	406258.73	964864.17	TSW
617	406258.73	964898.93	TSW
618	406180.36	964855.59	TSW
619	406243.71	964872.57	TSW
620	406243.71	964882.93	TSW
621	406180.36	964882.93	TSW
622	406159.11	964898.93	TSW
623	406159.11	964910.78	TSW
624	406152.17	964939.68	TSW
625	406147.11	964960.74	TSW
626	406209.77	964960.74	TSW
627	406209.77	964966.74	TSW
628	406147.11	964966.74	TSW
629	406147.11	964994.08	TSW
630	406167.11	964994.08	TSW
631	406480.83	965108.08	TSW
632	406167.11	965087.33	TSW
633	406147.11	965087.33	TSW
634	406147.11	965096.70	TSW
635	406158.48	965108.08	TSW
636	406241.69	965108.08	TSW
637	406262.76	965103.02	TSW
638	406267.53	965100.83	TSW
639	406267.53	965019.74	TSW
640	406281.11	965080.23	TSW
641	406276.11	965080.23	TSW
642	406276.11	965096.08	TSW
643	406281.11	965096.08	TSW
644	406289.11	965096.08	TSW
645	406340.41	965096.08	TSW
646	406351.67	965080.23	TSW

POINT TABLE

POINT #	NORTHING	EASTING	DESCRIPTION
647	406348.41	965080.23	TSW
648	406348.41	965096.08	TSW
649	406351.67	965096.08	TSW
650	406361.67	965045.76	TSW
651	406361.67	965101.64	TSW
652	406365.28	965103.02	TSW
653	406386.35	965108.08	TSW
654	406725.27	964555.51	TSW
700	406700.72	964580.34	BA
701	406698.12	964577.80	BA
702	406636.96	964577.80	BA
703	406634.36	964580.40	BA
704	406712.99	965081.64	BA
705	406710.39	965084.30	BA
706	406636.96	965084.30	BA
707	406634.36	965081.70	BA
708	406717.72	965176.58	BA
709	406712.72	965171.70	BA
710	406670.23	965171.70	BA
711	406665.23	965176.70	BA
712	406724.66	965460.01	BA
713	406719.66	965465.13	BA
714	406670.23	965465.13	BA
715	406665.23	965460.13	BA
716	406726.59	965539.13	BA
717	406689.20	965577.32	BA
718	406727.40	965572.07	BA
719	406695.80	965539.89	BA
720	406014.98	964455.70	BA
721	405609.98	964455.70	BA
722	405604.98	964460.70	BA
723	405604.98	965089.22	BA
724	406014.98	965153.79	BA
725	406034.98	965153.79	BA
726	406029.98	964455.70	BA
727	406034.98	964460.70	BA
728	406722.42	965577.19	BA
729	405894.21	965433.90	BA
730	406014.98	965455.20	BA
731	406201.82	965488.14	BA
732	406317.70	965508.57	BA
733	406678.92	965572.27	BA
734	406685.86	965532.87	BA
735	406295.28	965464.00	BA
736	406291.81	965483.70	BA
800	406612.96	964585.01	CO
801	406612.96	964577.01	CO
802	406612.96	964664.01	CO
803	406612.96	964667.01	CO
804	406612.96	964742.01	CO
805	406612.96	964746.01	CO
810	406612.96	964931.13	CO
811	406612.96	964936.13	CO
812	406612.96	965052.26	CO
813	406612.96	965056.26	CO
818	406635.23	965451.33	CO
819	406635.23	965453.33	CO
820	406559.26	965489.23	CO
821	406519.87	965482.28	CO
822	406433.67	965467.08	CO

POINT TABLE

POINT #	NORTHING	EASTING	DESCRIPTION
823	406425.79	965465.69	CO
824	406071.58	965142.97	CO
825	406070.22	965141.61	CO
826	406050.98	965049.08	CO
827	406050.98	965045.08	CO
828	406050.98	964967.08	CO
829	406050.98	964979.08	CO
832	406050.98	964872.70	CO
833	406050.98	964864.70	CO
836	406050.98	964734.33	CO
837	406050.98	964724.33	CO
838	406050.98	964560.33	CO
839	406050.98	964552.33	CO
840	406432.23	964459.58	CO
841	406437.12	964460.59	CO
842	406491.18	964507.88	CO
843	406492.95	964508.82	CO
844	406509.46	964556.77	CO
845	406509.46	964560.77	CO
846	406274.17	964479.70	CO
847	406276.17	964479.70	CO
848	406386.85	964479.70	CO
849	406388.85	964479.70	CO
850	406114.48	964551.70	CO
851	406114.48	964555.70	CO
852	406110.48	964551.70	CO
853	406110.48	964555.70	CO
854	406114.48	964705.33	CO
855	406114.48	964709.33	CO
856	406110.48	964705.33	CO
857	406110.48	964709.33	CO
858	406114.48	964721.33	CO
859	406114.48	964725.33	CO
860	406110.48	964721.33	CO
861	406110.48	964725.33	CO
862	406114.48	964866.22	CO
863	406114.48	964870.22	CO
864	406110.48	964866.22	CO
865	406110.48	964870.22	CO
866	406114.48	964976.08	CO
867	406114.48	964980.08	CO
868	406110.48	964976.08	CO
869	406110.48	964980.08	CO
870	406114.48	964992.08	CO
871	406114.48	964996.08	CO
872	406110.48	964992.08	CO
873	406110.48	964996.08	CO
874	406114.48	965060.70	CO
875	406114.48	965064.70	CO
876	406110.48	965060.70	CO
877	406110.48	965064.70	CO
878	406509.46	965072.67	CO
879	406509.46	965074.67	CO
880	406556.27	965146.70	CO
881	406554.27	965146.70	CO
882	406546.73	965146.70	CO
883	406540.73	965146.70	CO
884	406525.90	965146.70	CO
885	406523.90	965146.70	CO
886	406432.15	965146.70	CO

POINT TABLE

POINT #	NORTHING	EASTING	DESCRIPTION
887	406430.15	965146.70	CO
888	406405.54	965146.70	CO
889	406403.54	965146.70	CO
890	406391.08	965146.70	CO
891	406389.08	965146.70	CO
892	406433.65	965156.70	CO
893	406428.65	965156.70	CO
894	406548.73	965156.70	CO
895	406538.73	965156.70	CO
900	406641.50	964582.80	RR
901	406649.16	964582.80	RR
902	406649.16	964557.03	RR
903	406641.50	964557.03	RR
904	406639.36	964576.01	RR
905	406639.36	964586.01	RR
906	406613.58	964586.01	RR
907	406613.58	964576.01	RR
908	406613.58	964663.01	RR
909	406613.58	964668.01	RR
910	406639.36	964668.01	RR
911	406639.36	964663.01	RR
912	406634.36	964703.78	RR
913	406639.36	964703.78	RR
914	406634.36	964708.78	RR
915	406639.36	964708.78	RR
916	406639.36	964741.01	RR
917	406639.36	964747.01	RR
918	406613.58	964747.01	RR
919	406613.58	964741.01	RR
920	406613.58	964930.13	RR
921	406613.58	964937.13	RR
922	406639.36	964930.13	RR
923	406639.36	964937.13	RR
924	406639.36	965051.26	RR
925	406639.36	965057.26	RR
926	406613.58	965057.26	RR
927	406613.58	965051.26	RR
928	406560.14	965490.02	RR
929	406557.64	965504.17	RR
930	406518.78	965482.72	RR
931	406516.28	965496.88	RR
932	406434.55	965467.87	RR
933	406432.05	965482.03	RR
934	406424.70	965466.13	RR
935	406422.20	965480.29	RR
936	406071.94	965144.07	RR
937	406069.11	965141.25	RR
938	406056.99	965163.44	RR
939	406049.75	965156.20	RR
940	406442.97	964443.56	RR
941	406433.60	964441.62	RR
942	406439.20	964460.42	RR
943	406430.39	964458.60	RR
944	406670.24	965450.33	RR
945	406670.24	965454.33	RR
946	406635.86	965450.33	RR
947	406635.86	965454.33	RR
948	406553.27	965149.33	RR
949	406547.73	965149.33	RR
950	406539.73	965149.33	RR

POINT TABLE

POINT #	NORTHING	EASTING	DESCRIPTION
951	406526.90	965149.33	RR
952	406522.90	965149.33	RR
953	406433.15	965149.33	RR
954	406429.15	965149.33	RR
955	406406.54	965149.33	RR
956	406402.54	965149.33	RR
957	406392.08	965149.33	RR
958	406388.08	965149.33	RR
959	406701.79	965074.30	RR
960	406681.29	965074.30	RR
961	406681.29	965094.30	RR
962	406701.79	965094.30	RR
963	406701.79	965181.70	RR
964	406681.29	965181.70	RR
965	406681.29	965161.70	RR
966	406701.79	965161.70	RR
967	406694.28	965455.15	RR
968	406694.77	965475.13	RR
969	406714.78	965455.15	RR
970	406715.27	965475.13	RR
971	406730.15	965532.12	RR
972	406729.29	965561.83	RR
973	406691.38	965580.31	RR
974	406722.43	965580.00	RR
975	406557.27	965149.33	RR

LEGEND:

EG	EXISTING GRADE
GB	GRADE BREAK
HP	HIGH POINT
LP	LOW POINT
P	PAVEMENT
TC	TOP OF CURB
TSW	TOP OF SIDEWALK
BA	BASIN
CO	CURB OPENING
RR	RIP RAP

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Registered Professional Engineer
60430
TIMOTHY J. RHINE
Civil
Date Signed 11/16/18
ARIZONA, U.S.A.
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Health Services Center II
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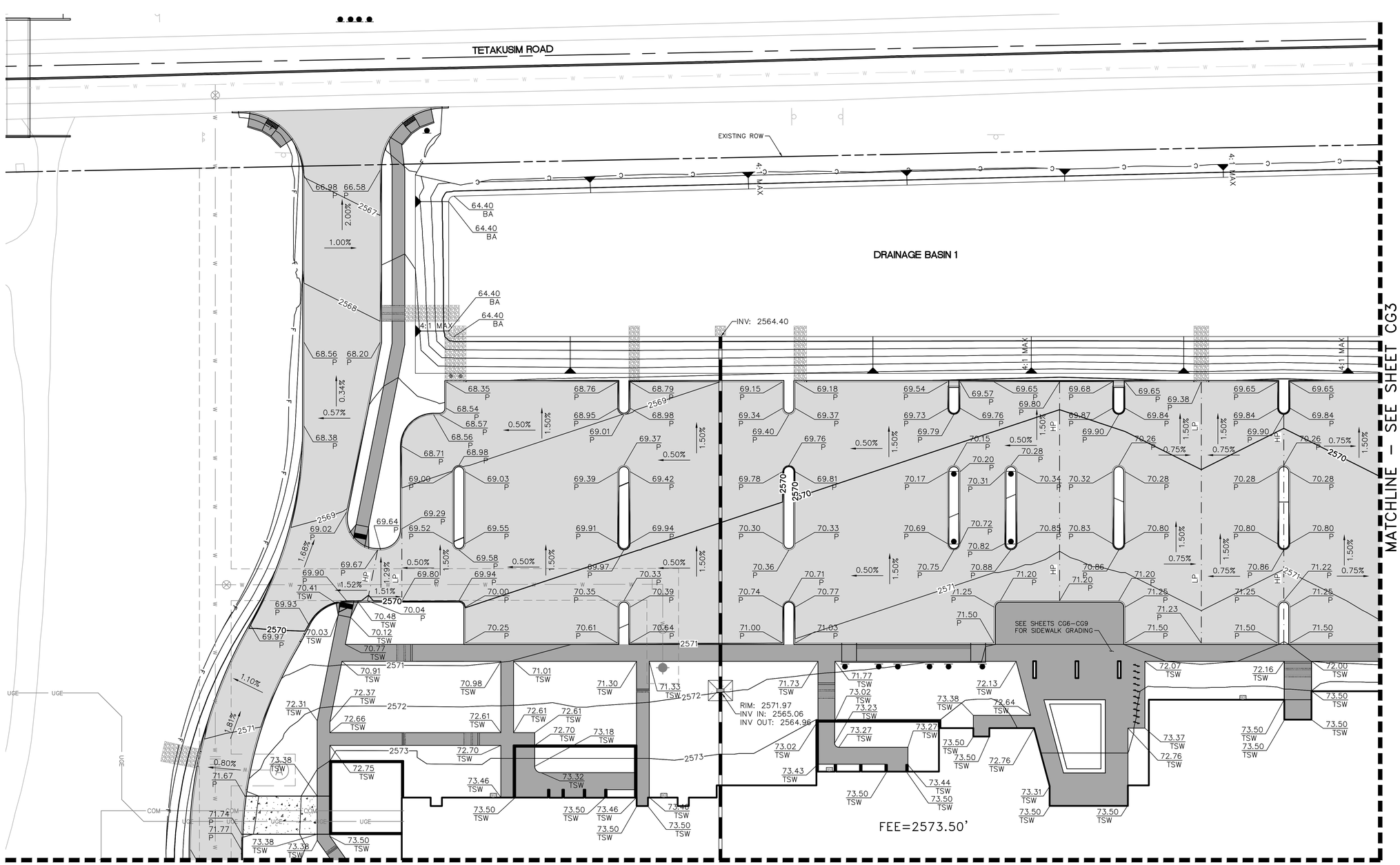
CIVIL SITE PLAN - POINT TABLES

CS7



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0 20' 40'
SCALE: 1"=20'

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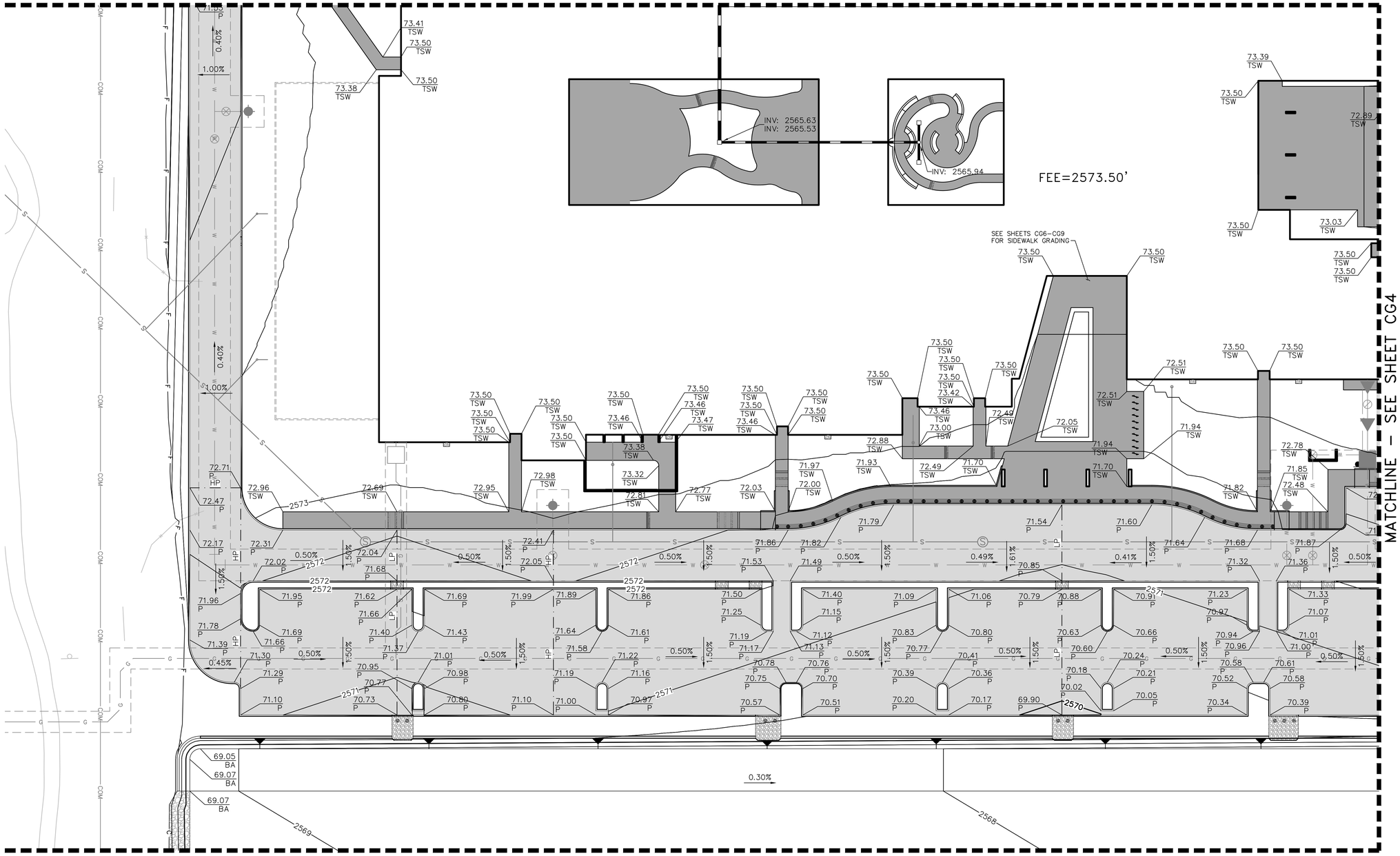
CIVIL GRADING PLAN - QUADRANT 1

CG1

MATCHLINE – SEE SHEET CG1

MATCHLINE – SEE SHEET CG4



MATCHLINE – SEE SHEET CG5

SCALE: 1"=20'

LEGEND:

EG	EXISTING GRADE
GB	GRADE BREAK
HP	HIGH POINT
LP	LOW POINT
P	PAVEMENT
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TSW	TOP OF SIDEWALK
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CIVIL GRADING PLAN - QUADRANT 3

CG2

TETAKUSIM ROAD

EXISTING ROW

DRAINAGE BASIN 1

DRAINAGE BASIN 2

DRAINAGE BASIN 3

INV: 2564.40

Concrete 2:1 Side Slope

MATCHLINE – SEE SHEET CG1

MATCHLINE – SEE SHEET CG4

SCALE: 1"=20'

LEGEND:

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GB	GRADE BREAK
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LP	LOW POINT
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CIVIL GRADING PLAN - QUADRANT 2

CG3

MATCHLINE – SEE SHEET CG3

MATCHLINE – SEE SHEET CG2

MATCHLINE – SEE SHEET CG5

SEE SHEETS CG6–CG9 FOR SIDEWALK GRADING

FEE=2573.50'

SCALE: 1"=20'

LEGEND:

EG	EXISTING GRADE
GB	GRADE BREAK
HP	HIGH POINT
LP	LOW POINT
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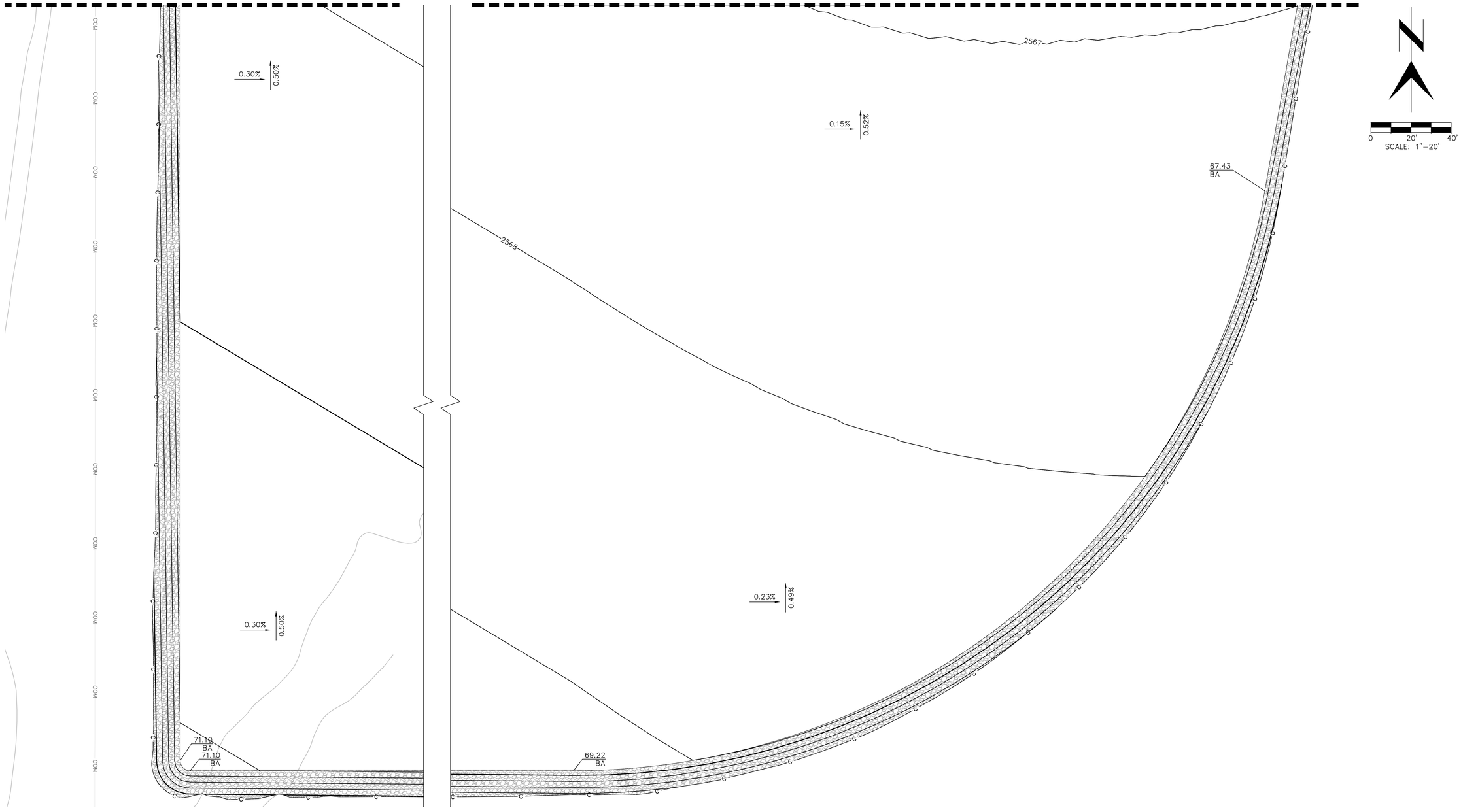
CIVIL GRADING PLAN - QUADRANT 4

CG4

MATCHLINE – SEE SHEET CG2

MATCHLINE – SEE SHEET CG4



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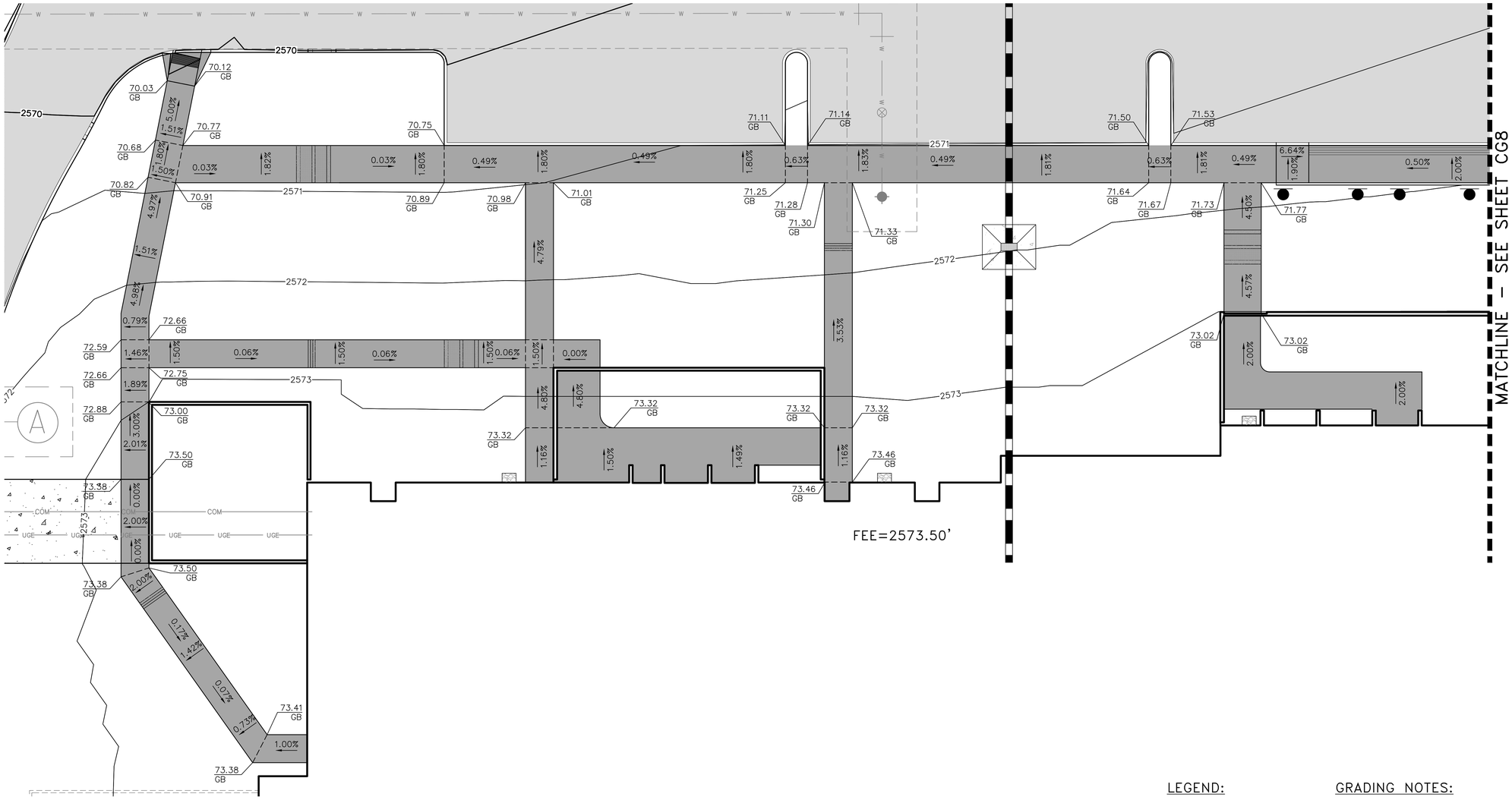
CIVIL GRADING PLAN - CHANNEL

CG5



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HP	HIGH POINT
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0 10' 20'
SCALE: 1"=10'

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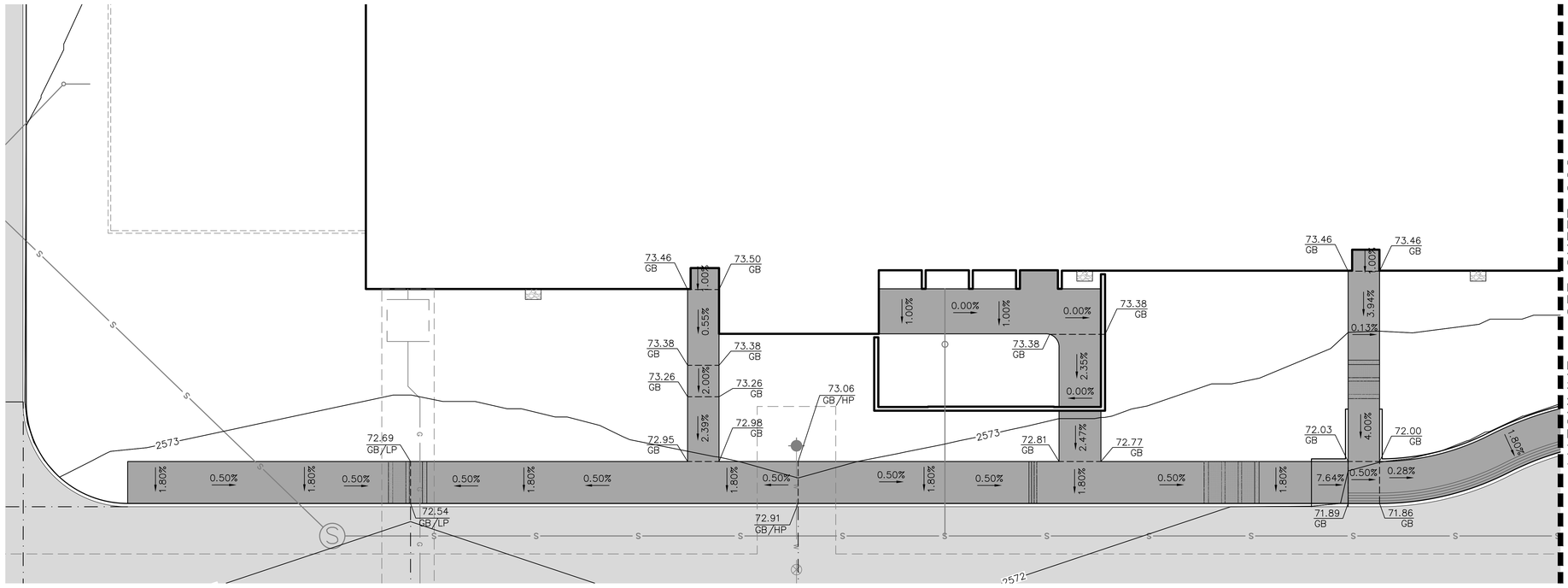
CIVIL GRADING SIDEWALK PLAN - QUADRANT 1

CG6



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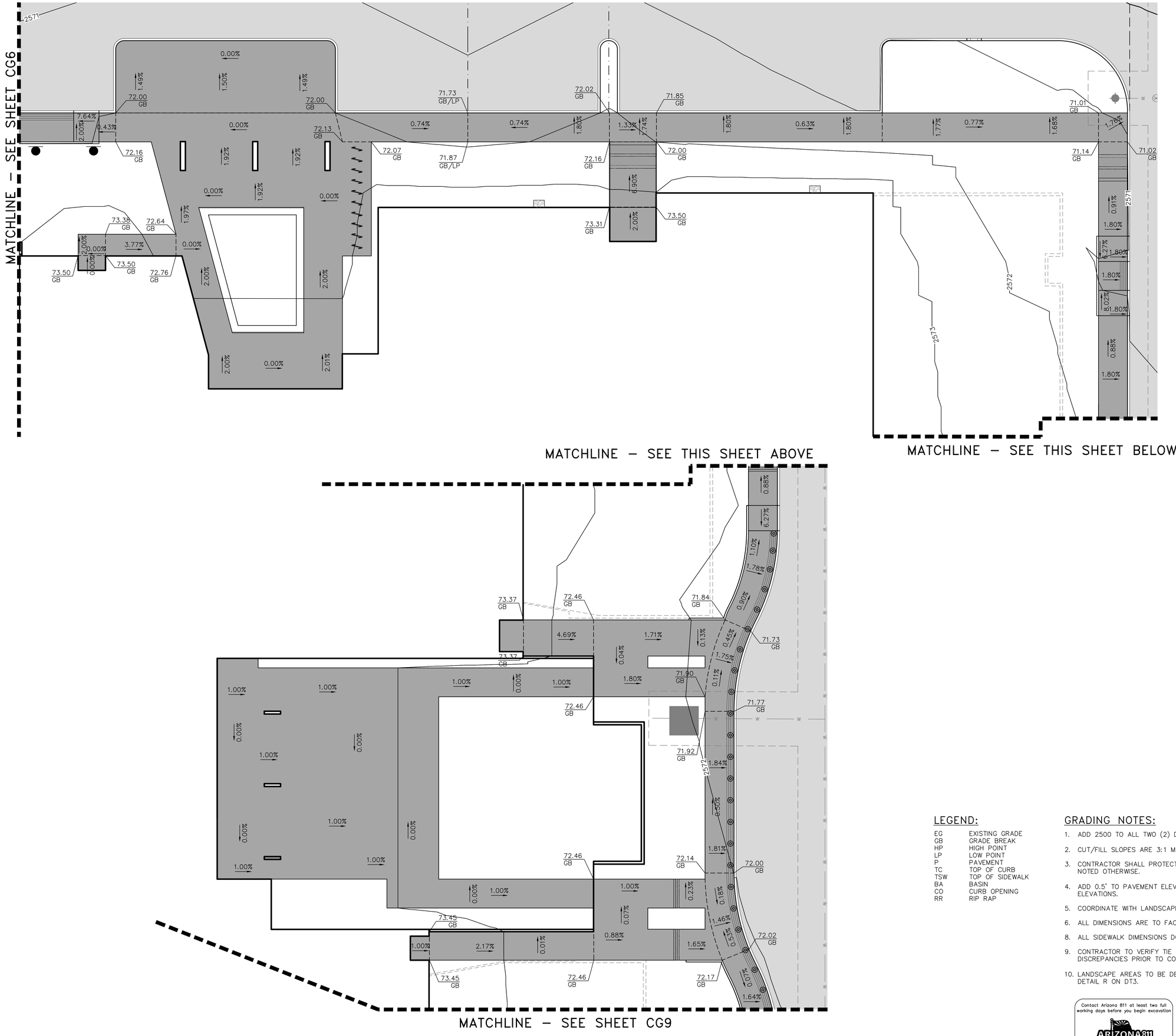
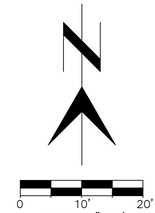
CIVIL GRADING PLAN SIDEWALK-QUADRANT 3

CG7





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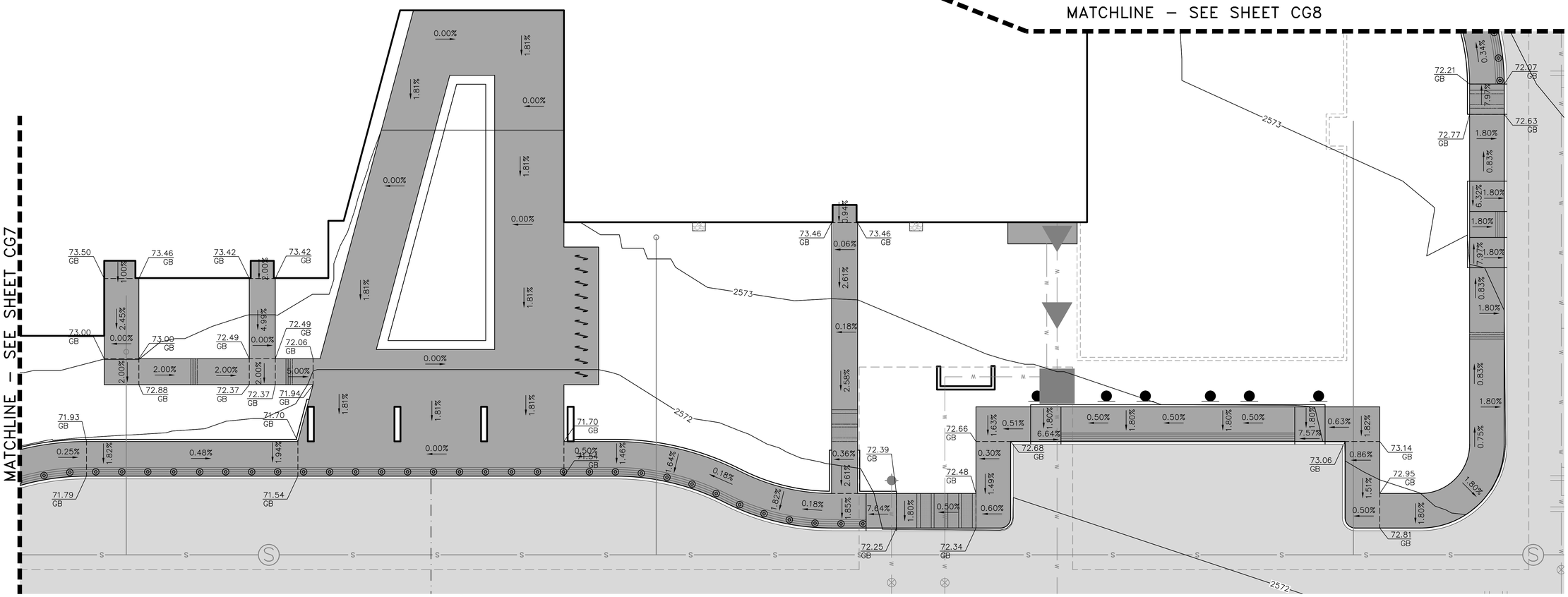
CIVIL GRADING PLAN SIDEWALK - QUADRANT 2

CG8



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Registered Professional Engineer
60430
TIMOTHY J. RHINE
Date Signed 11/16/18
ARIZONA, U.S.A.
Expires 09/30/21

job
1717

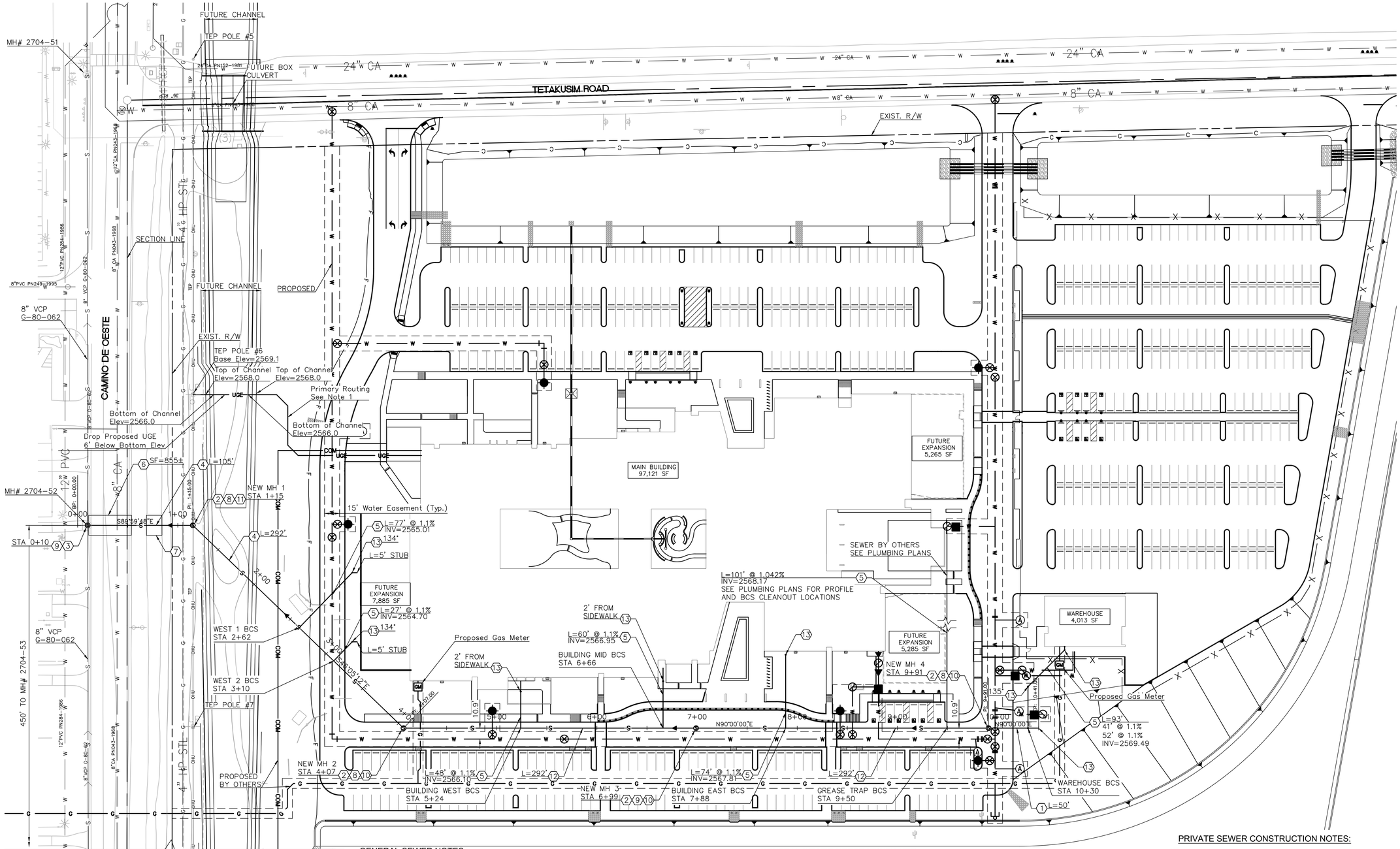
date
11.16.18

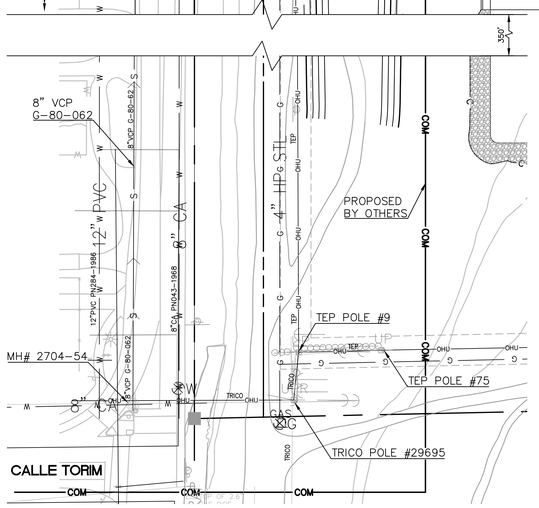
revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

CIVIL GRADING PLAN SIDEWALK - QUADRANT 4

CG9





GENERAL SEWER NOTES

1. ALL DESIGN STANDARDS, MATERIALS AND WORKMANSHIP FOR SANITARY SEWERS SHALL BE IN ACCORDANCE WITH THE PIMA COUNTRY REGIONAL WASTEWATER RECLAMATION DEPARTMENT (PCRWRD) ENGINEERING DESIGN STANDARDS 2016 (EDS 2016) AND THE STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION 2016 (SSDC 2016). SAID DOCUMENTS ARE AVAILABLE THROUGH THE PCRWRD WEBSITE (WWW.PIMA.GOV/WASTEWATERRECLAMATION).
2. SEWER CONSTRUCTION SHALL NOT COMMENCE UNTIL: (A) THE CONTRACTOR HAS OBTAINED A PCRWRD PUBLIC SEWER CONSTRUCTION PERMIT (CONTACT THE PCRWRD PERMITS SECTION AT (520) 724-6649 FOR PERMIT APPLICATION REQUIREMENTS); (B) THE CONTRACTOR'S FLOW MANAGEMENT PLAN HAS BEEN SUBMITTED THIRTY (30) CALENDAR DAYS PRIOR TO THE PRE-CONSTRUCTION MEETING AND APPROVED BY PCRWRD FIELD ENGINEERING.
3. IMMEDIATELY REPORT ANY OF THE FOLLOWING TO THE PCRWRD OPERATIONS CONTROL CENTER (OCC) AT (520) 724-6500: ANY RELEASE OF SEWAGE, ANY DAMAGE TO THE PUBLIC SANITARY SEWER SYSTEM, OR THE DROPPING OF DEBRIS INTO A PUBLIC SANITARY SEWER MANHOLE. A PCRWRD REPRESENTATIVE WILL BE DISPATCHED TO THE SITE. THE CONTRACTOR SHALL TAKE IMMEDIATE ACTION TO CONTAIN A SANITARY SEWAGE OVERFLOW (SSO). THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS TO REPAIR THE SYSTEM, MITIGATE THE RELEASE OF SEWAGE, DISINFECT THE RELEASE AREAS, AND ANY REGULATORY PENALTIES LEVIED ON PCRWRD FOR SEWAGE ENTERING A NATURAL DRAINAGE WAY OR STORM WATER DRAINAGE SYSTEM. THE CONTRACTOR SHALL REPAIR ALL DAMAGES AS DIRECTED AND APPROVED BY THE PCRWRD FIELD REPRESENTATIVE.
4. STORM WATER AND SEDIMENT CONTROL MEASURES SHALL BE PROPERLY INSTALLED TO PROTECT PCRWRD MANHOLES AT THE BEGINNING OF CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONSTANTLY MAINTAIN STORM WATER AND SEDIMENT CONTROL MEASURES THAT PROTECT PCRWRD FACILITIES UNDER ALL CONDITIONS FOR THE DURATION OF THE PROJECT. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR ALLOW STORM WATER, SEDIMENT, OR POTENTIAL POLLUTANTS FROM A CONSTRUCTION SITE TO ENTER A PCRWRD MANHOLE. THE CONTRACTOR SHALL ENSURE THAT THEIR FLOW MANAGEMENT OPERATIONS INCLUDE CONTROLS TO PREVENT ANY INTRODUCTION OF STORM WATER, SEDIMENT, OR POLLUTANTS INTO THE PUBLIC SANITARY SEWER SYSTEM. FAILURE TO CONFORM TO THESE REQUIREMENTS SHALL RESULT IN CANCELLATION OF THE SEWER CONSTRUCTION PERMIT.

GENERAL SEWER NOTES CONTINUED

5. SPECIAL CARE SHALL BE TAKEN TO ENSURE DESIGN SLOPES ARE MAINTAINED. CORRECTIVE ACTION, INCLUDING RE-CONSTRUCTION OF THE SEWER(S), WILL BE AT THE SOLE EXPENSE OF THE CONTRACTOR.
6. ALL FRAMES AND COVER ADJUSTMENTS SHALL BE IN ACCORDANCE WITH PCRWRD SSDC 2016, DETAIL NOS. RWRD 211, 212, 304 OR 305 (AS APPLICABLE). THE CONTRACTOR SHALL PROTECT THE BENCH AND FLOW CHANNELS WITH A COVER PER PCRWRD SSDC 2016, DETAIL NO. RWRD 306. PRIOR TO COMMENCING ANY WORK TO THE MANHOLE AND REMOVE THE COVER AFTER ALL WORK IS COMPLETED. THE CONTRACTOR SHALL ENSURE THAT FRAMES AND COVERS ARE CLEAN AND FREE FROM ANY AND ALL ATTACHED MATERIALS (ASPHALT, CONCRETE, ETC.) AND THAT ALL VENT HOLES ARE OPEN AND CLEAR OF OBSTRUCTIONS. EXISTING FRAMES AND/OR COVERS THAT ARE DAMAGED OR CANNOT BE COMPLETELY CLEANED SHALL BE REPLACED WITH A NEW FRAME AND COVER IN ACCORDANCE WITH PCRWRD SSDC 2016, DETAIL NO. RWRD 213-218. COSTS ASSOCIATED WITH EXISTING FRAMES AND COVERS THAT ARE LOST OR DAMAGED DUE TO THE CONTRACTOR'S SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

NOTES

1. All ELEVATIONS ARE INVERT ELEVATIONS UNLESS OTHERWISE NOTED.
2. HORIZONTAL SEPARATION OF UTILITIES SHALL BE 6' MINIMUM AND VERTICAL SEPARATION OF UTILITIES SHALL BE 2' MINIMUM UNLESS OTHERWISE NOTED.

DRY UTILITY CONSTRUCTION NOTES

1. PROPOSED TUCSON ELECTRIC POWER PRIMARY ROUTING FROM TEP POLE #6.
2. PROPOSED CENTURYLINK TELEPHONE ROUTING FROM THE WEST AT METER BOX ON CALLE TORIM, TO BE COORDINATED.
3. PROPOSED SOUTHWEST GAS ROUTING, FROM THE WEST, NEAR CALLE TETAKUSIM. NEW GAS PIPING BY SWG. TRENCHING AND BACKFILL BY CONTRACTOR WITHIN THE PARKING LOT.
4. PROPOSED SECONDARY ELECTRIC ROUTING FROM TRANSFORMER, 1-4" CONDUIT.

PRIVATE SEWER CONSTRUCTION NOTES:

1. INSTALL 6" PVC SDR 35 SEWER PIPE, LENGTH AND SLOPE PER PLAN. TRENCH, BEDDING AND BACKFILL PER PCRWD DTL 104.
2. 48" SEWER MANHOLES PER RWRD DTL 200, 201, 205, AND 207.
3. CONNECT TO EXISTING MANHOLE PER RWRD DTL 301/302 INVERT PER PROFILE.
4. INSTALL 8" DIP CLASS 350 SEWER PIPE WITH LINING PER RWRD SPEC SECTION 3.2.2(D), LENGTH AND SLOPE PER PLAN. TRENCH, BEDDING AND BACKFILL PER PCRWD DTL 104.
5. INSTALL 4" BCS PER RWRD DTL 401 TO WITHIN 3.5' OF BUILDING, UNLESS NOTED OTHERWISE.
6. TRENCH PATCH PAVEMENT PER PAG DTL 216
7. CONCRETE SCOUR PROTECTION PER RWRD DTL 113
8. 30" FRAME AND COVER PER RWRD DTL 216 WITH ACTIVATED CARBON ODOR FILTER INSERT.
9. 30" WATER TIGHT FRAME AND COVER PER RWRD DTL 217
10. CONCRETE COLLAR FOR PAVED AREAS PER RWRD DTL 211
11. CONCRETE COLLAR FOR UNPAVED AREAS PER RWRD DTL 212
12. INSTALL 8" PVC SDR 35 SEWER PIPE, LENGTH AND SLOPE PER PLAN. TRENCH, BEDDING AND BACKFILL PER RWRD DTL 104.
13. INSTALL BCS CLEANOUT PER RWRD DTL 404, TYPE 2.

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0 40' 80'
SCALE: 1"=40'

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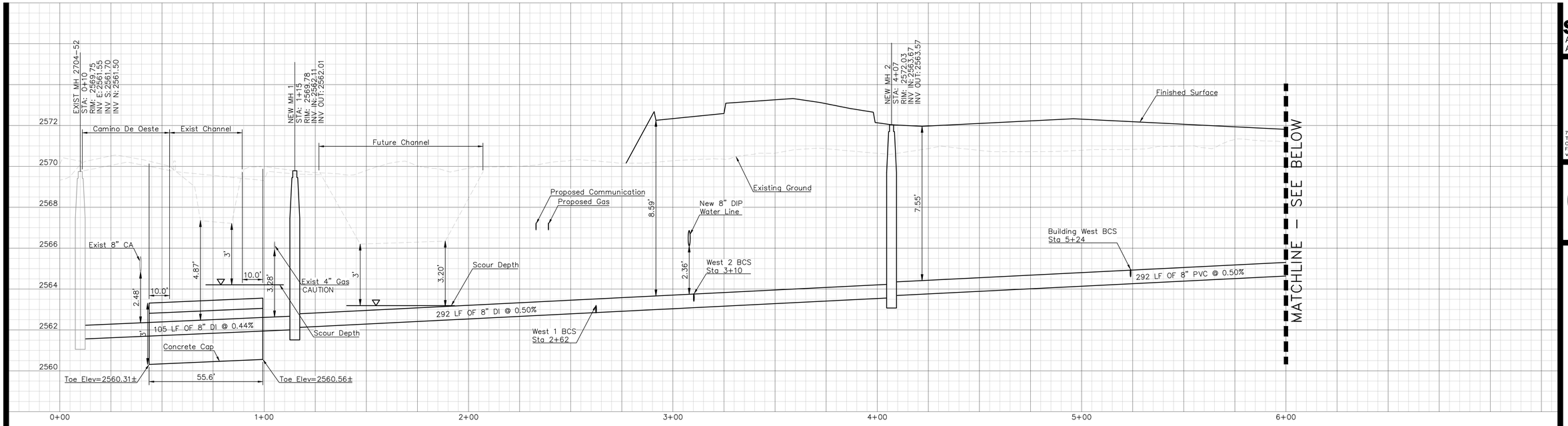
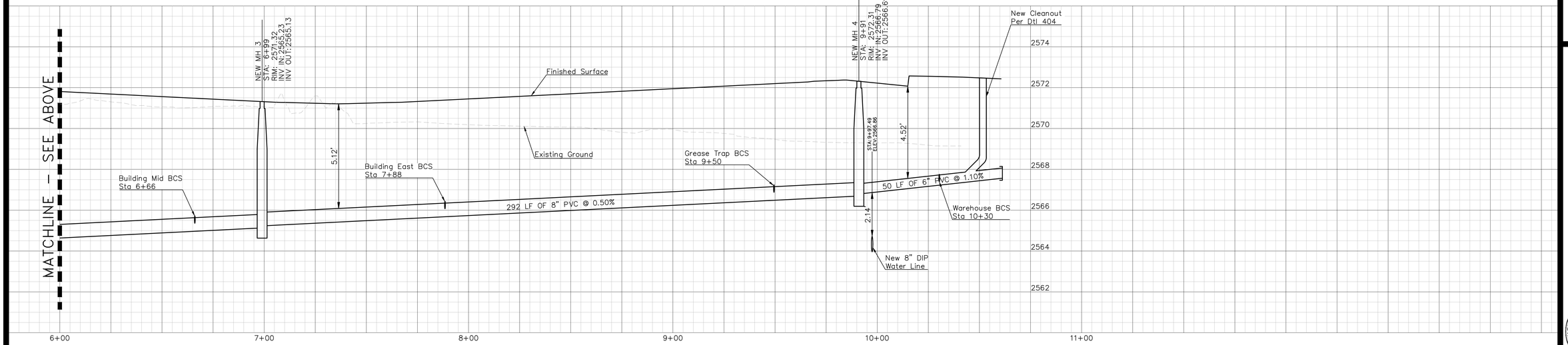
UTILITY SHEET PLAN

UT1





Sewer Main

HORIZ. SCALE: 1"=20'

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS PROJECT IS NORTH 00°00'44.50" EAST, ALONG THE EAST LINE OF THE NORTHEAST 1/4 OF SECTION 24, TOWNSHIP 15 SOUTH, RANGE 12 EAST, GILA AND SALT RIVER MERIDIAN, PIMA COUNTY, ARIZONA BETWEEN THE FOUND 3.25" DIAMETER BLM BRASS CAP (DISTURBED – ADJUSTED TO FIT PCDOT REFERENCES) MARKING THE EAST 1/4 CORNER OF SAID SECTION 24 AND THE FOUND 2" DIAMETER BRASS CAP SET IN HANDWELL AND STAMPED "T15S, R12E, R13E, 13/24, PCDOT" MARKING THE NORTHEAST CORNER OF SAID SECTION 24, AS SHOWN ON SHEET 9 OF 17 OF THE PIMA COUNTY DEPARTMENT OF TRANSPORTATION AND FLOOD CONTROL DISTRICT AS-BUILT PLAN FOR CAMINO DE OESTE ROADWAY IMPROVEMENTS FROM CALLE TETAKUSIM TO LOS REALES ROAD, WORK ORDER NO. 4PYCDO, DATED DECEMBER 12, 2010.

BASIS OF ELEVATIONS

THE BASIS OF ELEVATIONS FOR THIS SURVEY IS NAVD88. THE PRIMARY BENCHMARK IS PIMA COUNTY DEPARTMENT OF TRANSPORTATION OPUS CONTROL POINT 15S12E_N25 WHICH IS A FOUND #4 REBAR WITH BRASS TAG STAMPED "PCDOT REF 16" AT THE SOUTHWEST CORNER OF THE INTERSECTION OF CAMINO DE OESTE AND LOS REALES ROAD; +/-12 FEET SOUTH OF THE SOUTH EDGE OF PAVEMENT AND +/-105 FEET WEST-SOUTHWEST OF THE 2" BRASS CAP SET IN HANDWELL AND STAMPED "T15S, R12E, R13E, 13/24, PCDOT" MARKING THE NORTHEAST CORNER OF SECTION 24, T15S, R12E, G.&S.R.M. THE ELEVATION IS 2559.04 FEET. THE LOCAL BENCHMARK IS THE SOUTHEAST CORNER OF THE CONCRETE MAILBOX PAD AT THE SOUTHEAST CORNER OF THE INTERSECTION OF CAMINO DE OESTE AND TETAKUSIM ROAD. THE ELEVATION IS 2567.22 FEET.

BASIS OF COORDINATES

THE BASIS OF COORDINATES FOR THIS SURVEY IS 408041.40 NORTH AND 964263.20 EAST ON THE FOUND 2" DIAMETER BRASS CAP SET IN HANDWELL AND STAMPED "T15S, R12E, R13E, 13/24, PCDOT" MARKING THE NORTHEAST CORNER OF SECTION 24, TOWNSHIP 15 SOUTH, RANGE 12 EAST, GILA AND SALT RIVER MERIDIAN, PIMA COUNTY, ARIZONA, AS SHOWN ON SHEET 9 OF 17 OF THE PIMA COUNTY DEPARTMENT OF TRANSPORTATION AND FLOOD CONTROL DISTRICT AS-BUILT PLAN FOR CAMINO DE OESTE ROADWAY IMPROVEMENTS FROM CALLE TETAKUSIM TO LOS REALES ROAD, WORK ORDER NO. 4PYCDO, DATED DECEMBER 12, 2010. NOTE: PRIOR TO CONSTRUCTION, SHEET 9 OF 17 OF THE PIMA COUNTY DEPARTMENT OF TRANSPORTATION AND FLOOD CONTROL DISTRICT AS-BUILT PLAN FOR CAMINO DE OESTE ROADWAY IMPROVEMENTS SHOWS THAT THIS CORNER WAS ORIGINALLY MONUMENTED BY A 1/2" DIAMETER PIN.

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UTILITY SHEET PROFILE

UT2

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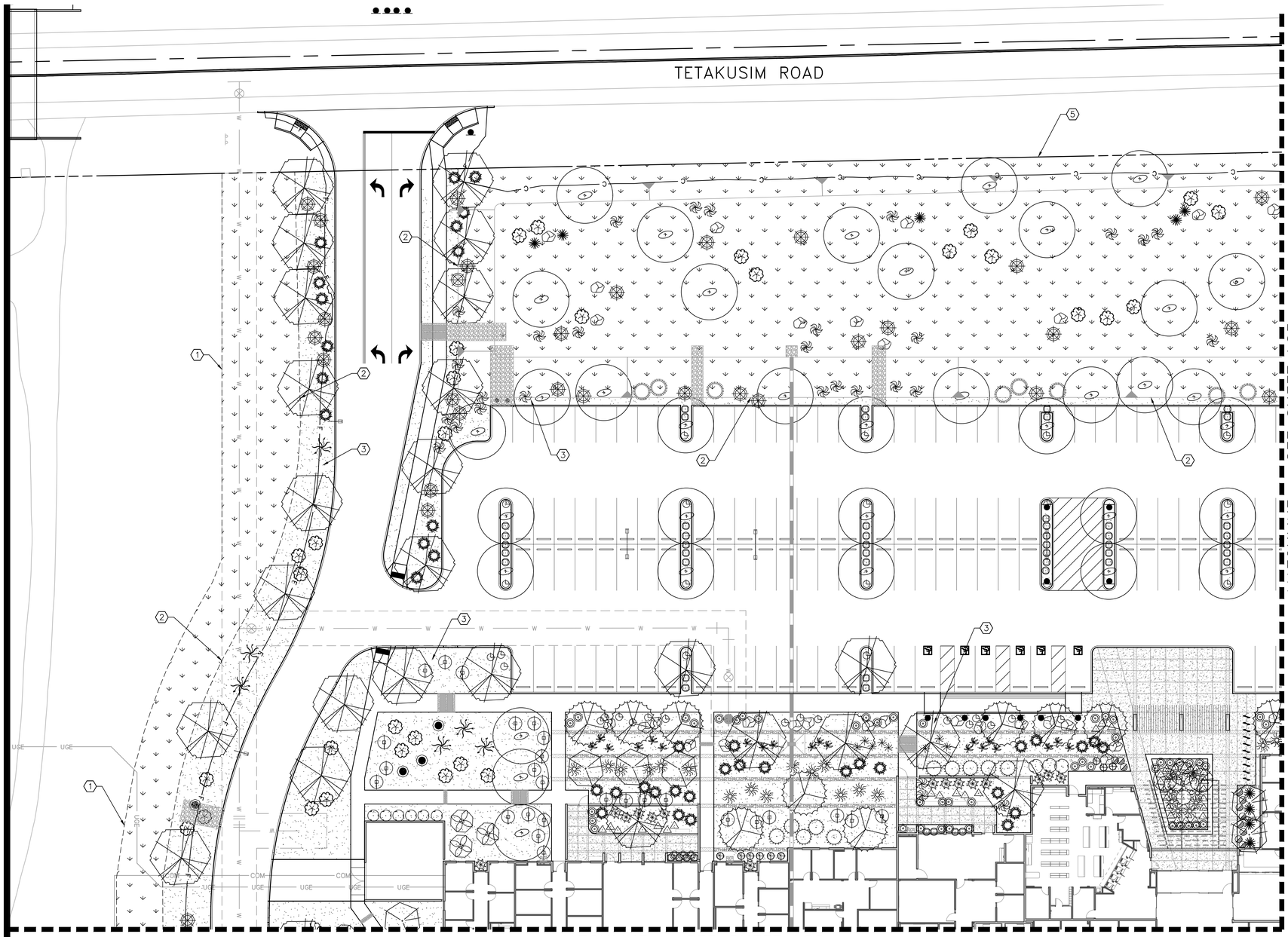

LANDSCAPE NOTES:

1. LIMITS OF SEED.
2. LIMITS OF DECOMPOSED GRANITE
3. DECOMPOSED GRANITE IN ALL PLANTING AREAS UNLESS OTHERWISE NOTED, TYP.
4. PROPERTY LINE
5. R.O.W. LIMITS

MAINTENANCE SCHEDULE:

FOR THE FIRST YEAR:

1. PLANTS NOT SURVIVING AFTER 30 DAYS SHALL BE REPLACED WITH EQUIVALENT SIZE AND SPECIES.

2. PLANT MATERIAL SHALL ONLY BE PRUNED TO CONTROL SIZE AND BE ALLOWED TO GROW IN ITS NATURAL GROWTH PATTERN, NOT BALLED.

3. INERT GROUNDCOVER SHALL BE REPLACED AS NEEDED DUE TO DISPLACEMENT OR EROSION.

4. MONTHLY MAINTENANCE SHALL BE PERFORMED TO KEEP LANDSCAPED AREAS FREE OF TRASH, WEEDS, DEBRIS AND DEAD PLANT MATERIAL.

5. REGULAR MONTHLY IRRIGATION CHECKS SHALL BE PERFORMED TO CHECK FOR AND/OR REPLACE LEAKY OR BROKEN PIPES, FITTINGS AND MALFUNCTIONING OR MISALIGNED HEADS, EMITTERS, AND BUBBLERS.

PLANTING NOTES:

1. ALL PLANT QUANTITIES TO BE VERIFIED PRIOR TO PROCUREMENT. QUANTITIES SHOWN ON LEGEND ARE FOR REFERENCE ONLY. IN CASE OF DISCREPANCY, QUANTITIES SHOWN ON PLAN WILL PREVAIL.

2. INSTALL DECOMPOSED GRANITE, 2" DEEP IN ALL PLANTING AREAS (NON-PAVED AREAS) OR TO LIMITS OF SEED. COLOR TO BE CORONADO BROWN OR APPROVED EQUAL. REFER TO SPECIFICATIONS.

3. NO STRUCTURES OR VEGETATION BETWEEN 30" AND 72" IN HEIGHT SHALL BE PLACED WITHIN SIGHT VISIBILITY TRIANGLES.

4. ALL TREES SHALL BE LOCATED A MINIMUM OF 10'-0" FROM SEWER LINES, 8'-0" FROM GAS LINES, AND 5'-0" FROM WATER LINES.

PLANT LEGEND:

TREES

SYMBOL	BOTANICAL NAME / COMMON NAME	QUANTITY	SIZE	GPH
	ACACIA WILLARDIANA PALO BLANCO	7	24" BOX	6
	CHILOPSIS LINEARIS DESERT WILLOW	13	24" BOX	6
	FRAXINUS VELUTINA 'FAN-TEX' FAN-TEX ASH	18	24" BOX	8
	PARKINSONIA X 'DESERT MUSEUM' DESERT MUSEUM PALO VERDE	75	24" BOX	6
	PROSOPIS VELUTINA VELVET MESQUITE	129	24" BOX	6
	OLNEYA TESOTA IRONWOOD	1	48" BOX	6
	SOPHORA SECUNDIFLORA TEXAS MOUNTAIN LAUREL	12	24" BOX	6
	CORDIA SONORAE PALO DE ASTA	3	24" BOX	6
	VALLESIA GLABRA VALLESIA	4	24" BOX	6

SHRUBS

SYMBOL	BOTANICAL NAME / COMMON NAME	QUANTITY	SIZE	GPH
	BUDDLEIA MARRUBIIFOLIA WOOLY BUTTERFLY BUSH	34	5 GAL	1
	CAESALPINIA MEXICANA MEXICAN BIRD OF PARADISE	13	5 GAL	1
	CAESALPINIA PULCHERRIMA RED BIRD OF PARADISE	10	5 GAL	1
	CALLIANDRA CALIFORNICA BAJA FAIRY DUSTER	224	5 GAL	1
	CALLIANDRA ERIOPHYLLA NATIVE FAIRYDUSTER	112	5 GAL	1
	CALYLOPHUS HARTWEGII SUNDROPS	74	1 GAL	1
	DALEA FRUTESCENS BLACK DALEA	94	5 GAL	1
	GAURA LINDHEIMERI WHITE GAURA	79	1 GAL	1
	LANTANA MONTEVIDENSIS PURPLE TRAILING LANTANA	113	1 GAL	1
	LANTANA SPP. 'NEW GOLD' NEW GOLD LANTANA	248	1 GAL	1
	LARREA TRIDENTATA CREOSOTE	133	5 GAL	1

CACTUS/ACCENTS

SYMBOL	BOTANICAL NAME / COMMON NAME	QUANTITY	SIZE	GPH
	LEUCOPHYLLUM ZYGOPHYLLUM CIMARRON	203	5 GAL	1
	NICOTIANA ATTENTUATA COYOTE TOBACCO	11	1 GAL	1
	RUELLIA PENINSULARIS DESERT RUELLIA	27	5 GAL	1
	SALVIA CLEVELANDII CHAPARRAL SAGE	46	5 GAL	1
	SALVIA GREGGII AUTUMN SAGE	114	5 GAL	1

CACTUS/ACCENTS

SYMBOL	BOTANICAL NAME / COMMON NAME	QUANTITY	SIZE	GPH
	ASCLEPIAS SUBULATA DESERT MILKWEED	77	1 GAL	1
	CARNEGIEA GIGANTEA SAGUARO	20	6'	0.5
	DASYLIRION LONGISSIMUM TOOTHLESS SOTOL	115	5 GAL	1
	FOUQUIERIA SPLENDENS OCOTILLO	37	5 GAL	0.5
	HESPERALOE PARVIFLORA BRAKELIGHTS RED YUCCA	55	1 GAL	1

CACTUS/ACCENTS

SYMBOL	BOTANICAL NAME / COMMON NAME	QUANTITY	SIZE	GPH
	HESPERALOE PARVIFLORA 'YELLOW' YELLOW HESPERALOE	36	1 GAL	1
	NOLINA MICROCARPA BEAR GRASS	77	5 GAL	1
	PEDILANTHUS MACROCARPUS SLIPPER PLANT	21	1 GAL	1

SYMBOL	SITE NAME	QUANTITY
	Native Seed – Desert Mix Refer to Specifications	
	Decorative Boulders (2' Min.) See Detail 9, Sheet LS5	95

SEED MIX:

BOTANICAL NAME	COMMON NAME	PLS/ACRE
AMBROSIA DELTOIDEA	TRIANGLE-LEAF BURSAGE	6.0
ACACIA CONSTRICTA	WHITETHORN ACACIA	1.0
ACACIA GREGGII	CATCLAW ACACIA	1.5
BAILEYA MULTIRADIATA	DESERT MARIGOLD	1.5
PARKINSONIA MICROPHYLLA	FOOTHILLS PALOVERDE	2.0
DYSSODIA PENTACHAETA	GOLDEN DYSSODIA	1.0
ENCELIA FARINOSA	BRITTLEBUSH	1.0
LARREA TRIDENTATA	CREOSOTE BUSH	6.0
PENSTEMON SPP.	PENSTEMON	1.0
PROSOPIS VELUTINA	VELVET MESQUITE	2.0
SPHAERALCEA AMBIGUA	GLOBEMALLOW	1.0
VERBENA TENUISECTA	MOSS VERBENA	1.0

0 20' 40'
SCALE: 1"=20'

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Registered Landscape Architect
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REBECA V. FIELD
Date Signed 11/16/18
ARIZONA U.S.A.
Exp. Date 03/31/2019

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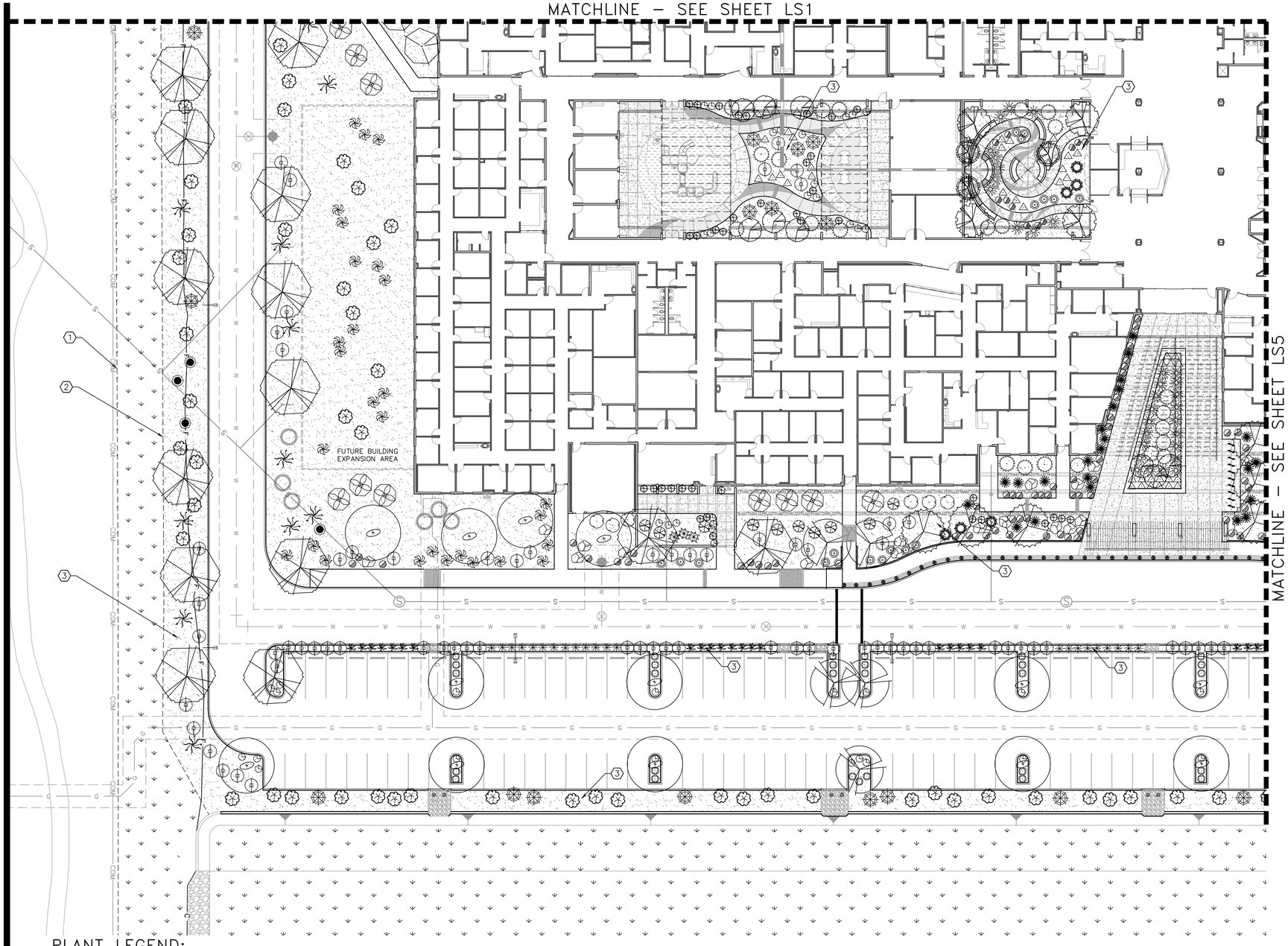
LANDSCAPE PLAN - QUADRANT 1

LS1



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	PROSOPIS VELUTINA VELVET MESQUITE	129	24" BOX	6
	OLNEYA TESOTA IRONWOOD	1	48" BOX	6
	SOPHORA SECUNDIFLORA TEXAS MOUNTAIN LAUREL	12	24" BOX	6
	CORDIA SONORAE PALO DE ASTA	3	24" BOX	6
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	CAESALPINIA PULCHERRIMA RED BIRD OF PARADISE	10	5 GAL	1
	CALLIANDRA CALIFORNICA BAJA FAIRY DUSTER	224	5 GAL	1
	CALLIANDRA ERIOPHYLLA NATIVE FAIRYDUSTER	112	5 GAL	1
	CALYLOPHUS HARTWEGII SUNDROPS	74	1 GAL	1
	DALEA FRUTESCENS BLACK DALEA	94	5 GAL	1
	GAURA LINDHEIMERI WHITE GAURA	79	1 GAL	1
	LANTANA MONTEVIDENSIS PURPLE TRAILING LANTANA	113	1 GAL	1
	LANTANA SPP. 'NEW GOLD' NEW GOLD LANTANA	248	1 GAL	1
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SYMBOL	BOTANICAL NAME / COMMON NAME	QUANTITY	SIZE	GPH
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	CARNEGIEA GIGANTEA SAGUARO	20	6'	0.5
	DASYLIRION LONGISSIMUM TOOTHLESS SOTOL	115	5 GAL	1
	FOUQUIERIA SPLENDENS OCOTILLO	37	5 GAL	0.5
	HESPERALOE PARVIFLORA BRAKELIGHTS RED YUCCA	55	1 GAL	1

CACTUS/ACCENTS

SYMBOL	BOTANICAL NAME / COMMON NAME	QUANTITY	SIZE	GPH
	HESPERALOE PARVIFLORA 'YELLOW' YELLOW HESPERALOE	36	1 GAL	1
	NOLINA MICROCARPA BEAR GRASS	77	5 GAL	1
	PEDILANTHUS MACROCARPUS SLIPPER PLANT	21	1 GAL	1

SYMBOL	SITE NAME	QUANTITY
	Native Seed – Desert Mix Refer to Specifications	
	Decorative Boulders (2' Min.) See Detail 9, Sheet LS5	95

SEED MIX:

BOTANICAL NAME	COMMON NAME	PLS/ACRE
AMBROSIA DELTOIDEA	TRIANGLE-LEAF BURSAGE	6.0
ACACIA CONSTRICTA	WHITETHORN ACACIA	1.0
ACACIA GREGGII	CATCLAW ACACIA	1.5
BAILEYA MULTIRADIATA	DESERT MARIGOLD	1.5
PARKINSONIA MICROPHYLLA	FOOTHILLS PALOVERDE	2.0
DYSSODIA PENTACHAETA	GOLDEN DYSSODIA	1.0
ENCELIA FARINOSA	BRITTLEBUSH	1.0
LARREA TRIDENTATA	CREOSOTE BUSH	6.0
PENSTEMON SPP.	PENSTEMON	1.0
PROSOPIS VELUTINA	VELVET MESQUITE	2.0
SPHAERALCEA AMBIGUA	GLOBEMALLOW	1.0
VERBENA TENUISECTA	MOSS VERBENA	1.0

0 20' 40'
SCALE: 1"=20'

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REBECA V. FIELD
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job
1717

date
11.16.18

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LANDSCAPE PLAN - QUADRANT 2

LS2

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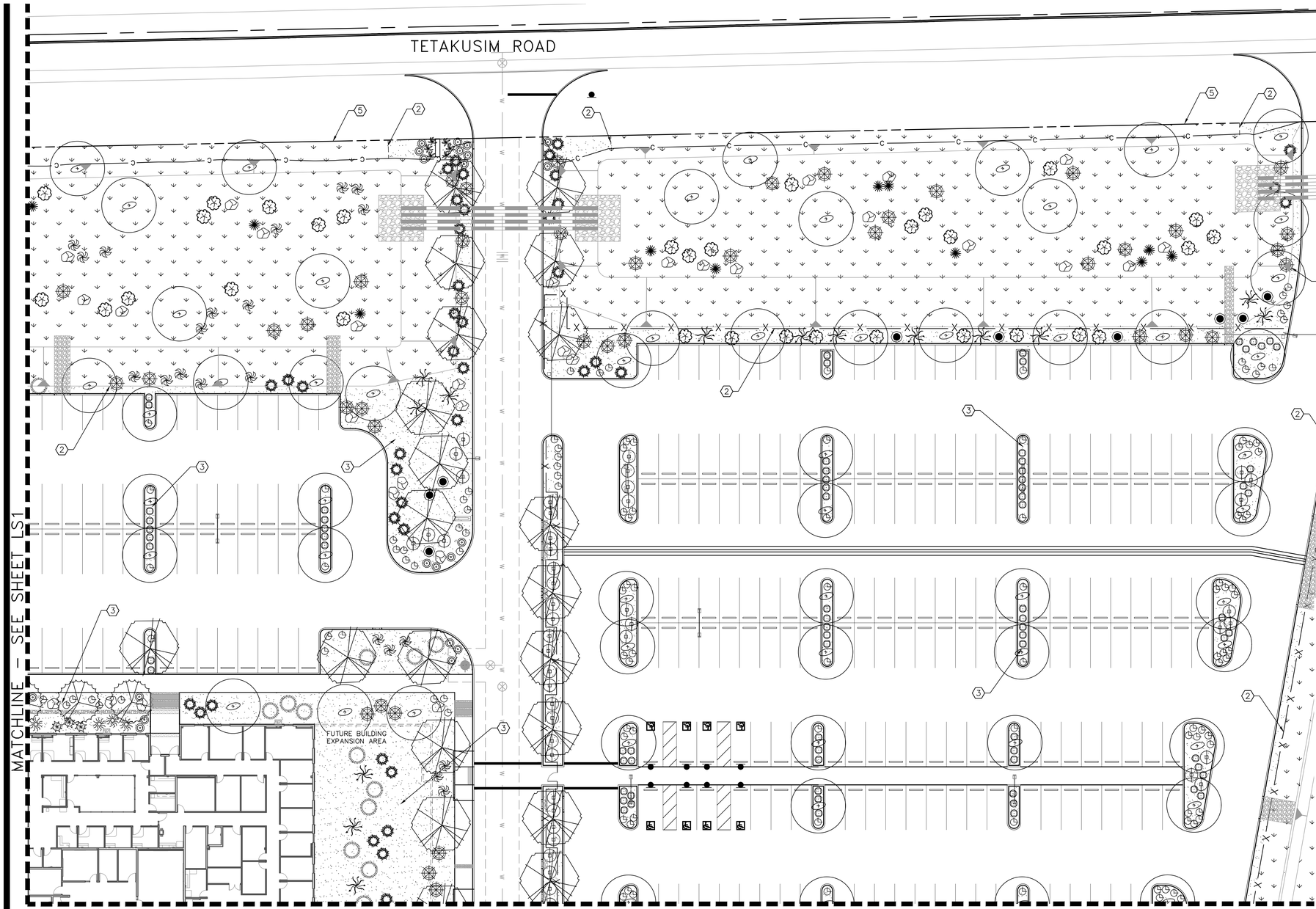

LANDSCAPE NOTES:

1. LIMITS OF SEED.
2. LIMITS OF DECOMPOSED GRANITE
3. DECOMPOSED GRANITE IN ALL PLANTING AREAS UNLESS OTHERWISE NOTED, TYP.
4. PROPERTY LINE
5. R.O.W. LIMITS

MAINTENANCE SCHEDULE:

FOR THE FIRST YEAR:

1. PLANTS NOT SURVIVING AFTER 30 DAYS SHALL BE REPLACED WITH EQUIVALENT SIZE AND SPECIES.
2. PLANT MATERIAL SHALL ONLY BE PRUNED TO CONTROL SIZE AND BE ALLOWED TO GROW IN ITS NATURAL GROWTH PATTERN, NOT BALLED.
3. INERT GROUNDCOVER SHALL BE REPLACED AS NEEDED DUE TO DISPLACEMENT OR EROSION.
4. MONTHLY MAINTENANCE SHALL BE PERFORMED TO KEEP LANDSCAPED AREAS FREE OF TRASH, WEEDS, DEBRIS AND DEAD PLANT MATERIAL.
5. REGULAR MONTHLY IRRIGATION CHECKS SHALL BE PERFORMED TO CHECK FOR AND/OR REPLACE LEAKY OR BROKEN PIPES, FITTINGS AND MALFUNCTIONING OR MISALIGNED HEADS, EMITTERS, AND BUBBLERS.

PLANTING NOTES:

1. ALL PLANT QUANTITIES TO BE VERIFIED PRIOR TO PROCUREMENT. QUANTITIES SHOWN ON LEGEND ARE FOR REFERENCE ONLY. IN CASE OF DISCREPANCY, QUANTITIES SHOWN ON PLAN WILL PREVAIL.
2. INSTALL DECOMPOSED GRANITE, 2" DEEP IN ALL PLANTING AREAS (NON–PAVED AREAS) OR TO LIMITS OF SEED. COLOR TO BE CORONADO BROWN OR APPROVED EQUAL. REFER TO SPECIFICATIONS.
3. NO STRUCTURES OR VEGETATION BETWEEN 30" AND 72" IN HEIGHT SHALL BE PLACED WITHIN SIGHT VISIBILITY TRIANGLES.
4. ALL TREES SHALL BE LOCATED A MINIMUM OF 10'–0" FROM SEWER LINES, 8'–0" FROM GAS LINES, AND 5'–0" FROM WATER LINES.

0 20' 40'
SCALE: 1"=20'

PLANT LEGEND:

TREES

SYMBOL	BOTANICAL NAME / COMMON NAME	QUANTITY	SIZE	GPH
	ACACIA WILLARDIANA / PALO BLANCO	7	24" BOX	6
	CHILOPSIS LINEARIS / DESERT WILLOW	13	24" BOX	6
	FRAXINUS VELUTINA 'FAN–TEX' / FAN–TEX ASH	18	24" BOX	8
	PARKINSONIA X 'DESERT MUSEUM' / DESERT MUSEUM PALO VERDE	75	24" BOX	6
	PROSOPIS VELUTINA / VELVET MESQUITE	129	24" BOX	6
	OLNEYA TESOTA / IRONWOOD	1	48" BOX	6
	SOPHORA SECUNDIFLORA / TEXAS MOUNTAIN LAUREL	12	24" BOX	6
	CORDIA SONORAE / PALO DE ASTA	3	24" BOX	6
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SYMBOL	BOTANICAL NAME / COMMON NAME	QUANTITY	SIZE	GPH
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	CAESALPINIA MEXICANA / MEXICAN BIRD OF PARADISE	13	5 GAL	1
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	CALLIANDRA CALIFORNICA / BAJA FAIRY DUSTER	224	5 GAL	1
	CALLIANDRA ERIOPHYLLA / NATIVE FAIRYDUSTER	112	5 GAL	1
	CALYLOPHUS HARTWEGII / SUNDROPS	74	1 GAL	1
	DALEA FRUTESCENS / BLACK DALEA	94	5 GAL	1
	GAURA LINDHEIMERI / WHITE GAURA	79	1 GAL	1
	LANTANA MONTEVIDENSIS / PURPLE TRAILING LANTANA	113	1 GAL	1
	LANTANA SPP. 'NEW GOLD' / NEW GOLD LANTANA	248	1 GAL	1
	LARREA TRIDENTATA / CREOSOTE	133	5 GAL	1

CACTUS/ACCENTS

SYMBOL	BOTANICAL NAME / COMMON NAME	QUANTITY	SIZE	GPH
	LEUCOPHYLLUM ZYGOPHYLLUM / CIMARRON	203	5 GAL	1
	NICOTIANA ATTENTUATA / COYOTE TOBACCO	11	1 GAL	1
	RUELLIA PENINSULARIS / DESERT RUELLIA	27	5 GAL	1
	SALVIA CLEVELANDII / CHAPARRAL SAGE	46	5 GAL	1
	SALVIA GREGGII / AUTUMN SAGE	114	5 GAL	1

CACTUS/ACCENTS

SYMBOL	BOTANICAL NAME / COMMON NAME	QUANTITY	SIZE	GPH
	ASCLEPIAS SUBULATA / DESERT MILKWEED	77	1 GAL	1
	CARNEGIEA GIGANTEA / SAGUARO	20	6'	0.5
	DASYLIRION LONGISSIMUM / TOOTHLESS SOTOL	115	5 GAL	1
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	HESPERALOE PARVIFLORA / BRAKELIGHTS RED YUCCA	55	1 GAL	1

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Registered Landscape Architect 50732 REBECA V. FIELD Date Signed 11/16/18 ARIZONA U.S.A.
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LANDSCAPE PLAN - QUADRANT 3

LS3

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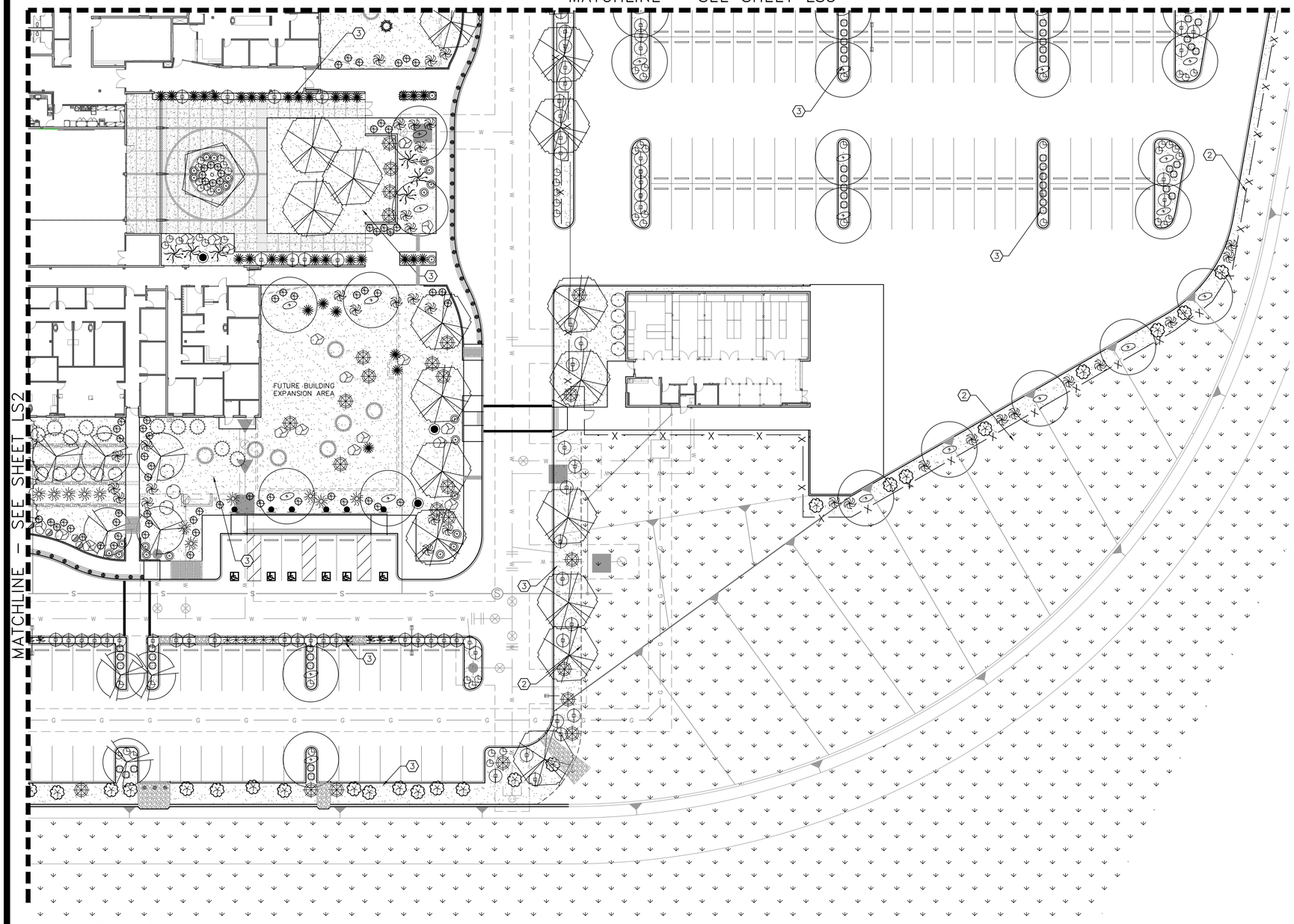

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ENCELIA FARINOSA	BRITTLEBUSH	1.0
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SPHAERALCEA AMBIGUA	GLOBEMALLOW	1.0
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LANDSCAPE PLAN - QUADRANT 4

LS4

Kimley»Horn

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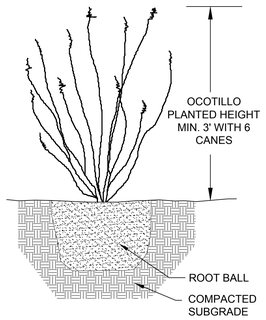
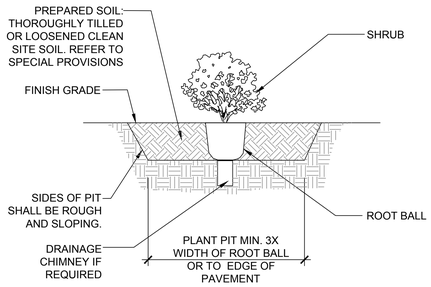
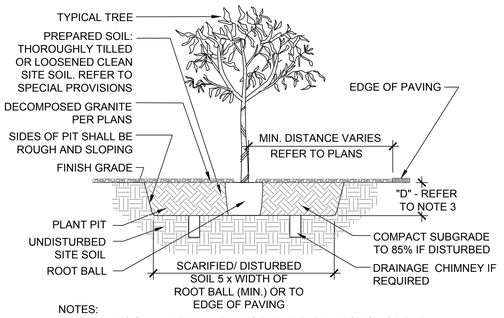


NOTES:
1. BACKFILL PLANT PIT WITH DRY SITE SOIL ONLY - NO MULCH.
2. PLANTING DEPTH TO BE THAT AT WHICH PLANT WAS GROWN.
3. FOR SLOPE PLANTING IN BASINS, GRADE TO DRAIN.

1 TYPICAL DESERT PLANTING
NTS

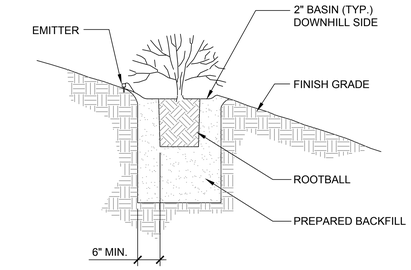


2 SHRUB PLANTING 5-GAL./1-GAL. PLANTS
NTS



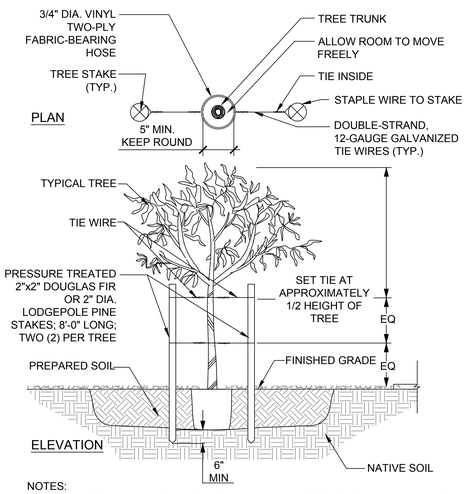
NOTES:
1. NO PLANTS SHALL BE PRUNED EXCEPT AT THE DIRECTION OF THE OWNER'S REPRESENTATIVE.
2. STAKE TREE ONLY IF NEEDED, PER DIRECTION OF OWNER'S REPRESENTATIVE. REFER TO TREE STAKING DETAIL.
3. DEPTH ("D") OF PLANT PIT TO BE EQUAL TO DEPTH OF ROOT BALL.
4. MULCH TO NOT TOUCH TRUNK OF TREE.

3 TREE PLANTING DETAIL
NTS



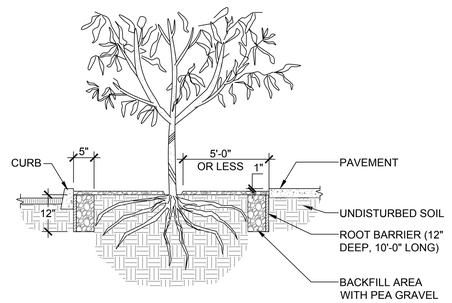
NOTES:
1. LOCATE EMITTER UP SLOPE OF PLANT.
2. FINISH GRADE 3:1 SLOPE MAX.

4 PLANTING ON SLOPES (3:1 MAX)
NTS



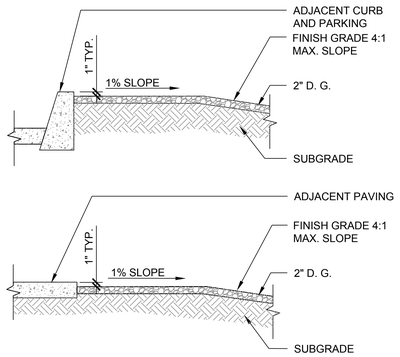
NOTES:
1. NO PLANTS SHALL BE PRUNED EXCEPT AT THE DIRECTION OF THE OWNER'S REPRESENTATIVE
2. STAKE TREES ONLY AS DIRECTED BY OWNER'S REPRESENTATIVE.
3. SET STAKES PARALLEL TO SIDEWALK AND PAVEMENT

5 TREE STAKING
NTS

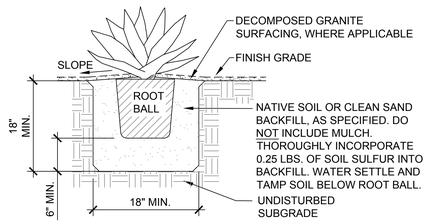


NOTES:
1. REFER TO OTHER DETAILS FOR PLANTING AND STAKING AS REQUIRED.

6 TREE PLANTING AT SIDEWALK
NTS

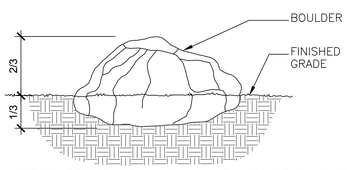


7 FINISH GRADE AT CURB AND PAVING
WITH DECOMPOSED GRANITE
NTS



NOTES:
1. DO NOT CREATE A BASIN AT BASE OF PLANT. SLOPE BACKFILL AWAY FROM STEM.
2. SET STEM SUCCULENT SO THAT TOP OF ROOT BALL MATCHES ADJACENT GRADE.
3. THIS DETAIL APPLIES TO NURSERY GROWN STOCK OF THE GENERA DASYLIRION, OPUNTIA, HESPERALOE AND NOLINA.

8 SUCCULENT PLANTING
NTS



NOTES:
1. BOULDER TO BE SET WITH MINIMUM 1/3 MASS BELOW FINISHED GRADE.
2. SUBGRADE TO BE COMPACTED TO 90% OR AS OTHERWISE INDICATED ON PLANS
3. ALL BOULDERS TO BE FROM SURFACE LOCATIONS, WEATHERED AND UNBROKEN.

9 DECORATIVE BOULDER
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LANDSCAPE DETAILS

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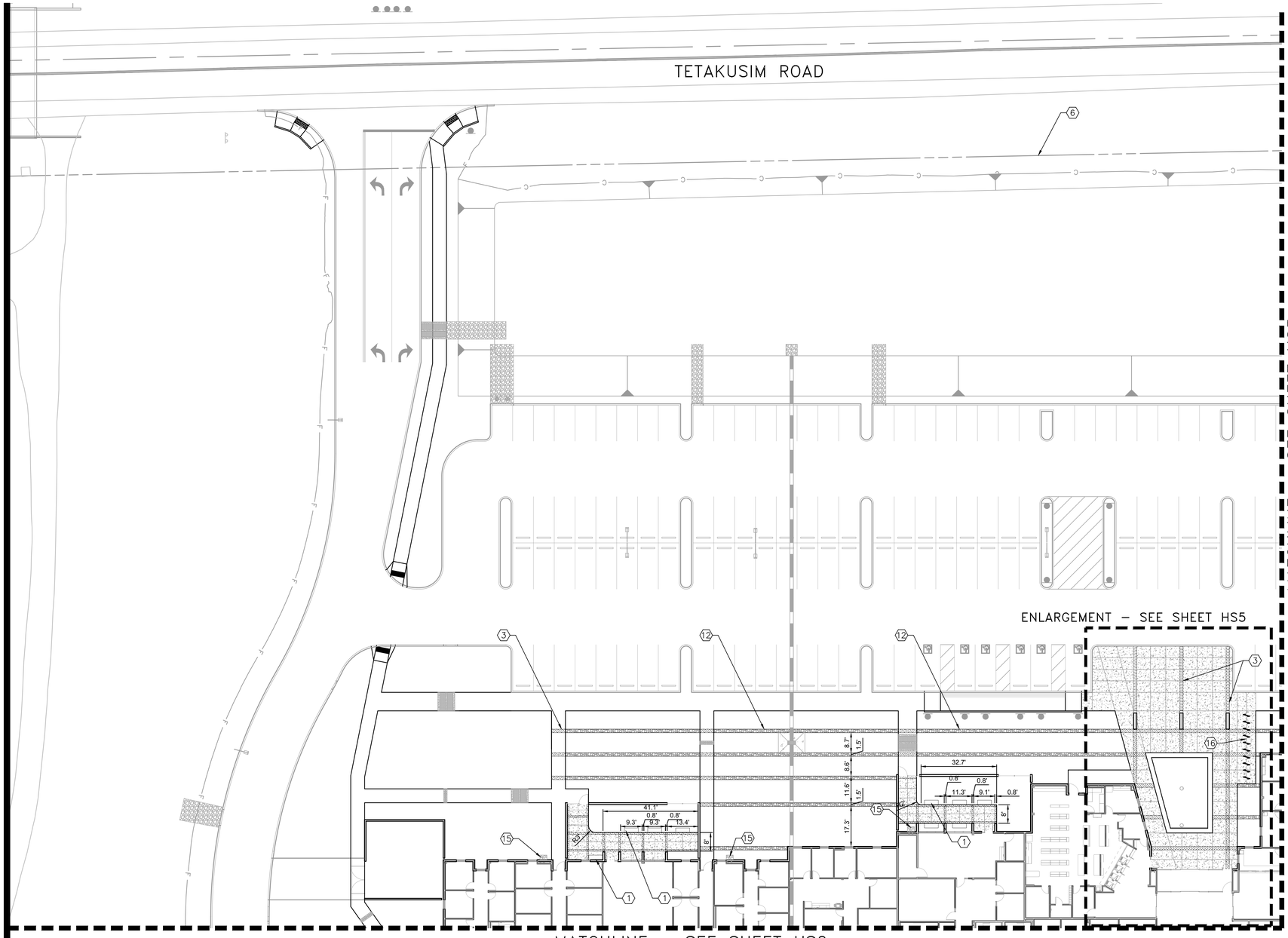

HARDSCAPE NOTES:

1. PLAINWELL BENCH BY LANDSCAPE FORMS, TYP. SEE DETAIL 01, SHEET HS8
2. PLAY STRUCTURE. SEE DETAILS 10 & 12, SHEET HS7
3. EXPOSED AGGREGATE FINISH, TYP.
4. OUTDOOR DINING AREA
5. PROPERTY LINE
6. R.O.W. LIMITS
7. TUMBLED LANDSCAPE GLASS
8. TUMBLED GLASS AGGREGATE FINISH, TYP.
9. CONCRETE SCREEN WALL, TYP. SEE DETAILS 04, 05, 06 SHEET HS8
10. CONCRETE SEATWALL WITH BACK, SEE DETAIL 07, SHEET HS8
11. ALTAR AREA, SEE DETAIL 01, SHEET HS7
12. STEEL EDGING, SEE DETAIL 09, SHEET HS7
13. CONCRETE RIBBON CURB, SEE DETAIL 06, SHEET HS7
14. PLAINWELL LITTER RECEPTACLE BY LANDSCAPE FORMS, SEE DETAIL 08, SHEET HS7
15. RIP RAP SPLASH BLOCK, SEE DETAIL 07, SHEET HS7
16. LOOP BIKE RACK BY LANDSCAPE FORMS, SEE DETAIL 02, SHEET HS81
17. CHARLIE PICNIC TABLE BY LANDSCAPE FORMS, SEE DETAIL 03, SHEET HS8
18. SEATWALL AREA, SEE DETAIL 3, SHEET HS7

0 20' 40'
SCALE: 1"=20'

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OFFICE (520) 326-3700
FAX (520) 326-1148
www.swaimaia.com

Registered Landscape Architect
50732
REBECA V. FIELD
Date Signed 11/16/18
ARIZONA U.S.A.
Exp. Date 03/31/2019

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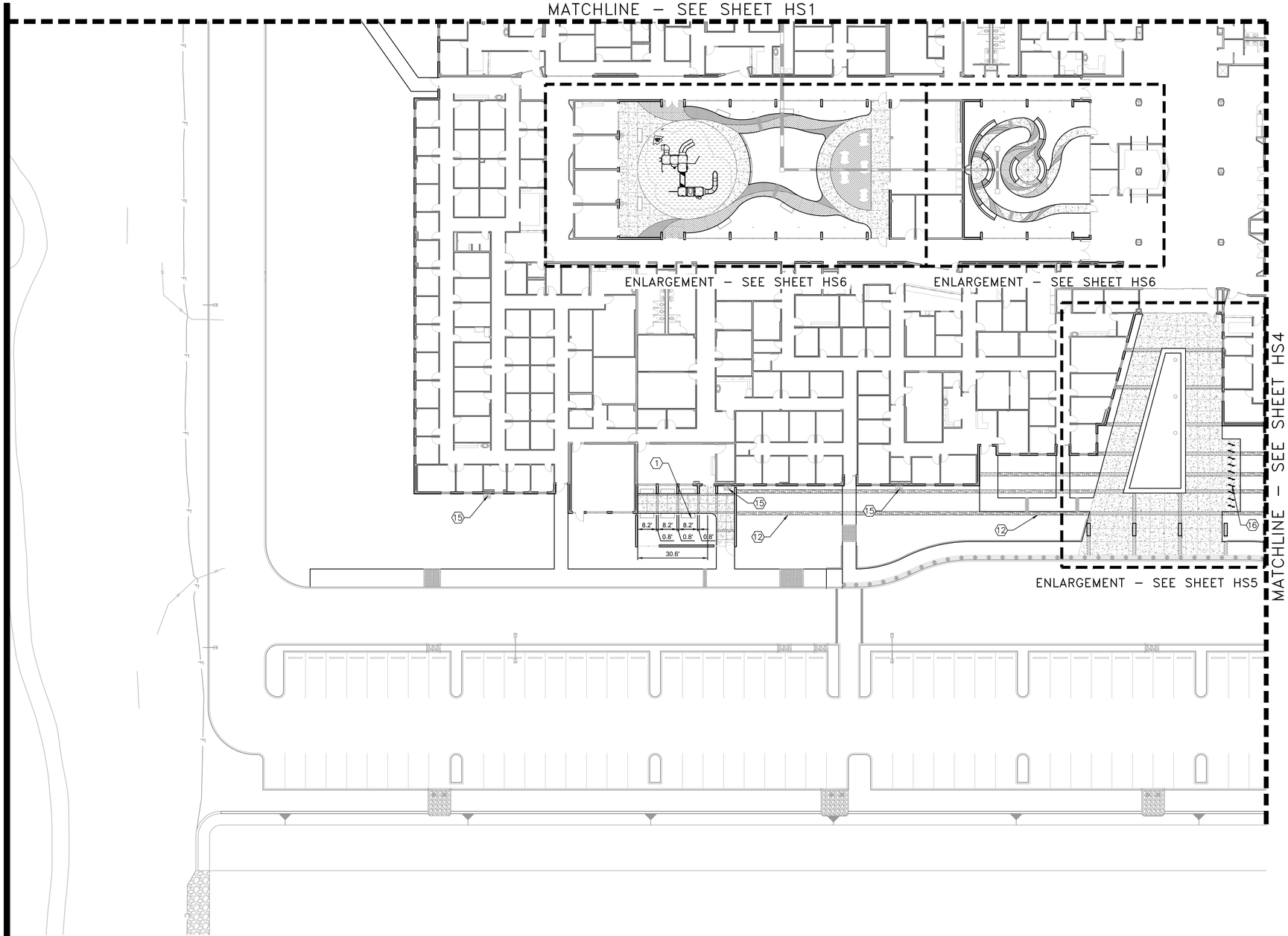
HARDSCAPE PLAN - QUADRANT 1

HS1



HARDSCAPE NOTES:

1. PLAINWELL BENCH BY LANDSCAPE FORMS, TYP. SEE DETAIL 01, SHEET HS8
2. PLAY STRUCTURE. SEE DETAILS 10 & 12, SHEET HS7
3. EXPOSED AGGREGATE FINISH, TYP.
4. OUTDOOR DINING AREA
5. PROPERTY LINE
6. R.O.W. LIMITS
7. TUMBLED LANDSCAPE GLASS
8. TUMBLED GLASS AGGREGATE FINISH, TYP.
9. CONCRETE SCREEN WALL, TYP. SEE DETAILS 04, 05, 06 SHEET HS8
10. CONCRETE SEATWALL WITH BACK, SEE DETAIL 07, SHEET HS8
11. ALTAR AREA, SEE DETAIL 01, SHEET HS7
12. STEEL EDGING, SEE DETAIL 09, SHEET HS7
13. CONCRETE RIBBON CURB, SEE DETAIL 06, SHEET HS7
14. PLAINWELL LITTER RECEPTACLE BY LANDSCAPE FORMS, SEE DETAIL 08, SHEET HS7
15. RIP RAP SPLASH BLOCK, SEE DETAIL 07, SHEET HS7
16. LOOP BIKE RACK BY LANDSCAPE FORMS, SEE DETAIL 02, SHEET HS81
17. CHARLIE PICNIC TABLE BY LANDSCAPE FORMS, SEE DETAIL 03, SHEET HS8
18. SEATWALL AREA, SEE DETAIL 3, SHEET HS7

0 20' 40'
SCALE: 1"=20'

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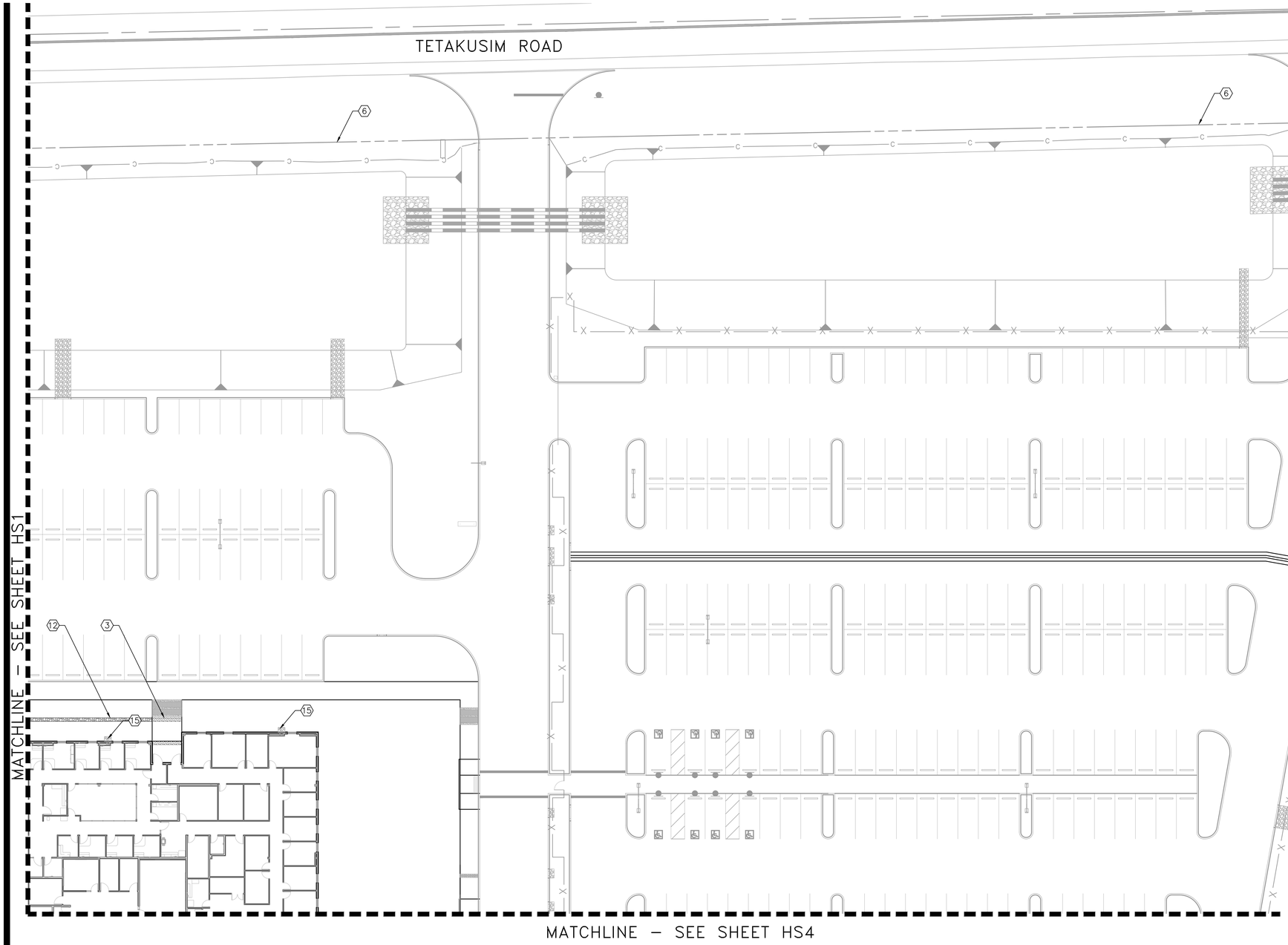
HARDSCAPE PLAN - QUADRANT 2

HS2



HARDSCAPE NOTES:

1. PLAINWELL BENCH BY LANDSCAPE FORMS, TYP. SEE DETAIL 01, SHEET HS8
2. PLAY STRUCTURE. SEE DETAILS 10 & 12, SHEET HS7
3. EXPOSED AGGREGATE FINISH, TYP.
4. OUTDOOR DINING AREA
5. PROPERTY LINE
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7. TUMBLED LANDSCAPE GLASS
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0 20' 40'
SCALE: 1"=20'

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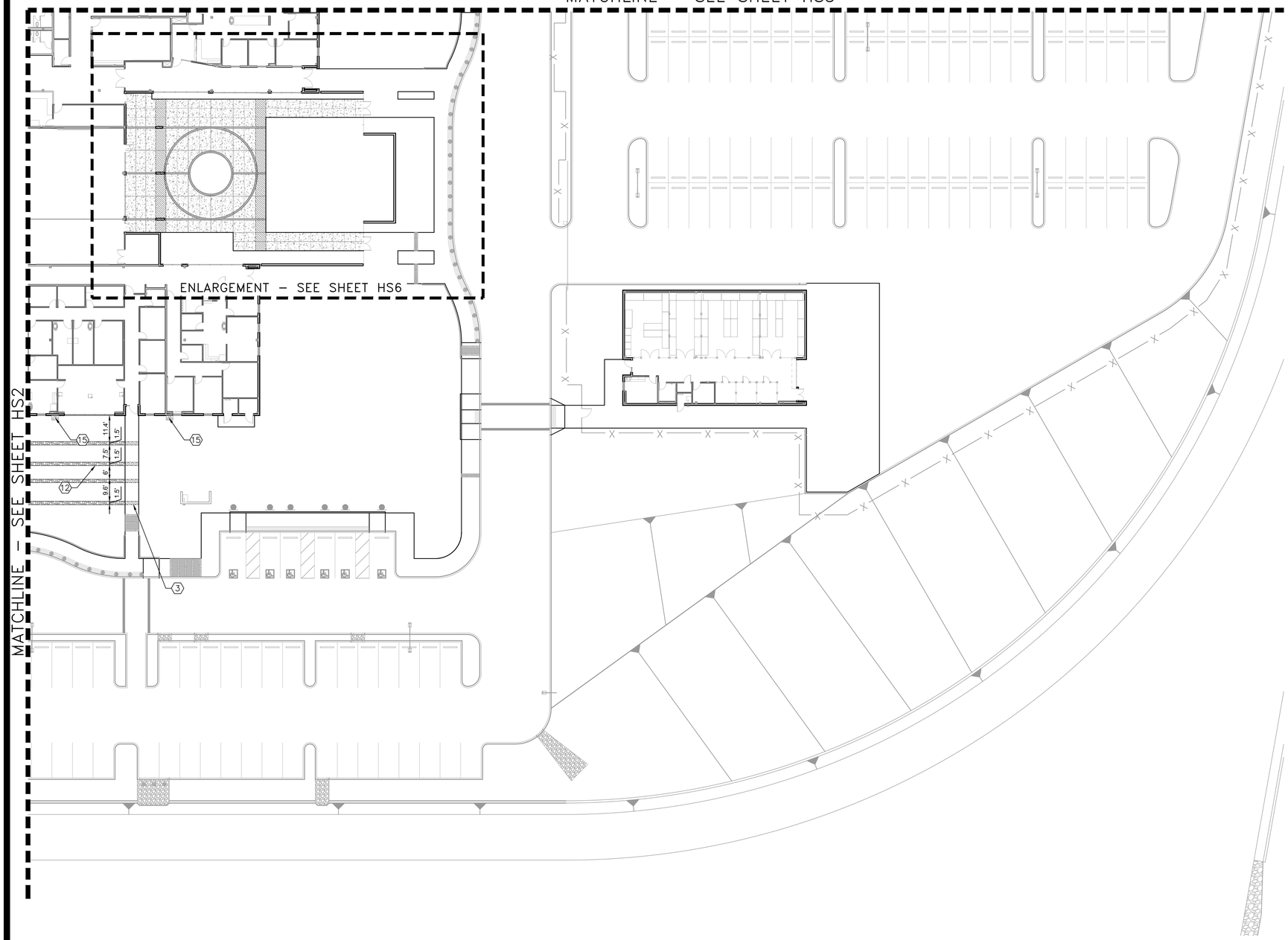
HARDSCAPE PLAN - QUADRANT 3

HS3



HARDSCAPE NOTES:

1. PLAINWELL BENCH BY LANDSCAPE FORMS, TYP. SEE DETAIL 01, SHEET HS8
2. PLAY STRUCTURE. SEE DETAILS 10 & 12, SHEET HS7
3. EXPOSED AGGREGATE FINISH, TYP.
4. OUTDOOR DINING AREA
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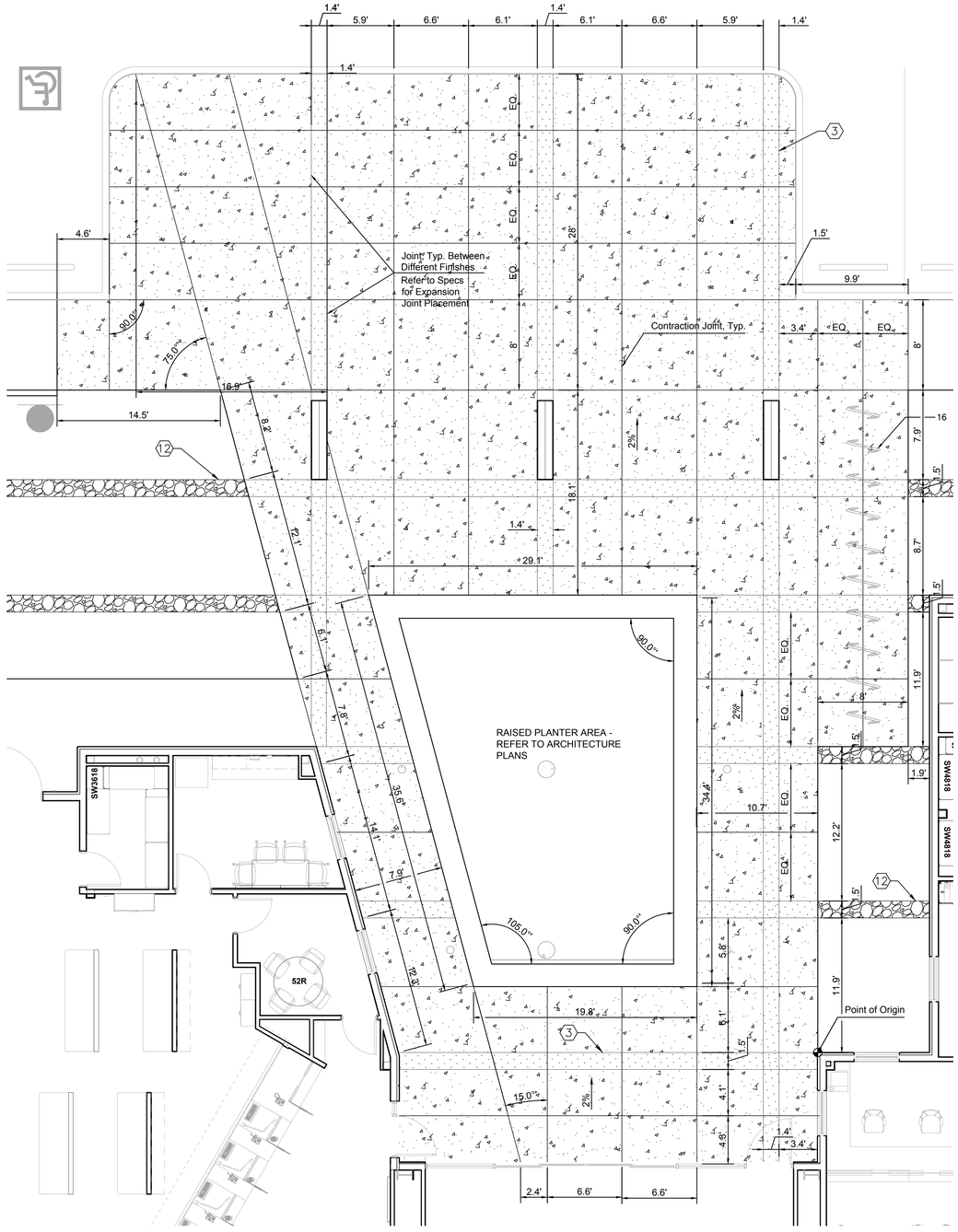
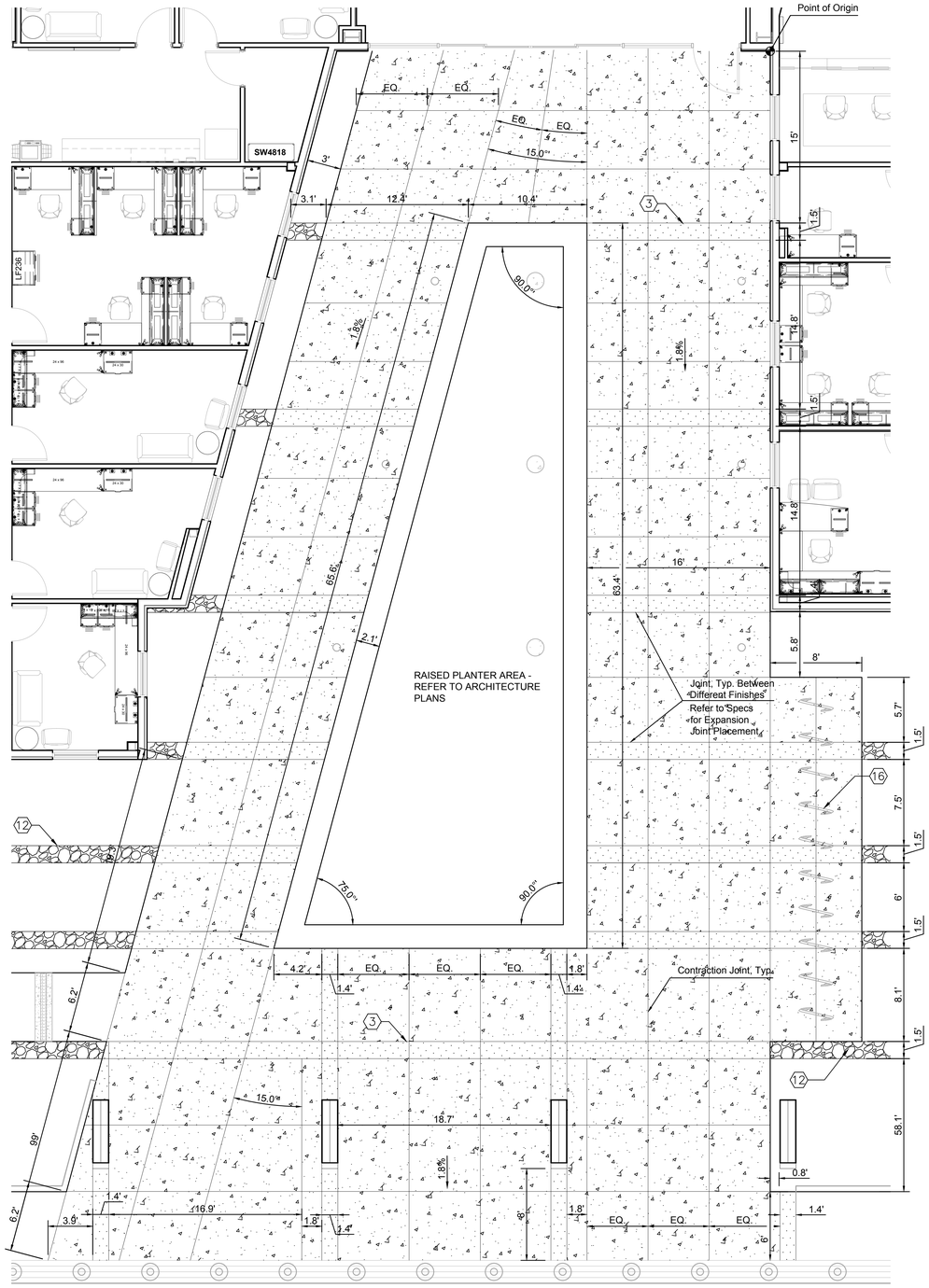
HARDSCAPE PLAN - QUADRANT 4

HS4



1 NORTH ENTRY LAYOUT DETAIL

1" = 5'-0"



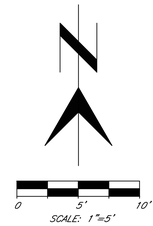
2 SOUTH ENTRY LAYOUT DETAIL

1" = 5'-0"

LEGEND

##%	SLOPE
XX	SPOT ELEVATION
	POINT OF ORIGIN
	ROCK MULCH
	TUMBLED LANDSCAPE GLASS
	CONCRETE PAVING - BROOM FINISH
	CONCRETE PAVING - EXPOSED AGGREGATE FINISH
	CONCRETE PAVING - TUMBLED GLASS AGGREGATE FINISH
	CONTROL JOINT
	JOINT BETWEEN DIFFERENT FINISHES

NOTE: REFER TO SPECIFICATIONS FOR EXPANSION JOINT PLACEMENT



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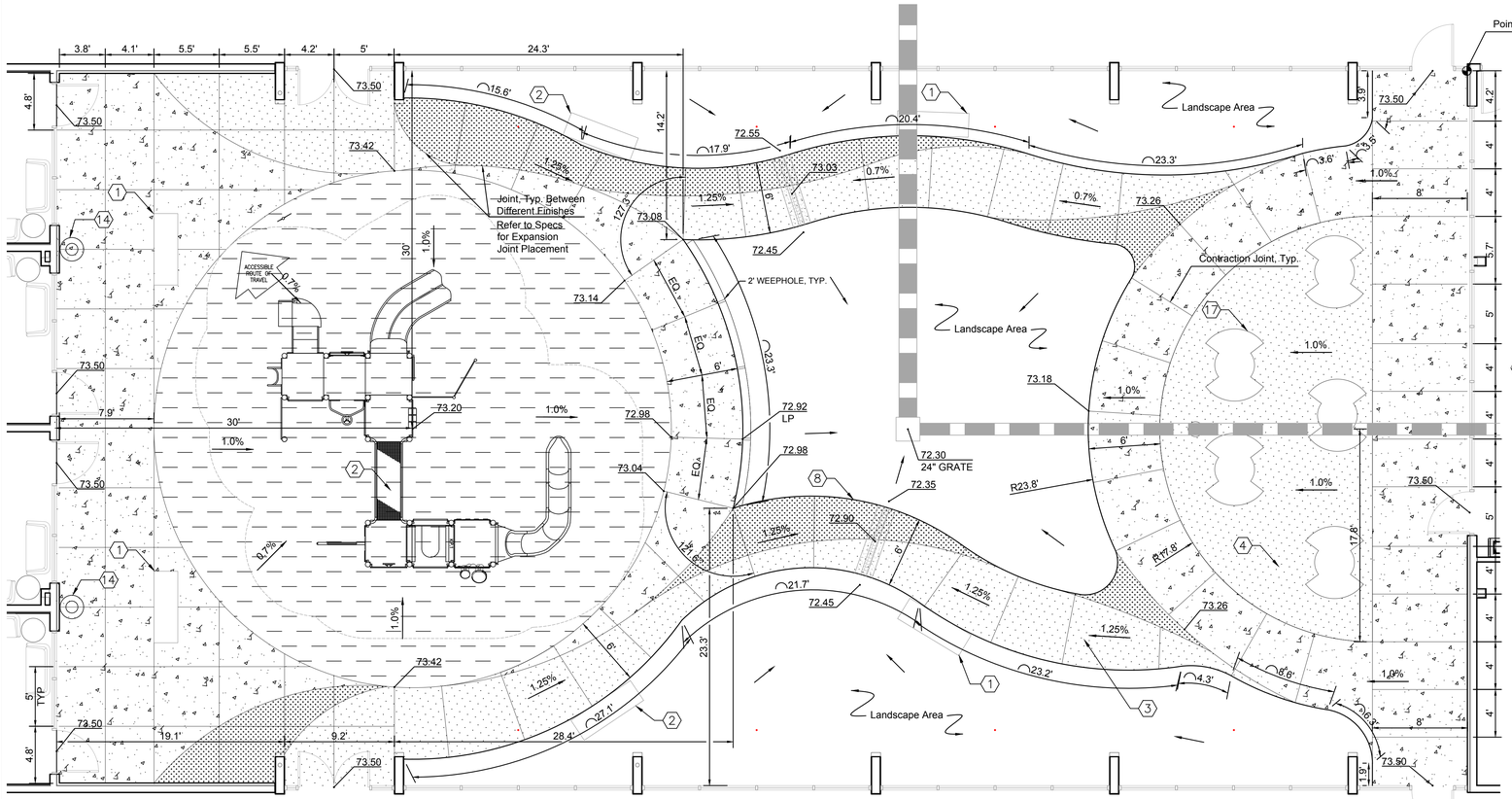
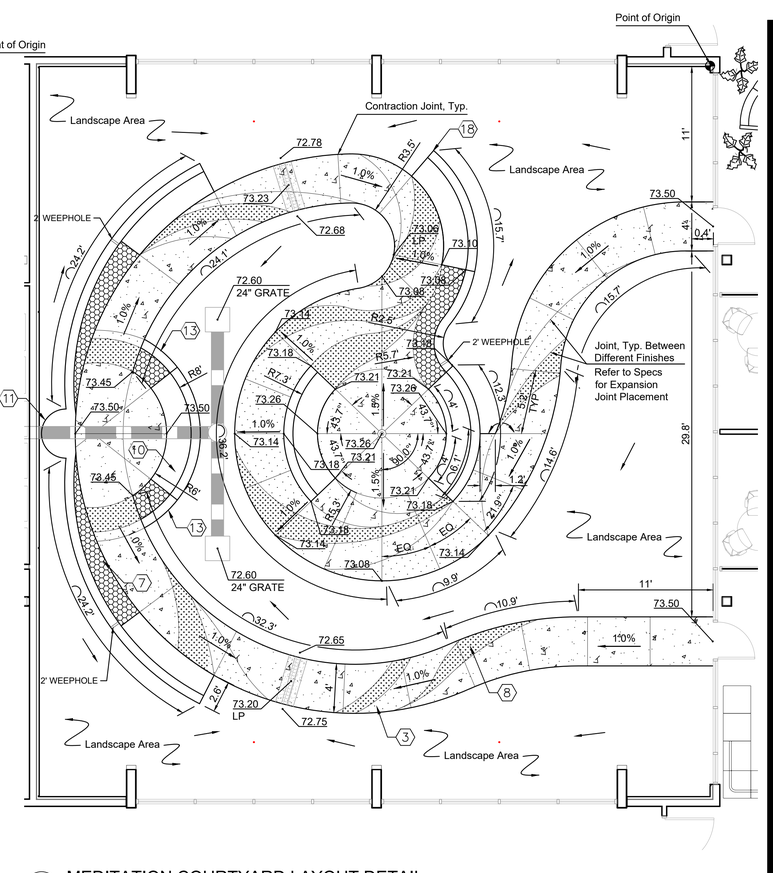
HARDSCAPE ENLARGEMENTS

HS5



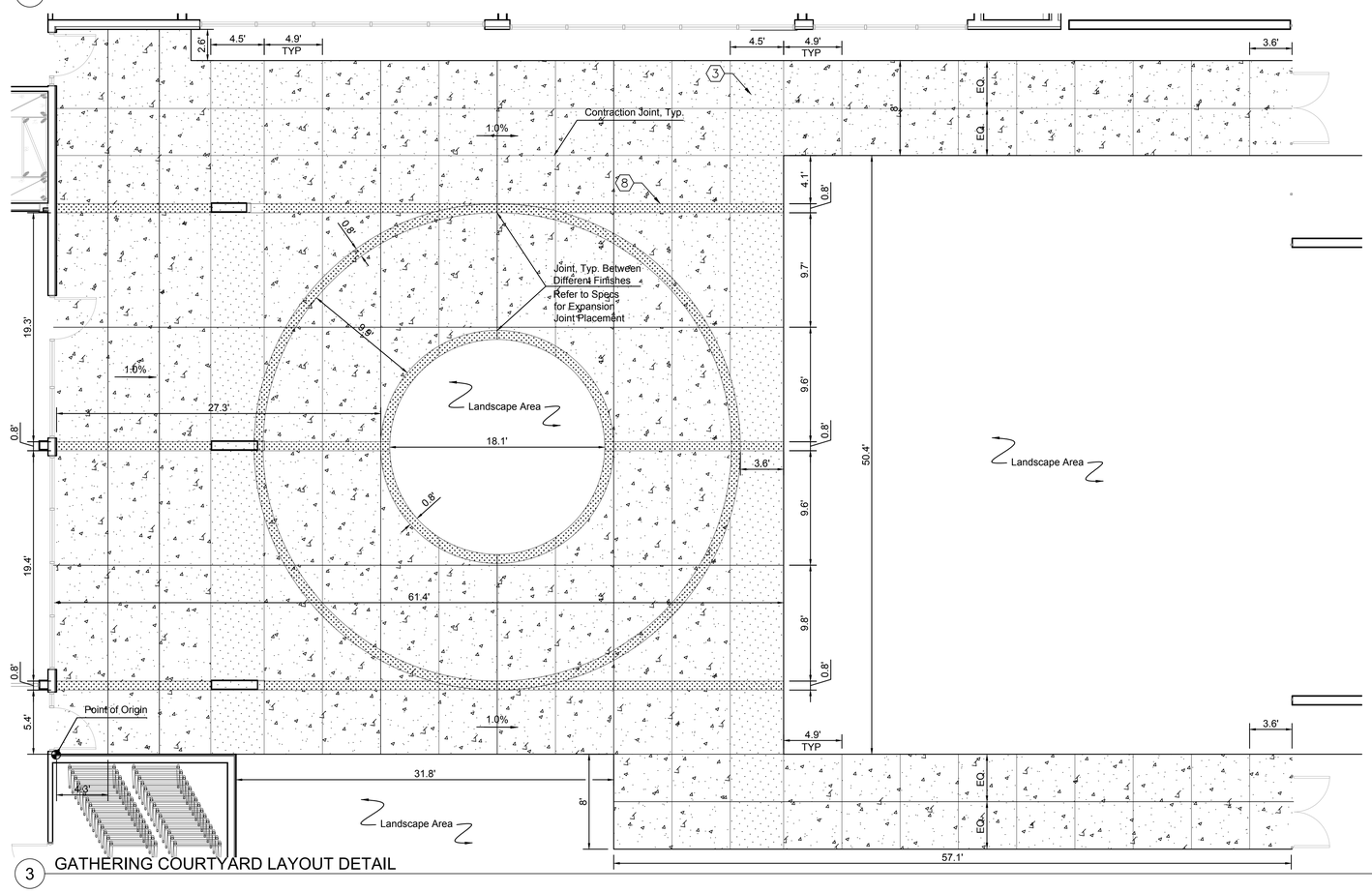
1 PLAY COURTYARD LAYOUT DETAIL

1" = 5'-0"



2 MEDITATION COURTYARD LAYOUT DETAIL

1" = 5'-0"



3 GATHERING COURTYARD LAYOUT DETAIL

1" = 5'-0"

LEGEND

##%	SLOPE
XX	SPOT ELEVATION
	POINT OF ORIGIN
	ROCK MULCH
	TUMBLED LANDSCAPE GLASS
	CONCRETE PAVING - BROOM FINISH
	CONCRETE PAVING - EXPOSED AGGREGATE FINISH
	CONCRETE PAVING - TUMBLED GLASS AGGREGATE FINISH
	CONTROL JOINT
	JOINT BETWEEN DIFFERENT FINISHES

NOTE: REFER TO SPECIFICATIONS FOR EXPANSION JOINT PLACEMENT

HARDSCAPE NOTES:

1. PLAINWELL BENCH BY LANDSCAPE FORMS, TYP. SEE DETAIL 01, SHEET HS8
2. PLAY STRUCTURE. SEE DETAILS 10 & 12, SHEET HS7
3. EXPOSED AGGREGATE FINISH, TYP.
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16. LOOP BIKE RACK BY LANDSCAPE FORMS, SEE DETAIL 02, SHEET HS81
17. CHARLIE PICNIC TABLE BY LANDSCAPE FORMS, SEE DETAIL 03, SHEET HS8
18. SEATWALL AREA, SEE DETAIL 3, SHEET HS7

0 5' 10'
SCALE: 1"=5'

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HARDSCAPE ENLARGEMENTS

HS6

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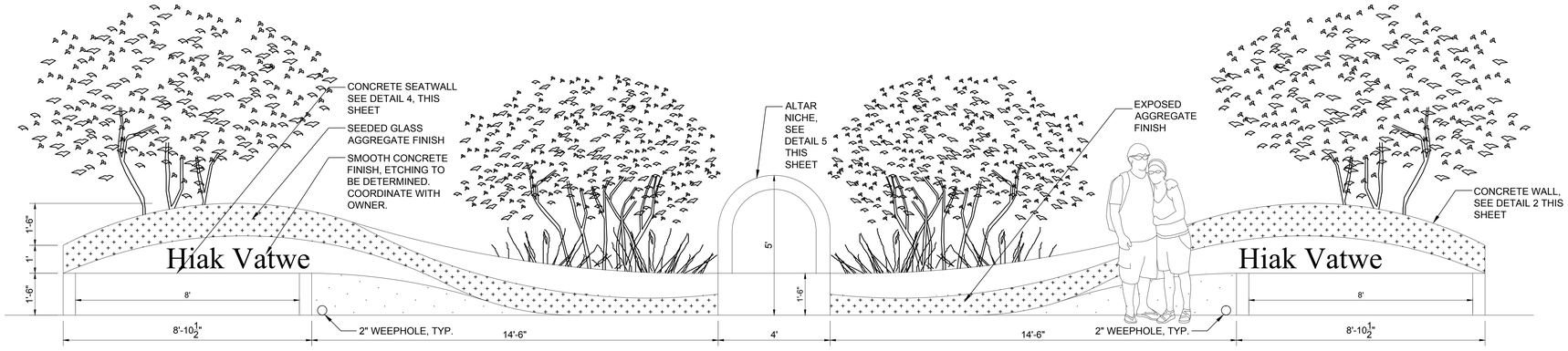
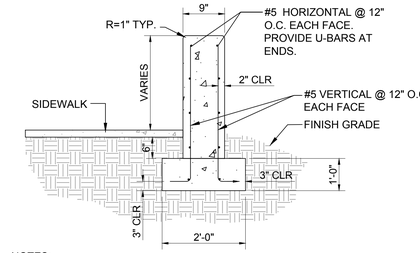


1 ALTAR AREA - CONCEPTUAL ELEVATION

NTS

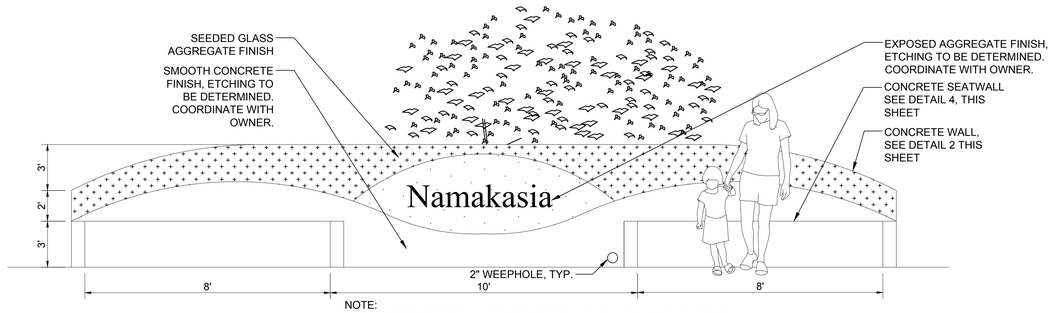
NOTE:
DIGITAL COPY OF FORM LINEWORK DESIGNATING VARYING FINISHES IS AVAILABLE FOR CONTRACTOR'S USE DURING CONSTRUCTION.



NOTES:
1. FOOTING TO BE IN UN-DISTURBED NATIVE SOIL OR ON SUBGRADE COMPACTED TO 95% DENSITY. CONCRETE TO BE CLASS S,
2. 3000 PSI @28 DAYS
3. REBAR TO BE GRADE 60

2 CONCRETE WALL

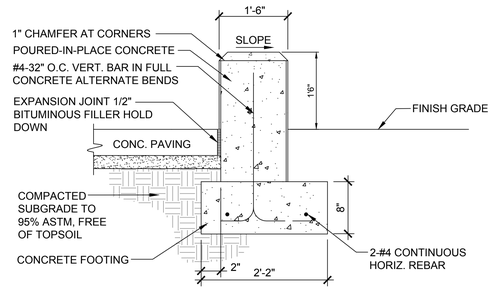
NTS



NOTE:
DIGITAL COPY OF FORM LINEWORK DESIGNATING VARYING FINISHES IS AVAILABLE FOR CONTRACTOR'S USE DURING CONSTRUCTION.

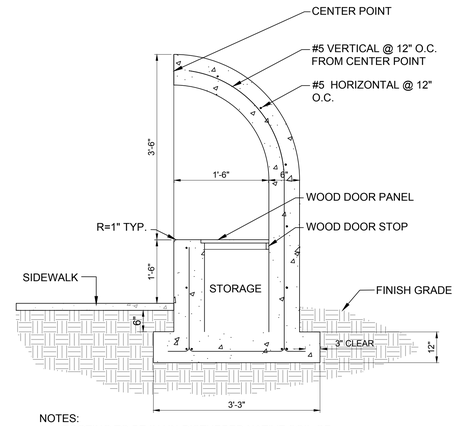
3 SEATWALL AREA - CONCEPTUAL ELEVATION

NTS



4 CONCRETE SEATWALL - ALTAR & SEATWALL AREAS

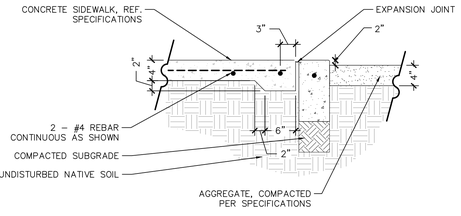
NTS



NOTES:
1. FOOTING TO BE IN UN-DISTURBED NATIVE SOIL OR ON SUBGRADE COMPACTED TO 95% DENSITY. CONCRETE TO BE CLASS S,3000 PSI @28 DAYS.
2. REBAR TO BE GRADE 60.

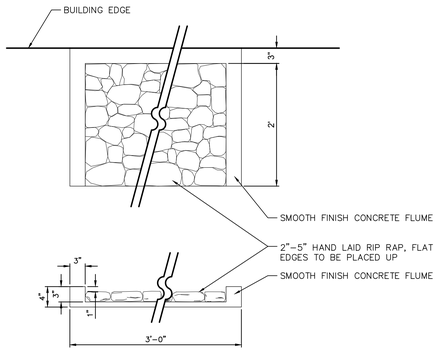
5 ALTAR NICHE

NTS



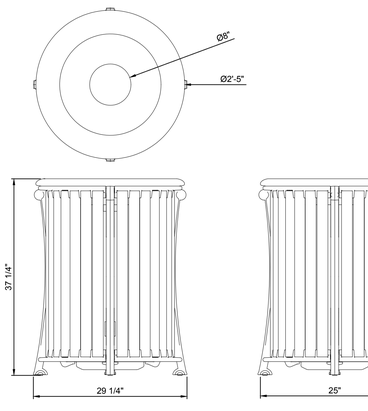
6 CONCRETE RIBBON CURB

NTS



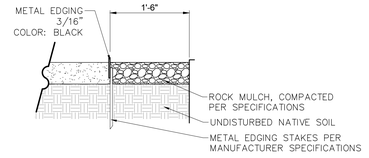
7 RIP RAP SPLASH BLOCK

NTS



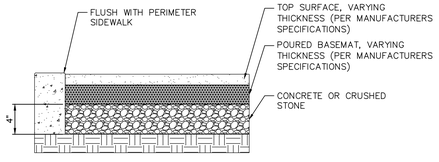
8 PLAINWELL LITTER RECEPTACLE

NTS



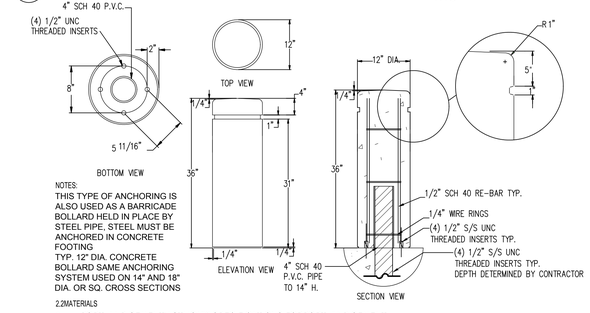
9 STEEL EDGING

NTS



10 POURED-IN-PLACE PLAY SURFACE

NTS



NOTES:
THIS TYPE OF ANCHORING IS ALSO USED AS A BARRICADE BOLLARD HELD IN PLACE BY STEEL PIPE, STEEL MUST BE ANCHORED IN CONCRETE FOOTING
TYP. 12" DIA. CONCRETE BOLLARD SAME ANCHORING SYSTEM USED ON 14" AND 18" DIA. OR SQ. CROSS SECTIONS

2.2MATERIALS

A. PORTLAND CEMENT:ASTMC150 SPECIFICATIONS FORPORTLAND CEMENT.

B. AGGREGATES: ALL AGGREGATES TO MEET ASTM C33 SPECIFICATIONS, TO BE CLEANED OF FOREIGN MATTER AND PROPERLY GRADED TO SIZE.

C. COLORING: PIGMENTS USED SHALL BE INORGANIC, RESISTANT TO ALKALINITY AND USED AS PER MANUFACTURERS RECOMMENDATIONS COLOR TO BE DETERMINED MY OWNER

11 DECORATIVE BOLLARD

NTS

PLAYBOOSTER® BY LANDSCAPE STRUCTURES

BRIDGES & RAMPS
1 152443A GRID WALK W/BARRIERS

CLIMBERS W/PERMALENE HANDHOLDS
1 150975A CASCADE CLIMBER 48"DK DB ONLY
1 148432A CORKSCREW PERM HANDHOLDS 40"DK DB
1 176080A LOGO CLIMBER 64"DK DB
1 128252A LOOP LADDER 40"DK DB
1 145624D VERTICAL ASCENT 72"DK

DECKS
1 152911 BCURVED TRANSFER MODULE RIGHT 40"DK DB
2 121948A KICK PLATE 8"RISE
3 111229A SQUARE DECK EXTENSION
4 111228A SQUARE TENDERDECK

ENCLOSURES
1 115228A DRIVER PANEL ABOVE DECK
2 115235B HOUSE PANEL GROUND LEVEL
1 127439A NAVIGATOR REACH PANEL GROUND LEVEL
6 116244A PIPE BARRIER ABOVE DECK
1 164145A ROCK-N-RING PANEL GROUND LEVEL
1 130565A TABLE PANEL DB
1 115231A TIC-TAC-TOE PANEL ABOVE DECK

MOTION & MORE FUN
2 120818A PLAY STRUCTURE SEAT
1 111357B TURNING BAR ALUM DB

SLIDES
1 130798A DOUBLE SWIRL SLIDE 48"DK DB
1 124863F SLIDEWINDER2 72"DK DB 1 STRAIGHT 2 LEFT

12 PLAY STRUCTURE COMPONENTS

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HARDSCAPE DETAILS

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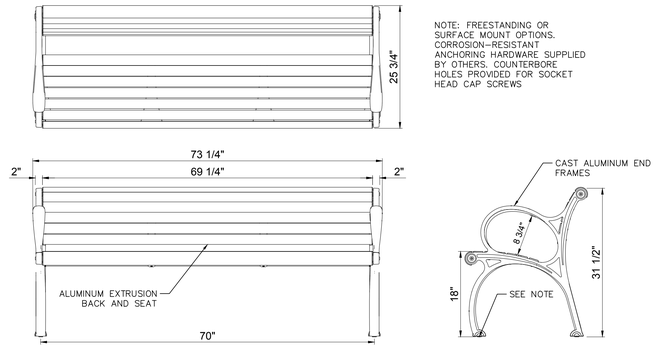
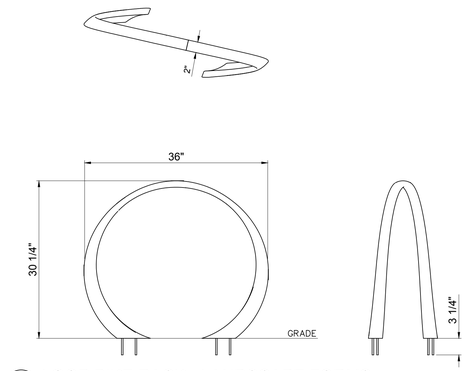


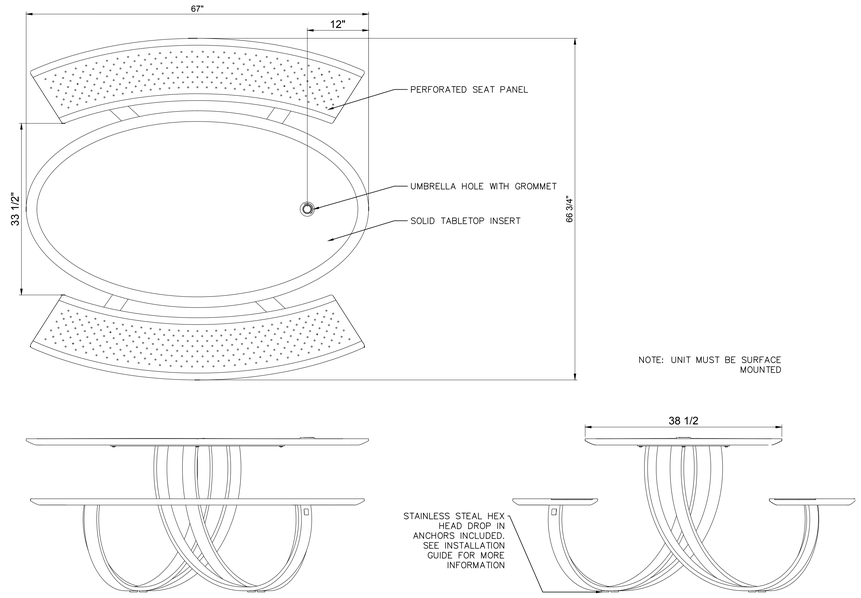
1 PLAINWELL BENCH - LANDSCAPE FORMS

NTS



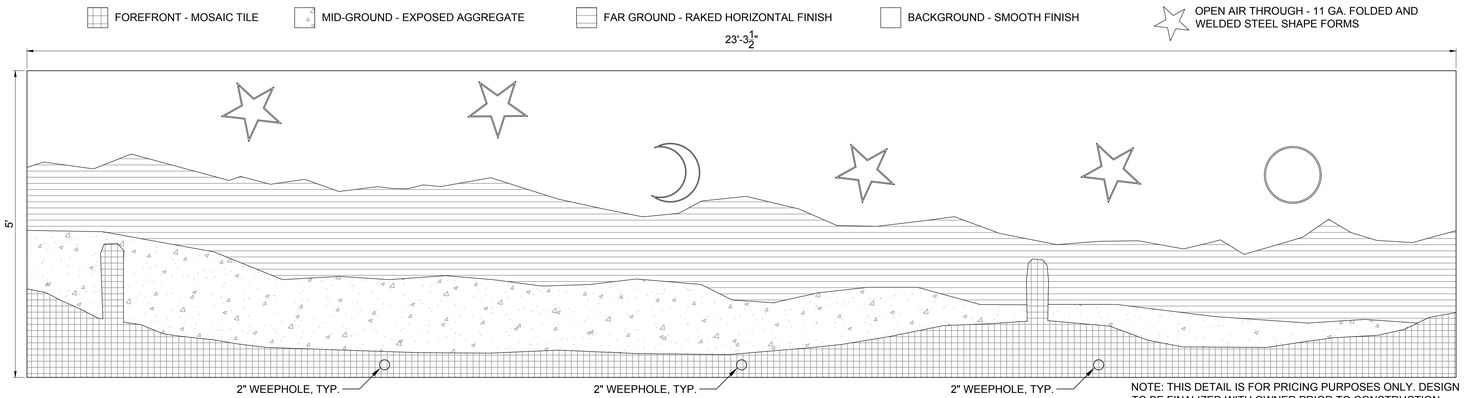
2 LOOP BIKE RACK - LANDSCAPE FORMS

NTS



3 CHARLIE PICNIC TABLE - LANDSCAPE FORMS

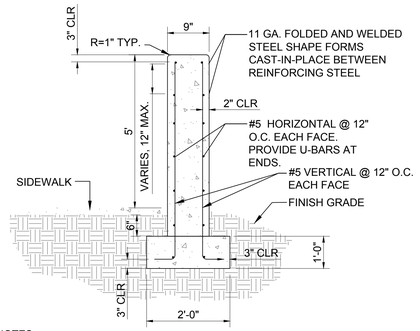
NTS



NOTE: THIS DETAIL IS FOR PRICING PURPOSES ONLY. DESIGN TO BE FINALIZED WITH OWNER PRIOR TO CONSTRUCTION.

4 CONCRETE SCREEN WALL - ELEVATION

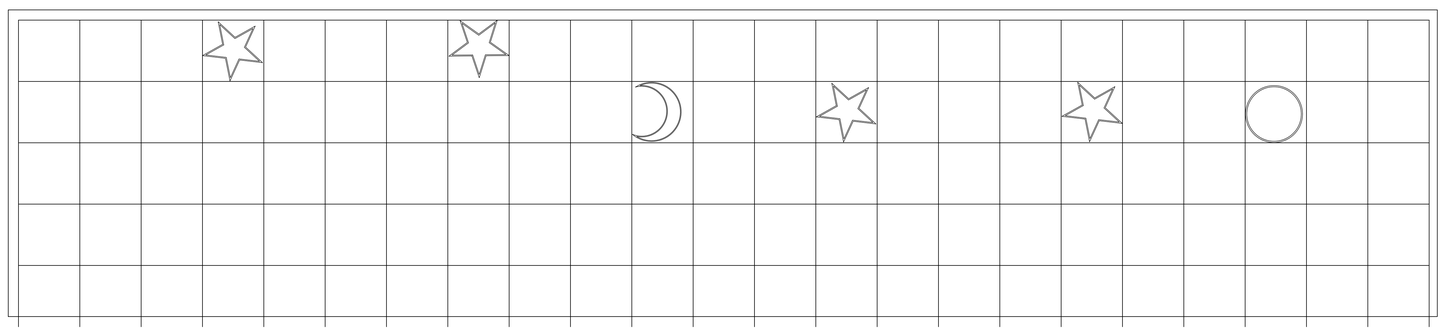
NTS



NOTES:
1. FOOTING TO BE IN UN-DISTURBED NATIVE SOIL OR ON SUBGRADE COMPACTED TO 95% DENSITY. CONCRETE TO BE CLASS S,
2. 3000 PSI @28 DAYS
3. REBAR TO BE GRADE 60

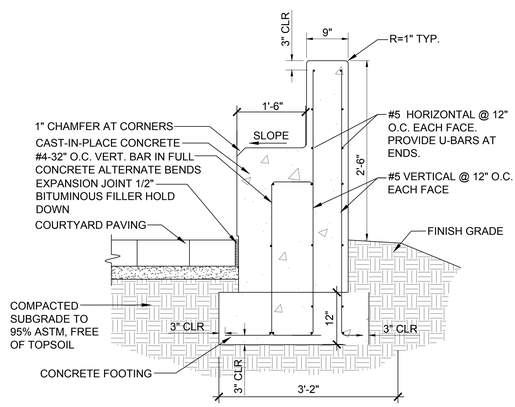
5 CONCRETE SCREEN WALL - SECTION DETAIL

NTS



6 CONCRETE SCREEN WALL - REBAR & OPENINGS DIAGRAM

NTS



7 CONCRETE SEATWALL W/ BACK

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50732
REBECA V. FIELD
Date Signed 11/16/18
ARIZONA USA
Exp. Date 03/31/2019

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HARDSCAPE DETAILS

HS8

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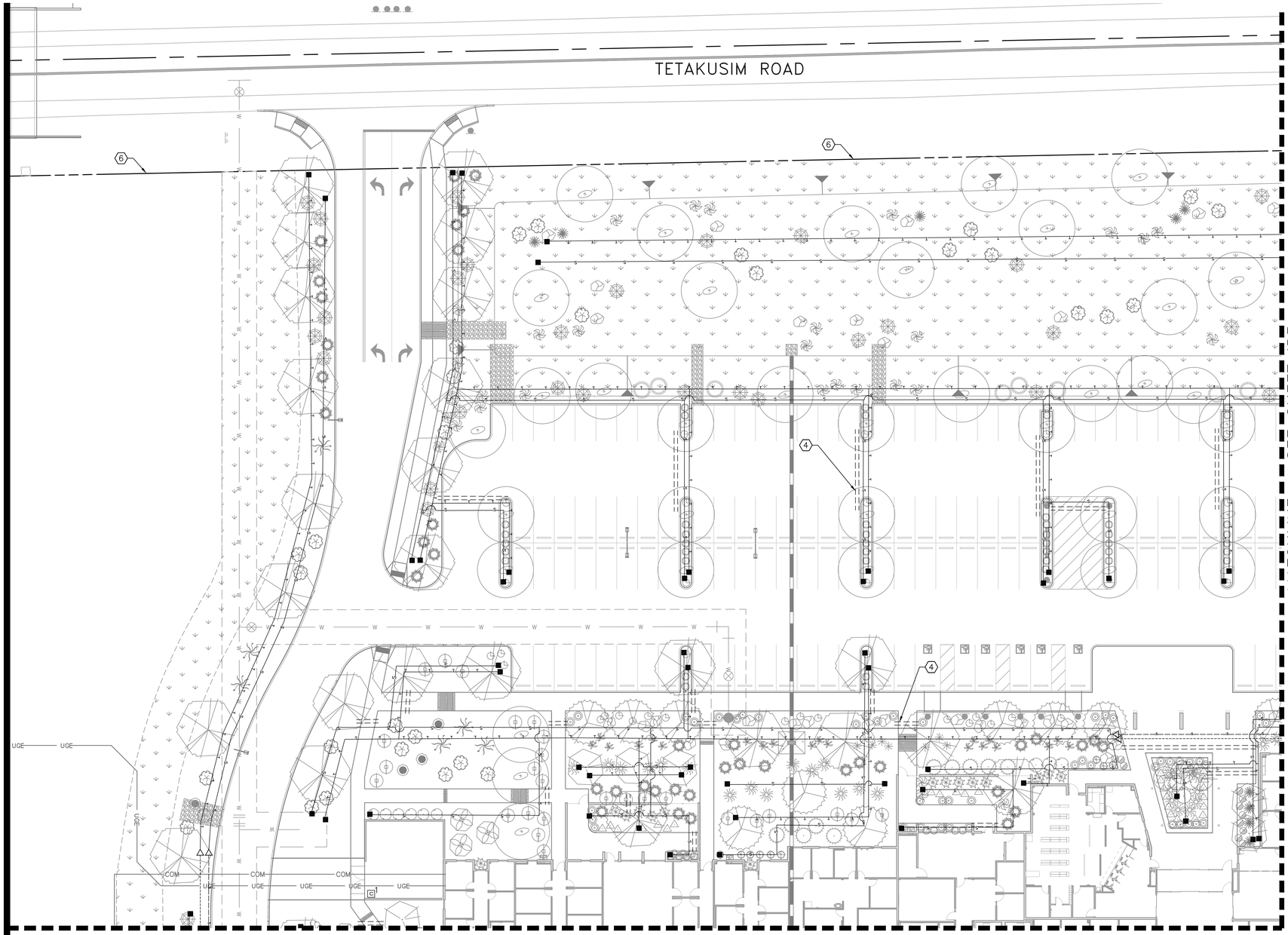

IRRIGATION NOTES:

1. IRRIGATION POINT OF CONNECTION.
2. IRRIGATION MAINLINE
3. REMOTE CONTROL VALVE, TYP.
4. SLEEVE, TYP.
5. PROPERTY LINE
6. R.O.W. LINE

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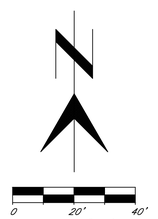
2. CONTRACTOR TO FIELD VERIFY ALL WATER PRESSURE AND FLOWS PRIOR TO INSTALLATION OF SYSTEM. IF INSUFFICIENT PSI OR GPM ARE ENCOUNTERED NOTIFY OWNER IMMEDIATELY.

3. SYSTEM REQUIRES A MINIMUM PRESSURE OF 50 PSI. OPERATE NO MORE THAN TWO VALVES AT A TIME.

IRRIGATION LEGEND:

SYMBOL	EQUIPMENT	PRODUCT	SIZE
C	CONTROLLER	1. RAINBIRD EXP16LXMEF 16–STATION (SITE) 2. RAINBIRD EXP8LXMEF 8–STATION (INTERIOR COURTYARDS)	
B	BACKFLOW PREVENTER	FEBCO 825Y REDUCED PRESSURE	1"
	BALL VALVE	ASAHI DUO BLOC SCH.80 TRU UNION BALL VALVE	1½"
	PRESSURE REGULATOR	SENNIGER PMR35MF	1"
	DRIP REMOTE CONTROL VALVE ASSEMBLY W/ FILTER	RAINBIRD 100–PEB	1"
	FILTER	RAINBIRD RBY–100–200MX 1" Y FILTER W/200 MESH SCREEN	
	QUICK COUPLER ASSEMBLY	RAINBIRD	1"

SYMBOL	EQUIPMENT	PRODUCT	SIZE
	MAIN LINE	PVC SCH 40	1½"
	TREE SUB–MAIN LINE	PVC SCH 40	1"
S	SHRUB SUB–MAIN LINE	PVC SCH 40	1"
T	TREE LATERAL LINE	PVC SCH 40	¾"
S	SHRUB LATERAL LINE	PVC SCH 40	¾"
	SLEEVE	PVC SCH 40	4" U.N.O.
NOT SHOWN	MANIFOLD ASSEMBLY MULTI–PORT; (.5 GPH, 1 GPH, & 2 GPH)	RAINBIRD EMT–6XERI W/ XB–05PC, XB–10PC, XB–20PC AS NEEDED	
NOT SHOWN	EMITTER ASSEMBLY MULTI–PORT; (1 GPH & 2 GPH)	RAINBIRD XBT–10–6, XBT–20–6; 1 PER TREE; SHRUBS WITH SAME FLOW RATE TO SHARE	
	END CAP	AUTOMATIC FLUSHING, COMPRESSION END PLUG	
S1 / xx / GPM	VALVE NUMBER VALVE SIZE GALLONS PER MINUTE		



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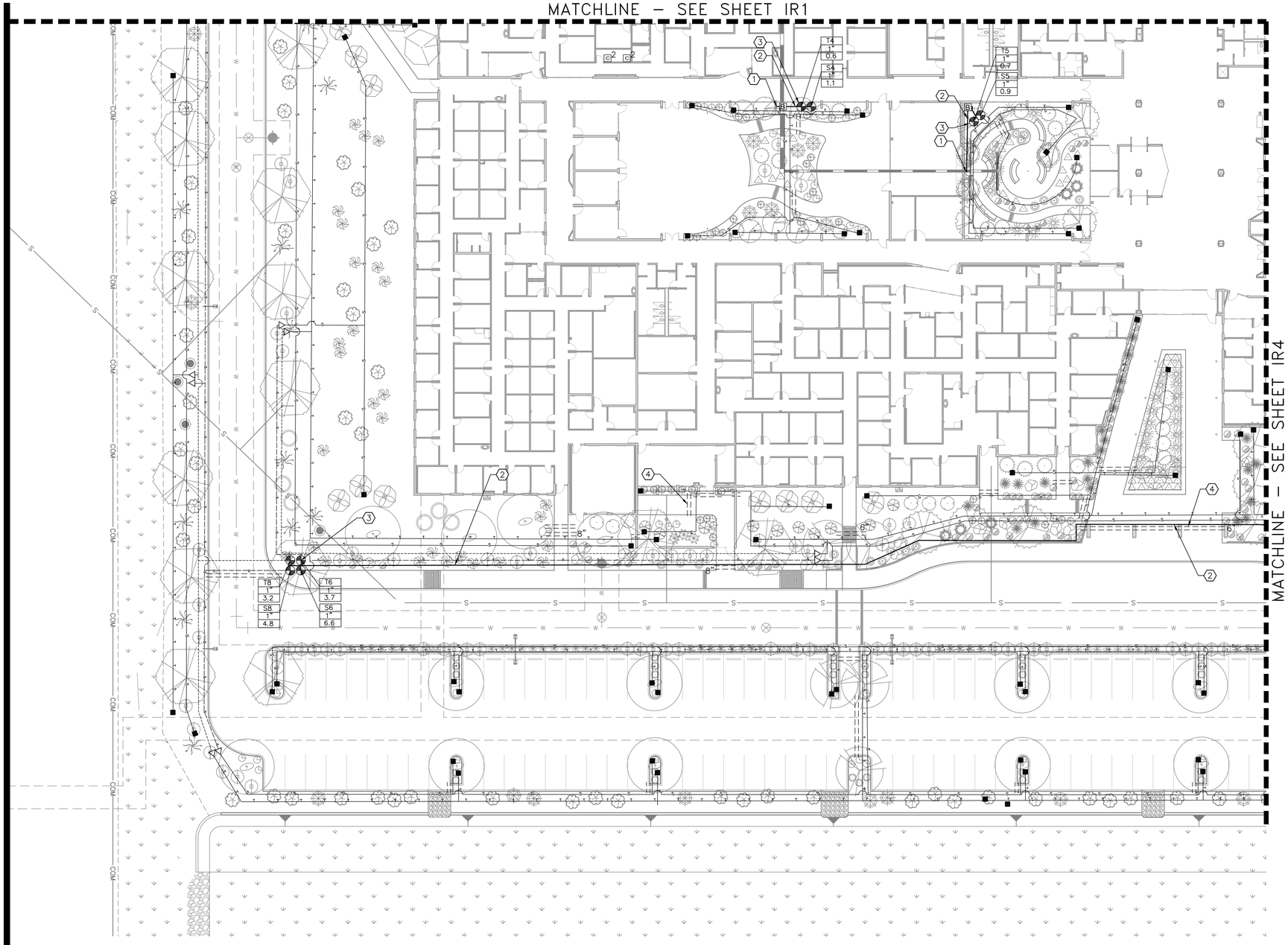
IRRIGATION PLAN - QUADRANT 1

IR1



IRRIGATION NOTES:

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2. IRRIGATION MAINLINE
3. REMOTE CONTROL VALVE, TYP.
4. SLEEVE, TYP.
5. PROPERTY LINE
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2. CONTRACTOR TO FIELD VERIFY ALL WATER PRESSURE AND FLOWS PRIOR TO INSTALLATION OF SYSTEM. IF INSUFFICIENT PSI OR GPM ARE ENCOUNTERED NOTIFY OWNER IMMEDIATELY.

3. SYSTEM REQUIRES A MINIMUM PRESSURE OF 50 PSI. OPERATE NO MORE THAN TWO VALVES AT A TIME.

IRRIGATION LEGEND:

SYMBOL	EQUIPMENT	PRODUCT	SIZE
C	CONTROLLER	1. RAINBIRD EXP16LXMEF 16–STATION (SITE) 2. RAINBIRD EXP8LXMEF 8–STATION (INTERIOR COURTYARDS)	
B	BACKFLOW PREVENTER	FEBCO 825Y REDUCED PRESSURE	1"
	BALL VALVE	ASAHI DUO BLOC SCH.80 TRU UNION BALL VALVE	1½"
	PRESSURE REGULATOR	SENNIGER PMR35MF	1"
	DRIP REMOTE CONTROL VALVE ASSEMBLY W/ FILTER	RAINBIRD 100–PEB	1"
	FILTER	RAINBIRD RBY–100–200MX 1" Y FILTER W/200 MESH SCREEN	
	QUICK COUPLER ASSEMBLY	RAINBIRD	1"

SYMBOL	EQUIPMENT	PRODUCT	SIZE
	MAIN LINE	PVC SCH 40	1½"
	TREE SUB–MAIN LINE	PVC SCH 40	1"
S	SHRUB SUB–MAIN LINE	PVC SCH 40	1"
T	TREE LATERAL LINE	PVC SCH 40	¾"
S	SHRUB LATERAL LINE	PVC SCH 40	¾"
	SLEEVE	PVC SCH 40	4" U.N.O.
NOT SHOWN	MANIFOLD ASSEMBLY MULTI–PORT; (.5 GPH, 1 GPH, & 2 GPH)	RAINBIRD EMT–6XERI W/ XB–05PC, XB–10PC, XB–20PC AS NEEDED	
NOT SHOWN	EMITTER ASSEMBLY MULTI–PORT; (1 GPH & 2 GPH)	RAINBIRD XBT–10–6, XBT–20–6; 1 PER TREE; SHRUBS WITH SAME FLOW RATE TO SHARE	
	END CAP	AUTOMATIC FLUSHING, COMPRESSION END PLUG	

S1 = VALVE NUMBER
XX = VALVE SIZE
GPM = GALLONS PER MINUTE

0 20' 40'
SCALE: 1"=20'

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IRRIGATION PLAN - QUADRANT 2

IR2

TETAKUSIM ROAD

MATCHLINE – SEE SHEET IR1

MATCHLINE – SEE SHEET IR4

IRRIGATION LEGEND:

SYMBOL	EQUIPMENT	PRODUCT	SIZE
C	CONTROLLER	1. RAINBIRD EXP16LXMEF 16–STATION (SITE) 2. RAINBIRD EXP8LXMEF 8–STATION (INTERIOR COURTYARDS)	
B	BACKFLOW PREVENTER	FEBCO 825Y REDUCED PRESSURE	1"
	BALL VALVE	ASAHI DUO BLOC SCH.80 TRU UNION BALL VALVE	1½"
	PRESSURE REGULATOR	SENNIGER PMR35MF	1"
	DRIP REMOTE CONTROL VALVE ASSEMBLY W/ FILTER	RAINBIRD 100–PEB	1"
	FILTER	RAINBIRD RBY–100–200MX 1" Y FILTER W/200 MESH SCREEN	
	QUICK COUPLER ASSEMBLY	RAINBIRD	1"

SYMBOL	EQUIPMENT	PRODUCT	SIZE
	MAIN LINE	PVC SCH 40	1½"
	TREE SUB–MAIN LINE	PVC SCH 40	1"
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T	TREE LATERAL LINE	PVC SCH 40	¾"
S	SHRUB LATERAL LINE	PVC SCH 40	¾"
	SLEEVE	PVC SCH 40	4" U.N.O.
NOT SHOWN	MANIFOLD ASSEMBLY MULTI–PORT; (.5 GPH, 1 GPH, & 2 GPH)	RAINBIRD EMT–6XERI W/ XB–05PC, XB–10PC, XB–20PC AS NEEDED	
NOT SHOWN	EMITTER ASSEMBLY MULTI–PORT; (1 GPH & 2 GPH)	RAINBIRD XBT–10–6, XBT–20–6; 1 PER TREE; SHRUBS WITH SAME FLOW RATE TO SHARE	
	END CAP	AUTOMATIC FLUSHING, COMPRESSION END PLUG	
S1 / XX / GPM	VALVE NUMBER VALVE SIZE GALLONS PER MINUTE		

IRRIGATION NOTES:

1. IRRIGATION POINT OF CONNECTION.
2. IRRIGATION MAINLINE
3. REMOTE CONTROL VALVE, TYP.
4. SLEEVE, TYP.
5. PROPERTY LINE
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0 20' 40'
SCALE: 1"=20'

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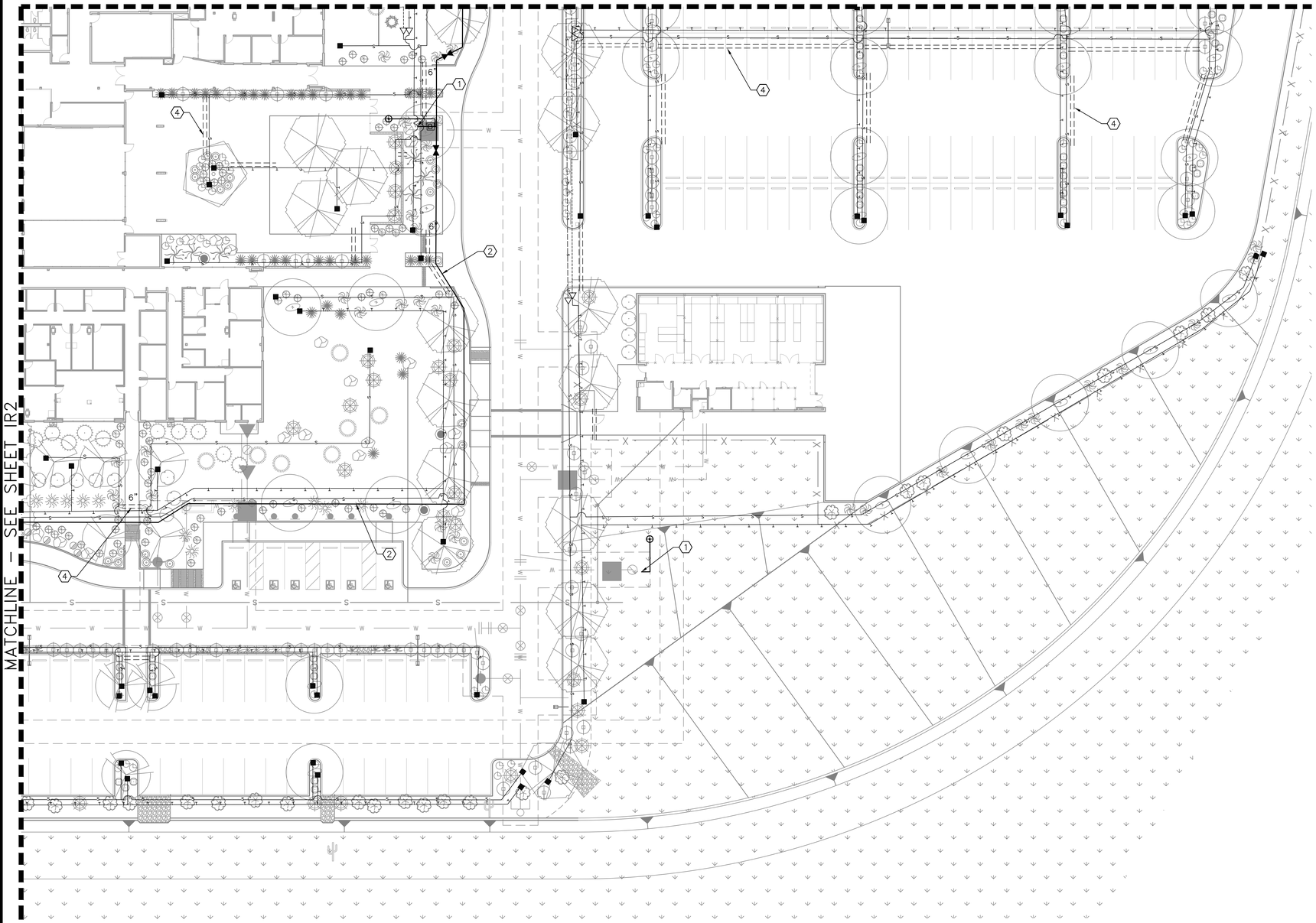
IRRIGATION PLAN - QUADRANT 3

IR3

MATCHLINE – SEE SHEET IR3

MATCHLINE – SEE SHEET IR2



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B	BACKFLOW PREVENTER	FEBCO 825Y REDUCED PRESSURE	1"
⋈	BALL VALVE	ASAHI DUO BLOC SCH.80 TRU UNION BALL VALVE	1½"
△	PRESSURE REGULATOR	SENNIGER PMR35MF	1"
◔	DRIP REMOTE CONTROL VALVE ASSEMBLY W/ FILTER	RAINBIRD 100–PEB	1"
	FILTER	RAINBIRD RBY–100–200MX 1" Y FILTER W/200 MESH SCREEN	
⊕	QUICK COUPLER ASSEMBLY	RAINBIRD	1"

SYMBOL	EQUIPMENT	PRODUCT	SIZE
———	MAIN LINE	PVC SCH 40	1½"
— — — —	TREE SUB–MAIN LINE	PVC SCH 40	1"
—S— — —	SHRUB SUB–MAIN LINE	PVC SCH 40	1"
—T— T—	TREE LATERAL LINE	PVC SCH 40	¾"
———S———	SHRUB LATERAL LINE	PVC SCH 40	¾"
= = = =	SLEEVE	PVC SCH 40	4" U.N.O.
NOT SHOWN	MANIFOLD ASSEMBLY MULTI–PORT; (.5 GPH, 1 GPH, & 2 GPH)	RAINBIRD EMT–6XERI W/ XB–05PC, XB–10PC, XB–20PC AS NEEDED	
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——◇	END CAP	AUTOMATIC FLUSHING, COMPRESSION END PLUG	
S1 / xx / GPM	VALVE NUMBER VALVE SIZE GALLONS PER MINUTE		

0 20' 40'
SCALE: 1"=20'

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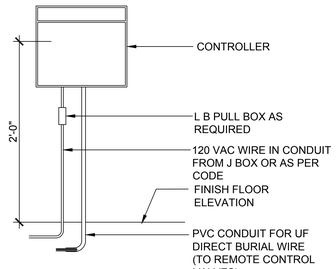
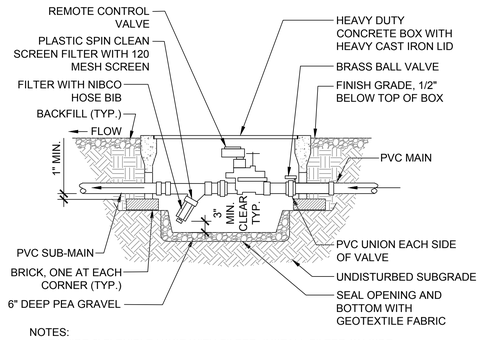
IRRIGATION PLAN - QUADRANT 4

IR4



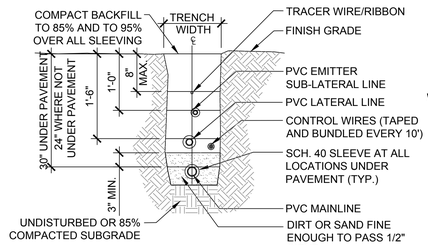
NOTES:
1. ALL WIRE CONNECTIONS SHALL BE APPROVED MECHANICAL CONNECTORS WITH SEALER.

1 WALL MOUNTED CONTROLLER
NTS



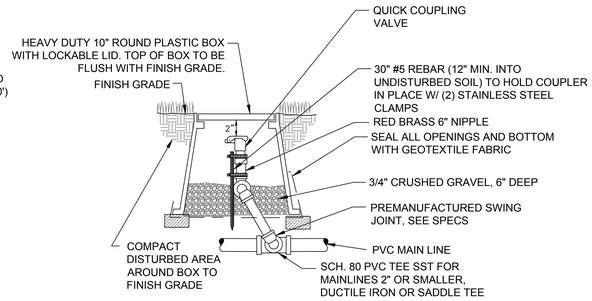
NOTES:
1. PROVIDE 2' FLEXIBLE HOSE WITH FILTER. INSTALL FILTER ON SIDE AT A SLIGHT DOWNWARD ANGLE.

2 REMOTE CONTROL VALVE WITH FILTER
NTS

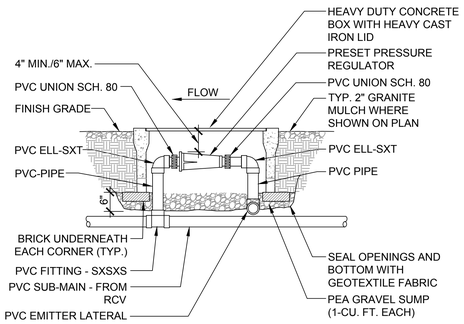


NOTES:
1. ALL PIPE SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. NO PIPE OR WIRE SHALL BE LOCATED UNDER PAVING UNLESS IT IS SLEEVED.
3. COLOR TRACER WIRE/RIBBON TO BE RUN ALONG DITCH ALIGNMENT AT CENTERLINE OF PIPES (6"-8" DEEP). AN EXPOSED LOOP IN THE TRACER WIRE/RIBBON SHALL BE PROVIDED AT ALL VALVES, PULL BOXES, AND THE END OF ALL SLEEVES. TRACER WIRE SHALL BE #16 GREEN COATED COPPER WIRE.

3 IRRIGATION TRENCHING
NTS

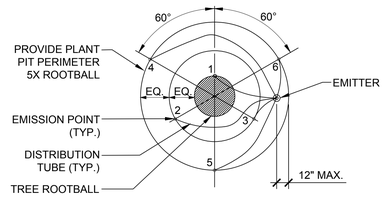


4 QUICK COUPLER ASSEMBLY AS REQUIRED
NTS



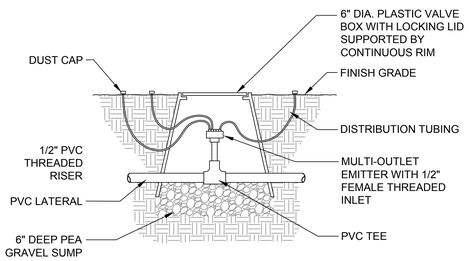
NOTES:
1. ALL PIPE SCH. 40 EXCEPT SCH. 80 UNIONS

5 PRESSURE REGULATOR RISER
NTS



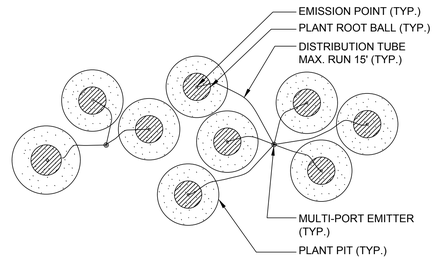
NOTES:
1. MAXIMUM LENGTH OF ONE DISTRIBUTION TUBE SHALL BE 15'.
2. EMISSION POINTS ARE NUMBERED IN ORDER OF PLACEMENT (1-6).
3. IF ONLY ONE EMITTER - PLACE UPHILL OF TREE.

6 MULTI PORT EMITTER LOCATION
NTS



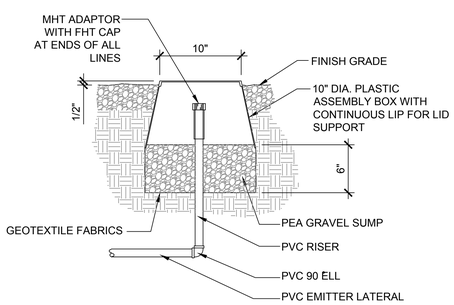
NOTES:
1. LENGTH OF DISTRIBUTION TUBING NOT TO EXCEED 15'-0"

7 MULTI-OUTLET EMITTER ON PVC LATERAL
NTS

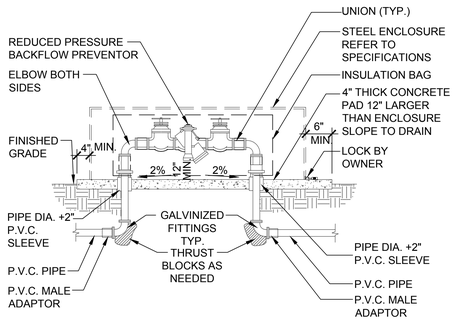


NOTES:
1. MORE THAN ONE SHRUB MAY BE WATERED FROM A SINGLE MULTI-PORT EMITTER.
2. MAXIMUM LENGTH OF ONE DISTRBUTION TUBE SHALL BE 15'.
3. IF ONLY ONE DISTRIBUTION TUBE IS REQUIRED, PLACE EMISSION POINT ON TOP OF ROOTBALL OR UPHILL OF PLANT.
4. IF MORE THAN ONE DISTRIBUTION TUBE PER SHRUB IS REQUIRED, SPACE EMISSION POINTS EVENLY WITHIN PLANT PIT.

8 EMITTER LOCATION DETAIL - SHRUBS
NTS

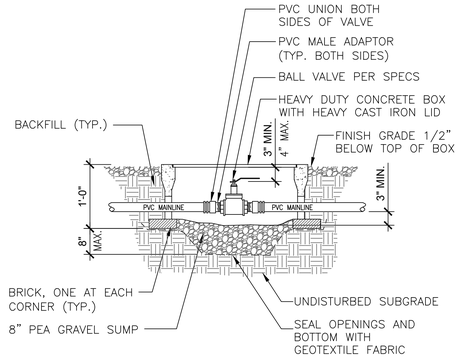


9 FLUSH END CAP (PVC LATERAL END CAP)
NTS



NOTES:
1. INSTALL PER C.O.T. WATER STANDARD 1802

10 BACKFLOW PREVENTION UNIT
NTS



11 BALL VALVE
NTS

swaim
ASSOCIATES LTD
ARCHITECTS AIA
7350 EAST SPEEDWAY 210
TUCSON, ARIZONA 85710
OFFICE (520) 326-3700
FAX (520) 326-1148
www.swaimaia.com

Registered Landscape Architect
50732
REBECA V. FIELD
Date Signed 11/16/18
ARIZONA U.S.A.
Exp. Date 03/31/2019

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

IRRIGATION DETAILS

IR5

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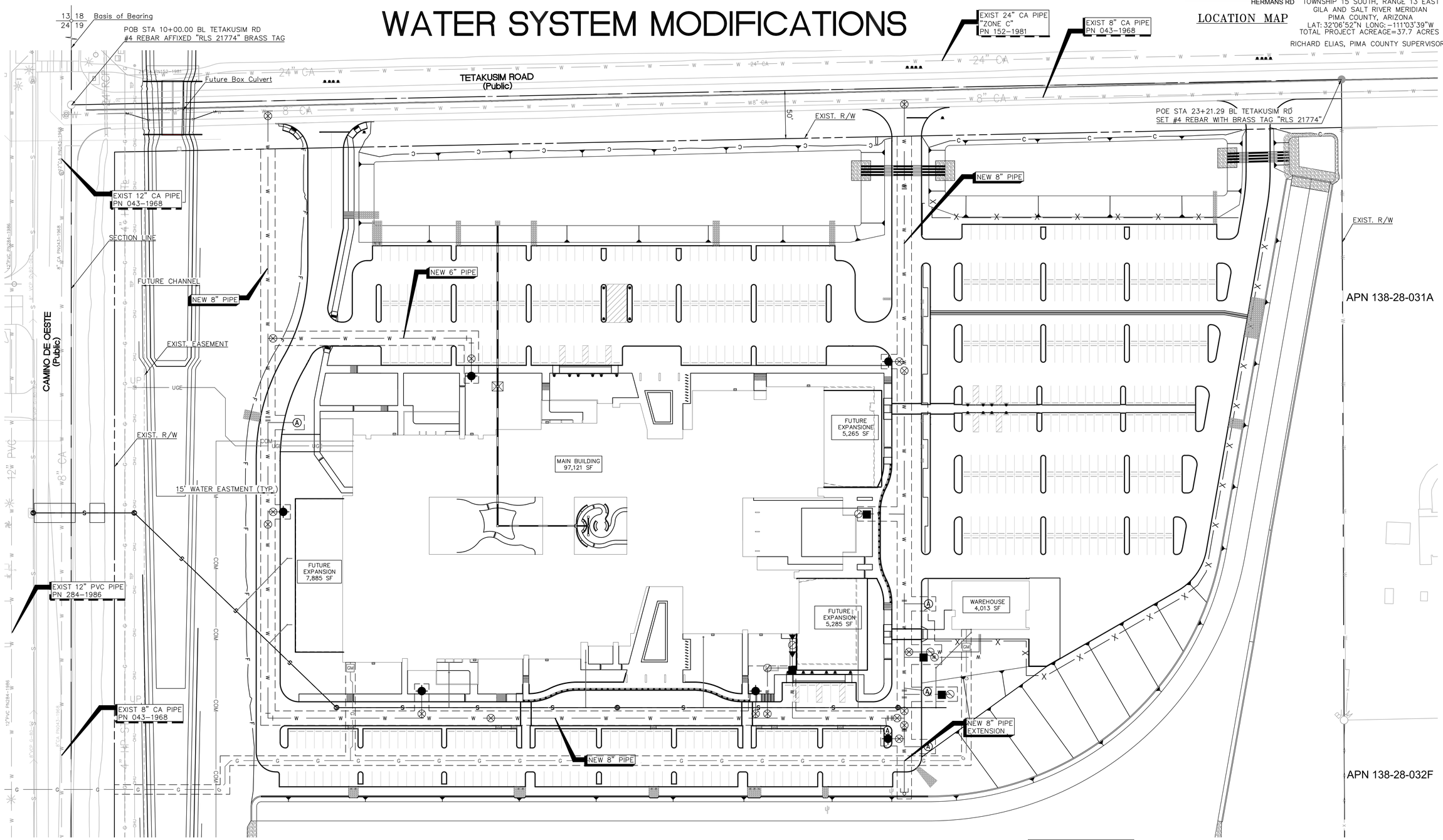
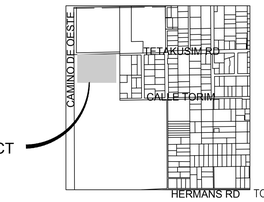
HEALTH SERVICES CENTER II

PASCUA YAQUI TRIBE

WATER SYSTEM MODIFICATIONS





THIS PROJECT

LOCATION MAP

SCALE: 3"=1 MILE

A PORTION OF SECTION 19,
TOWNSHIP 15 SOUTH, RANGE 13 EAST
GILA AND SALT RIVER MERIDIAN
PIMA COUNTY, ARIZONA
LAT: 32°06'52"N LONG: -111°03'39"W
TOTAL PROJECT ACREAGE=37.7 ACRES

RICHARD ELIAS, PIMA COUNTY SUPERVISOR

SHEET INDEX

PAGE NO.	SHEET NO.	DESCRIPTION
XX	W1	COVER SHEET
XX	W2	GENERAL NOTES, ABBREVIATIONS, AND LEGEND
XX	W3	PLAN
XX	W4	PROFILE
XX	W5	DETAILS, MATERIAL QUANTITIES SUMMARY

FOR ACCEPTANCE CONDITIONS, SEE THE WATER SYSTEM MODIFICATION NOTES, NOTE 1, SHEET W2 OF W5.

CITY OF TUCSON, WATER DEPARTMENT DATE

GOVERNMENT LOT 2
A PORTION OF APN 138-28-0860
SEQUENCE NO. 20101300277
OWNER: PASCUA YAQUI TRIBE

SHEET INDEX PLAN

1" = 40'

OWNER
PASCUA YAQUI TRIBE
7474 S. CAMINO DE OESTE
TUCSON, ARIZONA 85757
(520) 879-5935 OFFICE
IAN M. GEITNER
FACILITIES MANAGEMENT DIRECTOR

RESERVED FOR ENGINEERING AS-BUILT STAMP

INSPECTOR'S RECORD DRAWING COMMENTS
INSPCT: _____
CONTR: _____
START _____ FINAL _____
PIPE MFR. PVC _____
PIPE MFR. DIP _____
PIPE MFR. OTHER _____
SVC LINE MAT _____
B.F.'S _____
GATES _____
F.H.'S BRAND _____ MAT _____
MAGNETIC TAPE INST. YES ☐ NO ☐
TRACER WIRE INST. YES ☐ NO ☐
ZONE _____ PSI _____
MAPPING INFORMATION
PLOTTED _____ ON VM _____
CHECKED _____ DATE _____

TUCSON WATER

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TUCSON, ARIZONA 85710
OFFICE (520) 326-3700
FAX (520) 326-1148
www.swaimaia.com

Registered Professional Engineer (Civil)
CERTIFICATE NO.
48213
DAVID L. TAPIA
Date Signed 11/16/18
Expires 9/30/2020

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

WATER MODIFICATIONS
COVER SHEET

W1

WATER SYSTEM MODIFICATION NOTES

1. ACCEPTANCE CONDITIONS:
   A. THIS PROJECT IS ACCEPTED BY THE CITY OF TUCSON WATER DEPARTMENT FOR SUBSTANTIAL CONCURRENCE WITH STANDARD SPECIFICATIONS AND DETAILS.
   B. ACCEPTANCE OF THESE PLANS IS VALID FOR 2 YEARS AFTER THE DATE OF THE SIGNATURE.
   C. THE WARRANTEE AND GUARANTEE DURATION FOR ALL WATER WORK ON THIS PROJECT SHALL BE TWO (2) YEARS COMMENCING ON THE DATE OF FINAL ACCEPTANCE OF THE ROADWAY AGENCY IMPROVEMENTS PROJECT.

2. CURRENT STANDARDS:
   WATER SYSTEM MODIFICATION CONSTRUCTION WORK SHALL CONFORM TO THE FOLLOWING STANDARDS AND SPECIAL PROVISIONS:
   A. THE PIMA COUNTY/CITY OF TUCSON STANDARD SPECIFICATIONS FOR PUBLIC IMPROVEMENTS, 2003 EDITION. STANDARD DETAILS SHALL REFER TO THE STANDARD DETAIL DRAWINGS OF TUCSON WATER'S STANDARD SPECIFICATIONS AND DETAILS MANUAL, 2011 EDITION.
   B. THE WATER SYSTEM MODIFICATIONS SPECIAL PROVISIONS FOR THIS PROJECT.

3. WATER SYSTEM MODIFICATION PRE CONSTRUCTION PROCEDURE:
   A. THE CONTRACTOR SHALL CONTACT THE CITY OF TUCSON WATER DEPARTMENT, CONSTRUCTION SECTION (791-2665), A MINIMUM OF FIVE (5) CALENDAR DAYS PRIOR TO ANY WATER WORK. THE CONTRACTOR SHALL REFER TO THE CITY OF TUCSON WATER DEPARTMENT PLAN NO. _____.
   B. THE CITY OF TUCSON WATER DEPARTMENT CONSTRUCTION SECTION WILL SCHEDULE THE TIME AND PLACE FOR THE MEETING.
   C. NO WATER SYSTEM CONSTRUCTION SHALL BEGIN UNTIL A "NOTICE TO PROCEED" HAD BEEN ISSUED BY THE CITY OF TUCSON WATER DEPARTMENT.
   D. ANY WATER WORK INSTALLED PRIOR TO THE NOTICE TO PROCEED DATE SHALL BE REMOVED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.

4. SHUT DOWN OF TRANSMISSION MAINS:
   N/A

5. DIMENSIONS, SLOPES AND GRADES:
   ALL DIMENSIONS, SLOPES AND GRADES OF EXISTING WATER LINES ARE TAKEN FROM "AS BUILT" DRAWINGS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE EXACT INFORMATION BEFORE ORDERING ANY SPECIAL FITTINGS OR EQUIPMENT.

6. SHUT DOWN OF DISTRIBUTION MAINS:
   SHUT-DOWN OF THE EXISTING WATER SYSTEM REQUIRING THE OPERATION OF TUCSON WATER VALVES SHALL BE COORDINATED THROUGH A CITY OF TUCSON WATER DEPARTMENT CONSTRUCTION INSPECTOR A MINIMUM OF FIVE (5) CALENDAR DAYS IN ADVANCE.

7. DEPTH OF NEW WATER MAINS:
   A. NEW WATER MAINS SHALL BE INSTALLED AT A MINIMUM OF DEPTH OF THREE FEET (3.0') FROM THE BOTTOM OF ANY EXCAVATION OR SCARIFICATION TO THE TOP OF THE NEW PIPE. THIS DEPTH SHALL BE MAINTAINED FOR FIVE FEET (5.0') BEYOND ANY EXCAVATION, MEASURED PERPENDICULAR TO THE PROPOSED STRUCTURE OR EDGE OF THE PROPOSED ROADWAY.
   B. IN NO CASE SHALL NEW WATER MAINS BE INSTALLED IN LESS THAN THREE AND SIXTY SEVEN HUNDREDTHS OF A FOOT (3.67') DEEP FROM THE FINISHED GRADE TO THE TOP OF THE NEW PIPE.
   C. THESE MINIMUMS SHALL APPLY TO ALL WATER MAINS UNLESS OTHERWISE NOTED ON THE PLANS.

8. DEPTH OF NEW SERVICE LINES:
   A. NEW SERVICE LINES, TWO INCH (2") AND SMALLER, SHALL BE INSTALLED AT A MINIMUM DEPTH OF TWO FEET (2.0') FROM THE BOTTOM OF ANY EXCAVATION OR SCARIFICATION TO THE TOP OF THE NEW SERVICE LINE. THIS DEPTH SHALL BE MAINTAINED FOR FIVE FEET (5.0') BEYOND ANY EXCAVATION, MEASURED PERPENDICULAR TO THE PROPOSED STRUCTURE OR EDGE OF THE PROPOSED ROADWAY.
   B. IN NO CASE SHALL NEW SERVICE LINES BE INSTALLED LESS THAN THREE FEET (3.0') DEEP FROM THE FINISHED GRADE TO THE TOP OF THE NEW SERVICE LINE.
   C. THESE MINIMUMS SHALL APPLY TO ALL SERVICE LINES UNLESS OTHERWISE NOTED ON THE PLANS.

9. WATER METERS AND METER BOXES:
   THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WATER METERS AND METER BOXES IN THE CONSTRUCTION AREA. THIS WILL INCLUDE BUT NOT BE LIMITED TO:
   A. REMOVAL OF EXISTING METERS, REPLACEMENT COORDINATION AND INSTALLATION OF THE NEW AUTOMATIC METER READING (AMR) WATER METERS.
   B. DURING THIS OPERATION, EXISTING METERS SHALL BE TAGGED WITH THE CORRECT ADDRESS AND RETURNED TO TUCSON WATER. ALL EXISTING WATER METERS THAT ARE TO BE RELOCATED AS PART OF THIS PROJECT THAT ARE NOT ALREADY AUTOMATED ARE TO BE REPLACED WITH AMR TYPE METERS AT LOCATIONS/ADDRESSES SPECIFIED ON THE PLANS.
   C. PROTECTION OF METERS AT ALL TIMES. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO AVOID ANY DAMAGE TO METERS. THE CONTRACTOR SHALL PROVIDE FOR THEIR SAFE STORAGE AND THE PROPER EQUIPMENT FOR THEIR HANDLING.
   D. ACCESS TO METERS. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL IN-SERVICE METERS DURING CONSTRUCTION. AT THE CLOSE OF THE PROJECT THE CONTRACTOR SHALL ENSURE THAT ALL METERS ARE LEFT ACCESSIBLE AND THAT ALL METER BOXES ARE ADJUSTED TO FINAL GRADE.
   E. TUCSON WATER SHALL SUPPLY ALL NEW AMR WATER METERS TO BE INSTALLED AS PART OF THIS PROJECT.

10. FIRE PROTECTION SHUT DOWN:
    FIVE (5) WORKING DAYS PRIOR TO SHUT-DOWN OF ANY FIRE HYDRANTS OR FIRE PROTECTION SERVICE LINES THE CONTRACTOR SHALL PROVIDE THE CITY OF TUCSON WATER DEPARTMENT CONSTRUCTION INSPECTOR WITH A WRITTEN REPORT INDICATING THE LOCATION AND DURATION OF ANY FIRE HYDRANT OR FIRE PROTECTION SERVICE SHUT-DOWNS. THE CONTRACTOR SHALL NOTIFY THE CITY OF TUCSON WATER DEPARTMENT CONSTRUCTION INSPECTOR WHEN FIRE HYDRANTS OR FIRE PROTECTION SERVICES ARE BACK IN SERVICE.

11. MAINTAIN SERVICE TO CUSTOMERS:
    THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING SERVICE TO ALL WATER CUSTOMERS DURING CONSTRUCTION.
    IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE WHICH SERVICES WILL BE AFFECTED BY THIS PROJECT.
    IT MAY BE NECESSARY TO ACCOMPLISH TIE-OVERS, RE-CONNECTIONS ETC. WHILE BUSINESS CUSTOMERS ARE CLOSED.
    IF INTERRUPTIONS OF SERVICE IS UNAVOIDABLE, THE CONTRACTOR SHALL NOTIFY THE WATER INSPECTOR A MINIMUM OF FIVE (5) WORKING DAYS IN ADVANCE TO COORDINATE SHUT-DOWNS. EVERY EFFORT SHALL BE MADE TO MINIMIZE DISRUPTION TO THE CUSTOMER.
    IF THE CONTRACTOR CHOOSES TO ABANDON ANY PORTION OF THE EXISTING WATER SUPPLY SYSTEM WITHOUT CONCURRENT NEW CONSTRUCTION AS CALLED FOR ON THE PLANS, THE CONTRACTOR SHALL PROVIDE ANY AND ALL MATERIALS AND CONSTRUCTION OF A TEMPORARY OR PERMANENT WATER SYSTEM TO MAINTAIN CONTINUED WATER SERVICE TO CUSTOMERS AT NO ADDITIONAL COST.

12. SPECIAL USE WATER PERMITS:
    PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL APPLY FOR TWO (2) SPECIAL WATER USE PERMITS FROM THE CITY OF TUCSON WATER DEPARTMENT COMMERCIAL SECTION.
    A. CONSTRUCTION WATER SPECIAL PERMIT:
       THERE WILL BE NO CHARGE FOR THIS PERMIT, BUT THE CONTRACTOR MUST PAY THE SUM OF $_____ PLUS TAX AS THE ESTIMATED COST OF THE WATER TO BE USED. THIS MATER MAY ONLY BE USED FOR TRENCH SETTLING, DISINFECTION AND TESTING.
    B. METERED FIRE HYDRANT ONLY PERMIT:
       THIS NON-TRANSFERABLE PERMIT WILL ENTITLE THE CONTRACTOR TO USE WATER THROUGH A METER FROM EXISTING FIRE HYDRANTS AT APPROVED LOCATIONS. WATER USED UNDER THIS PERMIT IS FOR GENERAL CONSTRUCTION PURPOSES SUCH AS DUST CONTROL, SITE PREPARATION ETC.

13. NEW MATERIAL:
    ALL MATERIALS, FITTINGS AND APPURTENANCES CALLED FOR ON THE PLANS, OR REQUIRED FOR A COMPLETE INSTALLATION, SHALL BE NEW. NO REFURBISHED ITEMS OR MATERIALS WILL BE ALLOWED.

14. VALVE BOXES:
    THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTING ALL NEW AND EXISTING WATER VALVE BOXES TO FINISHED GRADE PER SD-300.

15. JOINT RESTRAINT:
    THE CONTRACTOR SHALL USE MECHANICALLY RESTRAINED JOINTS AT ALL CHANGES OF DIRECTION IN THE WATER MAINS. THE LENGTHS OF RESTRAINED PIPE ON BOTH SIDES OF THE RESTRAINED JOINT SHALL BE AS CALLED FOR ON THE PLANS OR AS PER STANDARD DETAIL SD-600. WITH THE APPROVAL OF THE ENGINEER AND THE CITY OF TUCSON WATER DEPARTMENT, THE CONTRACTOR MAY USE CONCRETE THRUST BLOCKING IN LIEU OF MECHANICALLY RESTRAINED JOINTS. CONCRETE THRUST BLOCKING SHALL COMPLY WITH STANDARD DETAIL SD-610.

16. MARKING TAPE:
    IF ANY EXISTING DETECTABLE MARKING TAPE IS DISTURBED OR DESTROYED DURING CONSTRUCTION, THE CONTRACTOR SHALL FURNISH AND INSTALL APPROPRIATE NEW TAPE. THERE SHALL BE NO ADDITIONAL CHARGE FOR THIS REINSTALLATION.

17. CORROSION CONTROL:
    THIS PROJECT HAS CORROSION CONTROL/MONITORING WORK INCLUDED AS PART OF THE CONTRACT. THE CONTRACTOR SHALL PROVIDE ALL SUBMITTALS, COMPONENTS AND REPORTS OF THE CORROSION WORK AS CALLED FOR ON THESE PLANS AND IN THE SPECIAL PROVISIONS.

18. TRACER WIRE:
    THIS PROJECT WILL HAVE TRACER WIRE INSTALLED. IF ANY EXISTING TRACER WIRE IS DISTURBED OR DESTROYED DURING CONSTRUCTION, THE CONTRACTOR SHALL FURNISH AND INSTALL NEW TRACER WIRE TO REPLACE THE EXISTING. THERE SHALL BE NO ADDITIONAL CHARGE FOR THIS REINSTALLATION. THE TRACER WIRE SHALL BE CERTIFIED BY A LICENSED ELECTRICAL CONTRACTOR FOR CONTINUITY PRIOR TO FINAL ROADWAY PAVEMENT. FINAL ACCEPTANCE WILL NOT BE GRANTED UNTIL CERTIFICATION IS RECEIVED BY TUCSON WATER.

19. PVC PIPE DEFLECTION:
    A. THE CONTRACTOR MAY NOT DEFLECT PVC PIPE AT BELL & SPIGOT GASKETED JOINTS OR AS LONGITUDINAL BENDING IN THE PIPE SEGMENT.
    B. THE CONTRACTOR SHALL ONLY DEFLECT PVC PIPE AT DUCTILE IRON BENDS/FITTINGS PROVIDED THE DEFLECTION DOES NOT EXCEED MANUFACTURER'S ALLOWABLE DEFLECTION.

20. RECLAIMED WATER DISPOSAL:
    DISPOSAL OF RECLAIMED WATER RELEASED DURING CONSTRUCTION PROJECTS MUST BE TO AN IDENTIFIED SEWER MANHOLE. IN CASES WHERE THIS IS NOT POSSIBLE, THE RELEASED RECLAIMED WATER NEEDS TO BE COLLECTED IN A LINED PIT AND TRUCKED TO WHERE IT CAN BE DISCHARGED (A GOLF COURSE LAKE, A WASTEWATER TREATMENT PLANT OR OTHER APPROVED LOCATION).

21. LEAD FREE
    THE CONTRACTOR SHALL FURNISH AND INSTALL ALL PIPE FITTINGS, APPURTENANCES OR ANY OTHER MATERIALS TO BE IN CONTACT WITH POTABLE WATER IN ACCORDANCE WITH THE LEAD-FREE REQUIREMENTS DEFINED BY THE "REDUCTION OF LEAD IN DRINKING WATER ACT OF 2011" AMENDING SECTION 1417 OF THE SAFE WATER DRINKING ACT.

22. FIRE HYDRANTS
    COORDINATE ANY REMOVAL OF OLD LOCKS AND INSTALLATION OF NEW LOCKS WITH THE TUCSON WATER CONSTRUCTION INSPECTOR FOR ALL FIRE HYDRANTS WITHIN THE PROJECT AREA.

GENERAL CONSTRUCTION NOTES

1. TUCSON WATER STANDARD DETAIL NO 105, "GENERAL CONSTRUCTION NOTES," SHALL APPLY TO AND BECOME AN INTEGRAL PART OF THIS CONTRACT. ALL DESIGN STANDARDS, MATERIALS, AND WORKMANSHIP ARE TO BE IN ACCORDANCE WITH TUCSON WATER STANDARD SPECIFICATIONS AND DETAILS, 2017 EDITION AND ENGINEERING DIRECTIVES AND POLICIES.

2. CONSTRUCTION WATER FOR PRESSURE TESTING, CHLORINATING AND FLUSHING SHALL BE PROVIDED THROUGH THE EXISTING WATER SYSTEM AND SHALL COST $_____. CONSTRUCTION WATER FOR TRENCH BACKFILL AND COMPACTIONS AND OTHER CONSTRUCTION NEEDS SHALL BE THROUGH AN APPROVED METERED WATER SOURCE OBTAINED FROM TUCSON WATER CUSTOMER SERVICE DIVISION UNDER A SEPARATE PERMIT/AGREEMENT.

3. THIS WATER SYSTEM IS DESIGNED TO ACCOMMODATE 2,000 GPM FIRE FLOW, FOR 4 HOURS.

4. AT THE TIME OF PLAN APPROVAL, THIS DEVELOPMENT IS LOCATED WITHIN "C" ZONE. MINIMUM DESIGN PRESSURES FOR THIS DEVELOPMENT ARE AS FOLLOWS:
   1. STATIC PRESSURE: 56 PSI.
   2. PEAK DAY PRESSURE: _____ PSI.
   3. PEAK DAY & FIRE FLOW: _____ PSI.
   DUE TO WATER SYSTEM OPERATIONAL VARIANCES PRESSURE WILL VARY AS MUCH AS 10 PSI ±.

5. 2,610 L.F. OF NEW PIPELINE (EXCLUDING WATER SERVICE LINE 2" AND LESS IN DIAMETER) WILL BE INSTALLED PER THIS PROJECT. A PIPELINE INSPECTION FEE OF $7.00 PER LINEAR FOOT OF PIPELINE WILL BE ASSESSED PRIOR TO ISSUANCE OF "NOTICE TO PROCEED".

6. EFFECTIVE AUGUST 11, 2003 PAYMENT OF THE WATER SYSTEM EQUITY FEE IS REQUIRED AT THE TIME OF WATER METER APPLICATION, PER ORDINANCE NO. 9842, AMENDMENT TO THE TUCSON CODE, SECTION 27-36.

7. EFFECTIVE MONDAY, JULY 9, 2007, THE CAP WATER RESOURCE FEE SHALL BE ASSESSED IN ADDITION TO THE SYSTEM EQUITY FEE FOR ALL NEW POTABLE WATER METER CONNECTIONS.

8. AFTER JANUARY 4, 2014, THE CONTRACTOR SHALL FURNISH AND INSTALL ALL PIPE, FITTINGS, APPURTENANCES OR ANY OTHER MATERIALS TO BE IN CONTACT WITH POTABLE WATER IN ACCORDANCE WITH THE LEAD-FREE REQUIREMENTS DEFINED BY THE "REDUCTION OF LEAD IN DRINKING WATER ACT OF 2011" AMENDING SECTION 1417 OF THE SAFE DRINKING WATER ACT.

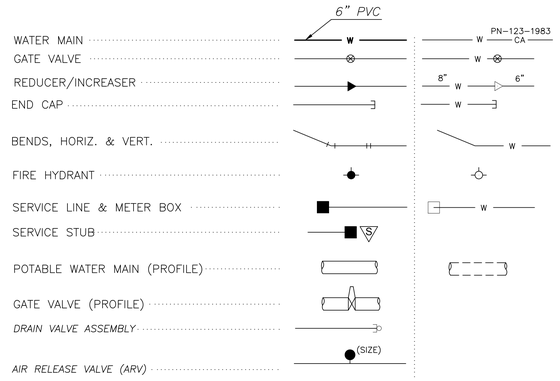
9. THIS PROJECT WILL BE REQUIRED TO USE AUTOMATIC METER READING (AMR) EQUIPMENT. THE DEVELOPER WILL BE HELD RESPONSIBLE FOR THE CARE AND CONDITION OF THE AMR METER, TRANSMITTER AND METER BOX. THE ADDITIONAL COST OF THE AMR EQUIPMENT WILL BE DETERMINED AT THE TIME OF METER APPLICATION IN ACCORDANCE WITH CHAPTER 27 SECTION 35 OF THE CITY OF TUCSON CODE.

10. THE RESPONSIBLE PARTY FOR FIRE SERVICE BILLING IS THE OWNER AS CALLED OUT ON THE PLAN.

WATER SYSTEM MODIFICATION LEGEND & ABBREVIATIONS

LEGEND

WATER SYMBOLS



UTILITY SYMBOLS

FEATURE	SYMBOL
GAS	G G G
SEWER	S S S
COM	COM COM COM
ELECTRIC UNDERGROUND	UGE UGE UGE
ELECTRIC OVERHEAD	OHE OHE OHE

BOUNDARY AND MARKER SYMBOLS

FEATURE	SYMBOL
RIGHT-OF-WAY (ROW)	
BASELINE	10+00 11+00
STREET ADDRESS	3347 N. MAJOR AVE.
PIMA COUNTY ASSESSOR PARCEL NUMBER	138-28-0660

CULTURE

EXIST. PAVED ROADWAY

EXIST. PAVED ROADWAY WITH CURB

ABBREVIATIONS

ARV	AIR RELEASE VALVE
AVE	AVENUE
BOT	BOTTOM
B & C	BOX & COVER
CA	CEMENT ASBESTOS
℄	CENTERLINE
CL	CLASS
CON	CONNECTION
CU	COPPER
DIA.	DIAMETER
DR	DIMENSION RATIO
DRWY.	DRIVEWAY
DIP	DUCTILE IRON PIPE
EA	EACH
EXIST.	EXISTING
FPS	FIRE PROTECTION SERVICE
FL	FLANGE
ELEV.	ELEVATION
G	GAS
HZ/HORIZ.	HORIZONTAL
INV.	INVERT
LT.	LEFT
LF	LINEAR FOOT
MATL.	MATERIAL
MJ	MECHANICAL JOINT
MIN.	MINIMUM
NPI	NON PAY ITEM
N.	NORTH
PVC	POLYVINYL CHLORIDE
P̲	PROPERTY LINE
RT.	RIGHT
R/W OR ROW	RIGHT-OF-WAY
ST.	STREET
STA.	STATION
SD	STORM DRAIN
VT/VERT.	VERTICAL

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS PROJECT IS NORTH 00°00'44" EAST, ALONG THE EAST LINE OF THE NORTHEAST 1/4 OF SECTION 24, TOWNSHIP 15 SOUTH, RANGE 12 EAST, GILA AND SALT RIVER MERIDIAN, PIMA COUNTY, ARIZONA BETWEEN THE FOUND 3.25" DIAMETER BLM BRASS CAP (DISTURBED – ADJUSTED TO FIT PCDOT REFERENCES) MARKING THE EAST 1/4 CORNER OF SAID SECTION 24 AND THE FOUND 2" DIAMETER BRASS CAP SET IN HANDWELL AND STAMPED "T15S, R12E, R13E, 13/24, PCDOT" MARKING THE NORTHEAST CORNER OF SAID SECTION 24, AS SHOWN ON SHEET 9 OF 17 OF THE PIMA COUNTY DEPARTMENT OF TRANSPORTATION AND FLOOD CONTROL DISTRICT AS-BUILT PLAN FOR CAMINO DE OESTE ROADWAY IMPROVEMENTS FROM CALLE TETAKUSIM TO LOS REALES ROAD, WORK ORDER NO. 4PYCDO, DATED DECEMBER 12, 2010.

BASIS OF ELEVATIONS

THE BASIS OF ELEVATIONS FOR THIS SURVEY IS NAVD88. THE PRIMARY BENCHMARK IS PIMA COUNTY DEPARTMENT OF TRANSPORTATION OPUS CONTROL POINT 15S12E_N25 WHICH IS A FOUND #4 REBAR WITH BRASS TAG STAMPED "PCDOT REF 16" AT THE SOUTHWEST CORNER OF THE INTERSECTION OF CAMINO DE OESTE AND LOS REALES ROAD; +/-12 FEET SOUTH OF THE SOUTH EDGE OF PAVEMENT AND +/-105 FEET WEST-SOUTHWEST OF THE 2" BRASS CAP SET IN HANDWELL AND STAMPED "T15S, R12E, R13E, 13/24, PCDOT" MARKING THE NORTHEAST CORNER OF SECTION 24, T15S, R12E, G.&S.R.M. THE ELEVATION IS 2559.04 FEET. THE LOCAL BENCHMARK IS THE SOUTHEAST CORNER OF THE CONCRETE MAILBOX PAD AT THE SOUTHEAST CORNER OF THE INTERSECTION OF CAMINO DE OESTE AND TETAKUSIM ROAD. THE ELEVATION IS 2567.22 FEET.

BASIS OF COORDINATES

THE BASIS OF COORDINATES FOR THIS SURVEY IS 408041.40 NORTH AND 964263.20 EAST ON THE FOUND 2" DIAMETER BRASS CAP SET IN HANDWELL AND STAMPED "T15S, R12E, R13E, 13/24, PCDOT" MARKING THE NORTHEAST CORNER OF SECTION 24, TOWNSHIP 15 SOUTH, RANGE 12 EAST, GILA AND SALT RIVER MERIDIAN, PIMA COUNTY, ARIZONA, AS SHOWN ON SHEET 9 OF 17 OF THE PIMA COUNTY DEPARTMENT OF TRANSPORTATION AND FLOOD CONTROL DISTRICT AS-BUILT PLAN FOR CAMINO DE OESTE ROADWAY IMPROVEMENTS FROM CALLE TETAKUSIM TO LOS REALES ROAD, WORK ORDER NO. 4PYCDO, DATED DECEMBER 12, 2010. NOTE: PRIOR TO CONSTRUCTION, SHEET 9 OF 17 OF THE PIMA COUNTY DEPARTMENT OF TRANSPORTATION AND FLOOD CONTROL DISTRICT AS-BUILT PLAN FOR CAMINO DE OESTE ROADWAY IMPROVEMENTS SHOWS THAT THIS CORNER WAS ORIGINALLY MONUMENTED BY A 1/2" DIAMETER PIN.

TUCSON WATER

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OFFICE (520) 326-3700
FAX (520) 326-1148
www.swaimaia.com

Registered Professional Engineer (Civil) CERTIFICATE NO. 48213 DAVID L. TAPIA Date Signed 11/16/18 Arizona U.S.A. Expires 9/30/2020

job 1717

date 11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

WATER MODIFICATIONS
GENERAL NOTES & LEGEND

W2

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TUCSON, AZ 85705 PHONE: 520-615-9191

POB
STA 10+00.00 BL TETAKUSIM RD
FOUND AND ACCEPTED UNTAGGED
#4 REBAR – AFFIXED "RLS 21774"
BRASS TAG TO IT

STA 12+04.2=34, 10.53' RT.
CUT–IN
1– 8"x 8" TEE
1– 8" VALVE, B&C
5 LF OF 8" DIP, E&W
2–CONNECTIONS TO EXIST. 8" CA
THRUST BLOCK AT NEW 8" TEE
PER TW SD 600

EXIST 24" CA PIPE
"ZONE C"
PN 152–1981

EXIST 8" CA PIPE
PN 043–1968

STA 18+66.27, 12.07' RT
CUT–IN
1– 8"x 8" TEE
1– 8" VALVE, B&C
5 LF OF 8" DIP, E&W
2–CONNECTIONS TO EXIST. 8" CA
THRUST BLOCK AT NEW 8" TEE
PER TW SD–600

0 40' 80'
SCALE: 1"=40'

1112'± TO CLOSEST VALVE

FUTURE BOX CULVERT

SAWCUT AND REMOVE 23 SY± EXIST PAVEMENT. REPLACE WITH TYPE 1 TRENCH PATCH PER SD 650.

210'± TO CLOSEST VALVE

TETAKUSIM ROAD
(Public)

TETAKUSIM ROAD BASELINE

EXIST. R/W

EXIST 12" CA PIPE
PN 043–1968

EXIST 8" CA PIPE
PN 043–1968

SAWCUT AND REMOVE 21 SY± EXIST PAVEMENT. REPLACE WITH TYPE 1 TRENCH PATCH PER SD 650.

POE –
STA 23+21.29 TETAKUSIM RD BL
NORTHWEST 1/16 CORNER OF
SECTIONS 19, T 15S R 13E.
SET #4 REBAR WITH BRASS TAG
STAMPED "RLS 21774" – ALSO
FOUND #4 REBAR WITH BRASS TAG
STAMPED "RLS 14145" @ S21°00'40" W,
0.25' (NOT ACCEPTED)

APN 138-28-031A

NEW 8"DIP (CLASS 350)
632'±

NEW 8" DIP (CLASS 350)
643'±

EXIST 12" PVC PIPE
PN 284–1986

FUTURE CHANNEL

NEW 6"DIP (CLASS 350)
212'±

STA 14+11.13, 251.00' RT
1– 6"x 90° BEND

STA 18+60.81, 284.36' RT
1– 8"x6" TEE
1– 6" GATE VALVE, B&C
1– 8" GATE VALVE, B&C
17'±, 6" DIP (CLASS 350)
1– FH PER SD 500

CAMINO DE OESTE
(Public)

STA 11+99.60, 246.99' RT
1– 8"x6" TEE
1– 6" GATE VALVE, B&C

STA 14+10.34, 290.40' RT
1– 6" GATE VALVE, B&C
40'±, 6" DIP (CLASS 350)
1– FH PER SD 500

FUTURE EXPANSION
5,265 SF

STA 18+57.63, 433.01' RT
1– 1½" IRRIGATION SERVICE
PER SD 309

MAIN BUILDING
97,121 SF

9'± 1 ¼" CU PIPE

STA 18+56, 536' RT
25'± 1" CU PIPE
STA 18+81, 537' RT
1– 1" ARV PER SD 330

STA 11+95.99, 427.44' RT
1– 8"x6" TEE
1– 6" GATE VALVE, B&C
1– 8" GATE VALVE, B&C
16'±, 6" DIP (CLASS 350)
1– FH PER SD 500

STA 11+98, 335' RT
30'± 1" CU PIPE
STA 12+28, 336' RT
1– 1" ARV PER SD 330

STA 18+54.76, 586.39' RT
1– 8"x4" TEE
1– 4" GATE VALVE, B&C
96'±, 4" DIP (CLASS 350)
STUB & BLOCK FOR FIRE
SERVICE PER SD 340

STA 17+36.96, 652.87' RT
1–2" WATER SERVICE
PER SD 309

STA 18+53.87, 630.58' RT
1– 1" IRRIGATION SERVICE
PER SD 309

FUTURE EXPANSION
7,885 SF

FUTURE EXPANSION
5,285 SF

WAREHOUSE
4,013 SF

STA 19+32.52, 587.95' RT
1– 4"x 90° BEND

EXIST. EASEMENT

15' WATER EASEMENT (TYP.)

EXIST. R/W

STA 13+51.61, 645.14' RT
1– 8"x6" TEE
1– 6" GATE VALVE, B&C
28'±, 6" DIP (CLASS 350)
1– FH PER SD 500

STA 16+98.75, 652.10' RT
1– 8"x6" TEE
1– 6" GATE VALVE, B&C
28'±, 6" DIP (CLASS 350)
1– FH PER SD 500

STA 18+54.64, 591.94' RT
1– 2" WATER SERVICE
PER SD 309

STA 11+91.69, 641.94' RT
1– 8"x 90° BEND

STA 18+34, 655' RT
13'± 1" CU PIPE
STA 18+36, 668' RT
1– 1" ARV PER SD 330

STA 18+56, 536' RT
24'± 1" CU PIPE
STA 18+81, 537' RT
1– 1" ARV PER SD 330

STA 14+23.46, 646.58' RT
1– 8" GATE VALVE, B&C

STA 17+11.04, 652.35' RT
1– 8"x6" TEE
1– 6" GATE VALVE, B&C
50'±, 6" DIP (CLASS 350)
CONNECT FOR FIRE
SERVICE PER SD 340

NEW 8"DIP (CLASS 350)
662'±

NEW 8"DIP (CLASS 350)
77'±

STA 18+53.38, 655.20' RT
1– 8"x8" TEE
3– 8" GATE VALVES, B&C

STA 18+54, 625' RT
25'± 1" CU PIPE
STA 18+78, 629' RT
1– 1" ARV PER SD 330

STA 18+52.95, 676.69' RT
1– 8"x6" TEE
1– 6" GATE VALVE, B&C
17'±, 6" DIP (CLASS 350)
1– FH PER SD 500

STA 18+51.83, 732.36' RT
1– DVA PER SD 400

PROPOSED BY OTHERS

APN 138-28-032F

GOVERNMENT LOT 2
A PORTION OF APN 138-28-0860
SEQUENCE NO. 20101300277
OWNER: PASCUA YAQUI TRIBE

NOTES

1. All elevations are invert elevations unless otherwise noted. See sheet W4.
2. Horizontal separation of utilities shall be 6' minimum and vertical separation of utilities shall be 2' minimum unless otherwise noted.
3. Restrain all fittings per SD–600.
4. Stationing based on Tetakusim Road baseline.
5. Contractor to field verify prior to construction.

PRIVATE WATER NOTES:

1. Install 3" SCH 40 PVC domestic water pipe, length per plan.
2. Backflow preventor with remote F.D.C. See plumbing plans for specifications and details.
3. Install 3" x 4" reducer.
4. Connect to 3" domestic reduced pressure assembly water backflow preventer with enclosure and insulation blanket.
5. Building water/fireline connection, ref MEP plans for continuation.
6. Install 2" x 3" reducer.
7. Connect to 2" domestic reduced pressure assembly water backflow preventer with enclosure and insulation blanket.
8. Install 2" SCH 40 PVC domestic water pipe, length per plan.
9. Install new 1½" irrigation backflow preventer with enclosure and insulation blanket see dtl 10 on sheet IR5.
10. Install 4" SCH 40 PVC domestic water pipe, length per plan.
11. Reduced pressure detector assembly "Watts" model #LF957RPDAOSY (or equivalent–locked).

SERVICE WORK

CODE		ADDRESS	PIPE SIZE & QUANT. (IN FEET ±) 1"	1½"	2"
		METER # & SIZE			
1	S	4567 W. TETAKUSIM RD. 2"			50
2	S	4567 W. TETAKUSIM RD. 2"			20
3	S	4567 W. TETAKUSIM RD. IRRIGATION 1½"		40	
4	S	4567 W. TETAKUSIM RD. IRRIGATION 1"	40		
TOTAL QUANTITIES OF CU PIPE FOR SERVICE WORK ONLY			40	40	70

TUCSON WATER

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Registered Professional Engineer (Civil)
CERTIFICATE NO.
48213
DAVID L. TAPIA
Date Signed 11/16/18
Expires 9/30/2020

job
1717

date
11.16.18

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Health Services Center II
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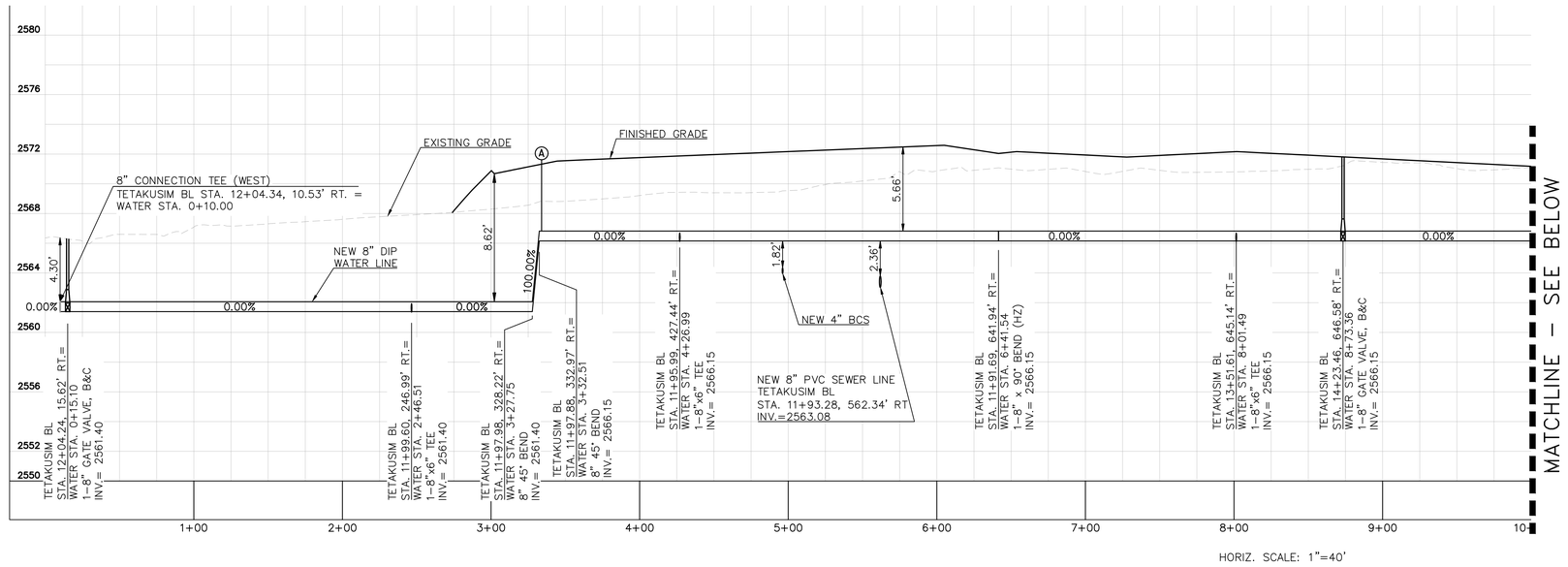
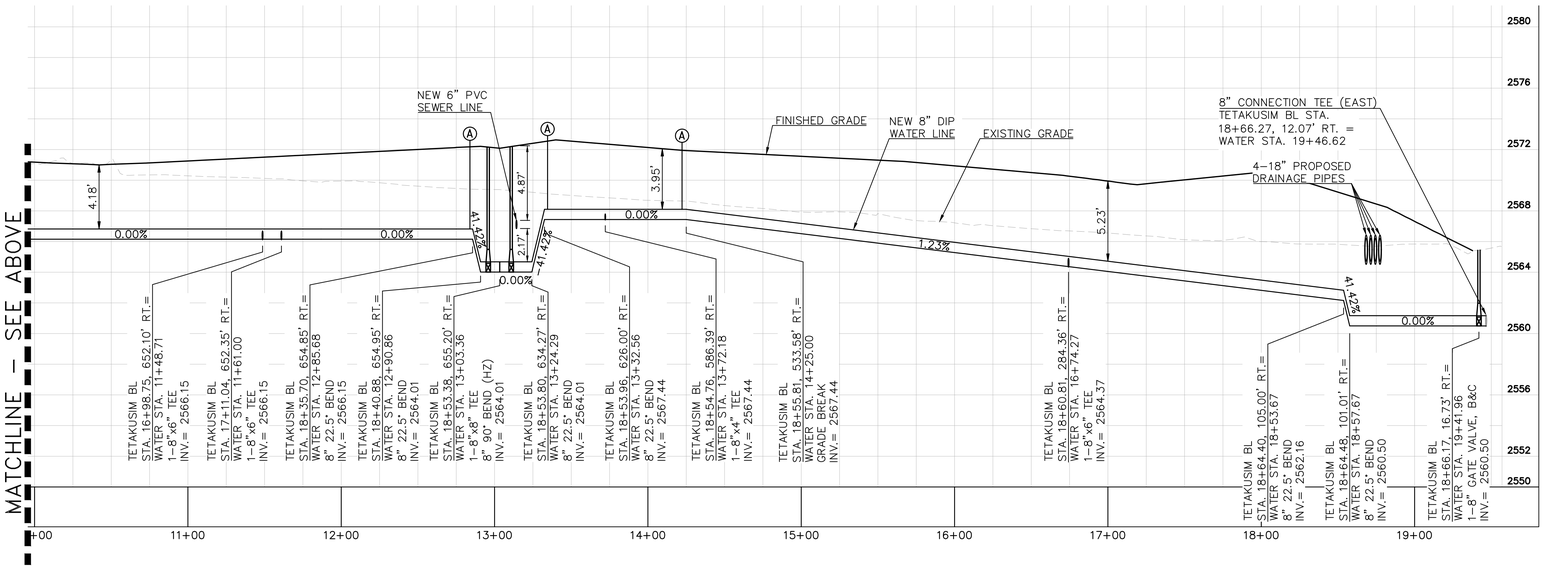
WATER MODIFICATIONS PLAN

W3

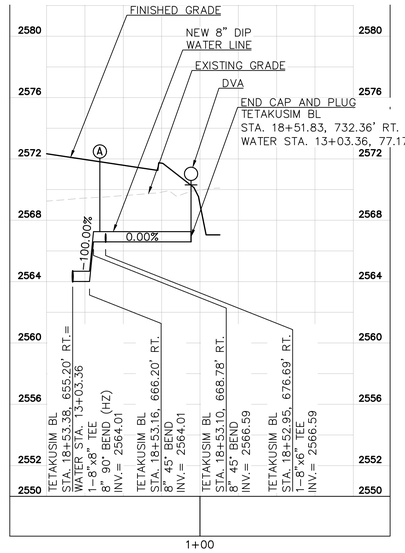


HORIZ. SCALE: 1"=40'



8" MAINLINE

HORIZ. SCALE: 1"=40'



8" MAINLINE EXTENSION SOUTH

HORIZ. SCALE: 1"=40'

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Health Services Center II
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WATER MODIFICATIONS
PROFILE

W4

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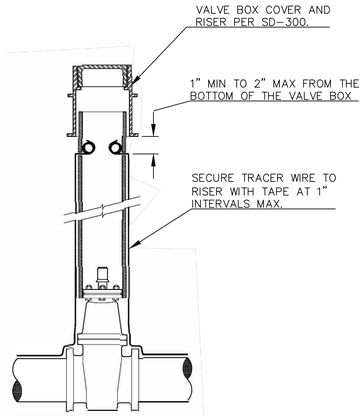
NOTES:

1. ALL NEW WATER MAINS REQUIRE DETECTABLE LOCATOR TAPE PER W–115. IN ADDITION, A TRACER WIRE SHALL ALSO BE INSTALLED. THE TRACER WIRE SHALL BE UF, THWN, THW, OR RHW/RHH SOLID 12 GAUGE WIRE. THE TRACER WIRE SHALL BE LAID DIRECTLY ON TOP OF THE PIPE IN CONTINUOUS LENGTHS BETWEEN VALVES, AIR RELEASE VALVES (ARV), DRAIN VALVE ASSEMBLIES (DVA) AND LATERAL CONNECTIONS TO EXISTING WATER MAINS.
2. THE TRACER WIRE SHALL BE SECURED TO THE PIPE WITH ADHESIVE TAPE AT INTERVALS NOT GREATER THAN 10'. THE INTENT IS TO KEEP THE TRACER WIRE IN PLACE DURING BACKFILL, NOT TO PERMANENTLY FIX THE TAPE TO THE PIPE.
3. THE TRACER WIRE SHALL BE SECURED TO VERTICAL COMPONENTS, I.E. VALVE RISERS, AIR RELEASE VALVE (ARV) LINES ETC., BY WRAPPING THE PIPE CIRCUMFERENCE WITH 10 MIL PVC PIPE TAPE OR ZIP TIES WITH A TENSILE STRENGTH OF NOT LESS THAN 50 LBS. AT INTERVALS NOT GREATER THAN ONE FOOT (1').
4. FOR DIP WATER MAINS, TRACER WIRE SHALL BE ATTACHED TO THE PIPE OUTSIDE OF THE POLYETHYLENE ENCASEMENT.
5. THE CONTINUITY OF EACH SEGMENT OF TRACER WIRE INSTALLED SHALL BE VERIFIED BY THE CONTRACTOR. FINAL ACCEPTANCE OF THE PROJECT WILL NOT BE GRANTED UNTIL WRITTEN CERTIFICATION, SIGNED BY THE CONTRACTOR, IS RECEIVED BY THE CONSTRUCTION SECTION OF THE CITY OF TUCSON WATER DEPARTMENT.
6. THE INSULATION ON TRACER WIRE INSTALLED ON POTABLE WATER MAINS SHALL BE COLORED BLUE. THE INSULATION ON TRACER WIRE INSTALLED ON RECLAIMED WATER LINES SHALL BE COLORED PURPLE.
7. WHERE THE ENDS OF NEW TRACER WIRE TERMINATE BELOW GROUND, THE END OF THE NEW TRACER WIRE SHALL BE TAPED WITH TWO HALF LAPPED LAYERS OF POLYETHYLENE OR POLYVINYL CHLORIDE TAPE (ELECTRICIANS TAPE).
8. METALLIC TAGS SHALL BE ONE INCH (1") WIDE BY A MINIMUM OF ONE AND ONE HALF INCHES LONG (1 ½") AND A MINIMUM OF ONE SIXTEENTH INCH (1/16") THICK WITH A ONE EIGHTH INCH (1/8") HOLE AT ONE CORNER OF THE TAG. IT SHALL BE ATTACHED TO THE TRACER WIRE WITH TWELVE GAUGE (12 GA.) WIRE. THE DIRECTION SHALL BE STAMPED WITH A HALF INCH (1/2") LETTER MARKING PUNCH.

TRACER WIRE - NOTES

NOT TO SCALE

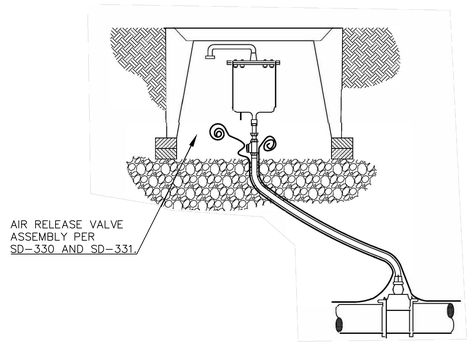


NOTES:

1. THREAD TRACER WIRES THROUGH 1/4" HOLES DRILLED IN THE RISER PIPE 2" TO 4" BELOW THE VALVE BOX.
2. A KNOT SHALL BE TIED IN THE TRACER WIRE INSIDE THE RISER PIPE AND A 3' COIL OF WIRE LEFT NEATLY INSIDE THE RISER.
3. THE TRACER WIRE SHALL ENTER THE RISER PIPE ON THE SAME SIDE AS THE WATER PIPE TO BE TRACED.

TRACER WIRE - IN LINE VALVES

NOT TO SCALE

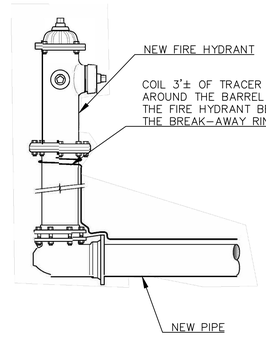


NOTES:

1. THE TRACER WIRE SHALL BE ATTACHED TO THE AIR RELEASE LINE WITH TAPE OR ZIP TIES AT A MAXIMUM OF 1' INTERVALS. A 3' COIL OF WIRE SHALL BE LEFT IN THE METER BOX FOR EACH TRACER WIRE INSTALLED.
2. TRACER WIRE SHALL BE LOCATED ON THE SAME SIDE OF THE METER BOX AS THE PIPE IT IS ATTACHED TO. THE COILED TRACER WIRE SHALL BE PERMANENTLY LABELED WITH A METALLIC TAG STATING THE DIRECTION (I.E. NORTH, EAST, ETC.) OF THE PIPE IT IS ATTACHED TO.
3. THIS DETAIL APPLIES TO AIR RELEASE VALVES IN W–330 AND W–331.

TRACER WIRE - AIR RELEASE VALVES

NOT TO SCALE

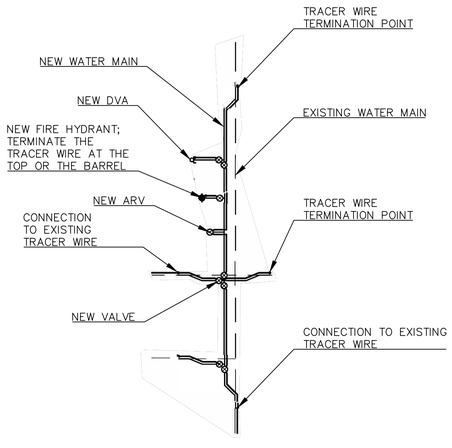


NOTES:

1. THE TRACE WIRE SHALL TERMINATE ABOVE GRADE BELOW THE BREAK–AWAY RING.

TRACER WIRE - FIRE HYDRANT

NOT TO SCALE



TRACER WIRE - SCENARIOS

NOT TO SCALE

TUCSON WATER BID SCHEDULE MATERIAL QUANTITIES SUMMARY						
ITEM NUMBER	ITEM DESCRIPTION		SHEET W3		TOTALS	
		UNIT	EST.	AS BUILT	EST.	
5101104	Potable Water Pipe, DI, 4" (CL 350)	L.T.	96			
5101106	Potable Water Pipe, DI, 6" (CL 350)	L.F.	458			
5101108	Potable Water Pipe, DI, 8" (CL 350)	L.F.	2014			
5101604	Potable Water Pipe, Copper, 1" w/fittings	L.F.	157			
5101606	Potable Water Pipe, Copper, 1½" w/fittings	L.F.	40			
5101608	Potable Water Pipe, Copper, 2" w/fittings	L.F.	70			
5102204	Potable Water Pipe, Gate Valve, 4"	EACH	1			
5102206	Potable Water Pipe, Gate Valve, 6"	EACH	8			
5102208	Potable Water Pipe, Gate Valve, 8"	EACH	8			
5102604	Air Release Valve, 1" (ARV)	EACH	5			
5103205	Potable Water Pipe, Fire Hydrant	EACH	6			
5103305	Drain Valve Assembly	EACH	1			
5106008	Potable Water Pipe, Connections, 8"	EACH	4			
5108156	Stubs (S), 1½"	EACH	2			
5108158	Stubs (S), 2"	EACH	2			

MATERIAL QUANTITIES SUMMARY

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revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
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WATER MODIFICATIONS
DETAILS & MATERIALS

W5

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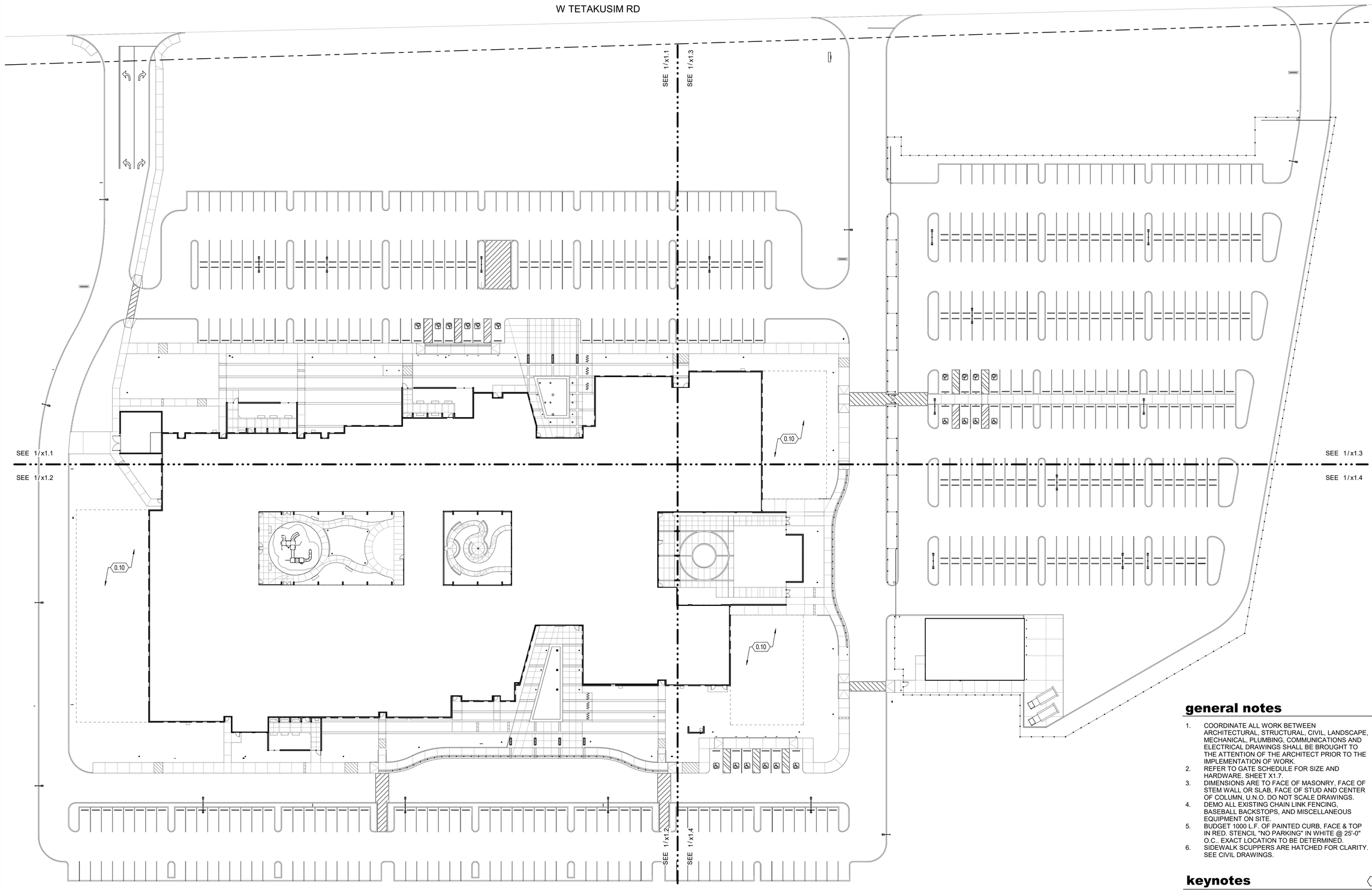

1 x1.0 **overall site plan**
1" = 30'-0"

north

general notes

1. COORDINATE ALL WORK BETWEEN ARCHITECTURAL, STRUCTURAL, CIVIL, LANDSCAPE, MECHANICAL, PLUMBING, COMMUNICATIONS AND ELECTRICAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE IMPLEMENTATION OF WORK.
2. REFER TO GATE SCHEDULE FOR SIZE AND HARDWARE. SHEET X1.7.
3. DIMENSIONS ARE TO FACE OF MASONRY, FACE OF STEM WALL OR SLAB, FACE OF STUD AND CENTER OF COLUMN, U.N.O. DO NOT SCALE DRAWINGS.
4. DEMO ALL EXISTING CHAIN LINK FENCING, BASEBALL BACKSTOPS, AND MISCELLANEOUS EQUIPMENT ON SITE.
5. BUDGET 1000 L.F. OF PAINTED CURB, FACE & TOP IN RED. STENCIL "NO PARKING" IN WHITE @ 25'-0" O.C.. EXACT LOCATION TO BE DETERMINED.
6. SIDEWALK SCUPPERS ARE HATCHED FOR CLARITY. SEE CIVIL DRAWINGS.

keynotes

0.10 FUTURE BUILDING PAD.

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REGISTERED ARCHITECT
37165
KEVIN A. BARBER
ARIZONA U.S.A.

job
1717

date
11.16.18

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Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

site plan

x1.0

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general notes

1. COORDINATE ALL WORK BETWEEN ARCHITECTURAL, STRUCTURAL, CIVIL, LANDSCAPE, MECHANICAL, PLUMBING, COMMUNICATIONS AND ELECTRICAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE IMPLEMENTATION OF WORK.
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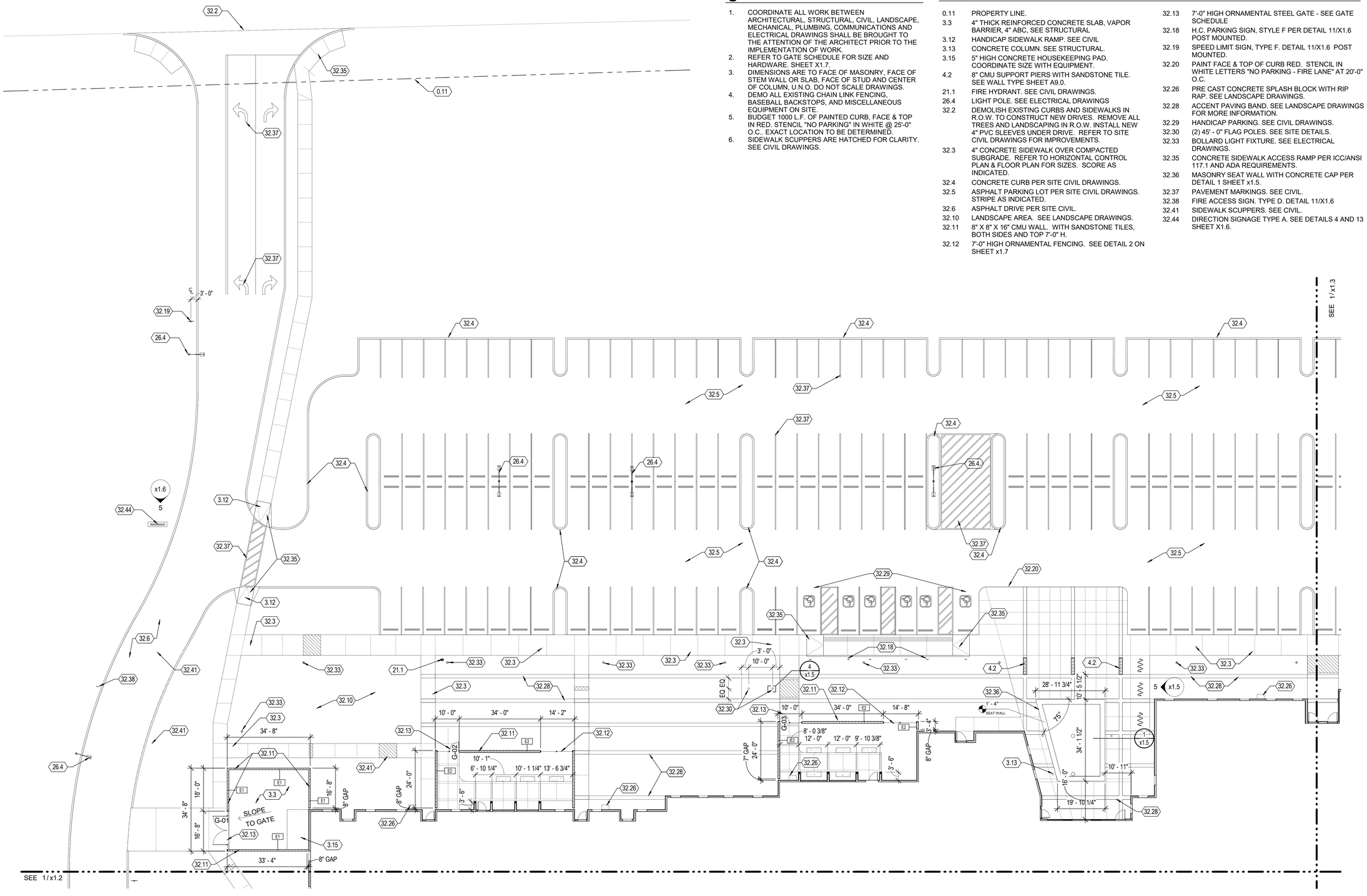
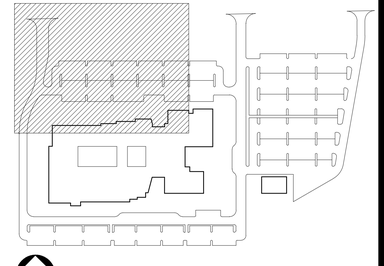
6. SIDEWALK SCUPPERS ARE HATCHED FOR CLARITY. SEE CIVIL DRAWINGS.

keynotes

0.11 PROPERTY LINE.
3.3 4" THICK REINFORCED CONCRETE SLAB, VAPOR BARRIER, 4" ABC, SEE STRUCTURAL
3.12 HANDICAP SIDEWALK RAMP. SEE CIVIL
3.13 CONCRETE COLUMN. SEE STRUCTURAL.
3.15 5" HIGH CONCRETE HOUSEKEEPING PAD. COORDINATE SIZE WITH EQUIPMENT.
4.2 8" CMU SUPPORT PIERS WITH SANDSTONE TILE. SEE WALL TYPE SHEET A9.0.
21.1 FIRE HYDRANT. SEE CIVIL DRAWINGS.
26.4 LIGHT POLE. SEE ELECTRICAL DRAWINGS
32.2 DEMOLISH EXISTING CURBS AND SIDEWALKS IN R.O.W. TO CONSTRUCT NEW DRIVES. REMOVE ALL TREES AND LANDSCAPING IN R.O.W. INSTALL NEW 4" PVC SLEEVES UNDER DRIVE. REFER TO SITE CIVIL DRAWINGS FOR IMPROVEMENTS.
32.3 4" CONCRETE SIDEWALK OVER COMPACTED SUBGRADE. REFER TO HORIZONTAL CONTROL PLAN & FLOOR PLAN FOR SIZES. SCORE AS INDICATED.
32.4 CONCRETE CURB PER SITE CIVIL DRAWINGS.
32.5 ASPHALT PARKING LOT PER SITE CIVIL DRAWINGS. STRIPE AS INDICATED.
32.6 ASPHALT DRIVE PER SITE CIVIL.
32.10 LANDSCAPE AREA. SEE LANDSCAPE DRAWINGS.
32.11 8" X 8" X 16" CMU WALL. WITH SANDSTONE TILES, BOTH SIDES AND TOP 7'-0" H.
32.12 7'-0" HIGH ORNAMENTAL FENCING. SEE DETAIL 2 ON SHEET x1.7
32.13 7'-0" HIGH ORNAMENTAL STEEL GATE - SEE GATE SCHEDULE
32.18 H.C. PARKING SIGN, STYLE F PER DETAIL 11/X1.6 POST MOUNTED.
32.19 SPEED LIMIT SIGN, TYPE F. DETAIL 11/X1.6 POST MOUNTED.
32.20 PAINT FACE & TOP OF CURB RED. STENCIL IN WHITE LETTERS "NO PARKING - FIRE LANE" AT 20'-0" O.C.
32.26 PRE CAST CONCRETE SPLASH BLOCK WITH RIP RAP. SEE LANDSCAPE DRAWINGS.
32.28 ACCENT PAVING BAND. SEE LANDSCAPE DRAWINGS FOR MORE INFORMATION.
32.29 HANDICAP PARKING. SEE CIVIL DRAWINGS.
32.30 (2) 45' - 0" FLAG POLES. SEE SITE DETAILS.
32.33 BOLLARD LIGHT FIXTURE. SEE ELECTRICAL DRAWINGS.
32.35 CONCRETE SIDEWALK ACCESS RAMP PER ICC/ANSI 117.1 AND ADA REQUIREMENTS.
32.36 MASONRY SEAT WALL WITH CONCRETE CAP PER DETAIL 1 SHEET x1.5.
32.37 PAVEMENT MARKINGS. SEE CIVIL.
32.38 FIRE ACCESS SIGN. TYPE D. DETAIL 11/X1.6
32.41 SIDEWALK SCUPPERS. SEE CIVIL.
32.44 DIRECTION SIGNAGE TYPE A. SEE DETAILS 4 AND 13 SHEET X1.6.





keyplan
n.t.s.

1 / x1.1 **enlarged site plan - north west**
1/16" = 1'-0"

north

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REGISTERED ARCHITECT
37165
KEVIN A. BARBER
ARIZONA U.S.A.

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

enlarged site plan - north west

x1.1

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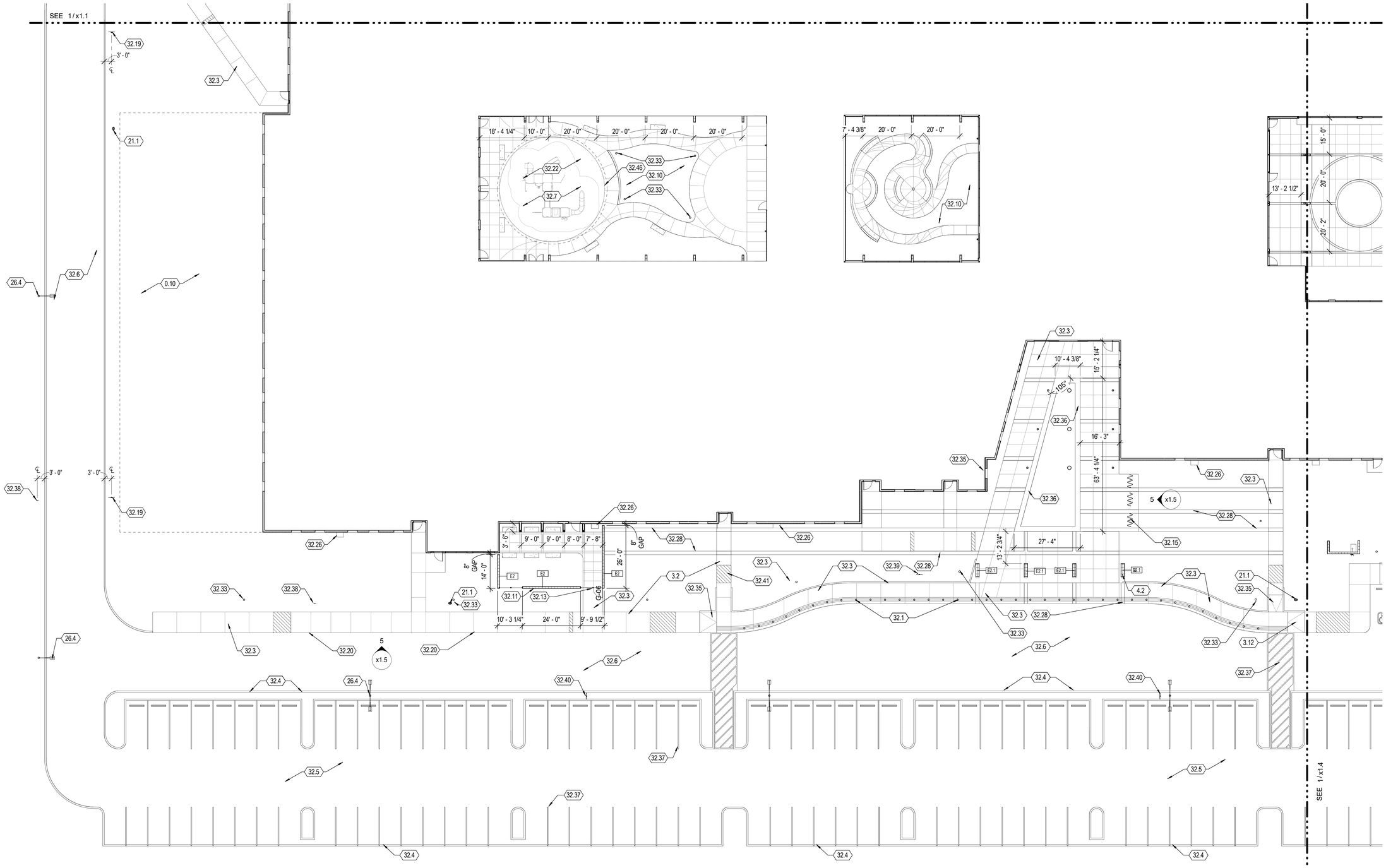


1 x1.2 **enlarged site plan - south west**

1/16" = 1'-0"

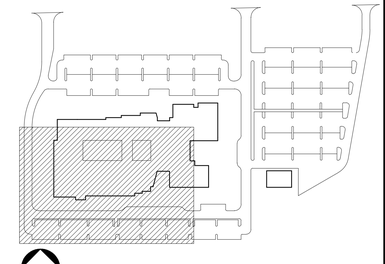
north

general notes

1. COORDINATE ALL WORK BETWEEN ARCHITECTURAL, STRUCTURAL, CIVIL, LANDSCAPE, MECHANICAL, PLUMBING, COMMUNICATIONS AND ELECTRICAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE IMPLEMENTATION OF WORK.
2. REFER TO GATE SCHEDULE FOR SIZE AND HARDWARE. SHEET X1.7.
3. DIMENSIONS ARE TO FACE OF MASONRY, FACE OF STEM WALL OR SLAB, FACE OF STUD AND CENTER OF COLUMN, U.N.O. DO NOT SCALE DRAWINGS.
4. DEMO ALL EXISTING CHAIN LINK FENCING, BASEBALL BACKSTOPS, AND MISCELLANEOUS EQUIPMENT ON SITE.
5. BUDGET 1000 L.F. OF PAINTED CURB, FACE & TOP IN RED. STENCIL "NO PARKING" IN WHITE @ 25'-0" O.C.. EXACT LOCATION TO BE DETERMINED.
6. SIDEWALK SCUPPERS ARE HATCHED FOR CLARITY. SEE CIVIL DRAWINGS.

keynotes

0.10	FUTURE BUILDING PAD.
3.2	4" CONCRETE SIDEWALK ON COMPACTED SUBGRADE. SCORE AS INDICATED. SEE DETAILS 2 & 3 SHEET X1.6 FOR TYPICAL JOINT CONDITIONS.
3.12	HANDICAP SIDEWALK RAMP. SEE CIVIL
4.2	8" CMU SUPPORT PIERS WITH SANDSTONE TILE. SEE WALL TYPE SHEET A9.0.
21.1	FIRE HYDRANT. SEE CIVIL DRAWINGS.
26.4	LIGHT POLE. SEE ELECTRICAL DRAWINGS
32.1	DECORATIVE CONCRETE BOLLARD. SEE CIVIL.
32.3	4" CONCRETE SIDEWALK OVER COMPACTED SUBGRADE. REFER TO HORIZONTAL CONTROL PLAN & FLOOR PLAN FOR SIZES. SCORE AS INDICATED.
32.4	CONCRETE CURB PER SITE CIVIL DRAWINGS.
32.5	ASPHALT PARKING LOT PER SITE CIVIL DRAWINGS. STRIPE AS INDICATED.
32.6	ASPHALT DRIVE PER SITE CIVIL.
32.7	PLAYGROUND PLAY AREA. REFER TO LANDSCAPE DRAWINGS.
32.10	LANDSCAPE AREA. SEE LANDSCAPE DRAWINGS.
32.11	8" X 8" X 16" CMU WALL. WITH SANDSTONE TILES, BOTH SIDES AND TOP 7'-0" H.
32.13	7'-0" HIGH ORNAMENTAL STEEL GATE - SEE GATE SCHEDULE
32.15	BICYCLE RACKS. SEE LANDSCAPE.
32.19	SPEED LIMIT SIGN, TYPE F. DETAIL 11/X1.6 POST MOUNTED.
32.20	PAINT FACE & TOP OF CURB RED. STENCIL IN WHITE LETTERS "NO PARKING - FIRE LANE" AT 20'-0" O.C.
32.22	PLAYGROUND FALL SURFACE. SEE LANDSCAPE DRAWINGS FOR MORE INFORMATION.
32.26	PRE CAST CONCRETE SPLASH BLOCK WITH RIP RAP. SEE LANDSCAPE DRAWINGS.
32.28	ACCENT PAVING BAND. SEE LANDSCAPE DRAWINGS FOR MORE INFORMATION.
32.33	BOLLARD LIGHT FIXTURE. SEE ELECTRICAL DRAWINGS.
32.35	CONCRETE SIDEWALK ACCESS RAMP PER ICC/ANSI 117.1 AND ADA REQUIREMENTS.
32.36	MASONRY SEAT WALL WITH CONCRETE CAP PER DETAIL 1 SHEET x1.5.
32.37	PAVEMENT MARKINGS. SEE CIVIL.
32.38	FIRE ACCESS SIGN. TYPE D. DETAIL 11/X1.6
32.39	NO PARKING SIGN, TYPE E. DETAIL 11/X1.6 POST MOUNTED.
32.40	POST MOUNTED PEDESTRIAN CROSSING SIGN. DETAIL 7/X1.6.
32.41	SIDEWALK SCUPPERS. SEE CIVIL.
32.46	8"X18" CONCRETE TOE DOWN.



north **keyplan**

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enlarged site plan - south west

x1.2

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general notes

1. COORDINATE ALL WORK BETWEEN ARCHITECTURAL, STRUCTURAL, CIVIL, LANDSCAPE, MECHANICAL, PLUMBING, COMMUNICATIONS AND ELECTRICAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE IMPLEMENTATION OF WORK.
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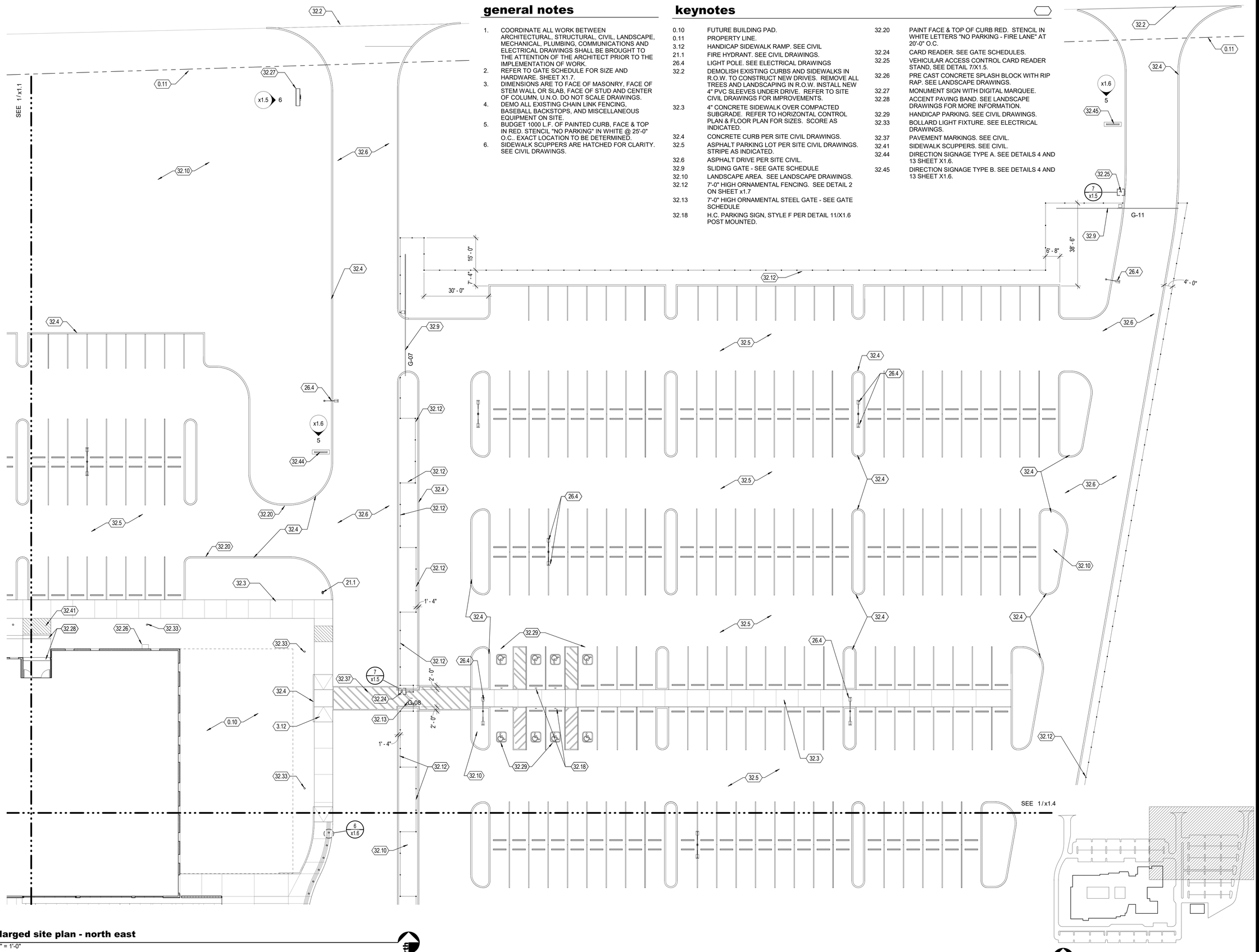
4. DEMO ALL EXISTING CHAIN LINK FENCING, BASEBALL BACKSTOPS, AND MISCELLANEOUS EQUIPMENT ON SITE.
5. BUDGET 1000 L.F. OF PAINTED CURB, FACE & TOP IN RED. STENCIL "NO PARKING" IN WHITE @ 25'-0" O.C.. EXACT LOCATION TO BE DETERMINED.
6. SIDEWALK SCUPPERS ARE HATCHED FOR CLARITY. SEE CIVIL DRAWINGS.

keynotes

0.10	FUTURE BUILDING PAD.
0.11	PROPERTY LINE.
3.12	HANDICAP SIDEWALK RAMP. SEE CIVIL
21.1	FIRE HYDRANT. SEE CIVIL DRAWINGS.
26.4	LIGHT POLE. SEE ELECTRICAL DRAWINGS
32.2	DEMOLISH EXISTING CURBS AND SIDEWALKS IN R.O.W. TO CONSTRUCT NEW DRIVES. REMOVE ALL TREES AND LANDSCAPING IN R.O.W. INSTALL NEW 4" PVC SLEEVES UNDER DRIVE. REFER TO SITE CIVIL DRAWINGS FOR IMPROVEMENTS.
32.3	4" CONCRETE SIDEWALK OVER COMPACTED SUBGRADE. REFER TO HORIZONTAL CONTROL PLAN & FLOOR PLAN FOR SIZES. SCORE AS INDICATED.
32.4	CONCRETE CURB PER SITE CIVIL DRAWINGS.
32.5	ASPHALT PARKING LOT PER SITE CIVIL DRAWINGS. STRIPE AS INDICATED.
32.6	ASPHALT DRIVE PER SITE CIVIL.
32.9	SLIDING GATE - SEE GATE SCHEDULE
32.10	LANDSCAPE AREA. SEE LANDSCAPE DRAWINGS.
32.12	7'-0" HIGH ORNAMENTAL FENCING. SEE DETAIL 2 ON SHEET x1.7
32.13	7'-0" HIGH ORNAMENTAL STEEL GATE - SEE GATE SCHEDULE
32.18	H.C. PARKING SIGN, STYLE F PER DETAIL 11/X1.6 POST MOUNTED.
32.20	PAINT FACE & TOP OF CURB RED. STENCIL IN WHITE LETTERS "NO PARKING - FIRE LANE" AT 20'-0" O.C.
32.24	CARD READER. SEE GATE SCHEDULES.
32.25	VEHICULAR ACCESS CONTROL CARD READER STAND, SEE DETAIL 7/X1.5.
32.26	PRE CAST CONCRETE SPLASH BLOCK WITH RIP RAP. SEE LANDSCAPE DRAWINGS.
32.27	MONUMENT SIGN WITH DIGITAL MARQUEE.
32.28	ACCENT PAVING BAND. SEE LANDSCAPE DRAWINGS FOR MORE INFORMATION.
32.29	HANDICAP PARKING. SEE CIVIL DRAWINGS.
32.33	BOLLARD LIGHT FIXTURE. SEE ELECTRICAL DRAWINGS.
32.37	PAVEMENT MARKINGS. SEE CIVIL.
32.41	SIDEWALK SCUPPERS. SEE CIVIL.
32.44	DIRECTION SIGNAGE TYPE A. SEE DETAILS 4 AND 13 SHEET X1.6.
32.45	DIRECTION SIGNAGE TYPE B. SEE DETAILS 4 AND 13 SHEET X1.6.



1 x1.3 **enlarged site plan - north east**
1/16" = 1'-0"

north

north **keyplan**
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enlarged site plan - north east

x1.3

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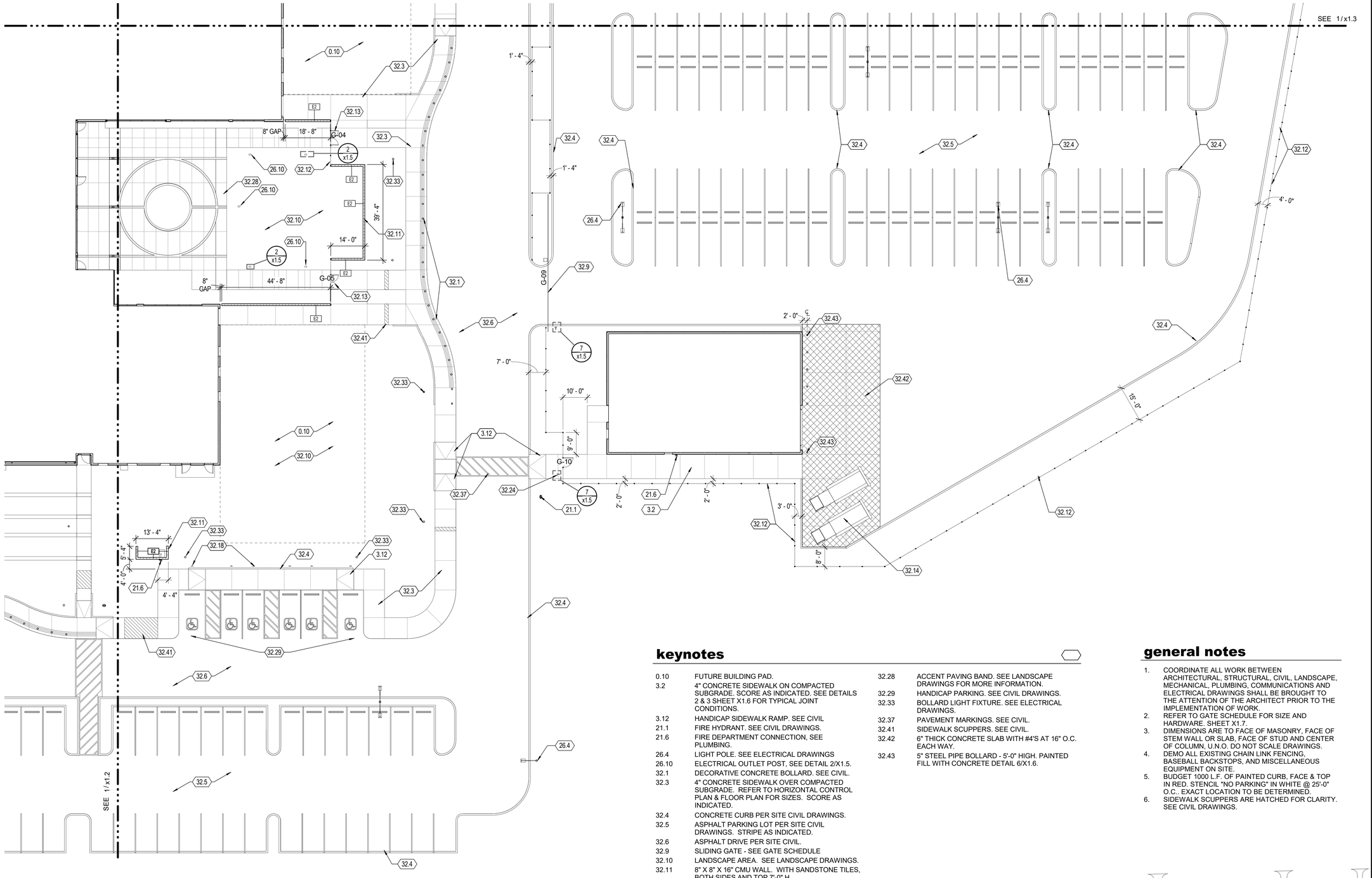

enlarged site plan - south east

1 x1.4 — 1/16" = 1'-0"

north

keynotes

0.10	FUTURE BUILDING PAD.
3.2	4" CONCRETE SIDEWALK ON COMPACTED SUBGRADE. SCORE AS INDICATED. SEE DETAILS 2 & 3 SHEET X1.6 FOR TYPICAL JOINT CONDITIONS.
3.12	HANDICAP SIDEWALK RAMP. SEE CIVIL
21.1	FIRE HYDRANT. SEE CIVIL DRAWINGS.
21.6	FIRE DEPARTMENT CONNECTION, SEE PLUMBING.
26.4	LIGHT POLE. SEE ELECTRICAL DRAWINGS
26.10	ELECTRICAL OUTLET POST, SEE DETAIL 2/X1.5.
32.1	DECORATIVE CONCRETE BOLLARD. SEE CIVIL.
32.3	4" CONCRETE SIDEWALK OVER COMPACTED SUBGRADE. REFER TO HORIZONTAL CONTROL PLAN & FLOOR PLAN FOR SIZES. SCORE AS INDICATED.
32.4	CONCRETE CURB PER SITE CIVIL DRAWINGS.
32.5	ASPHALT PARKING LOT PER SITE CIVIL DRAWINGS. STRIPE AS INDICATED.
32.6	ASPHALT DRIVE PER SITE CIVIL.
32.9	SLIDING GATE - SEE GATE SCHEDULE
32.10	LANDSCAPE AREA. SEE LANDSCAPE DRAWINGS.
32.11	8" X 8" X 16" CMU WALL. WITH SANDSTONE TILES, BOTH SIDES AND TOP 7'-0" H.
32.12	7'-0" HIGH ORNAMENTAL FENCING. SEE DETAIL 2 ON SHEET x1.7
32.13	7'-0" HIGH ORNAMENTAL STEEL GATE - SEE GATE SCHEDULE
32.14	TRASH DUMPSTER LOCATION. PREPARE FOR (2) COMPACTERS AND (2) TRASH DUMPSTERS.
32.18	H.C. PARKING SIGN, STYLE F PER DETAIL 11/X1.6 POST MOUNTED.
32.24	CARD READER. SEE GATE SCHEDULES.
32.28	ACCENT PAVING BAND. SEE LANDSCAPE DRAWINGS FOR MORE INFORMATION.
32.29	HANDICAP PARKING. SEE CIVIL DRAWINGS.
32.33	BOLLARD LIGHT FIXTURE. SEE ELECTRICAL DRAWINGS.
32.37	PAVEMENT MARKINGS. SEE CIVIL.
32.41	SIDEWALK SCUPPERS. SEE CIVIL.
32.42	6" THICK CONCRETE SLAB WITH #4'S AT 16" O.C. EACH WAY.
32.43	5" STEEL PIPE BOLLARD - 5'-0" HIGH. PAINTED FILL WITH CONCRETE DETAIL 6/X1.6.

general notes

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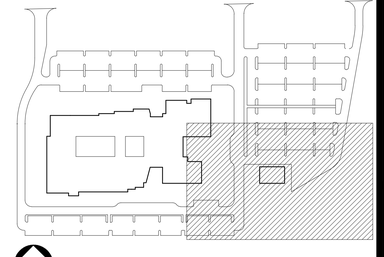

north

keyplan

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enlarged site plan - south east

x1.4

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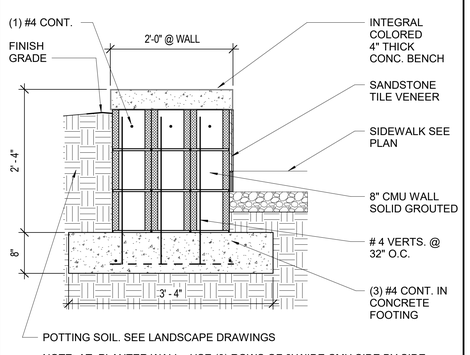
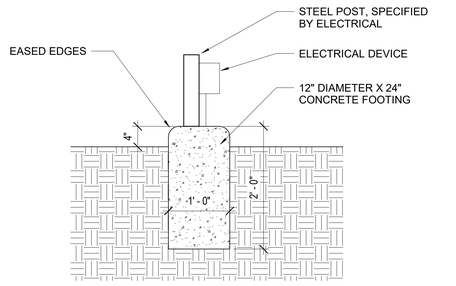
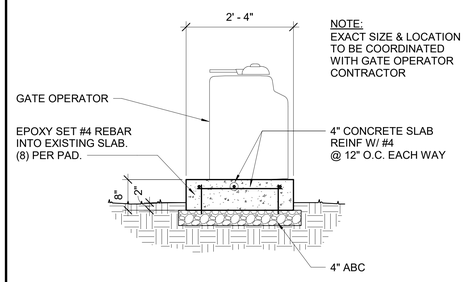


NOTE: AT PLANTER WALL - USE (3) ROWS OF 8' WIDE CMU SIDE BY SIDE

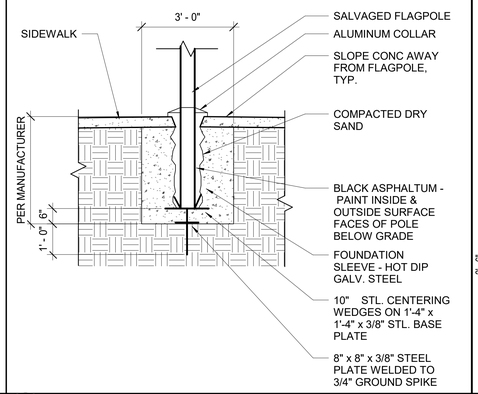
1 seat wall
x1.5 1" = 1'-0" (1/ a6.0)



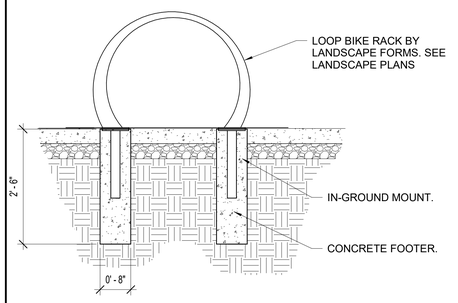
2 electrical outlet post
x1.5 1" = 1'-0" (1/ x1.4)



3 typical equipment pad
x1.5 3/4" = 1'-0" (/)

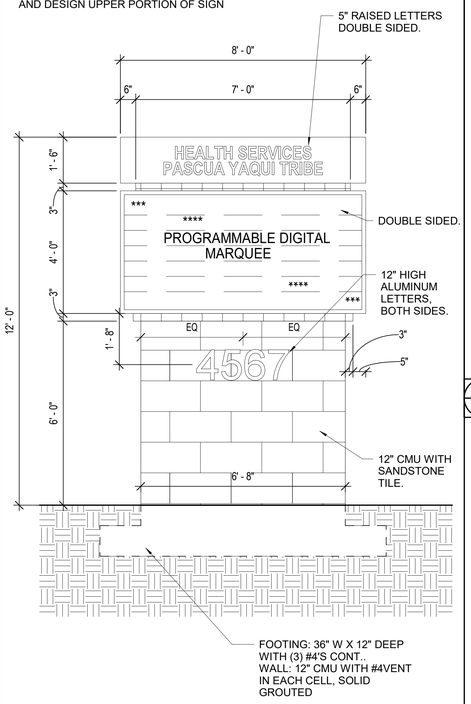


4 flagpole foundation
x1.5 1/2" = 1'-0" (1/ x1.1)

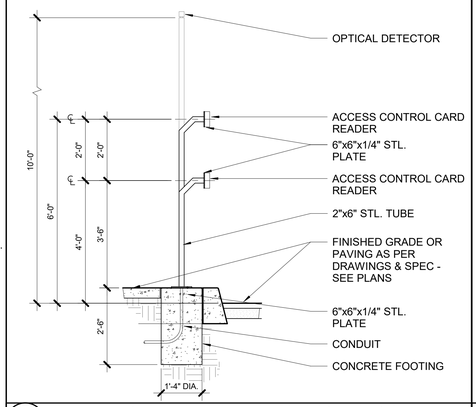


5 bicycle rack
x1.5 3/4" = 1'-0" (1/ x1.1)

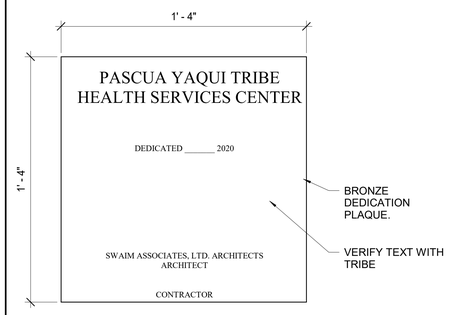
NOTE: SIGN COMPANY TO ENGINEER AND DESIGN UPPER PORTION OF SIGN



6 entry sign
x1.5 1/2" = 1'-0" (1/ x1.3)



7 access control card reader - dual height pedestal
x1.5 1/2" = 1'-0" (1/ x1.3)



8 dedication plaque
x1.5 3" = 1'-0" (/)

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site details

x1.5

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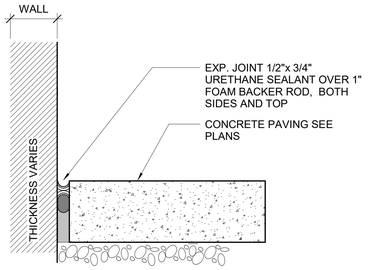
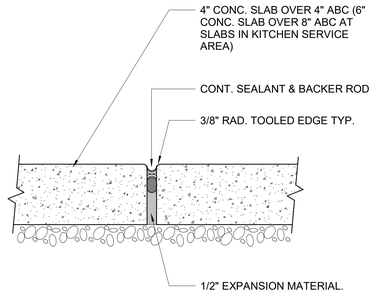
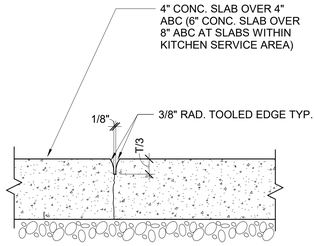


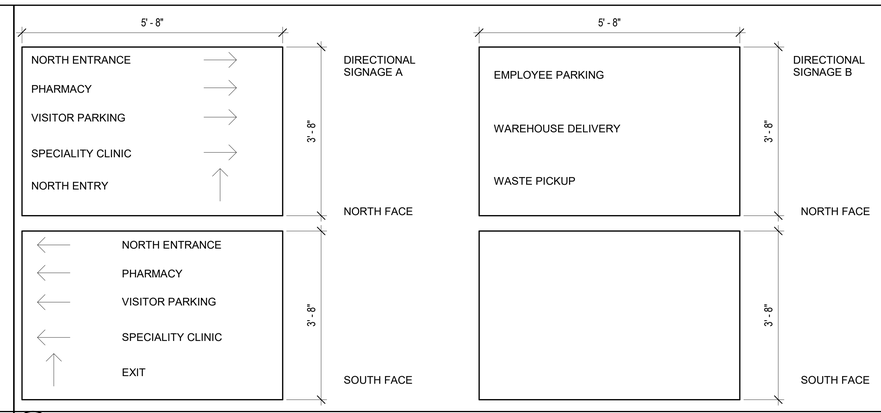
1 expansion joint - slab to wall
x1.6 3" = 1'-0"



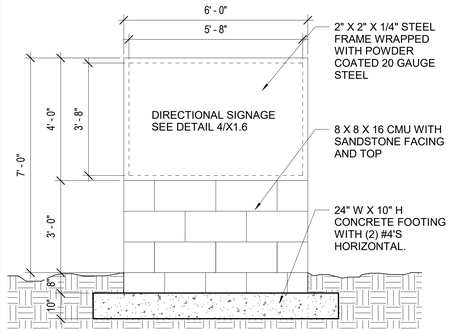
2 exterior concrete slab expansion joint
x1.6 3" = 1'-0"



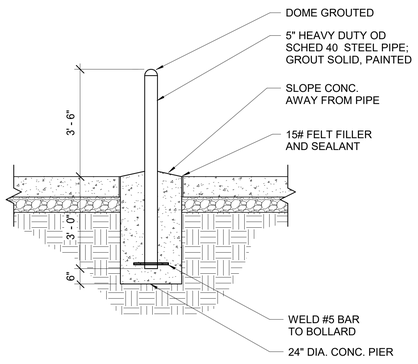
3 exterior concrete slab control joint
x1.6 3" = 1'-0"



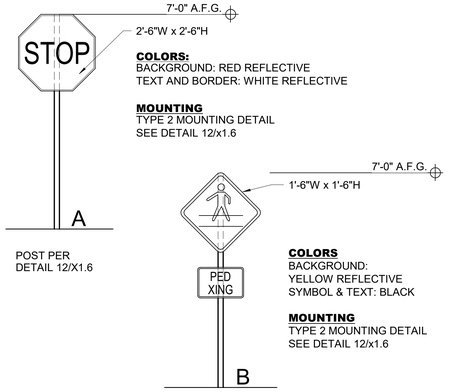
4 diretional signage
x1.6 3/4" = 1'-0"



5 directional sign detail
x1.6 1/2" = 1'-0" (1/ x1.1)

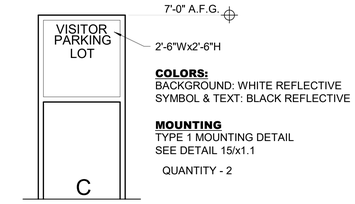


6 bollard detail
x1.6 1/2" = 1'-0" (1/ x1.3)



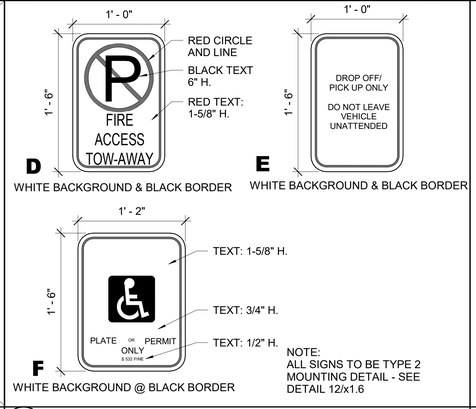
7 dual post signage 1
x1.6 1/2" = 1'-0"

8 NOT USED
x1.6 12" = 1'-0"

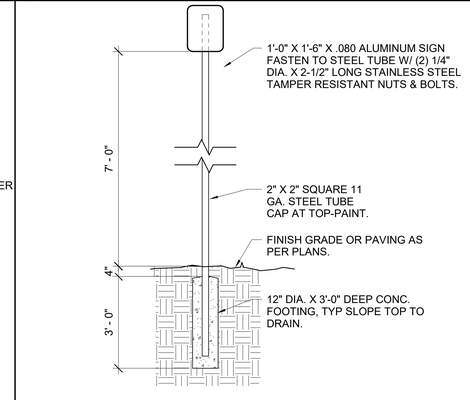


9 dual post signage 2
x1.6 1/2" = 1'-0"

10 NOT USED
x1.6 12" = 1'-0"



11 signage 3
x1.6 1 1/2" = 1'-0"



12 type 2 signage mounting detail
x1.6 1/2" = 1'-0"

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REGISTERED ARCHITECT
37165
KEVIN A. BARBER
ARIZONA U.S.A.

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

site details

x1.6

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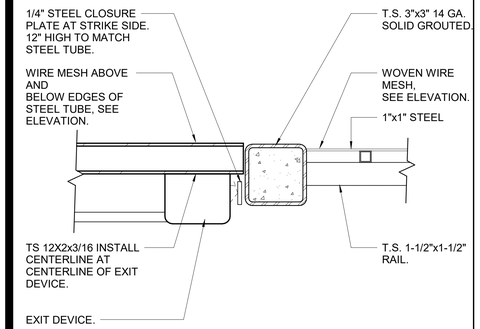
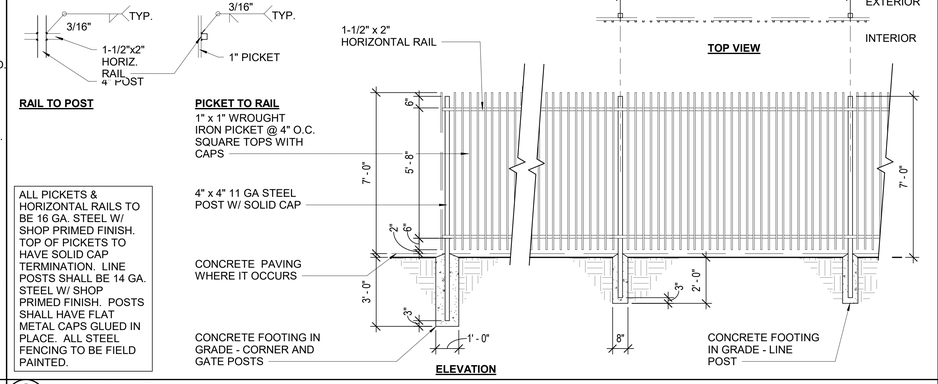
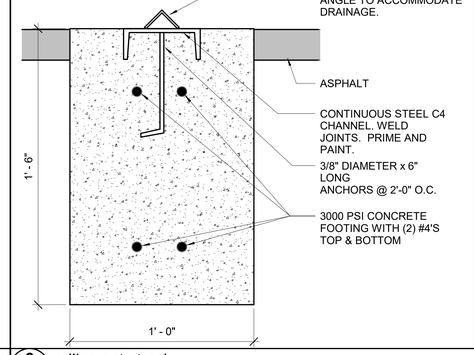


1 x1.7 — w.i. gate jamb @ panic device
3" = 1'-0"



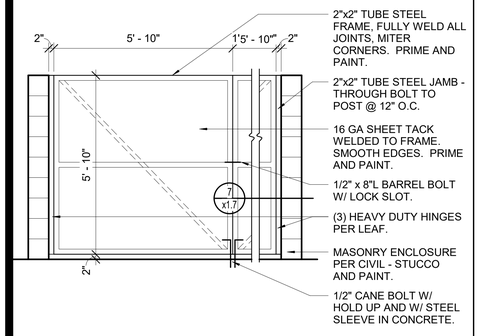
2 x1.7 — wrought iron fence
3/8" = 1'-0"



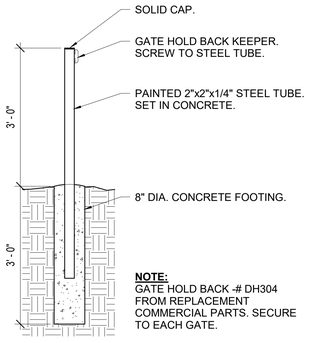
3 x1.7 — rolling gate track
3" = 1'-0"

NOT USED

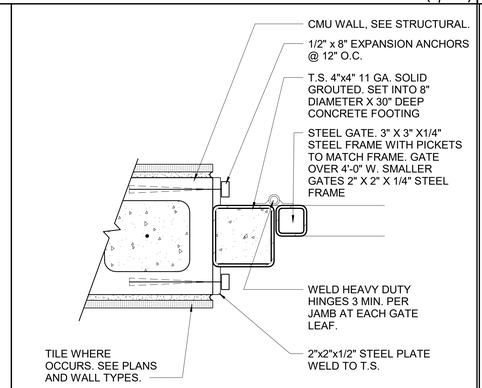
4 x1.7 — NOT USED
12" = 1'-0"



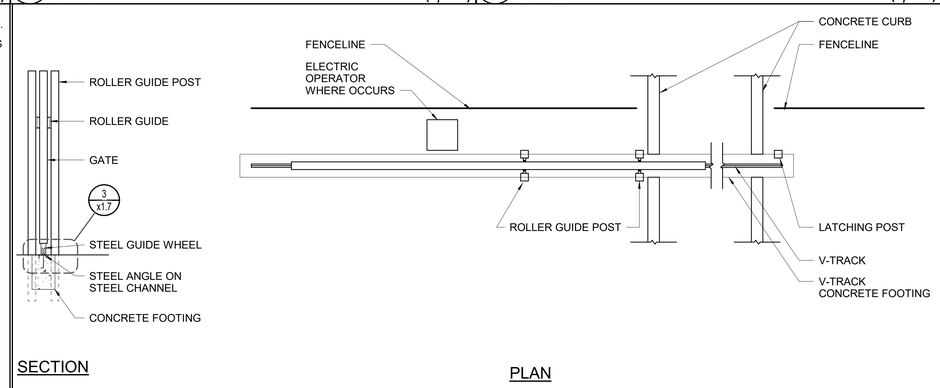
5 x1.7 — wrought iron gate
1/2" = 1'-0"



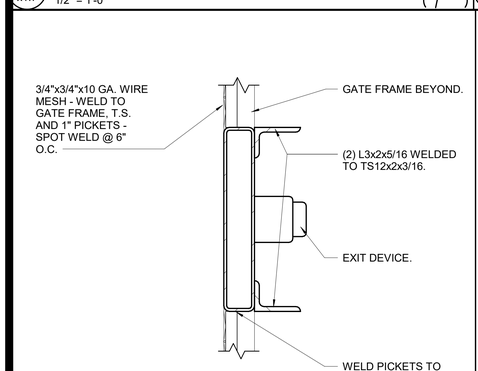
6 x1.7 — gate hold back post
3/4" = 1'-0"



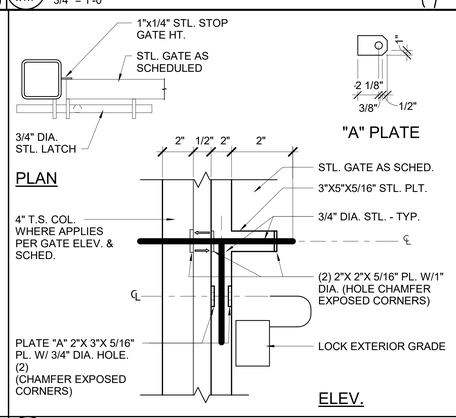
7 x1.7 — w.i. gate jamb @ cmu
3" = 1'-0"



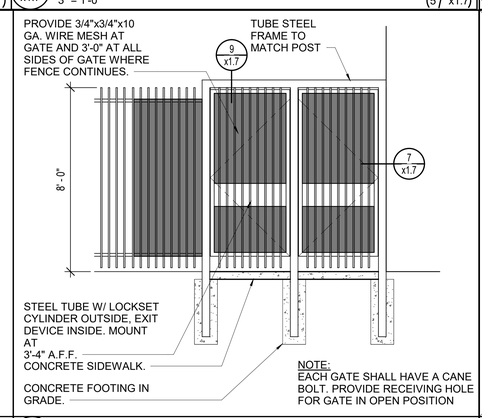
8 x1.7 — rolling gate section/ plan
3/8" = 1'-0"



9 x1.7 — w.i. gate detail @ panic device
3" = 1'-0"



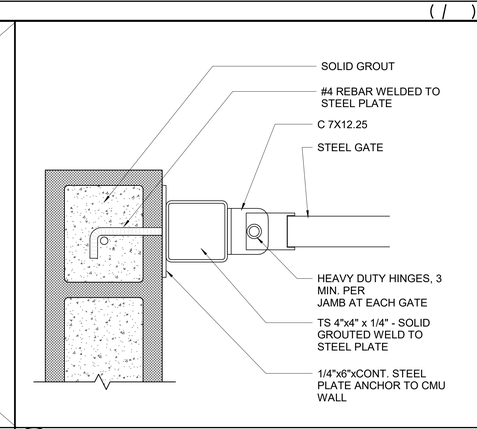
10 x1.7 — wrought iron fence gate latch detail
1" = 1'-0"



11 x1.7 — w.i. gate w/ panic hardware
3/8" = 1'-0"

NOT USED

12 x1.7 — NOT USED
12" = 1'-0"



13 x1.7 — gate jamb
3" = 1'-0"

GATE SCHEDULE

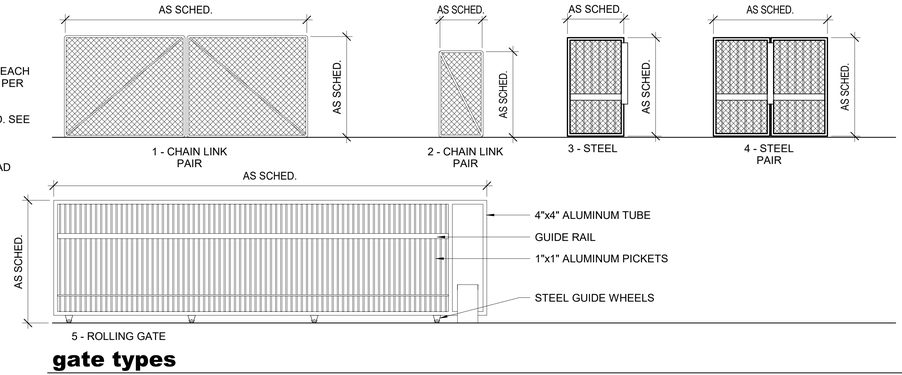
NUMBER	GATE HEIGHT	GATE WIDTH	GATE THICKNESS	GATE MATERIAL	GATE TYPE	DETAILS	HARDWARE	COMMENTS
G-01	7' - 0"	12' - 0"	4"	STL	4	7/X1.7	G-05	2
G-02	7' - 0"	4' - 0"	2"	STL	3	11/X1.7	G-01	1
G-03	7' - 0"	4' - 0"	2"	STL	3	11/X1.7	G-01	1
G-04	7' - 0"	8' - 0"	2"	STL	4	11/X1.7	G-02	1
G-05	7' - 0"	8' - 0"	2"	STL	4	11/X1.7	G-01	1
G-06	7' - 0"	4' - 0"	2"	STL	3	11/X1.7	G-01	1
G-07	7' - 0"	26' - 0"	4"	STL	5		G-03	5
G-08	7' - 0"	8' - 0"	2"	STL	4	11/X1.7	G-01	4
G-09	7' - 0"	26' - 0"	4"	STL	5		G-03	5
G-10	7' - 0"	4' - 0"	2"	STL	3	11/X1.7	G-01	1, 4
G-11	7' - 0"	26' - 0"	4"	STL	5		G-03	3
G-12	6' - 0"	18' - 0"		CL	1		G-05	
G-13	6' - 0"	18' - 0"		CL	1		G-05	
G-14	6' - 0"	18' - 0"		CL	1		G-05	
G-15	6' - 0"	18' - 0"		CL	1		G-05	
G-16	6' - 0"	3' - 0"	1 3/4"	CL	2		G-04	
G-17	6' - 0"	3' - 0"	1 3/4"	CL	2		G-04	
G-18	6' - 0"	3' - 0"	1 3/4"	CL	2		G-04	

GATE SCHEDULE NOTES:

1. INSTALL A GATE KEEPER ON EACH GATE AND HOLD OPEN POST PER DETAIL 6/ x1.7
2. LATCH DETAIL PER 10/x1.7.
3. ELECTRONICALLY OPERATED. SEE DETAIL 8/ x1.7
4. CARD READER.
5. PROVIDE LOCKING TABS 1/4" STEEL TO ACCOMMODATE PAD LOCK.

GATE SCHEDULE LEGEND:

CL - CHAIN LINK
GI - GALVANIZED IRON
PH - PANIC HARDWARE
SIM - SIMILAR
STL - STEEL



gate types

swaim
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Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
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site details - gates and fence

x1.7

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GENERAL STRUCTURAL NOTES

(APPLY UNLESS NOTED OTHERWISE)

DESIGN CRITERIA:

2012 EDITION OF THE INTERNATIONAL BUILDING CODE, WITH LOCAL AMENDMENTS.
RISK CATEGORY II.

LOADS:

ROOF LIVE LOAD = 20 PSF (REDUCIBLE).
SUPERIMPOSED DEAD LOAD ON ROOF TRUSSES & JOISTS = 18 PSF
WIND DESIGN: ULTIMATE WIND SPEED(Vult) = 115 MPH (3 SECOND GUST). NOMINAL DESIGN WIND SPEED (Vasd) = 90 MPH. EXPOSURE C.
INTERNAL PRESSURE COEFFICIENT (GCpi) = +-0.18. C&C = +-25.6 PSF FOR ZONE 4
REGIONS PER ASCE 7-10. NET UPLIFT (ASD) = 5 PSF NET.
SEISMIC DESIGN: Ie = 1.0. Ss = 0.272. S1 = 0.077. SOIL SITE CLASS = D.
Sds = 0.287. SD1 = 0.123. SEISMIC DESIGN CATEGORY B. ORDINARY STEEL CANTILEVERED COLUMNS. Vbase = 400 KIPS. Cs = 0.23. R = 1.25. EQUIVALENT LATERAL FORCE PROCEDURE.

WIND AND SEISMIC LOADS INDICATED ARE INTENDED FOR ULTIMATE/STRENGTH DESIGN LIMIT STATES PER ASCE 7-10.

GENERAL:

1. THE STRUCTURAL CONSTRUCTION DOCUMENTS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OR SEQUENCE OF CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR AND PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, SHORING FOR LOADS DUE TO CONSTRUCTION EQUIPMENT, ETC. THE STRUCTURAL ENGINEER SHALL NOT BE RESPONSIBLE FOR THE CONTRACTOR'S MEANS, METHODS, TECHNIQUES, SEQUENCES FOR PROCEDURE OF CONSTRUCTION, OR THE SAFETY PRECAUTIONS AND THE PROGRAMS INCIDENT THERETO (NOR SHALL OBSERVATION VISITS TO THE SITE INCLUDE INSPECTION OF THESE ITEMS). THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND IMPLEMENTATION OF ALL SCAFFOLDING, BRACING AND SHORING.

2. CONSTRUCTION MATERIALS SHALL BE SPREAD OUT IF PLACED ON FRAMED CONSTRUCTION. LOAD SHALL NOT EXCEED THE DESIGN LIVE LOAD PER SQUARE FOOT.

3. WHERE REFERENCE IS MADE TO VARIOUS TEST STANDARDS FOR MATERIALS, SUCH STANDARDS SHALL BE THE LATEST EDITION AND/OR ADDENDA.

4. ESTABLISH AND VERIFY ALL OPENINGS AND INSERTS FOR ARCHITECTURAL, MECHANICAL, PLUMBING AND ELECTRICAL WITH APPROPRIATE TRADES, DRAWINGS AND SUBCONTRACTORS PRIOR TO CONSTRUCTION.

5. OPTIONS ARE FOR CONTRACTOR'S CONVENIENCE. IF AN OPTION IS CHOSEN, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL NECESSARY CHANGES AND SHALL COORDINATE ALL DETAILS WITH ALL TRADES.

6. NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL STRUCTURAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT. FOR BIDDING PURPOSES, WHERE ANY MEMBER IS SHOWN BUT NOT CALLED OUT, THE LARGEST SIMILAR MEMBER SHALL BE UTILIZED.

7. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS PRIOR TO START OF CONSTRUCTION. RESOLVE ANY DISCREPANCY WITH THE ARCHITECT. DO NOT USE SCALED DIMENSIONS.

8. ALL DETAILS SHALL BE INCORPORATED INTO THE PROJECT AT ALL APPROPRIATE LOCATIONS, WHETHER SPECIFICALLY CUT OR NOT. TYPICAL DETAILS MAY NOT NECESSARILY BE CUT ON PLANS, BUT APPLY UNLESS NOTED OTHERWISE. FOR CLARITY, DETAILS MAY SHOW ONLY ONE SIDE OF FRAMING CONDITION.

9. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL STRUCTURAL NOTES AND SPECIFICATIONS, THE GREATER REQUIREMENTS SHALL GOVERN.

10. ANY ENGINEERING DESIGN, PROVIDED BY OTHERS AND SUBMITTED FOR REVIEW, SHALL BEAR THE SEAL OF AN ENGINEER REGISTERED IN THE STATE IN WHICH THE PROJECT OCCURS.

FOUNDATIONS:

1. FOUNDATION DESIGN IS BASED UPON SOIL REPORT BY TERRACON; JOB NO.631850431. ALL CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS OF THE SOILS REPORT. SPREAD FOOTINGS SHALL BEAR ON ENGINEERED FILL PER THE SOILS REPORT. DESIGN SOIL BEARING VALUE = 2500 PSF AT 1'-6" BELOW LOWEST ADJACENT FINISHED GRADE.

3. PROVIDE POSITIVE DRAINAGE SLOPES, BOTH DURING AND AFTER CONSTRUCTION, FOR SURFACE AND ROOF RUNOFF. THERE SHALL BE A MINIMUM OF 10'-0" OF POSITIVE DRAINAGE FROM BUILDING FOUNDATIONS.

4. DO NOT BACKFILL AGAINST BASEMENT OR RESTRAINED WALLS UNTIL FRAMING TO SUPPORT WALL IS PERMANENTLY ATTACHED. DO NOT EXCEED 1'-0" DIFFERENTIAL IN FILL LEVEL ON OPPOSITE SIDES OF FOUNDATION WALLS.

5. THE STRUCTURAL ENGINEER IS NOT RESPONSIBLE FOR ANY GEOTECHNICAL ASPECTS OF THIS PROJECT. THE OWNER SHALL EMPLOY A REGISTERED GEOTECHNICAL ENGINEER TO PERFORM NECESSARY TESTING AND QUALITY CONTROL INSPECTIONS TO ENSURE THAT THE REQUIREMENTS OF THE SOILS REPORT ARE COMPLIED WITH. ALL EARTHWORK SHALL BE INSPECTED AND APPROVED BY THE GEOTECHNICAL ENGINEER.

6. FOR CLARITY, ALL EXTERIOR SLABS AND SIDEWALKS MAY NOT BE SHOWN. FOR EXACT DIMENSIONS, LOCATIONS, JOINT AND SLOPE LINES, ETC. SEE ARCHITECTURAL DRAWINGS.

CONCRETE:

1. ALL CONCRETE WORK SHALL CONFORM WITH THE REQUIREMENTS OF ACI 301 AND ACI 318. CEMENT PER ASTM C150, TYPE II. AGGREGATE PER ASTM C33. CONCRETE SHALL BE READY MIXED IN ACCORDANCE WITH ASTM C94 AND SHALL BE DESIGNED FOR A MINIMUM 28 DAY COMPRESSIVE STRENGTH AS FOLLOWS:

   COLUMNS ---------- 4,000 PSI
   SLABS ON GRADE ---------- 3,000 PSI*,**
   FOUNDATIONS AND CAISSONS ---------- 3,000 PSI*
   * DESIGNED FOR 2500 PSI
   **SEE NOTE 7 FOR SLABS CAST DIRECTLY ON A VAPOR BARRIER/RETARDER.

2. FLY ASH - SHALL CONFORM TO ASTM C618, CLASS F AND SHALL BE LIMITED TO 25% OF CEMENTITIOUS MATERIALS AND SHALL HAVE A REPLACEMENT FACTOR OF 1.2 RELATIVE TO CEMENT REPLACED. CONCRETE SHALL BE FREE OF CHLORIDE. MAXIMUM SLUMP 4 1/2" FOR CONCRETE WITHOUT PLASTICIZER. IF PLASTICIZER IS USED, AN 8" MAXIMUM SLUMP IS ALLOWED AT PLACEMENT. ALL MIX DESIGNS SHALL BE DESIGNED BY THE CONCRETE PRODUCTION FACILITY IN ACCORDANCE WITH ACI 301 AND SHALL BE REVIEWED BY THE STRUCTURAL ENGINEER PRIOR TO PLACEMENT. MIX DESIGNS FOR POST-TENSIONING CONCRETE SHALL BE PROPORTIONED SO AS TO MINIMIZE SHRINKAGE CRACKING.

3. MECHANICALLY VIBRATE ALL CONCRETE WHEN PLACED, EXCEPT THAT SLABS ON GRADE NEED BE VIBRATED ONLY AROUND UNDER-FLOOR DUCTS, ETC. DO NOT DROP CONCRETE MORE THAN FIVE FEET WITH OUT THE USE OF TREMIES. REVIBRATE TOPS OF CAISSONS 15 MINUTES AFTER PLACING CONCRETE. UNLESS APPROVED OTHERWISE IN WRITING BY THE ARCHITECT, ALL CONCRETE SLABS ON GRADE SHALL BE BOUND BY CONTROL JOINTS (KEYED OR SAW CUT), AS SHOWN ON THE FOUNDATION PLAN, SUCH THAT THE ENCLOSED AREA DOES NOT EXCEED 225 SQUARE FEET. KEYED CONTROL JOINTS NEED ONLY OCCUR AT EXPOSED EDGES DURING POURING, ALL OTHER JOINTS MAY BE SAW CUT. CAST CLOSURE POUR AROUND COLUMNS AFTER COLUMN DEAD LOAD IS APPLIED.

CONCRETE (CONTINUED):

4. PROVIDE SLEEVES FOR ALL UTILITY OPENINGS. DO NOT CUT ANY REINFORCING AT OPENINGS. CONCRETE WHICH HAS CONTAINED WATER FOR MORE THAN 90 MINUTES (60 MINUTES IF AIR TEMPERATURE EXCEEDS 85 DEGREES) SHALL NOT BE USED. RETEMPERING OF CONCRETE AFTER INITIAL SET IS NOT ALLOWED. CURE EXPOSED CONCRETE PER ACI 301 FOR A MINIMUM OF 7 DAYS.

5. TESTING OF COMPRESSIVE STRENGTH AND SLUMP PER ASTM C31, C39 AND C143. PROVIDE A MINIMUM OF 3 CYLINDERS (4 FOR 4"X 8" CYLINDERS) FOR EACH DAY'S PLACEMENT U.N.O. A QUALIFIED TESTING LABORATORY SHALL TEST ONE CYLINDER AT 7 DAYS AND TWO (THREE FOR 4" X 8" CYLINDERS) AT 28 DAYS.

6. MACRO FIBER - HIGH VOLUME SYNTHETIC FIBER MAY BE SUBSTITUTED AT A RATE OF 7.5 POUNDS PER CUBIC YARD OF CONCRETE FOR WELDED WIRE FABRIC IN SLABS ON GRADE AND SLABS ON METAL DECK. ACCEPTABLE PRODUCTS INCLUDE FORTA FERRO.

7. THE SLABS ON GRADE ON THIS PROJECT ARE DIRECTLY CAST ONTO A VAPOR BARRIER/RETARDER. VAPOR BARRIERS/RETARDERS HAVE BEEN REPORTED TO AFFECT THE BEHAVIOR OF THE CONCRETE IN THE SLAB BY INCREASING FINISHING TIME, PROMOTING CRACKING, INCREASING SLAB CURLING, AND REDUCING STRENGTH. THEREFORE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR USING THEIR EXPERIENCE FOR APPLYING AND EMPLOYING MEASURES AND INSTALLING THE CONCRETE IN SUCH A WAY AS TO MITIGATE THESE UNDESIRABLE EFFECTS. THE FOLLOWING ARE SOME RECOMMENDATIONS THAT THE CONTRACTOR MAY CONSIDER IN THEIR CONCRETE PLACEMENT PLANS.

   A. USE OF CONCRETE MIXES WHICH USE THE LARGEST SIZE AGGREGATE POSSIBLE AND EVENLY DISTRIBUTED AGGREGATE MIXES WITH LIMITED GAP GRADING.
   B. USE OF SHRINKAGE REDUCING ADMIXTURES.
   C. USE OF MACRO FIBER ADMIXTURES WHICH REDUCE CURLING.
   D. CUTTING SLAB JOINTS WITHIN 12 HOURS USING AN EARLY ENTRY SAW.
   E. USING THE MAXIMUM AMOUNT OF FLYASH ALLOWABLE TO REDUCE CEMENT.
   F. REDUCE WATER CEMENT RATIOS WHILE USING WATER-REDUCING ADMIXTURES THAT DON'T INCREASE SHRINKAGE.
   G. AGGRESSIVE CURING MEASURES THAT RETARD THE EVAPORATION OF WATER FROM THE SURFACE OF THE CONCRETE.

MASONRY:

1. C.M.U. SHALL CONFORM TO ASTM C90, NORMAL OR MEDIUM WEIGHT, F'm =2,000 PSI AT 28 DAYS, RUNNING BOND, WITH A NET COMPRESSIVE STRENGTH OF 2000 PSI PER ASTM C140.

2. MORTAR SHALL CONFORM TO ASTM C270, TYPE S, 2,000 PSI USING PORTLAND CEMENT. FINE OR COURSE GROUT PER ASTM C476, 2,000 PSI AT 28 DAYS, TESTED PER ASTM C1019. GROUT SHALL BE FREE OF CHLORIDE. GROUT MAY CONTAIN UP TO 18% FLY ASH AT THE APPROVAL OF THE ARCHITECT.

3. SEE DRAWINGS FOR SIZE AND SPACING OF REINFORCING. LAP SPLICE ALL REINFORCING PER TYPICAL DETAIL. ALL REINFORCING SHALL BE ACCURATELY LOCATED PRIOR TO AND DURING GROUTING. TIE ALL VERTICAL REINFORCING AT 8'-0" VERTICALLY WITH SINGLE WIRE LOOP TIE BY A A. WIRE PRODUCTS COMPANY. DOWEL ALL VERTICAL REINFORCING TO FOUNDATION WITH DOWELS TO MATCH SIZE AND SPACING OF VERTICAL REINFORCING. PROVIDE BENT BARS TO MATCH HORIZONTAL BOND BEAM REINFORCING AT CORNERS AND WALL INTERSECTIONS.

4. HORIZONTAL JOINT REINFORCING SHALL BE 9 GAGE LADDER OR TRUSS TYPE JOINT REINFORCEMENT PER ASTM A82 AT 16" O.C. WITH 12" SPLICES. USE TRUSS TYPE JOINT REINFORCEMENT IN BRICK OR COMPOSITE WALLS.

5. ALL CELLS AND COURSES WITH REINFORCING AND ADDITIONAL CELLS AND COURSES NOTED ON DRAWINGS SHALL BE GROUTED SOLID. ALL MASONRY BELOW FINISHED FLOOR OR GRADE SHALL BE GROUTED SOLID. MECHANICALLY VIBRATE GROUT IN VERTICAL SPACES IMMEDIATELY AFTER POURING AND AGAIN ABOUT 5 MINUTES LATER. PROVIDE CLEANOUTS IF GROUT POUR HEIGHT EXCEEDS 5'-4" IN BLOCK WALLS. IF THE MASONRY HAS CURED FOR AT LEAST 4 HOURS, THE GROUT SLUMP IS MAINTAINED BETWEEN 10" AND 11", AND NO INTERMEDIATE BOND BEAMS ARE PLACED BETWEEN THE TOP AND BOTTOM OF THE POUR HEIGHT, THEN GROUT MAY BE PLACED IN LIFTS UP TO 12'8" TALL. STOP ALL GROUT LIFTS 1-1/2" BELOW THE TOP COURSE OF THE LIFT.
   PLACE GROUT LIFTS CONTINUOUS FOR HEIGHT OF LINTELS.
   DO NOT INTERRUPT GROUTING FOR MORE THAN ONE HOUR. FOG SPRAY ERECTED CMU EVERY 8 HOURS FOR 48 HOURS FOLLOWING INSTALLATION WHEN TEMPERATURES EXCEED 100 DEGREES OR WHEN THE TEMPERATURE EXCEEDS 90 DEGREES AND THE WIND SPEED IS GREATER THAN 8 MPH.

6. UNLESS NOTED OTHERWISE ON THE PLANS, PLACE CONTROL JOINTS IN MASONRY WALLS SUCH THAT NO STRAIGHT RUN OF WALL EXCEEDS 25'-0". CONTROL JOINTS SHALL NOT OCCUR AT WALL CORNERS, INTERSECTIONS, ENDS, WITHIN 24" OF CONCENTRATED POINTS OF BEARING OR JAMBS, OR OVER OPENINGS UNLESS SPECIFICALLY SHOWN ON THE STRUCTURAL DRAWINGS.

7. MORTAR AND GROUT SHALL BE TESTED BY A QUALIFIED TESTING AGENCY. TEST MORTAR, GROUT, AND MASONRY UNITS AT THE FREQUENCY AND SAMPLING REQUIRED BY THE CONSTRUCTION DOCUMENT TESTING TABLES.

8. ADHERED VENEER SHALL WEIGH LESS THAN 15 PSF. ADHESION DEVELOPED BETWEEN ADHERED VENEER UNITS AND BACKING SHALL HAVE A SHEAR TRANSFER STRENGTH OF AT LEAST 50 PSI BASED ON GROSS UNIT SURFACE AREA.

REINFORCING STEEL:

1. REINFORCING STEEL SHALL CONFORM TO ASTM A615 (Fy = 60 KSI) DEFORMED BARS FOR ALL REBAR. ALL REINFORCING TO BE WELDED SHALL BE ASTM A706. WELDED WIRE FABRIC PER ASTM A185, WIRE PER ASTM A82. NO TACK WELDING OF REINFORCING BARS ALLOWED WITHOUT PRIOR REVIEW OF PROCEDURE WITH THE STRUCTURAL ENGINEER. LATEST ACI CODE AND DETAILING MANUAL APPLY.

2. ACCURATELY PLACE OR SUPPORT ALL REINFORCING, INCLUDING WELDED WIRE FABRIC, WITH GALVANIZED METAL CHAIRS, SPACERS OR HANGERS FOR THE FOLLOWING CLEAR CONCRETE COVERAGES:
   CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH ------- 3"
   EXPOSED TO EARTH OR WEATHER
   #6 OR LARGER ---------- 2"
   #5 AND SMALLER ---------- 1 1/2"
   COLUMNS (TO TIES) ---------- 1 1/2"
   ALL OTHER PER LATEST EDITION OF ACI 318.

3. LAP SPLICES, UNLESS NOTED OTHERWISE, SHALL BE CLASS "B" TENSION LAP SPLICES PER LATEST EDITION OF ACI 318. LAP SPLICES IN CONCRETE COLUMNS SHALL BE STANDARD COMPRESSION LAP SPLICES. STAGGER SPLICES A MINIMUM OF ONE LAP LENGTH. LAPS IN WELDED WIRE FABRIC SHALL BE MADE SO THAT THE OVERLAP, MEASURED BETWEEN OUTERMOST CROSS WIRES OF EACH FABRIC SHEET, IS NOT LESS THAN THE SPACING OF CROSS WIRES PLUS 2 INCHES.

4. ALL SPLICE LOCATIONS SUBJECT TO APPROVAL BY THE STRUCTURAL ENGINEER. SPLICED BARS SHALL BE PLACED AT THE SAME EFFECTIVE DEPTH U.N.O. ALL REINFORCING NOTED AS "CONTINUOUS" SHALL BE FULLY CONTINUOUS AND SPLICED. PROVIDE BENT CORNER BARS TO MATCH AND LAP WITH HORIZONTAL BARS AT ALL CORNERS AND INTERSECTIONS PER TYPICAL DETAILS.

REINFORCING STEEL (CONTINUED):

5. REINFORCING BAR SPACING GIVEN ARE MAXIMUM ON CENTERS. ALL BARS PER CRSI SPECIFICATIONS AND HANDBOOK. DOWEL ALL VERTICAL REINFORCING TO FOUNDATION WITH STANDARD 90 DEGREE HOOKS UNLESS NOTED OTHERWISE. SKEW HOOKS AS REQUIRED TO MAINTAIN CONCRETE COVER. SECURELY TIE ALL BARS IN LOCATION BEFORE PLACING CONCRETE. CONCRETE COLUMN DOWEL EMBEDMENT SHALL BE A STANDARD COMPRESSION DOWEL WITH EMBEDMENT LENGTH ACCORDING TO THE LATEST EDITION OF THE ACI 318.

STRUCTURAL STEEL:

1. ALL STEEL CONSTRUCTION SHALL CONFORM WITH THE LATEST AISC HANDBOOK. ALL STRUCTURAL STEEL W SECTIONS SHALL BE ASTM A992 (Fy = 50 KSI). ALL RECTANGULAR HSS SHALL BE ASTM A500, GRADE B (Fy = 46 KSI). ALL ROUND HSS SHALL BE ASTM A500, GRADE B (Fy = 42 KSI). ALL PIPE STEEL SHALL BE ASTM A53, GRADE B (Fy = 35 KSI). ALL OTHER STRUCTURAL SHAPES AND PLATES SHALL BE ASTM A36 (Fy = 36 KSI). SHOP PAINT ALL STEEL SURFACES WITH FABRICATOR'S STANDARD RUST-INHIBITING PRIMER EXCEPT AT SURFACES ENCASED IN CONCRETE, SURFACES TO RECEIVE FIREPROOFING, OR SURFACES ENCLOSED WITHIN THE BUILDING FINISHES. BEAMS, COLUMNS AND BRACES SHALL NOT BE SPLICED WITHOUT THE PRIOR APPROVAL OF THE STRUCTURAL ENGINEER.

2. BOLTS SHALL BE ASTM A307, UNLESS NOTED OTHERWISE. ANCHOR BOLTS SHALL BE ASTM A36 OR A307, GRADE A. ANCHOR RODS SHALL BE ASTM F1554, GRADE 36. THREADED RODS SHALL BE ASTM A36.

3. ALL WELDING PER LATEST AMERICAN WELDING SOCIETY STANDARDS. ALL WELDING SHALL BE PERFORMED BY WELDERS HOLDING VALID CERTIFICATES AND HAVING CURRENT EXPERIENCE IN THE TYPE OF WELD SHOWN ON THE DRAWINGS OR NOTES. CERTIFICATES SHALL BE THOSE ISSUED BY AN ACCEPTED TESTING AGENCY. ALL WELDING DONE BY E70 SERIES LOW HYDROGEN RODS UNLESS NOTED OTHERWISE. FOR GRADE 60 REINFORCING BARS, USE E80 SERIES. THESE DRAWINGS DO NOT DISTINGUISH BETWEEN SHOP AND FIELD WELDS; THE CONTRACTOR MAY SHOP WELD OR FIELD WELD AT HIS DISCRETION. SHOP WELDS AND FIELD WELDS SHALL BE SHOWN ON THE SHOP DRAWINGS SUBMITTED FOR REVIEW. ALL FULL (COMPLETE) PENETRATION WELDS SHALL BE TESTED AND CERTIFIED BY AN INDEPENDENT TESTING LABORATORY.

4. NON-SHRINK GROUT SHALL BE 5,000 PSI, FIVE STAR, SIKA 212 OR EQUIVALENT. INSTALL NON-SHRINK GROUT UNDER BEARING PLATES BEFORE FRAMING MEMBER IS INSTALLED. AT COLUMNS, INSTALL NON-SHRINK GROUT UNDER BASEPLATES AFTER COLUMN HAS BEEN PLUMBED BUT PRIOR TO FLOOR OR ROOF INSTALLATION.

5. ARCHITECTURALLY EXPOSED STRUCTURAL STEEL (AESS) MEMBERS SHALL CONFORM TO AISC 303 SECTION 10. IN ADDITION, PREPARE MEMBER SURFACES ACCORDING TO SSPC SPECIFICATION SSPC-SP3, ORIENT HSS SEAMS AWAY FROM VIEW, AND GRIND SMOOTH ALL WELDS THAT PROJECT BEYOND FLAT SURFACES. CLEARLY INDICATE ON SHOP DRAWINGS WHICH MEMBERS ARE CONSIDERED AESS.

STEEL DECK:

1. STEEL ROOF DECK SHALL BE 1.5" DEEP, 36" WIDE, 20 GAGE PAINTED STEEL, WITH MINIMUM YIELD STRESS OF 33 KSI, WITH MINIMUM +S = 0.234 IN^3 AND I = 0.201 IN^4 PER FOOT OF WIDTH. DECK SHALL BE ERECTED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AS 3 SPAN MINIMUM AND SHALL BE ATTACHED FOR A MINIMUM DIAPHRAGM SHEAR CAPACITY OF 482 PLF USING THE FOLLOWING MINIMUM ATTACHMENTS:

   WELD DECK TO SUPPORTING MEMBERS WITH 4 - 5/8" DIAMETER OR 3/8" X 1" PUDDLE WELDS PER SHEET AT ENDS, END LAPS AND AT INTERMEDIATE SUPPORTS, AND AT 16" O.C. AT PERIMETER BEAMS AND OPENING EDGES RUNNING PARALLEL TO THE DECK. SIDE SEAM ATTACHMENT SHALL BE 1 1/2" SIDE SEAM WELDS AT 16" O.C., OR #12-14 X 3/4" LONG TEKS/1 HEX WASHER HEAD SCREWS AT 16" O.C.

   OR: ATTACH DECK TO SUPPORTING MEMBERS WITH #12-24 X 1 1/4" LONG TEKS/5 HEX WASHER HEAD SCREWS PER SHEET AT ENDS, END LAPS, AND AT INTERMEDIATE SUPPORTS, AND AT 12" O.C. AT PERIMETER BEAM AND OPENING EDGES RUNNING PARALLEL TO THE DECK. SIDE SEAM ATTACHMENT SHALL BE #12-14 X 3/4" LONG TEKS/1 HEX WASHER HEAD SCREWS AT 16" O.C.

4. ALL WELDING SHALL BE PERFORMED BY WELDERS EXPERIENCED IN LIGHT GAGE STEEL DECK WORK. WELD DECK WITH E60 SERIES LOW HYDROGEN RODS.

5. CONCENTRATED/HANGING LOADS ON STEEL ROOF DECK SHALL BE LIMITED TO SUSPENDED ACOUSTICAL CEILINGS AND LIGHT DUCT WORK. ALL OTHER CONCENTRATED/HANGING LOADS ARE NOT ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER.

LOW VELOCITY POWDER ACTUATED FASTENERS (P.A.F.):

1. LOW VELOCITY P.A.F. SHALL BE HILTI X-U FASTENERS WITH A MINIMUM SHANK DIAMETER OF .157" INSTALLED AND COMPLYING WITH ICC ES REPORT NO. 2269.

POST-INSTALLED ANCHORS:

1. EPOXY BOLTS OR DOWELS SHALL BE A THREADED ROD OR REINFORCING STEEL INSTALLED WITH THE ONE OF THE FOLLOWING APPROVED PRODUCTS SATISFYING CRACKED CONCRETE REQUIREMENTS IN ACCORDANCE WITH ACI APPENDIX D.

   SIMPSON "SET-XP" ICC REPORT ESR-2508
   HILTI "RE-500 V3" ICC REPORT ESR-3814
   HILTI "HIT-HY 200 SAFE SET" ICC REPORT ESR-3187
   POWERS "PE1000+" ICC REPORT ESR-2583

2. EXPANSION BOLTS FOR CONCRETE SHALL BE ONE OF THE FOLLOWING APPROVED PRODUCTS SATISFYING CRACKED CONCRETE REQUIREMENTS IN ACCORDANCE WITH ACI APPENDIX D.

   HILTI "KWIK BOLT TZ" ICC REPORT ESR-1917
   HILTI "HDA UNDERCUT ANCHOR" ICC REPORT ESR-1546
   HILTI "HSL-3 HD EXPANSION ANCHOR" ICC REPORT ESR-1545
   SIMPSON "STRONG BOLT 2 WEDGE ANCHOR" ICC REPORT ESR-3037
   SIMPSON "TORQ-CUT" ICC REPORT ESR-2705
   POWERS "POWER-STUD+ SD1" ICC REPORT ESR-2818
   POWERS "POWER-STUD+ SD2" ICC REPORT ESR-2502

3. SCREW BOLTS FOR CONCRETE SHALL BE ONE OF THE FOLLOWING APPROVED PRODUCTS SATISFYING CRACKED CONCRETE REQUIREMENTS IN ACCORDANCE WITH ACI APPENDIX D.

   SIMPSON "TITEN HD" ICC REPORT ESR-2713
   POWERS "WEDGE BOLT+" ICC REPORT ESR-2526

4. THE CONTRACTOR MAY NOT USE SUBSTITUTES FOR EPOXY OR EXPANSION ANCHORS WITHOUT PRIOR APPROVAL OF THE STRUCTURAL ENGINEER.

5. FOR MINIMUM EMBEDMENT LENGTH SEE DETAILS. INSTALL ALL BOLTS AS OUTLINED IN MANUFACTURER'S SPECIFICATIONS, UTILIZING PROPER SIZE AND TYPE OF DRILL, CLEANING HOLE, DRIVING AND TIGHTENING BOLT.

6. SPECIAL INSPECTION OF ALL POST-INSTALLED ANCHORS IS REQUIRED.

INTERPRETATION OF DRAWINGS

ABBREVIATION

A.B.C.	AGGREGATE BASE COURSE
A.F.F.	ABOVE FINISHED FLOOR
ALT	ALTERNATE
A.B.	ANCHOR BOLT
B.F.F.	BELOW FINISHED FLOOR
B.O.B.	BOTTOM OF BEAM
B.O.D.	BOTTOM OF DECK
B.O.F.	BOTTOM OF FOOTING
B.O.S.	BOTTOM OF STEEL
BOT	BOTTOM
BRG	BEARING
C.I.P.	CAST IN PLACE
C.F.S.	COLD FORMED STEEL
C.L.	CENTERLINE
CLR	CLEAR
CONC.	CONCRETE
CONC. C.J.	CONCRETE CONTROL JOINT
C.M.U.	CONCRETE MASONRY UNIT
CONN.	CONNECTION
CONT.	CONTINUOUS
D.L.	DEAD LOAD
DIA.	DIAMETER
DN	DOWN
DWG (S)	DRAWING(S)
(E)	EXISTING
E.F.	EACH FACE
E.O.S.	EDGE OF SLAB
EQ	EQUAL
EQUIP.	EQUIPMENT
EXP. BOLT	EXPANSION BOLT
E.J.	EXPANSION JOINT
E.W.	EACH WAY
FDN	FOUNDATION
F.F.E.	FINISHED FLOOR ELEVATION
GA	GAGE
GALV	GALVANIZED
G.S.N.	GENERAL STRUCTURAL NOTES
GLB (GLULAM)	GLUED-LAMINATED BEAM
HORIZ.	HORIZONTAL
I.B.C.	INTERNATIONAL BUILDING CODE
I.C.C.	INTERNATIONAL CODE COUNCIL
I.C.F.	INSULATED CONCRETE FORM
K (KIP)	1000 POUNDS
L.L.	LIVE LOAD
LBS	POUNDS
L.L.H.	LONG LEG HORIZONTAL
L.L.V.	LONG LEG VERTICAL
MFR (S)	MANUFACTURER('S)
M.C.J.	MASONRY CONTROL JOINT
MECH.	MECHANICAL
(N)	NEW
N/A	NOT APPLICABLE
N.I.C.	NOT IN CONTRACT
N.F.S.	NON-FROST SUSCEPTIBLE
N.T.	NOT TO SCALE
O.C.	ON CENTER
OPP	OPPOSITE (MIRRORED)
P.A.F.	POWDER ACTUATED FASTENER
P.C.	PRECAST CONCRETE
PCF	POUNDS PER CUBIC FOOT
PLF	POUNDS PER LINEAR FOOT
PREFAB.	PREFABRICATED
P.S.F.	POUNDS PER SQUARE FOOT
P.S.I.	POUNDS PER SQUARE INCH
REINF.	REINFORCING
SCH	SCHEDULE
SIM	SIMILAR
S.I.P.	STRUCTURAL INSULATED PANEL
S.L.R.S.	SEISMIC LOAD RESISTING SYSTEM
SP	SPACES
STD	STANDARD
T&B	TOP AND BOTTOM
T.L.	TOTAL LOAD
T.O.B.	TOP OF BEAM
T.O.C.	TOP OF CONCRETE
T.O.D.	TOP OF DECK
T.O.F.	TOP OF FOOTING
T.O.L.	TOP OF LEDGER
T.O.M.	TOP OF MASONRY
T.O.PL.	TOP OF PLATE
T.O.S.	TOP OF STEEL
T.O.W.	TOP OF WALL
TYP	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE.
VERT.	VERTICAL
W.S.P.	WOOD STRUCTURAL PANEL
W.W.F.	WELDED WIRE FABRIC
W/ (W/O)	WITH (WITHOUT)

PLAN

SYMBOL	DESCRIPTION	REMARKS
101	DETAIL CUTS SHOWN ON PLANS	FOUNDATION DETAILS ARE 100 SERIES NUMBERS. FRAMING DETAILS ARE 200 SERIES NUMBERS.
#	KEYNOTE	
	8" MASONRY WALL U.N.O.	SEE PLANS AND SCHEDULES FOR SIZE AND REINFORCING
	12" MASONRY WALL U.N.O.	SEE PLANS AND SCHEDULES FOR SIZE AND REINFORCING
	CONCRETE WALL U.N.O.	SEE PLANS AND SCHEDULES FOR SIZE AND REINFORCING
	STEEL STUD WALL U.N.O.	SEE PLANS AND SCHEDULES FOR SIZE
	WOOD STUD WALL U.N.O.	SEE PLANS AND SCHEDULES FOR SIZE
SW	SHEAR WALL	SEE PLANS FOR LOCATION, SIZE AND TYPE
SW / SW	TWO-SIDED SHEAR WALL	SEE PLANS FOR LOCATION, SIZE AND TYPE
H	HOLDOWN ANCHOR	SEE PLANS FOR LOCATION AND TYPE
M.C.J.	MASONRY CONTROL JOINT	SEE PLANS FOR LOCATION
P.J.	PANEL JOINT	SEE PLANS FOR LOCATION
C.J.	CONTROL JOINT	SEE PLANS FOR LOCATION
	DIRECTION OF SLOPE	VERIFY DEPTH WITH ARCHITECTURAL AND/OR MECHANICAL DRAWINGS
	SLAB DEPRESSION/ CHANGE IN ELEVATION	VERIFY DEPTH WITH ARCHITECTURAL DRAWINGS
B (F)	FLUSH BEAM	
B (D)	DROPPED BEAM	
	BRACED FRAME MEMBERS	SEE PLANS FOR LOCATION
	RIGID (MOMENT) CONNECTION	
	SIMPLE BEAM SPLICE CONNECTION	
(15") (15")	CIRCULAR OR RECTANGULAR OPENING IN BEAM WEB (SIZE)	SEE TYPICAL DETAIL U.N.O.
c=1/2"	BEAM CAMBER	
	INDICATES NUMBER OF ROWS OF BOLTS AT BEAM TO COLUMN OR BEAM TO BEAM CONNECTION	SEE PLANS FOR LOCATION. IF NO SYMBOL INDICATED, SINGLE ROW OF BOLTS OCCURS
(-2 1/2")	TOP OF STEEL ELEVATION RELATIVE TO BOTTOM OF DECK ELEVATION	
(24)	QUANTITY OF HEADED STUDS ON COMPOSITE STEEL BEAM	SEE G.S.N. AND TYPICAL DETAILS FOR PLACEMENT
100'-0"	ELEVATION TARGET	
1	REVISION SYMBOL	
	OPENING	
	MECHANICAL EQUIPMENT	VERIFY SIZE AND LOCATION WITH ARCHITECTURAL AND/OR MECHANICAL DRAWINGS
	POINT OF SUPPORT/SHORING	

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ARIZONA, U.S.A.
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date
11/16/18

revisions

Pascua Yaqui Tribe
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General Structural Notes + Interpretation of Drawings

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GENERAL STRUCTURAL NOTES (CONTINUED)

(APPLY UNLESS NOTED OTHERWISE)

COLD FORMED STEEL / STEEL STUD FRAMING:

(THESE NOTES APPLY TO STRUCTURAL STUD WALLS SHOWN ON THE STRUCTURAL PLANS. FOR INTERIOR NON-BEARING PARTITIONS, REFER TO THE ARCHITECTURAL DRAWINGS)

1. ALL COLD FORMED STEEL FRAMING SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND IN ACCORDANCE WITH THE LATEST EDITION OF "SPECIFICATIONS FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS" BY THE AMERICAN IRON AND STEEL INSTITUTE.

2. STEEL FOR 97, 68 AND 54 MIL STUDS AND JOISTS, AND FOR ALL DIAGONAL TENSION STRAPS SHALL HAVE A MINIMUM YIELD STRENGTH OF 50 KSI AND SHALL CONFORM TO ASTM A1003, STRUCTURAL GRADE 50, TYPE H. STEEL FOR ALL 43 AND 33 MIL STUDS AND JOISTS, AND FOR ALL THICKNESSES OF TRACK, ACCESSORIES AND BRIDGING SHALL HAVE A MINIMUM YIELD STRENGTH OF 33 KSI AND SHALL CONFORM TO ASTM A1003, STRUCTURAL GRADE 33, TYPE H. STUDS, JOISTS, TRACKS AND ACCESSORIES SHALL HAVE A MINIMUM METALLIC COATING COMPLYING WITH THE REQUIREMENTS OF ASTM A1003. ADDITIONAL CORROSION PROTECTION SHALL NOT BE REQUIRED ON EDGES OF METALLIC-COATED STEEL FRAMING MEMBERS, SHOP OR FIELD CUT, PUNCHED OR DRILLED. FRAMING MEMBERS SHALL BE LOCATED WITHIN BUILDING ENVELOPE AND ADEQUATELY SHIELDED FROM DIRECT CONTACT WITH MOISTURE FROM THE GROUND OR OUTDOOR CLIMATE.

3. THE FOUNDATION SHALL BE LEVEL AND FREE FROM DEFECTS BENEATH LOAD BEARING WALL TRACKS. IF THE FOUNDATION IS NOT LEVEL, PROVISIONS SHALL BE MADE TO PROVIDE A UNIFORM BEARING SURFACE WITH A MAXIMUM 1/4" GAP BETWEEN THE BOTTOM TRACK OR RIM TRACK AND THE FOUNDATION. THIS SHALL BE ACCOMPLISHED THROUGH THE USE OF LOAD BEARING SHIMS OR NON SHRINK GROUT PROVIDED BETWEEN THE UNDERSIDE OF THE TRACK AND THE TOP OF THE FOUNDATION AT BEARING STUD OR JOIST LOCATIONS.

4. ALL STUDS SHALL SEATED TIGHT FOR FULL END BEARING ON THE TOP AND BOTTOM TRACKS. TIGHT SEATING, PER THE AISI, SHALL CONSIST OF STUDS WITH NO MORE THAN A 1/8" GAP BETWEEN THE STUD AND THE WEB OF THE TRACK. DO NOT SPLICE OR NOTCH FLANGES OF STUDS, JOISTS OR TENSION STRAPS UNLESS NOTED. UNLESS NOTED OTHERWISE, PROVIDE DOUBLE STUDS AT ALL JAMBS, CORNERS, INTERSECTIONS, BEAM BEARINGS AND STEEL JOIST BEARINGS WHERE SPACING EXCEEDS 4'0" ON CENTER. DOUBLE UP JOISTS BELOW PARTITIONS AND AT ROOF (AND FLOOR) OPENINGS WHICH INTERRUPT ANY MEMBERS UNLESS NOTED OTHERWISE.

5. SCREW CONNECTIONS FOR STEEL TO STEEL AND SHEATHING TO STEEL SHALL CONFORM TO THE ASTM C1513 STANDARD. SCREW FASTENERS SHALL EXTEND THROUGH THE STEEL CONNECTION A MINIMUM OF THREE (3) EXPOSED THREADS. SCREW FASTENERS SHALL PENETRATE INDIVIDUAL COMPONENTS OF CONNECTIONS WITHOUT CAUSING PERMANENT SEPERATION BETWEEN COMPONENTS.

6. WELDED CONNECTIONS FOR COLD FORMED STEEL SHALL BE IN ACCORDANCE WITH AISI S100 AND AWS D1.3.

7. BRIDGING SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATION WITH THE FOLLOWING MINIMUM REQUIREMENTS: FOR WALLS WITH NO AXIAL LOAD, PROVIDE BRIDGING AT MID-HEIGHT FOR WALLS LESS THAN OR EQUAL TO 10'-0" HIGH, AND 5'-0" O.C. MAXIMUM FOR WALLS GREATER THAN 10'-0" HIGH. FOR AXIAL LOAD BEARING WALLS, PROVIDE BRIDGING EQUALLY SPACED AT 4'-0" MAXIMUM. IN ADDITION, BLOCKING OR BRIDGING SHALL BE PROVIDED AT ROOF (AND FLOOR) LINES AND ELSEWHERE AS NOTED ON THE DRAWINGS. SOLID BLOCKING SHALL BE INSTALLED IN LIEU OF BRIDGING WHERE NOTED ON THE DRAWINGS. WELDING SHALL BE PERFORMED BY WELDERS EXPERIENCED IN LIGHT GAGE STEEL FRAMING CONSTRUCTION.

8. STUD WALLS SHALL BE 43 MIL THICK AT 24" O.C. UNLESS NOTED OTHERWISE. BLOCKING SHALL BE THE SAME GAGE AS THE STUDS. PLACE 1/2" DIAMETER ANCHOR BOLTS IN TRACKS WITH SPACINGS NOT TO EXCEED 4'-0" O.C. AND AT ALL JAMBS, INTERSECTIONS, CORNERS, AND WALL ENDS (2 ANCHOR BOLTS MINIMUM PER TRACK).

9. MEMBERS SHALL HAVE THE FOLLOWING MINIMUM PROPERTIES BASED ON ICC ESR-4943P:

	SIZE
STUDS ----------	600S162-54
TRACKS ---------	600T125-33*

* USE 43 MIL THICKNESS WHERE REQUIRED FOR WELDING

ROUGH CARPENTRY AND WOOD STRUCTURAL PANELS:

1. ALL FRAMING PER IBC CHAPTER 23. FRAMING LUMBER SHALL COMPLY WITH THE 2012 EDITION OF THE NATIONAL DESIGN SPECIFICATION. MAXIMUM MOISTURE CONTENT SHALL NOT EXCEED 19%. ALL SAWN LUMBER SHALL BE STAMPED WITH THE GRADE MARK OF AN APPROVED LUMBER GRADING AGENCY. ALL SAWN LUMBER SHALL BE DOUGLAS FIR-LARCH WITH THE FOLLOWING MINIMUM PROPERTIES:

	WOOD TYPE
JOISTS	
2 X 4 ----------	D.F. #2
2 X 6 OR LARGER ----------	D.F. #2
BEAMS, LEDGERS AND TOP PLATES	
WIDTH 4" OR LESS ----------	D.F. #2
WIDTH GREATER THAN 4" ---------	D.F. #1

2. ALL WOOD STRUCTURAL PANELS SHALL CONFORM TO DOC PS-1 OR PS-2 STANDARDS, SHALL HAVE AN EXTERIOR OR EXPOSURE 1 CLASSIFICATION AND SHALL BEAR THE STAMP OF AN APPROVED TESTING AGENCY. WHERE PLYWOOD IS USED, LAY UP PLYWOOD WITH FACE GRAIN PERPENDICULAR TO SUPPORTS AND STAGGER JOINTS. ON ROOFS WHERE PLYWOOD IS LAID UP WITH FACE GRAIN PARALLEL TO SUPPORTS, USE A MINIMUM OF 5-PLY PLYWOOD. AT SHEARWALLS, PROVIDE 2X BLOCKING AT ALL UNSUPPORTED EDGES. ALL NAILING, COMMON NAILS. WHERE SCREWS ARE INDICATED FOR WOOD TO WOOD ATTACHMENTS, USE WOOD SCREWS. ALL WOOD STRUCTURAL PANELS SHALL BE OF THE FOLLOWING NOMINAL THICKNESS, SPAN/INDEX RATIO AND SHALL BE ATTACHED AS FOLLOWS UNLESS NOTED OTHERWISE:

	SPAN/INDEX	EDGE	INTERMEDIATE	
USE	THICKNESS	RATIO	ATTACHMENT	ATTACHMENT
ROOF ------	1/2" ----	32/16 -----	8d AT 6" O.C. -----	8d AT 12" O.C.

3. DO NOT NOTCH, DRILL OR SPLICE JOISTS, BEAMS OR LOAD BEARING STUDS WITHOUT PRIOR APPROVAL OF THE STRUCTURAL ENGINEER THRU THE ARCHITECT. DOUBLE UP FLOOR JOISTS AND BLOCKING UNDER PARTITIONS. DOUBLE UP JOISTS BELOW MECHANICAL EQUIPMENT. PROVIDE 2" SOLID BLOCKING AT MIDSPAN AND AT SUPPORTS OF ALL JOISTS.

4. ALL NAILING NOT NOTED SHALL BE ACCORDING TO TABLE 2304.9.1 OF THE INTERNATIONAL BUILDING CODE. ALL NAILS SHALL BE WITH COMMON NAILS. WOOD CONNECTORS SHALL BE AS MANUFACTURED BY SIMPSON STRONG-TIE COMPANY, INC. OR OTHER MANUFACTURER WITH CURRENT AND EQUIVALENT I.C.B.O. APPROVAL. ALL NAIL HOLES IN CONNECTORS SHALL BE FILLED WITH NAIL OF THE LARGEST SIZE INDICATED IN THE MANUFACTURER'S CATALOG U.N.O.

5. ALL FABRICATION SHALL BE PERFORMED ON THE PREMISES OF A FABRICATOR REGISTERED AND APPROVED TO PERFORM SUCH WORK WITHOUT SPECIAL INSPECTION.

LAMINATED VENEER LUMBER (LVL):

1. LVL PRODUCTS SHALL CONFORM WITH THE PROVISIONS OF APA/EWS PRL-501 AND ICBO ESR-1387.

WOOD I-JOIST (TJI TYPE):

1. THE JOIST MANUFACTURER SHALL BE RESPONSIBLE FOR THE COMPLETE DESIGN, FABRICATION AND ERECTION PROCEDURES OF ALL JOISTS, BRIDGING AND/OR BLOCKING PANELS, STIFFENERS, HANGERS, BRACING, ETC. FOR A COMPLETE INSTALLATION OF THE JOIST SYSTEM. ALL JOISTS AND CONNECTORS SHALL HAVE A CURRENT I.C.B.O. APPROVAL. CONNECTIONS AND BEARING MATERIAL TO BE SHOP CONNECTED TO JOISTS AND DESIGNED AND FURNISHED BY JOIST FABRICATOR.

2. JOIST SIZES ARE INDICATED ON PLANS AND SCHEDULES. TYPICAL JOIST DESIGNATIONS ARE AS FOLLOWS: 11 7/8" WOOD I-JOIST - 72/40 WHERE 11 7/8" INDICATES JOIST DEPTH, 72 INDICATES THE TOTAL LOAD (PLF), 40 INDICATES THE TOTAL LIVE LOAD (PLF). THE UNIFORM LOADS DO NOT INCLUDE SPECIAL OR ADDITIONAL LOADS NOTED ON THE PLANS OR DETAILS. THE ROOF LOAD DURATION FACTOR IS 1.25.

3. FOR ROOF JOISTS LIMIT TOTAL LOAD DEFLECTIONS TO SPAN/240 AT SIMPLE SPANS U.N.O. LIMIT LIVE LOAD DEFLECTIONS TO SPAN/360 AT SIMPLE SPANS U.N.O. FOR FLOOR JOISTS LIMIT TOTAL LOAD DEFLECTIONS TO SPAN/360 AT SIMPLE SPANS U.N.O. LIMIT LIVE LOAD DEFLECTIONS TO SPAN/480 AT SIMPLE SPANS U.N.O. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS WITH DESIGN CALCULATIONS SEALED BY AN ARIZONA REGISTERED CIVIL OR STRUCTURAL ENGINEER FOR REVIEW PRIOR TO MANUFACTURE.

4. ADDITIONAL JOISTS SHALL BE SUPPLIED AS REQUIRED TO SUPPORT MECHANICAL EQUIPMENT.

5. ALL FABRICATION SHALL BE PERFORMED ON THE PREMISES OF A FABRICATOR REGISTERED AND APPROVED TO PERFORM SUCH WORK WITHOUT SPECIAL INSPECTION.

PREFABRICATED WOOD TRUSSES:

1. THE TRUSS MANUFACTURER SHALL BE RESPONSIBLE FOR THE COMPLETE DESIGN, FABRICATION AND ERECTION PROCEDURES OF ALL TRUSSES, BRIDGING AND/OR BLOCKING PANELS, HANGERS, BRACING, ETC. FOR A COMPLETE INSTALLATION OF THE TRUSS SYSTEM. TRUSS CONFIGURATIONS ARE AS SHOWN ON THE DRAWINGS. ALL BRACING AND BRIDGING SIZES AND SPACINGS BY TRUSS MANUFACTURER IN ACCORDANCE WITH THE LATEST RECOMMENDATIONS OF THE TRUSS PLATE INSTITUTE.

2. TRUSSES SHALL BE DESIGNED AND FABRICATED IN ACCORDANCE WITH IBC CHAPTER 23 TO SUPPORT SELF WEIGHT PLUS LIVE LOAD, SUPERIMPOSED DEAD LOADS, AND LATERAL LOADS STATED IN THE GENERAL STRUCTURAL NOTES OR LOCATED ON PLANS. ROOF TRUSSES SHALL BE DESIGNED TO ACCOMMODATE A FUTURE MECHANICAL LOAD OF 300 POUNDS AT ANY LOCATION. THE UNIFORM LOADS DO NOT INCLUDE SPECIAL OR ADDITIONAL LOADS NOTED ON THE PLANS OR DETAILS. THE ROOF LOAD DURATION FACTOR IS 1.25.

3. FOR ROOF TRUSSES, LIMIT TOTAL LOAD DEFLECTIONS TO SPAN/240 AT SIMPLE SPANS U.N.O. LIMIT LIVE LOAD DEFLECTIONS TO SPAN/360 AT SIMPLE SPANS U.N.O. FOR FLOOR TRUSSES, LIMIT TOTAL LOAD DEFLECTIONS TO SPAN/360 AT SIMPLE SPANS U.N.O. LIMIT LIVE LOAD DEFLECTIONS TO SPAN/480 AT SIMPLE SPANS U.N.O. ALL TRUSSES SHALL BE CAMBERED FOR 1.5 TIMES THE DESIGN DEAD LOAD DEFLECTION.

4. ADDITIONAL TRUSSES SHALL BE SUPPLIED AS REQUIRED TO SUPPORT MECHANICAL EQUIPMENT.

5. ALL CONNECTORS SHALL HAVE CURRENT I.C.B.O. APPROVAL. ALL TRUSS TO TRUSS CONNECTORS SHALL BE DESIGNED BY THE TRUSS MANUFACTURER. MULTIPLE TRUSS MEMBERS SHALL BE FASTENED TOGETHER TO ALLOW TRANSFER OF SHEAR AND TENSION FORCES (MINIMUM 200 PLF) AT PLYWOOD SHEATHING JOINTS AND TO PREVENT CROSS GRAIN BENDING OF TOP CHORDS. ATTACHMENT SHALL BE A CONTINUOUS 20 GAGE METAL PLATE OR OTHER APPROVED MEANS. METHOD OF ATTACHMENT SHALL BE INDICATED ON SHOP DRAWINGS FOR REVIEW.

6. TRUSS MEMBER PERMANENT BRACING. WHERE PERMANENT BRACING OF TRUSS MEMBERS IS REQUIRED ON THE TRUSS DESIGN DRAWINGS, IT SHALL BE ACCOMPLISHED BY THE FOLLOWING METHOD: THE TRUSSES SHALL BE DESIGNED SO THAT THE BUCKLING OF ANY INDIVIDUAL TRUSS MEMBER CAN BE RESISTED INTERNALLY BY THE STRUCTURE (E.G. BUCKLING MEMBER T-BRACING, L-BRACING, ETC.) OF THE INDIVIDUAL TRUSS. THE TRUSS INDIVIDUAL MEMBER BUCKLING REINFORCEMENT SHALL BE INSTALLED AS SHOWN ON THE TRUSS DESIGN DRAWING OR ON SUPPLEMENTAL TRUSS MEMBER BUCKLING REINFORCEMENT DIAGRAMS PROVIDED BY THE TRUSS DESIGNER.

7. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS, ERECTION DRAWINGS AND DESIGN CALCULATIONS SEALED BY A REGISTERED ENGINEER FOR REVIEW PRIOR TO MANUFACTURE. CALCULATIONS AND SHOP DRAWINGS SHALL SHOW ANY SPECIAL DETAILS REQUIRED AT BEARING POINTS.

8. ALL FABRICATION SHALL BE PERFORMED ON THE PREMISES OF A FABRICATOR REGISTERED AND APPROVED TO PERFORM SUCH WORK WITHOUT SPECIAL INSPECTION.

GLUED-LAMINATED BEAMS (GLULAM):

1. GLUED-LAMINATED BEAMS SHALL BE DOUGLAS FIR LARCH WITH THE FOLLOWING MINIMUM PROPERTIES: Fb = 2,400 PSI, Fv = 265 PSI, Fc (PERPENDICULAR) = 650 PSI, E = 1,800,000 PSI. BEAMS CANTILEVERING OVER SUPPORTS SHALL HAVE THE SPECIFIED MINIMUM PROPERTIES TOP AND BOTTOM.

2. CAMBER AS SHOWN ON DRAWINGS. IF NO CAMBER IS SPECIFIED, PROVIDE STANDARD CAMBER USING A RADIUS OF 3500 FEET.

3. ALL BEAMS SHALL BE FABRICATED USING WATERPROOF GLUE. FABRICATION AND HANDLING PER LATEST AITC AND WCLA STANDARDS. BEAMS SHALL BEAR GRADE STAMP AND AITC STAMP AND CERTIFICATE. APPEARANCE GRADE BEAMS SHALL BE USED IF INDICATED ON ARCHITECTURAL DRAWINGS.

SHOP DRAWINGS AND PRODUCT DATA SUBMITTALS:

1. SUBMIT SHOP DRAWINGS AND/OR PRODUCT DATA FOR ALL ITEMS DEFINED BY THE STRUCTURAL DRAWINGS AND SPECIFICATIONS, AS WELL AS STRUCTURAL ITEMS DEFINED BY THE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS, PRIOR TO FABRICATION AND/OR CONSTRUCTION IN THE FIELD.

2. PROVIDE SUBMITTALS IN A TIMELY MANNER TO ALLOW FIVE WORKING DAYS FOR THE ENGINEER'S REVIEW. FOR HARD COPY SUBMITTALS, PROVIDE NO MORE THAN FOUR SETS FOR REVIEW (ONE COPY TO BE RETAINED BY THE ENGINEER). FOR ELECTRONIC SUBMITTALS, PROVIDE PDF FILES ONLY. ALL SUBMITTALS WITH A REQUESTED REVIEW TIME OF LESS THAN FIVE WORKING DAYS MAY BE RETURNED WITHOUT REVIEW AT THE ENGINEER'S DISCRETION.

3. CONSTRUCTION DOCUMENTS SHALL NOT BE REPRODUCED FOR USE AS SHOP DRAWINGS. THE MANUFACTURER OR FABRICATOR SHALL CLOUD ANY CHANGES, SUBSTITUTIONS, AND/OR DEVIATIONS FROM THE CONTRACT DOCUMENTS. ANY CHANGES, SUBSTITUTIONS, AND/OR DEVIATIONS THAT ARE NOT CLOUDED OR FLAGGED SHALL NOT BE CONSIDERED ALLOWED AFTER THE ENGINEER'S REVIEW, UNLESS NOTED ACCORDINGLY BY THE ENGINEER.

4. THE CONTRACTOR SHALL REVIEW ALL SHOP DRAWINGS PRIOR TO SUBMITTAL TO THE ENGINEER. CLEARLY INDICATE ITEMS NOT IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. VERIFY DIMENSIONS WITH THE ARCHITECT.

5. THE ENGINEER'S REVIEW IS INTENDED ONLY AS AN AID TO THE CONTRACTOR IN OBTAINING CORRECT SHOP DRAWINGS. RESPONSIBILITY FOR CORRECTNESS AND COMPLETENESS SHALL REST WITH THE CONTRACTOR. SHOP DRAWINGS WILL BE RETURNED FOR RESUBMITTAL IF SIGNIFICANT ERRORS ARE FOUND DURING REVIEW.

6. THE SHOP DRAWINGS DO NOT REPLACE THE CONTRACT DOCUMENTS. SHOP DRAWINGS PROCESSED BY THE ENGINEER SHALL NOT BE CONSIDERED CHANGE ORDERS. ITEMS THAT ARE OMITTED OR SHOWN INCORRECTLY AND THAT ARE NOT FLAGGED BY THE ENGINEER ARE NOT TO BE CONSIDERED CHANGES TO CONTRACT DOCUMENTS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONSTRUCT ITEMS ACCORDING TO THE CONTRACT DOCUMENTS. SHOULD A DISCREPANCY BE NOTED BETWEEN THE REVIEWED AND RETURNED SHOP DRAWINGS AND THE CONTRACT DOCUMENTS, THE CONTRACT DOCUMENTS SHALL GOVERN.

SHOP DRAWINGS AND PRODUCT DATA SUBMITTALS (CONTINUED):

7. THE ENGINEER RESERVES THE RIGHT TO MAKE CHANGES TO THE CONTRACT DOCUMENTS AT ANY TIME BEFORE OR AFTER SHOP DRAWING REVIEW.

8. THE ADEQUACY OF ENGINEERING DESIGNS AND LAYOUT PERFORMED BY OTHERS RESTS WITH THE DESIGNING OR SUBMITTING PARTY.

DEFERRED SUBMITTALS: (PER 2012 IBC 107.3.4.1)

1. FOR THE PURPOSES OF THIS SECTION, DEFERRED SUBMITTALS ARE DEFINED AS THOSE PORTIONS OF THE DESIGN THAT ARE NOT SUBMITTED AT THE TIME OF THE APPLICATION AND WHICH ARE TO BE SUBMITTED TO THE BUILDING OFFICIAL WITHIN A SPECIFIED PERIOD.

2. DEFERRAL OF ANY SUBMITTAL ITEMS SHALL HAVE PRIOR APPROVAL OF THE BUILDING OFFICIAL. THE ARCHITECT OR ENGINEER OF RECORD SHALL LIST THE DEFERRED SUBMITTALS ON THE PLANS AND THE CONTRACTOR SHALL SUBMIT THE DEFERRED SUBMITTAL DOCUMENTS FOR REVIEW BY THE BUILDING OFFICIAL.

3. SUBMITTAL DOCUMENTS FOR DEFERRED SUBMITTAL ITEMS SHALL BE SUBMITTED TO THE ARCHITECT OR ENGINEER OF RECORD A MINIMUM OF 30 DAYS PRIOR TO FABRICATION. THE DOCUMENTS SHALL BE REVIEWED FOR GENERAL CONFORMANCE WITH THE DRAWINGS. A COPY OF THE DEFERRED SUBMITTAL DOCUMENTS SHALL BE SUBMITTED TO THE BUILDING OFFICIAL WITH A NOTATION INDICATING THAT THE DEFERRED SUBMITTAL DOCUMENTS HAVE BEEN REVIEWED. THE DEFERRED SUBMITTAL ITEMS SHALL NOT BE INSTALLED UNTIL THEIR DESIGN AND SUBMITTAL DOCUMENTS HAVE BEEN APPROVED BY THE BUILDING OFFICIAL.

4. DEFERRED SUBMITTAL ITEMS:

WOOD TRUSSES
WOOD I-JOIST

SPECIAL INSPECTIONS AND TESTING:

1. THE OWNER (OR REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE ACTING AS THE OWNER'S AGENT) SHALL EMPLOY ONE OR MORE SPECIAL INSPECTORS TO PROVIDE INSPECTION AND TESTING DURING CONSTRUCTION OF THE TYPES OF WORK REQUIRING SPECIAL INSPECTION AS INDICATED ON THE DRAWINGS.

2. EACH SPECIAL INSPECTOR SHALL BE A QUALIFIED PERSON WHO SHALL DEMONSTRATE COMPETENCE, TO THE SATISFACTION OF THE BUILDING OFFICIAL AND STRUCTURAL ENGINEER OF RECORD, FOR INSPECTION OF THE PARTICULAR TYPE OF CONSTRUCTION OR OPERATION REQUIRING SPECIAL INSPECTION.

3. THE CONTRACTOR SHALL CONVENE A MEETING WITH THE SPECIAL INSPECTION AGENCY (AGENCIES), THE BUILDING OFFICIAL, THE ARCHITECT, AND THE STRUCTURAL ENGINEER OF RECORD TO REVIEW INSPECTION REQUIREMENTS AND PROCEDURES, PRIOR TO COMMENCING WITH CONSTRUCTION.

4. DUTIES AND RESPONSIBILITIES OF THE SPECIAL INSPECTOR:

A) THE SPECIAL INSPECTOR SHALL OBSERVE THE WORK ASSIGNED FOR CONFORMANCE TO THE APPROVED CONSTRUCTION DOCUMENTS.
B) THE SPECIAL INSPECTOR SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL AND TO THE ENGINEER OR ARCHITECT OF RECORD. REPORTS SHALL INDICATE THAT WORK INSPECTED WAS DONE IN CONFORMANCE TO APPROVED CONSTRUCTION DOCUMENTS. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION, THEN, IF UNCORRECTED, TO THE ENGINEER OR ARCHITECT OF RECORD AND THE BUILDING OFFICIAL. IT IS EXPECTED THAT REPORTS WILL BE SUBMITTED ON A WEEKLY BASIS AT A MINIMUM.
C) UPON COMPLETION OF THE ASSIGNED WORK, THE SPECIAL INSPECTOR SHALL COMPLETE AND SIGN THE APPROPRIATE FORMS CERTIFYING THAT, TO THE BEST OF HIS KNOWLEDGE, THE WORK IS IN CONFORMANCE WITH THE APPROVED CONSTRUCTION DOCUMENTS, AND THE APPLICABLE WORKMANSHIP PROVISIONS OF THE CODE.

STRUCTURAL OBSERVATIONS:

STRUCTURAL OBSERVATIONS ARE THE VISUAL OBSERVATIONS OF THE STRUCTURAL SYSTEM FOR GENERAL CONFORMANCE TO THE APPROVED CONSTRUCTION DOCUMENTS AT SIGNIFICANT CONSTRUCTION STAGES, AND AT COMPLETION OF THE STRUCTURAL SYSTEM. STRUCTURAL OBSERVATION DOES NOT INCLUDE OR WAIVE THE RESPONSIBILITY FOR ANY SPECIAL INSPECTIONS REQUIRED.

1. THE OWNER SHALL EMPLOY A REGISTERED STRUCTURAL ENGINEER TO PERFORM STRUCTURAL OBSERVATIONS DURING CONSTRUCTION. IT IS RECOMMENDED THAT THE ENGINEER OF RECORD BE RETAINED AS THE STRUCTURAL OBSERVER, AS HE IS THE MOST FAMILIAR WITH THE STRUCTURAL SYSTEM.

2. THE CONTRACTOR SHALL NOTIFY THE STRUCTURAL OBSERVER AT THE STAGES OF CONSTRUCTION INDICATED ON THE DRAWINGS, 5 BUSINESS DAYS IN ADVANCE OF THE REQUESTED OBSERVATION. THE STATE OF COMPLETION AT THE TIME OF THE OBSERVATION SHALL ALLOW FOR CORRECTION OF POTENTIAL DEFICIENCIES WITHOUT SUBSTANTIAL REMOVAL OF COMPLETED WORK.

3. THE STRUCTURAL OBSERVER SHALL PREPARE A WRITTEN OBSERVATION REPORT AFTER EACH VISIT. DEFICIENCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. AT THE CONCLUSION OF THE WORK INCLUDED IN THE PERMIT, THE STRUCTURAL OBSERVER SHALL PREPARE FOR THE BUILDING OFFICIAL A WRITTEN STATEMENT THAT THE OBSERVATIONS HAVE BEEN MADE, AND IDENTIFY ANY REPORTED DEFICIENCIES WHICH, TO THE BEST OF THE STRUCTURAL OBSERVER'S KNOWLEDGE, HAVE NOT BEEN RESOLVED.

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Expires 12/31/19

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TABLE 1: REQUIRED GEOTECHNICAL SPECIAL INSPECTIONS

SYSTEM OR MATERIAL	INSPECTION				REMARKS
	IBC CODE REFERENCE	CODE OR STANDARD REFERENCE	FREQUENCY		
			CONTINUOUS	PERIODIC	
1. SOILS					
VERIFY FOOTING BEARING CAPACITY AND SUBGRADE PREPARATION FOR FILLS	1705.6	GEOTECHNICAL REPORT		X	BY THE GEOTECHNICAL ENGINEER
FILL MATERIAL VERIFICATION			X		
FILL PLACEMENT & COMPACTION			X		
LIFT THICKNESS			X		

TABLE 2: REQUIRED STRUCTURAL SPECIAL INSPECTIONS

SYSTEM OR MATERIAL	INSPECTION				REMARKS
	IBC CODE REFERENCE	CODE OR STANDARD REFERENCE	FREQUENCY		
			CONTINUOUS	PERIODIC	
1. FABRICATORS					
FABRICATED SYSTEMS AND ELEMENTS	1704.2.5			X	SPECIAL INSPECTIONS APPLY TO VERIFICATION OF DETAILED FABRICATION AND QUALITY CONTROL PROCEDURES, INCLUDING REVIEW FOR COMPLETENESS AND ADEQUACY RELATIVE TO THE CODE REQUIREMENTS. SPECIAL INSPECTIONS ARE NOT REQUIRED FOR WORK DONE ON THE PREMISES OF A FABRICATOR REGISTERED AND APPROVED TO PERFORM SUCH WORK WITHOUT SPECIAL INSPECTION. APPROVED FABRICATOR'S, UPON COMPLETION OF COMPONENT MANUFACTURING, SHALL SUBMIT A CERTIFICATE OF COMPLIANCE TO THE BUILDING OFFICIAL STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH THE APPROVED CONSTRUCTION DOCUMENTS.
2. CONCRETE					
WELDING OF REINFORCING STEEL	1705.3 1903.1	ACI 318 3.5.2 AWS D1.4			REFER TO STEEL FOR WELDING REQUIREMENTS
PLACEMENT OF CAST-IN-PLACE ANCHOR BOLTS	1705.3 1908.5 1909.1	ACI 318 8.1.3 21.2.8		X	ALL BOLTS VISUALLY INSPECTED
VERIFY USE OF REQUIRED MIX DESIGN(S)	1705.3 1904.2 1910.2 1910.3	ACI 318, CHAPTER 4 ACI 318 5.2-5.4		X	
CONCRETE PLACEMENT	1705.3	ACI 318 5.9, 5.10	X		
VERIFICATION OF FORMWORK	1705.3	ACI 318 6.1.1		X	SPECIAL INSPECTIONS APPLY TO SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED
3. STRUCTURAL STEEL					
FABRICATION OF STRUCTURAL ELEMENTS	1704.2.5	AISC 360 N7		X	INSPECTION MAY BE WAIVED WHEN PERFORMED IN A PRE-APPROVED SHOP
INSPECTION PRIOR TO WELDING					
WELDING PROCEDURE SPECIFICATIONS AVAILABLE	1705.2		X		
MANUFACTURER CERTIFICATIONS FOR WELDING CONSUMABLES AVAILABLE	1705.2		X		
MATERIAL IDENTIFICATION (TYPE/GRADE)				X	
WELDER IDENTIFICATION SYSTEM				X	THE FABRICATOR OR ERECTOR, AS APPLICABLE, SHALL MAINTAIN A SYSTEM BY WHICH A WELDER WHO HAS WELDED A JOINT OR MEMBER CAN BE IDENTIFIED. STAMPS, IF USED, SHALL BE THE LOW-STRESS TYPE
FIT-UP OF GROOVE WELDS (INCLUDING JOINT GEOMETRY)		AISC 360 N5.4-1		X	
JOINT PREPERATION				X	
CLEANLINESS (CONDITION OF STEEL SURFACE)				X	

TABLE 2: REQUIRED STRUCTURAL SPECIAL INSPECTIONS (CONTINUED)

SYSTEM OR MATERIAL	INSPECTION				REMARKS
	IBC CODE REFERENCE	CODE OR STANDARD REFERENCE	FREQUENCY		
			CONTINUOUS	PERIODIC	
3. STRUCTURAL STEEL (CONTINUED)					
FABRICATION OF STRUCTURAL ELEMENTS	1704.2.5	AISC 360 N7		X	INSPECTION MAY BE WAIVED WHEN PERFORMED IN A PRE-APPROVED SHOP
INSPECTION PRIOR TO WELDING (CONTINUED)					
TRACKING (TACK WELD QUALITY AND LOCATION)		AISC 360 N5.4-1		X	
BACKING TYPE AND FIT (IF APPLICABLE)				X	
CONFIGURATION AND FINISH OF ACCESS HOLES				X	
FIT-UP OF FILLET WELDS				X	
DIMENSIONS (ALIGNMENT, GAPS AT ROOT)				X	
CHECK WELDING EQUIPMENT				X	
INSPECTION DURING WELDING					
USE OF QUALIFIED WELDERS		AISC 360 N5.4-2		X	
CONTROL AND HANDLING OF WELDING CONSUMABLES				X	
PACKAGING				X	
EXPOSURE CONTROL				X	
NO WELDING OVER CRACKED TACK WELDS				X	
ENVIRONMENTAL CONDITIONS				X	
WIND SPEED WITHIN LIMITS				X	
PRECIPITATION AND TEMPERATURE				X	
WPS FOLLOWING				X	
SETTINGS ON WELDING EQUIPMENT				X	
TRAVEL SPEED				X	
SELECTED WELDING MATERIALS				X	
SHIELDING GAS TYPE/FLOW RATE				X	
PREHEAT APPLIED				X	
INTERPASS TEMPERATURE MAINTAINED (MIN./MAX.)				X	
PROPER POSITIONS (F, V, H, OH)				X	
WELDING TECHNIQUES				X	
INTERPASS AND FINAL CLEANING				X	
EACH PASS WITHIN PROFILE LIMITATIONS				X	
EACH PASS MEETS QUALITY REQUIREMENTS				X	

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TABLE 2: REQUIRED STRUCTURAL SPECIAL INSPECTIONS (CONTINUED)

SYSTEM OR MATERIAL	INSPECTION				REMARKS
	IBC CODE REFERENCE	CODE OR STANDARD REFERENCE	FREQUENCY		
			CONTINUOUS	PERIODIC	
3. STRUCTURAL STEEL (CONTINUED)					
INSPECTION AFTER WELDING					
WELDS CLEANED		AISC 360 N5.4-3		X	
SIZE, LENGTH AND LOCATION OF WELDS				X	
WELDS MEET VISUAL ACCEPTANCE CRITERIA				X	
CRACK PROHIBITION				X	
WELD/BASE-METAL FUSION				X	
CRATER CROSS SECTION				X	
WELD PROFILES				X	
WELD SIZE				X	
UNDERCUT				X	
POROSITY				X	
ARC STRIKES				X	
K-AREA				X	WHEN WELDING OF DOUBLE PLATES, CONTINUITY PLATES OR STIFFENERS HAS BEEN PERFORMED IN THE K-AREA, VISUALLY INSPECT THE WEB K-AREA FOR CRACKS WITHIN 3 INCHES (75 MM) OF WELD
BACKING REMOVED AND WELD TABS REMOVED (IF REQUIRED)				X	
REPAIR ACTIVITIES				X	
DOCUMENT ACCEPTANCE OR REJECTION OF WELDED JOINT MEMBER				X	

TABLE 2: REQUIRED STRUCTURAL SPECIAL INSPECTIONS (CONTINUED)

891.1-IBC12

SYSTEM OR MATERIAL	INSPECTION				REMARKS
	IBC CODE REFERENCE	CODE OR STANDARD REFERENCE	FREQUENCY		
			CONTINUOUS	PERIODIC	
MASONRY (LEVEL B)					
VERIFY COMPLIANCE WITH THE APPROVED SUBMITTALS	1705.4	ACI 530.1, 1.5		X	
AS MASONRY CONSTRUCTION BEGINS, VERIFY THAT THE FOLLOWING ARE IN COMPIANCE:					
A. PROPORTIONS OF SITE-PREPARED MORTAR		ACI 530.1, 2.1, 2.6 A		X	
B. CONSTRUCTION OF MORTAR JOINTS		ACI 530.1, 3.3 B		X	
C. GRADE AND SIZE OF PRESTRESSING TENDONS AND ANCHORAGES		ACI 530.1, 2.4 B, 2.4 H		X	
D. LOCATION OF REINFORCEMENT, CONNECTORS, AND PRESTRESSING TENDONS AND ANCHORAGES		ACI 530.1, 3.4, 3.6 A		X	
E. PRESTRESSING TECHNIQUES		ACI 530.1, 3.6 B		X	
F. PROPERTIES OF THIN-BED MORTAR FOR AAC MASONRY		ACI 530.1, 2.1 C	X SEE NOTE 1	X SEE NOTE 2	
PRIOR TO GROUTING, VERIFY THAT THE FOLLOWING ARE IN COMPLIANCE:					
A. GROUT SPACES	1705.4	ACI 530.1, 3.2 D, 3.2 F		X	
B. GRADE, TYPE, AND SIZE OF REINFORCEMENT AND ANCHOR BOLTS, AND PRESTRESSING TENDONS AND ANCHOR BOLTS		ACI 530, 1.16 ACI 530.1, 2.4, 3.4		X	
C. PLACEMENT OF REINFORCEMENT, CONNECTORS, AND PRESTRESSING TENDONS AND ANCHORAGES		ACI 530, 1.16 ACI 530.1, 3.2 E, 3.4, 3.6 A		X	
D. PROPORTIONS OF SITE-PREPARED GROUT AND PRESTRESSING GROUT FOR BONDED TENDONS		ACI 530.1, 2.6 B, 2.4 G.1.b		X	
E. CONSTRUCTION OF MORTAR JOINTS		ACI 530.1, 3.3 B		X	
VERIFY DURING CONSTRUCTION:					
A. SIZE AND LOCATION OF STRUCTURAL ELEMENTS	1705.4	ACI 530.1, 3.3 F		X	
B. TYPE, SIZE, AND LOCATION OF ANCHORS, INCLUDING OTHER DETAILS OF ANCHORAGE OF MASONRY TO STRUCTURAL MEMBERS, FRAMES OR OTHER CONSTRUCTION		ACI 530, 1.16.4.3, 1.17.1		X	
C. WELDING REINFORCEMENT		ACI 530, 2.1.7.7.2, 3.3.3.4(c), 8.3.3.4(b)	X		
D. PREPARATION, CONSTRUCTION, AND PROTECTION OF MASONRY DURING COLD WEATHER (TEMPERATURE BELOW 40°F (4.4°C)) OR HOT WEATHER (TEMPERATURE ABOVE 90°F (32.2°C))		ACI 530, 1.8 C, 1.8 D		X	
E. APPLICATION AND MEASUREMENT OF PRESTRESSING FORCE		ACI 530.1, 3.6 B	X		
F. PLACEMENT OF GROUT AND PRESTRESSING GROUT FOR BONDED TENDONS IS IN COMPLIANCE		ACI 530.1, 3.5, 3.6 C	X		
G. PLACEMENT OF AAC MASONRY UNITS AND CONSTRUCTION OF THIN-BED MORTAR JOINTS		ACI 530.1, 3.3 B.8	X SEE NOTE 1	X SEE NOTE 2	
OBSERVE PREPARATION OF GROUT SPECIMENS, MORTAR SPECIMENS, AND/OR PRISMS		ACI 530.1, 1.4 B.2.a.3, 1.4 B.2.b.3, 1.4 B.2.c.3, 1.4 B.3, 1.4 B.4		X	

NOTES:
1. REQUIRED FOR THE FIRST 5000 SQUARE FEET (465 SQUARE METERS) OF AAC MASONRY.
2. REQUIRED AFTER THE FIRST 5000 SQUARE FEET (465 SQUARE METERS) OF AAC MASONRY.

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TABLE 2: REQUIRED STRUCTURAL SPECIAL INSPECTIONS (CONTINUED)

SYSTEM OR MATERIAL	INSPECTION				REMARKS
	IBC CODE REFERENCE	CODE OR STANDARD REFERENCE	FREQUENCY		
			CONTINUOUS	PERIODIC	
5. POST-INSTALLED ANCHORS					
INSTALLATION IN HARDENED CONCRETE AND COMPLETED MASONRY	1705.3 1909.1	ACI 318, 3.8.6, 8.1.3, 21.2.8 ICC EVALUATION REPORT		X	SPECIAL INSPECTIONS APPLY TO ANCHOR PRODUCT NAME, TYPE, AND DIMENSIONS, HOLE DIMENSIONS, COMPLIANCE WITH DRILL BIT REQUIREMENTS, CLEANLINESS OF THE HOLE AND ANCHOR, ADHESIVE EXPIRATION DATE, ANCHOR/ADHESIVE INSTALLATION, ANCHOR EMBEDMENT, AND TIGHTENING TORQUE
6. COLD-FORMED STEEL FRAMING					
MATERIAL VERIFICATION OF WELD FILLER METALS	1705.2	AWS D1.3		X	MANUFACTURER'S CERTIFIED TEST REPORTS
MATERIAL VERIFICATION OF COLD FORMED STEEL DECK				X	
VERIFY USE OF PROPER WPS'S				X	COPY OF WELDING PROCEDURE SPECIFICATIONS
VERIFY WELDER QUALIFICATIONS				X	COPY OF QUALIFICATION CARDS
WELDED FRAMING CONNECTIONS	1705.2	AWS D1.3		X	ALL WELDS VISUALLY INSPECTED PER AWS D1.3 7.1
INSTALLATION OF FLOOR AND ROOF DECKING	1705.2	ICC EVALUATION REPORT		X	SPECIAL INSPECTIONS APPLY TO DECKING TYPE, DEPTH AND GAGE, POWER ACTUATED FASTENERS, SCREWS, PROPRIETARY SIDE SEAM ATTACHMENTS, AND BUTTON PUNCHES
FLOOR AND ROOF DECK WELDS	1705.2	AWS D1.3		X	ALL WELDS INSPECTED PER AWS D1.3 7.1
FABRICATION OF STRUCTURAL ELEMENTS	1705.2			X	REFER TO INSPECTION OF FABRICATOR REQUIREMENTS
MATERIAL VERIFICATION OF STRUCTURAL STEEL	1705.2	ASTM A6 AISC 360 A3.1		X	CERTIFIED MILL TEST REPORTS
MATERIAL VERIFICATION OF ANCHOR BOLTS AND THREADED RODS	1705.2	AISC 360 A3.4		X	MANUFACTURER'S CERTIFIED TEST REPORTS
GENERAL INSPECTIONS					
VERIFICATION OF FRAME JOINT DETAILS INCLUDING MEMBER AND COMPONENT LOCATIONS, BRACING AND STIFFENERS		AISC 360 N5.7		O	
PLACEMENT OF ANCHOR RODS AND OTHER EMBEDMENTS SUPPORTING STRUCTURAL STEEL FOR COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS	1705.2	AISC 360 N5.7		O	AT A MINIMUM, THE DIAMETER, GRADE, TYPE, AND LENGTH OF THE ANCHOR ROD OR EMBEDDED ITEM AND THE EXTENT OR DEPTH OF EMBEDMENT INTO THE CONCRETE, SHALL BE VERIFIED PRIOR TO PLACEMENT OF CONCRETE

TABLE 3: REQUIRED TESTING FOR SPECIAL INSPECTIONS

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SYSTEM OR MATERIAL	INSPECTION				REMARKS
	IBC CODE REFERENCE	CODE OR STANDARD REFERENCE	FREQUENCY		
			CONTINUOUS	PERIODIC	
1. GEOTECHNICAL					
FILL IN-PLACE DENSITY OR PREPARED SUBGRADE DENSITY	1704.7	VARIES; MINIMUM PER IBC APPENDIX J107.5		X	BY THE GEOTECHNICAL ENGINEER
MATERIAL VERIFICATION		VARIES; CLASSIFICATION AND TESTING OF CONTROLLED FILL MATERIALS		X	BY THE GEOTECHNICAL ENGINEER
2. CONCRETE					
CONCRETE STRENGTH	1704.4 1905.6	ASTM C39	EACH 150 CY NOT LESS THAN ONE TEST EACH 5000 SF OF SLAB OR WALL PLACED EACH DAY		FABRICATE SPECIMENS AT TIME FRESH CONCRETE IS PLACED
CONCRETE SLUMP		ASTM C143			
CONCRETE TEMPERATURE		ASTM C1064			
3. MASONRY					
UNIT STRENGTH METHOD	2105.2.2.1	ASTM C55 ASTM C90 ASTM C140 ASTM C476 ASTM C1019	PRIOR TO CONSTRUCTION (LEVEL 2 QA ONLY)		
4. STEEL					
ULTRASONIC (UT) TESTING OF WELDS		MT - AWS D1.1 6.14.4 UT - AWS D1.1 6.13 & 6.14.3	ALL CJPS FOR MOMENT FRAMES		

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Registered Professional Engineer (Structural)
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DATE SIGNED
ARIZONA, U.S.A.
Expires 12/31/19

THIS ELECTRONIC SIGNATURE HAS BEEN AUTHORIZED BY ME THIS: 11/29/18

job
1717

date
11/16/18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

Structural Special Inspection Tables

S1.4

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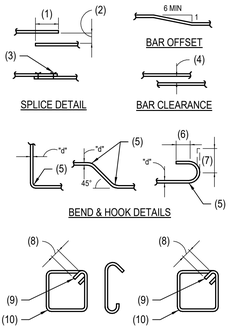
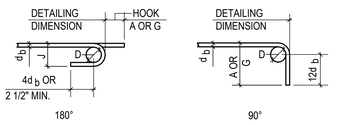


NOTES:

1. LAP - SEE G.S.N.
2. MAXIMUM 1/5 LAP BUT NOT MORE THAN 6".
3. WIRE TIES.
4. 1d (1" MINIMUM).
5. RADIUS=3d FOR BARS NOT OVER #8; 4d FOR #9, #10 AND #11 BARS; 5d FOR #14 AND #18 BARS. 5d FOR ALL GRADE 40 BARS WITH 180 DEGREE HOOK.
6. 4d (2 1/2" MINIMUM).
7. 12d (90 DEGREE HOOK).
8. 6d.
9. 135 DEGREE BEND.
10. BEND AROUND 1 1/2" PIN FOR #3 BARS. BEND AROUND 2" PIN FOR #4 BARS. BEND AROUND 2 1/2" PIN FOR #5 BARS.

14 TYPICAL CONCRETE REINFORCING BAR DETAILS
SCALE: NOT TO SCALE 200-050-TYP



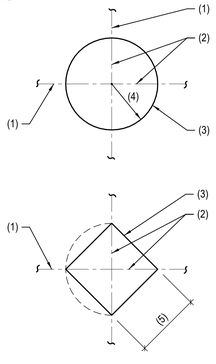
END HOOKS,ALL GRADES				
BAR SIZE	FINISHED BEND DIA. D, IN.	180-DEG HOOKS		90 DEG HOOKS
		A OR G, IN.	J, IN.	A OR G, IN.
#3	2.25	5	3	6
#4	3	6	4	8
#5	3.75	7	5	10
#6	4.5	8	6	12
#7	5.25	1O	7	14
#8	6	11	8	16
#9	9.5	15	11.75	19
#10	10.75	17	13.25	22
#11	12	19	14.75	24
#14	18.25	27	21.75	31
#18	24	36	28.5	41

15 TYPICAL REINFORCING HOOK SCHEDULE
SCALE: NOT TO SCALE 200-045-TYP

CONCRETE PSI	TENSION SPLICE LENGTHS (CLASS B) f'c=2,500/3,000 PSI				f'c = 4,000 PSI				f'c = 5,000 PSI				COMP. BARS f'c = ALL	
BAR LOCATION	REGULAR		TOP		REGULAR		TOP		REGULAR		TOP		STD LAP	ENCLOSED W/ SPIRAL TIES
SIZE / SPACING	>2db	OTHER	>2db	OTHER	>2db	OTHER	>2db	OTHER	>2db	OTHER	>2db	OTHER		
#3	24"	36"	31"	46"	19"	28"	25"	37"	17"	25"	22"	33"	12"	12"
#4	32"	47"	41"	61"	25"	37"	33"	49"	23"	34"	29"	44"	15"	12"
#5	39"	59"	51"	77"	31"	47"	41"	61"	28"	42"	36"	54"	19"	15"
#6	47"	71"	61"	92"	37"	56"	49"	73"	34"	50"	44"	65"	23"	18"
#7	69"	103"	89"	134"	54"	81"	71"	106"	49"	73"	63"	95"	27"	21"
#8	78"	117"	102"	153"	62"	93"	81"	121"	56"	83"	72"	108"	30"	23"
#9	88"	132"	115"	172"	70"	105"	91"	136"	63"	94"	81"	122"	34"	26"
#10	100"	149"	129"	194"	79"	118"	102"	153"	71"	106"	92"	137"	39"	30"
#11	110"	165"	143"	215"	87"	131"	114"	170"	78"	117"	102"	152"	43"	33"

NOTES:
1. TOP BARS ARE ANY HORIZONTAL BARS PLACED SO THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE REINFORCEMENT.
2. CONCRETE COVERAGE AROUND REINFORCING SHALL NOT BE LESS THAN THE DIAMETER OF THE BAR.

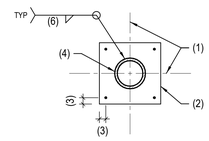
16 TYPICAL MINIMUM REINFORCING BAR SPLICE LENGTHS IN CONCRETE
SCALE: NOT TO SCALE 216080-X-DETAILS-16



NOTES:
1. "CONC. C.J." WHERE SHOWN ON PLAN.
2. CENTERLINE OF COLUMN.
3. KEYED JOINT - SEE TYPICAL THICKENED SLAB AT CONCRETE CLOSURE POUR DETAIL.
4. RADIUS 1'-6" MINIMUM/ 3'-0" MAXIMUM.
5. Z'-0" MINIMUM 4'-0" MAXIMUM.

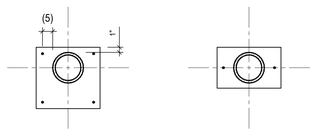
NOTE:
FOR CLARITY, COLUMNS OMITTED. FOR CONFIGURATION OF SPECIFIC CLOSURE POURS, SEE PLAN.

17 TYPICAL COLUMN CLOSURE POUR AT CONCRETE SLAB ON GRADE
SCALE: NOT TO SCALE 200-021-TYP

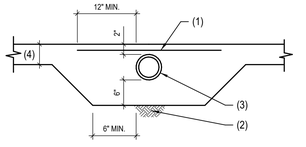


NOTES:
1. CENTERLINE OF COLUMN AND STEEL BASE PLATE.
2. STEEL BASE PLATE.
3. 1 1/4" MINIMUM OR PER A.I.S.C. TABLE J3.5.
4. STEEL COLUMN - FOR TYPE, SIZE, BASE PLATE AND ANCHOR BOLTS, SEE SCHEDULE.
5. 2" MINIMUM OR AS REQUIRED FOR WRENCHING CLEARANCE.
6. PER COLUMN SCHEDULE.

NOTE:
PROVIDE TEMPORARY SUPPORT DURING ERECTION FOR COLUMNS WITH 2 BOLT BASE PLATES.

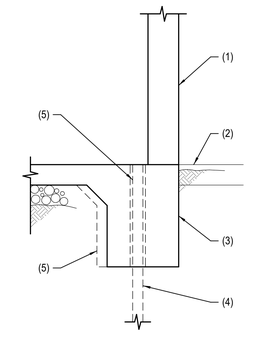


10 TYPICAL STEEL COLUMN BASE PLATE
SCALE: NOT TO SCALE 505-002-TYP



NOTES:
1. SLAB, SEE PLAN FOR REINFORCEMENT.
2. SLAB THICKNESS, SEE PLAN.

11 TYPICAL SLAB DEPRESSION
SCALE: NOT TO SCALE 202-010-TYP

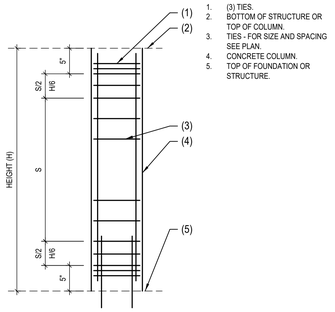


NOTE:
THIS DETAIL APPLIES FOR UP TO 3 VERTICAL PIPES PENETRATING THE FOOTING AT ONE LOCATION (1'-0" MAXIMUM LENGTH FOR ALL 3). IF FIELD CONDITIONS DIFFER FROM THIS CRITERIA OR DEPICTION CONTACT STRUCTURAL ENGINEER THROUGH ARCHITECT.

12 TYPICAL VERTICAL PIPING/CONDUITS THROUGH MONO-POUR CONCRETE FOOTINGS
SCALE: NOT TO SCALE 200-060-TYP

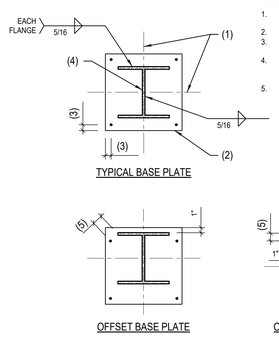
NOTES:
1. 4x4 - W1.4xW1.4 W.W.F. OR #4 AT 12" O.C.
2. FIRM UNDISTURBED SOIL OR COMPACTED BASE.
3. PIPE OR CONDUIT.
4. TYPICAL SLAB THICKNESS.

13 TYPICAL SLEEVE FOR PIPE AT SLAB
SCALE: NOT TO SCALE 200-022-TYP



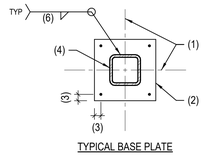
NOTES:
1. (3) TIES.
2. BOTTOM OF STRUCTURE OR TOP OF COLUMN.
3. TIES - FOR SIZE AND SPACING SEE PLAN.
4. CONCRETE COLUMN.
5. TOP OF FOUNDATION OR STRUCTURE.

07 TYPICAL TIE SPACING FOR CONCRETE COLUMN
SCALE: NOT TO SCALE 300-017-TYP



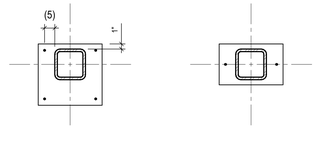
NOTES:
1. CENTERLINE OF COLUMN AND STEEL BASE PLATE.
2. STEEL BASE PLATE.
3. 1 1/4" MINIMUM OR PER A.I.S.C. TABLE J3.5.
4. STEEL COLUMN - FOR TYPE, SIZE, BASE PLATE AND ANCHOR BOLTS, SEE SCHEDULE.
5. 2" MINIMUM OR AS REQUIRED FOR WRENCHING CLEARANCE.

08 TYPICAL STEEL COLUMN BASE PLATE
SCALE: NOT TO SCALE 505-001-TYP

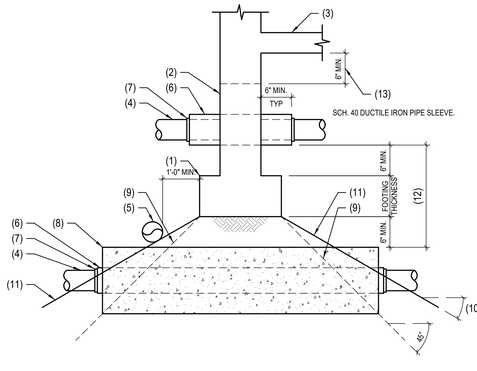


NOTES:
1. CENTERLINE OF COLUMN AND STEEL BASE PLATE.
2. STEEL BASE PLATE.
3. 1 1/4" MINIMUM OR PER A.I.S.C. TABLE J3.5.
4. STEEL COLUMN - FOR TYPE, SIZE, BASE PLATE AND ANCHOR BOLTS, SEE SCHEDULE.
5. 2" MINIMUM OR AS REQUIRED FOR WRENCHING CLEARANCE.
6. PER COLUMN SCHEDULE.

NOTE:
PROVIDE TEMPORARY SUPPORT DURING ERECTION FOR COLUMNS WITH 2 BOLT BASE PLATES.



09 TYPICAL STEEL COLUMN BASE PLATE
SCALE: NOT TO SCALE

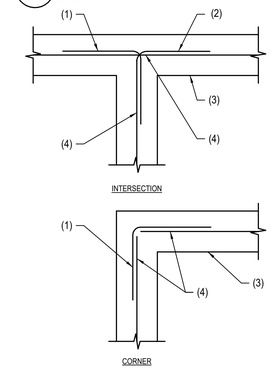


04 TYPICAL PIPES AT FOOTING AND FOUNDATION WALL
SCALE: NOT TO SCALE 216080-X-DETAILS-04

NOTES:
1. CONCRETE FOOTING.
2. FOUNDATION WALL.
3. FLOOR.
4. PIPE.
5. PIPE PARALLEL TO FOOTING.
6.
7. SILICONE SEAL ANNULUS.
8. 6" CONCRETE ENCASEMENT AROUND PIPE SLEEVE. EXTEND BEYOND ZONE OF INFLUENCE.
9. FOOTING ZONE OF INFLUENCE.
10. 30" IN GRANULAR SOILS. 45° IN OTHER SOILS, U.N.O.
11. DO NOT EXCAVATE BELOW THIS LINE, EXCEPT AS REQUIRED TO INSTALL PIPE PASSING BELOW FOOTING.
12. NO PIPE PENETRATIONS ARE PERMITTED THROUGH THIS ZONE.
13. NO PIPE PENETRATIONS ARE PERMITTED THROUGH THIS ZONE WHERE FLOOR IS STRUCTURALLY TIED TO FOUNDATION WALL.

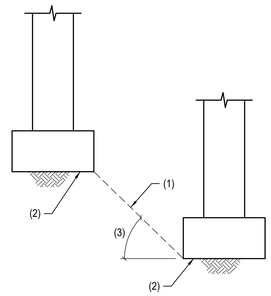
NOTES:
A. NO PIPES SHALL PASS UNDER COLUMN FOOTINGS UNLESS SPECIFICALLY INDICATED ON PLAN.
B. FOR PIPES GREATER THAN 3'-0" BELOW FOOTING, BACKFILL TRENCH WITH STRUCTURAL BACKFILL. SEE CIVIL DRAWINGS / SPECIFICATIONS.

05 TYPICAL CORNER REINFORCING IN CONCRETE FOOTING AND/OR STEM WALL
SCALE: NOT TO SCALE 216080-X-DETAILS-05



NOTES:
1. CORNER BARS SAME SIZE AND SPACING AS HORIZONTAL REINFORCING. LAP PER G.S.N. (24" MINIMUM).
2. ALTERNATE BEND.
3. CONCRETE STEM WALL OR FOOTING.
4. REINFORCING PER PLANS AND /OR G.S.N.

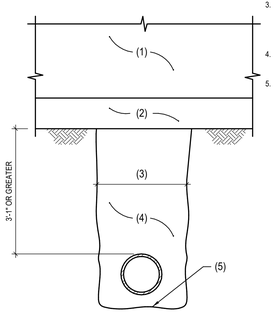
06 TYPICAL PLAN SECTION OF CONCRETE COLUMN
SCALE: NOT TO SCALE 300-016



NOTES:
1. DO NOT LOCATE ADJACENT FOOTING BELOW IMAGINARY LINE EXTENDING FROM BOTTOM OF FOOTING.
2. BOTTOM OF CONCRETE FOOTING.
3. 30" MAX IN GRANULAR SOILS. 45° MAX IN OTHER SOILS U.N.O.

NOTE:
FOR ADDITIONAL INFORMATION, SEE PLANS AND DETAILS.

01 TYPICAL MAXIMUM SLOPE BETWEEN ADJACENT FOOTING
SCALE: NOT TO SCALE 200-004-TYP

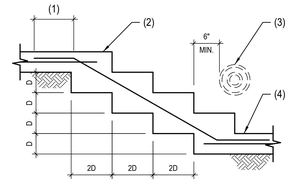


NOTES:
1. STEM WALL.
2. CONCRETE FOOTING.
3. 1'-6" MAXIMUM - WHERE TRENCH EXCEEDS 1'-6", NOTIFY STRUCTURAL ENGINEER PRIOR TO PLACEMENT OF FOOTING.
4. BACKFILL AND RECOMPACT TRENCH PER SOILS REPORT AND SPECIFICATIONS.
5. BOTTOM OF TRENCH.

NOTE:
FOR TRENCH DEPTH OF 3'-6" OR LESS, SEE TYPICAL PIPE AT FOOTING DETAIL.

NO PIPE SHALL PASS THRU FOOTINGS OR UNDER COLUMN FOOTINGS.

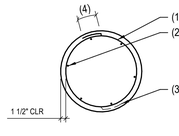
02 TYPICAL PIPE PASSING BELOW WALL FOOTING IN DEEP TRENCH
SCALE: NOT TO SCALE 200-007-TYP



NOTES:
1. LAP PER G.S.N. (24" MIN.) - TYPICAL.
2. TOP OF WALL FOOTING.
3. PIPE THRU STEM WALL AS OCCURS - SEE TYPICAL DETAIL.
4. RETURN TO FOOTING THICKNESS AS SHOWN ON PLAN.

NOTE:
D = 2'-0" MAXIMUM.

03 TYPICAL STEP IN CONCRETE FOOTING
SCALE: NOT TO SCALE 200-020-TYP



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DATE SIGNED
ARIZONA, U.S.A.
Expires 12/31/19

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1717

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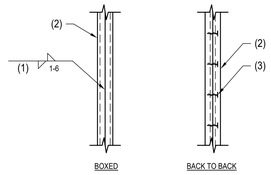
NOTES:

1. 1/16" WELD SIZE FOR 43 MIL OR LESS THICKNESS, 3/32 WELD SIZE FOR 54 MIL THICKNESS, 1/8" WELD SIZE FOR 68 MIL OR GREATER THICKNESS.
2. COLD FORMED COLUMN/JAMB.
3. #12 SCREWS AT 6" O.C. FULL HEIGHT.

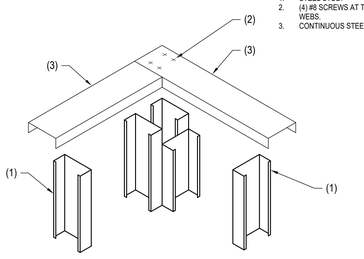


32 TYPICAL BUILT-UP COLD-FORMED COLUMN, JAMB STUD - ELEVATION VIEW

SCALE: NOT TO SCALE — 507-008-TYP

NOTES:

1. STEEL STUD.
2. (4) #8 SCREWS AT TRACK WEBS.
3. CONTINUOUS STEEL TRACK.

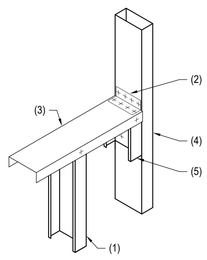


33 TYPICAL TRACK TO TRACK AT CORNER

SCALE: NOT TO SCALE — 507-014-TYP

NOTES:

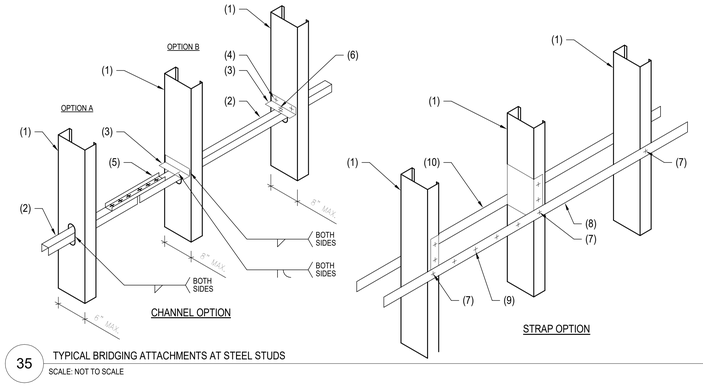
1. STEEL STUD.
2. STEEL CLIP.
3. STEEL TRACK SILL.
4. STEEL JAMB.
5. STEEL STUD, MINIMUM 4" LONG. ATTACH TO JAMB WITH (2) #10 SCREWS.



NOTE:
A. ALL SILL MEMBERS MUST SPAN ENTIRE LENGTH OF OPENING WITHOUT SPLICES.
B. SEE OPENING SCHEDULE FOR MEMBER SIZES AND CONNECTIONS.

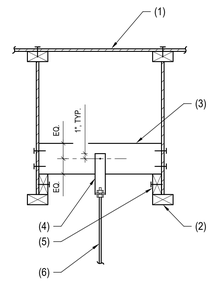
34 TYPICAL STEEL SILL AT STEEL JAMB

SCALE: NOT TO SCALE — 507-023-TYP



35 TYPICAL BRIDGING ATTACHMENTS AT STEEL STUDS

SCALE: NOT TO SCALE — 507-018-TYP



NOTES:

1. SHEATHING.
2. WOOD I-JOIST.
3. 4x6 BLOCKING WITH (2) 16d NAILS EACH END THRU WEB.
4. BENT STEEL PLATE 3/16"x 2" WIDE WITH 1/2" DIA. THRU BOLT.



5. 2x4x24" LONG EACH SIDE WITH (6) 10d NAILS EACH THRU WEB - CLINCH NAILS.
6. 3/8" DIA. MINIMUM HANGER ROD WITH DOUBLE NUTS.

NOTE.
MAXIMUM CAPACITY OF CONNECTION IS 500 LBS.

29 CONNECTION OF EQUIPMENT HANGER RODS TO WOOD I-JOISTS

SCALE: NOT TO SCALE — 698-033

NOTES:

1. STEEL JAMB.
2. STEEL STUD SECTION, ATTACH WITH (4) #10 SCREWS.
3. STEEL SILL.
4. (1) #10 SCREW AT 12" O.C., EACH FLANGE.
5. INFILL STEEL STUD.
6. (2) #10 SCREWS AT 12" O.C.
7. L2x2x14GA x STUD DEPTH - 1/2" WITH (8) #12 SCREWS EACH LEG.
8. STEEL TRACK.
9. SILL.

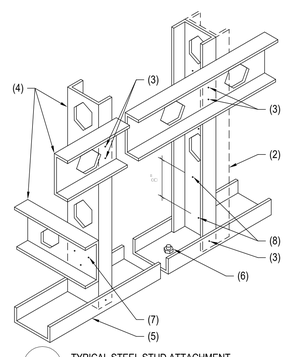
NOTES:
A. ALL SILL MEMBERS MUST SPAN ENTIRE LENGTH OF OPENING WITHOUT SPLICES.
B. SEE WALL SECTIONS FOR SILL/JAMB MEMBERS.

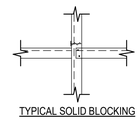
30 STEEL SILL AT STEEL JAMB

SCALE: NOT TO SCALE — 507-038

NOTES:

1. DOUBLE STUDS - TYPICAL.
2. DOUBLE STUDS WHERE SHOWN ON PLANS AND DETAILS.
3. (2) #12 SCREWS (EACH SIDE OF TRACK WHERE APPLIES).
4. STEEL STUD.
5. STEEL STUD TRACK.
6. TYPICAL FOUNDATION ATTACHMENT 1/2" DIA. ANCHOR BOLTS AT 48" O.C. OR 0.145 x 1 1/2" HILTI LOW VELOCITY FASTENERS. CONNECT AT 18" O.C. U.N.O.
7. (3) #12 SCREWS.
8. #12 AT 8" O.C. - STAGGERED.





TYPICAL SOLID BLOCKING

NOTE:
ALL STEEL STUD INTERSECTIONS SHALL BE SCREWED WITH (2) #12 SCREWS. FOR SIZE, GAUGE AND SPACING OF TYPICAL STEEL STUDS, SEE GENERAL STRUCTURAL NOTES. SPECIAL SIZES ARE CALLED OUT IN DETAILS.

31 TYPICAL STEEL STUD ATTACHMENT

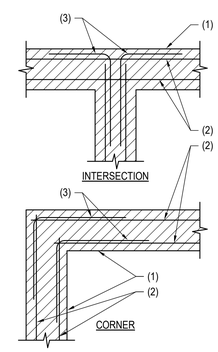
SCALE: NOT TO SCALE — 507-006-TYP

NOTES:

1. STEEL STUD.
2. 1 1/2"x16 GA STEEL CHANNEL.
3. L2"x2"x16 GA x (STUD DEPTH - 1/2") ANGLE.
4. (1) #10 SCREW EACH SIDE OF ANGLE TO STEEL STUD.
5. 1 1/2"x16 GA,x1'-0" LONG STEEL CHANNEL AT SPLICE LOCATIONS. ATTACH WITH (3) #10 SCREWS EACH SIDE OF SPLICE.
6. (2) #10 SCREWS AT ANGLE TO STEEL CHANNEL.
7. (1) #10 SCREW AT EACH STUD.
8. CONTINUOUS 1 1/2"x18GA STRAP EACH SIDE OF STUDS.
9. ATTACH FLAT STRAPPING TO BLOCKING WITH (4) #10 SCREWS.
10. SOLID BLOCKING AT MID-HEIGHT FOR WALLS LESS THAN OR EQUAL TO 10'-0" HIGH, AND 5'-0" O.C. MAXIMUM FOR WALLS GREATER THAN 10'-0" HIGH AND AT WALL OPENINGS OR CORNERS. NOTCH AND BEND UP TRACK FLANGES 90° OR INSTALL CLIP ANGLES AT BLOCKING TO STUDS.

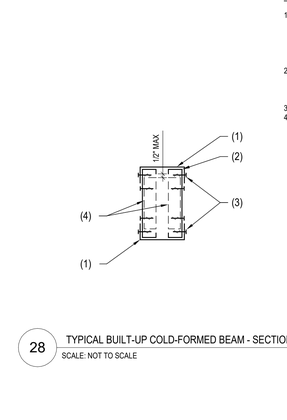
25 TYPICAL MASONRY BOND BEAM AT INTERSECTING WALLS

SCALE: NOT TO SCALE — 401-014-TYP



NOTES:

1. MASONRY WALL.
2. BOND BEAM REINFORCING.
3. CORNER BARS SAME SIZE AND SPACING AS HORIZONTAL REINFORCING (24" MIN).



NOTES:

1. MASONRY WALL.
2. CONTROL JOINT.
3. CONTROL JOINT MATERIAL PER ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.
4. 1 VERTICAL BAR EACH SIDE IN SOLID GROUTED CELLS TO MATCH VERTICAL WALL REINFORCING.
5. CONTINUOUS BOND BEAM BARS - WRAP BARS WITH MASTIC FOR BOND BREAK.

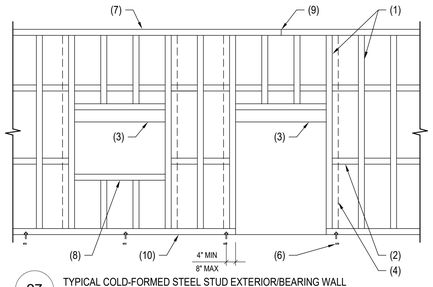
NOTE:
BOND BEAM BARS SHALL NOT BE LAPPED WITHIN 8'-0" OF CONTROL JOINT.

26 TYPICAL CONTROL JOINT IN MASONRY WALL

SCALE: NOT TO SCALE — 407-001-TYP

NOTES:

1. STEEL STUDS AT 16" O.C. U.N.O. - SEE TYPICAL STEEL STUD ATTACHMENT FOR TOP AND BOTTOM CONNECTION.
2. BRIDGING PER G.S.N. AND TYPICAL BRIDGING DETAIL.
3. LINTEL PER SCHEDULE.
4. SEE SCHEDULE FOR JAMB STUD SIZE.
5. NOT USED.
6. SILL TRACK ANCHORS SEE G.S.N. AND SHEAR WALL SCHEDULE FOR SIZE AND SPACING.
7. CONTINUOUS TOP TRACK.
8. SEE SCHEDULE FOR TRACK SILL SIZE.
9. SPLICE TOP TRACK WITH INSET STUD x12" LONG. MATCH WIDTH AND GAGE OF TOP TRACK, A MINIMUM FLANGE WIDTH = 1 5/8". INSTALL (6) #10 SCREWS ON EACH SIDE OF TRACK, EACH SIDE OF SPLICE, TO INSET STUD.
10. CONTINUOUS BOTTOM.



27 TYPICAL COLD-FORMED STEEL STUD EXTERIOR/BEARING WALL

SCALE: NOT TO SCALE — 507-001-TYP

NOTES:

1. CONTINUOUS COLD-FORMED TRACK TO MATCH WIDTH OF WALL THAT BEAM IS PLACED IN. THICKNESS SHALL MATCH JOIST THICKNESS AND FLANGE SHALL BE 1 1/2" DEEP.
2. COLD-FORMED JOIST MEMBERS PER SCHEDULE. PUNCHOUTS SHALL NOT BE PLACED IN BEAM MEMBERS.
3. #10 SCREWS AT 12" O.C.
4. WHERE REQUIRED PER SCHEDULE, PROVIDE (2) 600S162-54 WEB STIFFENERS AT ENDS OF BEAM. ATTACH TO WEB WITH (4) #10 SCREWS ON EACH SIDE.

28 TYPICAL BUILT-UP COLD-FORMED BEAM - SECTION VIEW

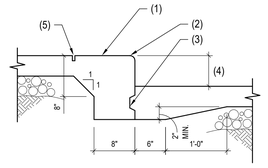
SCALE: NOT TO SCALE — 507-009-TYP

21 TYPICAL CONCRETE SLAB AT ELEVATION CHANGE

SCALE: NOT TO SCALE — 216080-X-DETAILS-33

NOTES:

1. CONCRETE SLAB ON GRADE.
2. TOOLED EDGE.
3. CONTINUOUS KEY - SEE TYPICAL KEY IN CONCRETE DETAIL.
4. 12" MAXIMUM - VERIFY WITH ARCHITECTURAL DRAWINGS.
5. CONTROL JOINT.

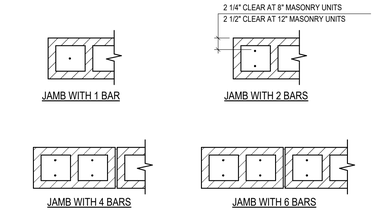


22 DETAIL NOT USED

SCALE: NOT TO SCALE

NOTES:

1. SEE MASONRY WALL REINFORCING SCHEDULE FOR REINFORCING.
2. ALL CELLS AND BOND BEAMS WITH REINFORCING SHALL BE GROUTED.
3. WHERE 2 BARS PER CELL ARE INDICATED, LOCATE AS SHOWN ON JAMB DETAILS AND PROVIDE ADDITIONAL LAP SPLICE LENGTH PER THE GENERAL STRUCTURAL NOTES.
4. MASONRY CONTROL JOINTS SHALL EXTEND FULL HEIGHT OF MASONRY WALL. TERMINATE ALL HORIZONTAL REINFORCING, INCLUDING JOINT REINFORCING, AT MASONRY CONTROL JOINTS EXCEPT FLOOR, ROOF AND PARAPET BOND BEAM REINFORCING.
5. SINGLE BARS SHALL BE ACCURATELY LOCATED AT CENTERLINE OF WALL U.N.O.



23 PLAN VIEW - TYPICAL MASONRY WALL REINFORCING

SCALE: NOT TO SCALE — 401-011-TYP

MASONRY PSI		TENSION AND COMPRESSION BARS f'm = 2,000 PSI			
MASONRY WIDTH		8"		12"	
SIZE	LOCATION OF BARS GR.	CENTERED BARS	EDGE BARS	CENTERED BARS	EDGE BARS
#3	40	12"	12"	12"	12"
	60	14"	14"	14"	14"
#4	40	12"	15"	12"	15"
	60	18"	22"	18"	22"
#5	40	15"	23"	15"	23"
	60	22"	34"	22"	34"
#6	60	38"	54"	34"	54"
#7	60	52"	63"	40"	63"
#8	60	72"	72"	53"	72"
#9	60	N/A	N/A	63"	81"

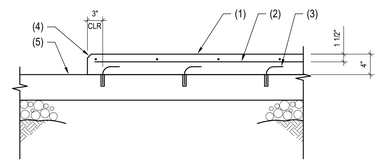
NOTES:
1. BASED ON IBC SECTION 2108.
2. CENTERED BARS ARE LOCATED IN THE CENTER OF A MASONRY CELL AND USUALLY ARE CONFIGURED WITH (1) BAR PER CELL.
3. EDGE BARS ARE LOCATED ON ONE OR BOTH FACES OF THE MASONRY WALL WITH A MINIMUM MASONRY CLEAR COVER OF 2" AND USUALLY ARE CONFIGURED WITH (2) BARS PER CELL.

24 TYPICAL MINIMUM REINFORCING BAR SPLICE LENGTHS IN MASONRY

SCALE: NOT TO SCALE — 401-012-TYP

NOTES:

1. CONCRETE HOUSEKEEPING PAD.
2. #4 AT 16" O.C. EACH WAY.
3. #3 DOWELS AT 24" O.C. EACH WAY AND AT PERIMETER. DRILL AND EPOXY-SET WITH 2" EMBEDMENT.
4. CHAMFER EDGE.
5. CONCRETE SLAB.



NOTE:
SEE MECHANICAL DRAWINGS FOR SIZE AND LOCATION OF PAD.

18 TYPICAL HOUSEKEEPING PAD AT MECHANICAL EQUIPMENT

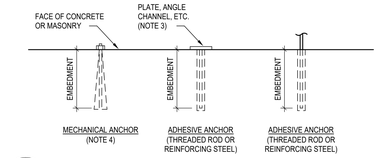
SCALE: NOT TO SCALE — 216080-X-DETAILS-18

REINFORCING STEEL SIZE	REINFORCING STEEL EMBEDMENT LENGTH IN CONCRETE	REINFORCING STEEL EMBEDMENT LENGTH IN MASONRY
#3	3"	6"
#4	6"	8"
#5	6"	8"
#6	8"	8"
#7	8"	8"
#8	10"	8"
#9	12"	12"

NOTES:

1. PROVIDE POST-INSTALLED ANCHORS AND REINFORCING STEEL PER THIS SCHEDULE UNLESS NOTED ON PLANS OR DETAILS.
2. POST-INSTALLED ANCHORS SHALL HAVE I.C.C. APPROVAL.
3. THICKNESS OF DRYPACK DOES NOT APPLY TOWARDS EMBEDMENT.
4. MECHANICAL ANCHORS INCLUDE BUT ARE NOT LIMITED TO WEDGE, UNDERCUT AND SCREW TYPE ANCHORS.

ANCHOR DIAMETER	MECHANICAL ANCHOR EMBEDMENT LENGTH IN CONCRETE	MECHANICAL ANCHOR EMBEDMENT LENGTH IN MASONRY	THREADED ROD ANCHOR EMBEDMENT LENGTH IN CONCRETE	THREADED ROD ANCHOR EMBEDMENT LENGTH IN MASONRY
3/8"	3"	2 3/4"	4 1/2"	3 1/2"
1/2"	4"	3 1/2"	5"	4 1/2"
5/8"	5 1/4"	4 1/2"	6 3/4"	6"
3/4"	5 3/4"	5 1/2"	6 3/4"	7"
7/8"	---	---	7"	---
1"	8"	8"	8"	---
1 1/4"	---	---	10"	---



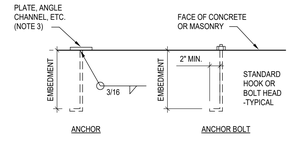
19 TYPICAL POST-INSTALLED ANCHOR AND REINFORCING STEEL SCHEDULE

SCALE: NOT TO SCALE — 501-002-TYP

ANCHOR DIAMETER	VERT BOLT EMBEDMENT LENGTH	HORIZ BOLT EMBEDMENT LENGTH
1/2"	7"	4"
5/8"	7"	4"
3/4"	7"	5"
7/8"	8"	6"
1"	9"	7"
1 1/8"	10"	8"
1 1/4"	11"	9"

NOTES:

1. PROVIDE ANCHORS AND ANCHOR BOLTS. PER THIS SCHEDULE UNLESS OTHERWISE NOTED ON PLANS OR DETAILS.
2. SCHEDULE APPLIES TO ANCHORS IN CONCRETE AND MASONRY.
3. THICKNESS OF DRYPACK DOES NOT APPLY TOWARDS EMBEDMENT.



20 TYPICAL CAST-IN-PLACE ANCHOR AND ANCHOR BOLT SCHEDULE

SCALE: NOT TO SCALE — 501-001-TYP

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Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

Typical Details

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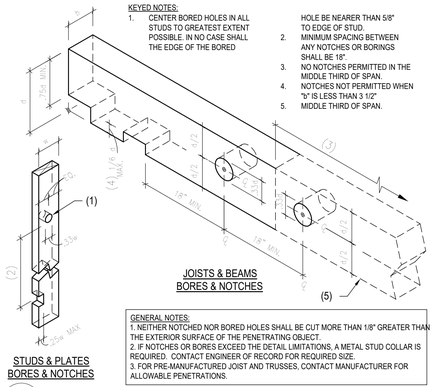
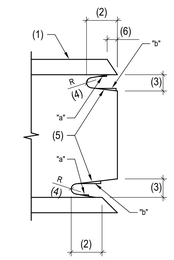


42 TYPICAL BORED HOLES AND NOTCHES IN WOOD FRAMING
SCALE: NOT TO SCALE 601-009-TYP

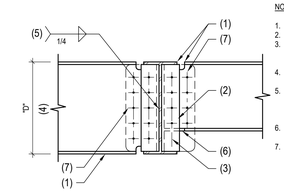


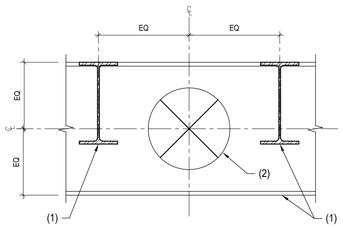
39 TYPICAL CJP WELD ACCESS HOLE
SCALE: NOT TO SCALE 535-001 TYP-AK

NOMINAL BEAM DEPTH "D"	NUMBER OF 3/4" DIA. ASTM, A307 BOLTS
UP TO 7"	2
8" - 11"	2
12" - 14"	3
15" - 17"	4
18" - 20"	5
21" - 23"	6
24" - 29"	7
30" - 32"	8
33" - 35"	9
36"	10

FRAMING NOTES:
1. THE TYPICAL STEEL BEAM TO STEEL COLUMN OR STEEL BEAM TO STEEL BEAM CONNECTION CONSISTS OF 3/8" SINGLE SHEAR PLATES WITH 3/4" DIA. ASTM A325 BOLTS. USE 5/8" SHEAR PLATES WHERE "D" = 27" OR GREATER.
2. ALL BOLTS SHALL BE INSTALLED USING STANDARD HOLES. (CONTRACTOR'S OPTION TO USE HORIZONTAL SHORT SLOTTED HOLES IN EITHER THE BEAM WEB OR THE SHEAR PLATE PER LATEST AISC SPECIFICATIONS.)

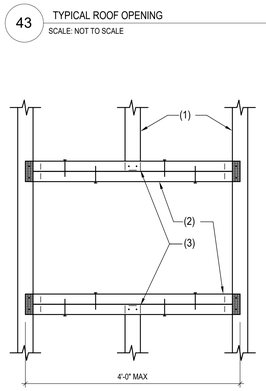
36 TYPICAL BOLT SCHEDULE FOR STEEL CONNECTIONS
SCALE: NOT TO SCALE 512-010-TYP-AK





40 TYPICAL PENETRATION THROUGH STEEL BEAM
SCALE: NOT TO SCALE 216080-X-DETAILS-31

37 TYPICAL FRAMED BEAM TO BEAM CONNECTION
SCALE: NOT TO SCALE 513-010-TYP



43 TYPICAL ROOF OPENING
SCALE: NOT TO SCALE 601-060-TYP

38 TYPICAL SUSPENDED CEILING WIRE ATTACHMENT TO STEEL DECK
SCALE: NOT TO SCALE 216080-X-DETAILS-27

44 TYPICAL ROOF OPENING
SCALE: NOT TO SCALE 601-065-TYP

CONNECTION	FASTENING	LOCATION
JOIST TO SILL OR GIRDER	(3) 8d COMMON (2 1/2"x0.131") (3) 3"x0.131" NAILS	TOENAIL
BRIDGING TO JOIST	(2) 8d COMMON (2 1/2"x0.131") (2) 3"x0.131" NAILS	TOENAIL EACH END
SILL PLATE TO JOIST OR BLOCKING	16d (3 1/2"x0.135") AT 16" O.C. 3"x0.131" NAILS AT 8" O.C.	TYPICAL FACE NAIL
TOP PLATE TO STUD	(2) 16d COMMON (3 1/2"x0.162") 3-3"x0.131" NAILS	END NAIL
STUD TO SILL PLATE	(4) 8d COMMON (2 1/2"x0.131") (4) 3"x0.131" NAILS (2) 16d COMMON (3 1/2"x0.162") (3) 3"x0.131" NAILS	TOENAIL END NAIL
BUILT-UP STUDS	16d (3 1/2"x0.135") AT 12" O.C. 3"x0.131" NAILS AT 8" O.C.	FACE NAIL
DOUBLE TOP PLATES	16d (3 1/2"x0.135") AT 16" O.C. 3"x0.131" NAILS AT 12" O.C. (8) 16d COMMON (3 1/2"x0.162") (12) 3"x0.131" NAILS	TYPICAL FACE NAIL LAP SPLICE
BLOCKING BETWEEN JOISTS OR RAFTERS TO TOP PLATE	(3) 8d COMMON (2 1/2"x0.131") (3) 3"x0.131" NAILS	TOENAIL
RIM JOIST TO TOP PLATE	8d (2 1/2"x0.131") AT 6" O.C. 3"x0.131" NAIL AT 6" O.C.	TOENAIL
TOP PLATES, LAPS AND INTERSECTIONS	(2) 16d COMMON (3 1/2"x0.162") (3) 3"x0.131" NAILS	FACE NAIL
CONT. HEADER, TWO PIECES	16d COMMON (3 1/2"x0.162")	16" O.C. ALONG EDGE
CONT. HEADER TO STUD	(4) 8d COMMON (2 1/2"x0.131")	TOENAIL
WOOD JOIST TO PLATE	(3) 8d COMMON (2 1/2"x0.131") (3) 3"x0.131" NAILS	TOENAIL
BUILT-UP CORNER STUDS	16d COMMON (3 1/2"x0.162") 3"x0.131" NAILS	24" O.C. 16" O.C.
BUILT-UP GIRDER AND BEAMS	20d COMMON (4"x0.192") 32" O.C. 3"x0.131" NAIL AT 24" O.C. (2) 20d COMMON (4"x0.192") (3) 3"x0.131" NAILS	FACE NAIL AT TOP AND BOTTOM STAGGERED ON OPPOSITE SIDES FACE NAIL AT ENDS AND AT EACH SPLICE

NOTES:
1. COMMON OR BOX NAILS ARE PERMITTED TO BE USED EXCEPT WHERE OTHERWISE STATED.
2. STAPLES SHALL HAVE A MINIMUM CROWN OF 7/16".
3. FASTENING SCHEDULE APPLIES U.N.O., WHERE DIFFERENCES OCCUR, GREATER REQUIREMENT GOVERNS.

41 TYPICAL WOOD FASTENING
SCALE: NOT TO SCALE 601-008-TYP

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DAVID M. GIBBENS
DATE SIGNED
ARIZONA, U.S.A.
Expires 12/31/19

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JOIST (J) SCHEDULE

MARK	SIZE/TYPE	JOIST SPACING	END CONNECTION	REMARKS
J1	20" WOOD I-JOIST 80/32	32" O.C.	--- ---	20" RED I-65 BASIS OF DESIGN
J2	24" WOOD I-JOIST 80/32	32" O.C.	--- ---	24" RED I-65 BASIS OF DESIGN
J3	24" WOOD I-JOIST 80/32	32" O.C.	--- ---	24" RED I-90 BASIS OF DESIGN
J4	2x8 WOOD	32" O.C.	SIMPSON LSSU28	--- ---

NOTES:
1. UNIFORM LOADING INDICATED DOES NOT INCLUDE MECHANICAL LOADS OR CONNECTED LOADS.
2. JOISTS SHALL BE DESIGNED FOR AN ADDITIONAL 300 LBS CONCENTRATED DEAD LOAD AT ANY POINT.

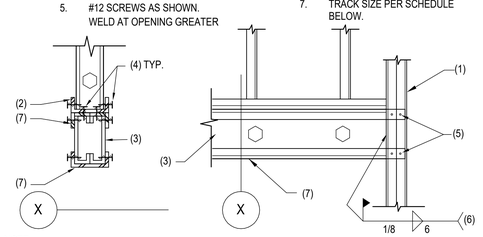
LEDGER (L) SCHEDULE

MARK	TYPE/SIZE	CONNECTION
L1	WOOD 2x12	(3) #8 SCREWS AND SIMPSON L50 AND H3 TO EACH STEEL STUD

WOOD:
1. ALL LEDGERS SHALL HAVE MINIMUM OF 2 ANCHOR BOLTS PER LEDGER PIECE.
2. ANCHOR BOLTS SHALL BE LOCATED NOT LESS THAN 6" NOR MORE THAN 12" FROM END OF LEDGER PIECE OR AT LEDGER SPLICE.

TYPICAL NON-SCHEDULED LINTEL IN COLD FORMED STEEL WALL

NOTES:
1. STEEL JAMB STUDS.
2. CONTINUOUS TOP TRACK.
3. HEADER STUD AS REQUIRED.
4. #10 SCREWS AT 12" O.C.
5. #12 SCREWS AS SHOWN. WELD AT OPENING GREATER THAN 3'-7". IF GAP BETWEEN HEADER AND JAMB STUD IS GREATER THAN 1/8" ADD FILLER PLATES.
6. TRACK SIZE PER SCHEDULE BELOW.



NOTE:
THIS SCHEDULE MAY BE USED ONLY IN WALLS WHERE NO OTHER LINTEL HAS BEEN CALLED OUT ON THE PLANS OR SCHEDULES.

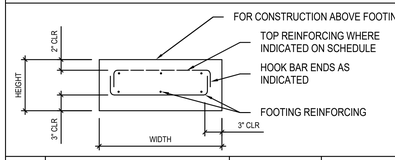
MAX WIDTH OF OPENING	HEADER STUD SIZE HEADER TRACK SIZE	JAMB STUD SIZE EXTERIOR	SILL TRACK SIZE EXTERIOR
0' - 4'-0"	(2) 600S162-54 BOXED (2) 600T125-54	(2) 600S162-54 BOXED	600T125-54
4'-1" - 12'-0"	(2) 600S162-54 BOXED (2) 600T125-54	(2) 600S162-68 BOXED	600T125-97
12-1" - 18'-0"	(2) 1000S162-97 BOXED (2) 600T250-97	(2) 600S162-97 BOXED	N/A
18'-1" - 22'-0"	(2) 1000S162-97 BOXED (2) 600T350-97	(2) 600S350-97 BOXED	600T250-97 600S250-97 600T250-97 FOR CONST. SEE TYP. DETAIL 30

LINTEL (LT) SCHEDULE

MARK	TYPE	LINTEL SIZE	TRIMMER STUDS	JAMB STUDS	REMARKS
LT1	STEEL	(2) 800S162-43 BOXED	(1) 600S162-43	(1) 600S162-43	---
LT2	STEEL	(2) 1200S300-97 BOXED	(2) 600S162-43	(2) 600S162-43	---

NOTES:
1. SEE TYPICAL DETAILS FOR ADDITIONAL INFORMATION.

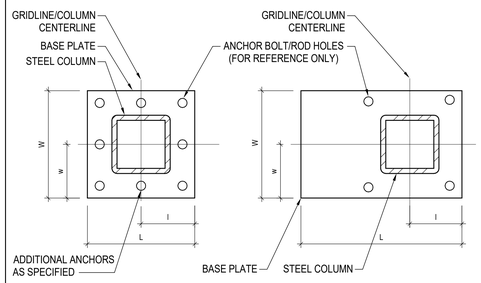
FOOTING (F) SCHEDULE



MARK	DIMENSIONS			FOOTING REINFORCING	REMARKS
	HEIGHT	WIDTH	LENGTH		
F1	12"	12"	CONT.	(1) #4 CONT. TOP AND BOTTOM	---
F2	12"	7'-6"	7'-6"	(5) #6 EACH WAY CENTERED IN FTG.	2'-0" SQUARE x 16" THICKNED SECTION AT ANCHOR BOLTS
F3	18"	36"	CONT.	(5) #7 TOP (8) #7 BOTTOM #5 AT 18" O.C. TOP&BOTT. TRANSVERSE	HOOK BARS 90° AT ENDS 3'-0" SQUARE x 30" THICKENED SECTION AT ANCHOR BOLTS
F4	12"	1'-6"	CONT.	(2) #4 CONT. BOTTOM	---
F5	12"	3'-6"	3'-6"	(3) #5 E.W. CENTERED	---
F6	18"	7'-0"	7'-0"	#5 AT 12" O.C. E.W. TOP AND BOTTOM	---
F7	12"	2'-6"	2'-6"	(3) #4 E.W. BOTTOM	---

NOTES:
1. FOR FOOTING BEARING DEPTH BELOW GRADE, SEE G.S.N. U.N.O.
2. CENTER FOOTINGS UNDER WALLS OR COLUMNS U.N.O.
3. WHERE FOOTINGS INTERSECT, THE GREATER REINFORCING REQUIREMENTS SHALL GOVERN.

COLUMN (C) SCHEDULE



MARK	COLUMN SIZE	BASE PLATE THICKNESS	BASE PLATE PLAN DIMENSIONS				BASE PLATE ANCHORS	REMARKS
			W	w	L	l		
C1	HSS8x8x3/8	1 1/2"	16"	8"	16"	8"	(4) 1 1/4" x 12" EMBED HEX HEAD ANCHORS	SNUG TIGHT WITH EXTRA 1/4 TURN
C2	W16x100	2"	28"	14"	26"	13"	(8) 1 1/2" x 24" EMBED HEX HEAD ANCHORS W/ 1/2" STEEL WASHERS	SNUG TIGHT WITH EXTRA 1/4 TURN
C3	(2) W16x100	2 1/2"	28"	14"	38"	12 3/16"	(10) 1 3/4" x 24" EMBED HEX HEAD ANCHORS W/ 1/2" STEEL WASHERS	SNUG TIGHT WITH EXTRA 1/4 TURN
C4	(2) 600S162-33 BOXED	STEEL TRACK	---	---	---	---	(2) PAF TRACK TO STEM	(2) #12 SCREWS EA. STUD TO TRACK
C5	HSS3x3x3/16	3/4"	6"	---	10"	7"	(2) 3/4" x 8" EMBED HEX HEAD ANCHORS	---
C6	HSS4x4x3/16	3/4"	4"	2"	10"	5"	(2) 3/4" x 8" EMBED HEX HEAD ANCHORS	---

CONCRETE COLUMN (CC) SCHEDULE

MARK	SIZE	REINFORCING		REMARKS
		VERTICAL	TIES	
C7	8" DIA. ROUND CONC.	(4) #4	#3 AT 8" O.C.	---
C8	18" DIA. ROUND CONC.	(14) #4	#3 AT 8" O.C.	---

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Schedules

S1.8

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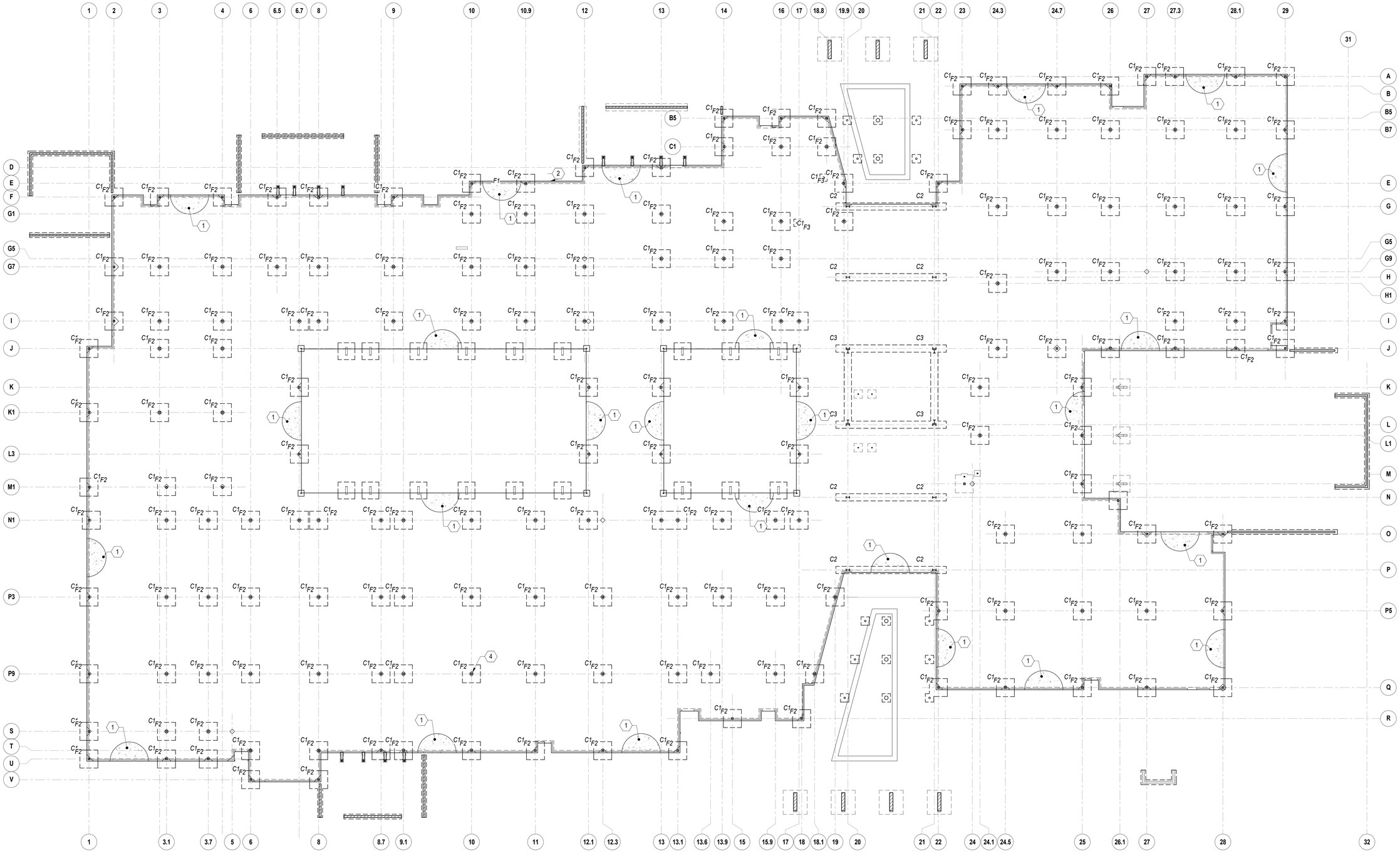
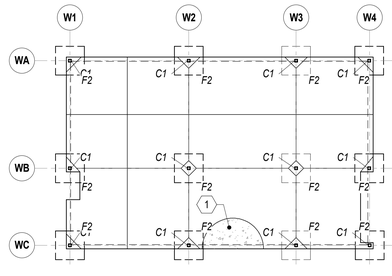


FOUNDATION PLAN OVERALL

SCALE: 1/16" = 1'-0"



FOUNDATION PLAN OVERALL WAREHOUSE

SCALE: 1/16" = 1'-0"

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Foundation Plan - Overall

S2.0

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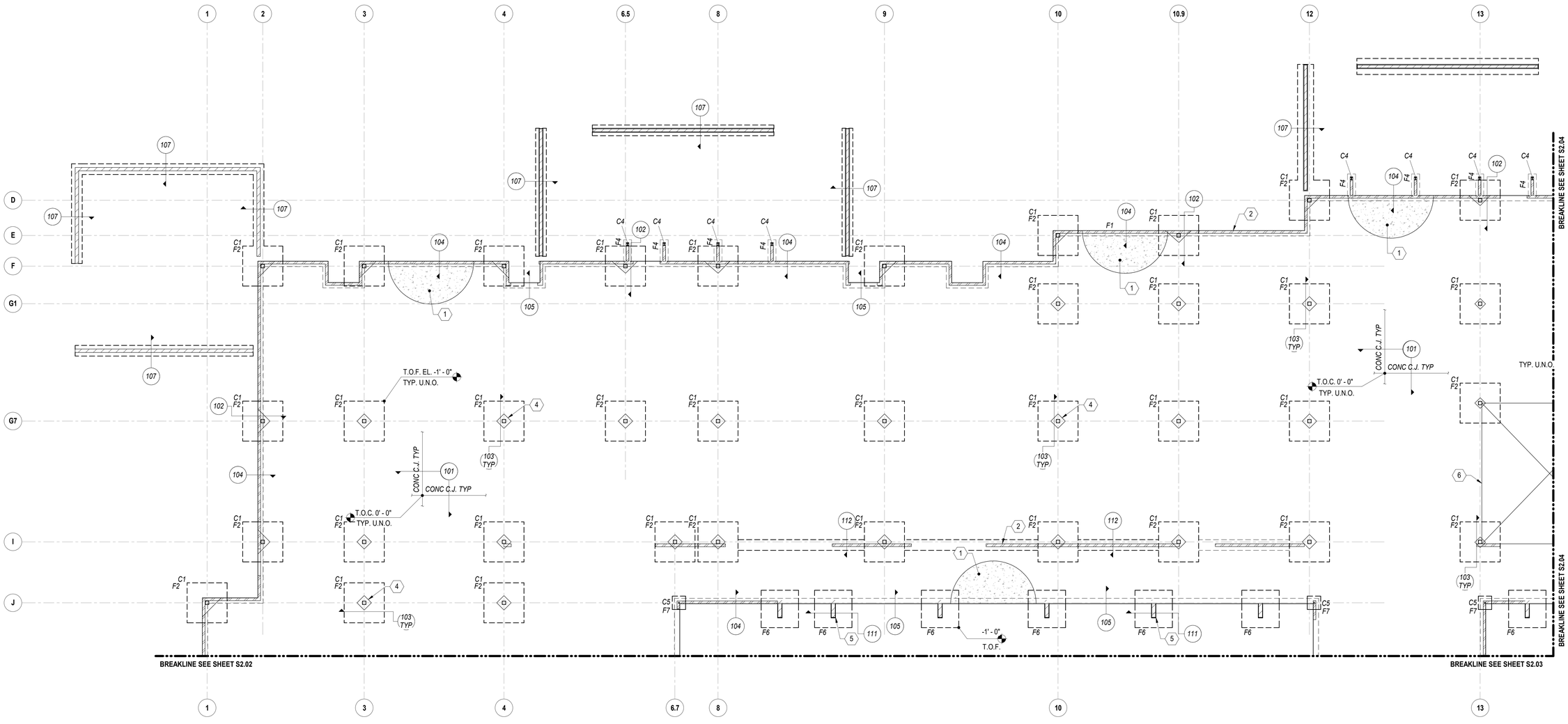
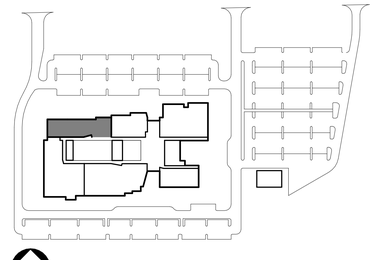
FOUNDATION KEYNOTES:

1. 5" CONCRETE SLAB WITH 7.5 LBS. CUBIC YARD OF FORTAFERRO MACROFIBER OVER VAPOR BARRIER PER ARCHITECTURAL OVER 4" A.B.C. OVER PREPARED SUBGRADE PER GEOTECHNICAL REPORT.
2. TYPICAL: 600S162-54 AT 24" O.C. STEEL STUD WALL.
3. CONCRETE CONTROL JOINT. COORDINATE JOINT LOCATIONS WITH ARCHITECTURAL DRAWINGS, TYPICAL.
4. CONCRETE CLOSURE POUR PER TYPICAL DETAIL 17. COORDINATE SIZE AND SHAPE WITH ARCHITECTURAL DRAWINGS, TYPICAL.
5. 12" MASONRY PIER, FULLY GROUTED WITH #6 VERT. BARS AT 8" O.C.
6. DEPRESSION IN CONCRETE SLAB ON GRADE. COORDINATE SIZE AND LOCATION WITH ARCHITECTURAL DRAWINGS. SEE TYPICAL DETAIL 11.



FOUNDATION PLAN - Sewa U'usim

SCALE: 1/8" = 1'-0"



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Foundation Plan - Sewa U'usim

S2.1

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FOUNDATION KEYNOTES:

1. 5" CONCRETE SLAB WITH 7.5 LBS. CUBIC YARD OF FORTAFERRO MACROFIBER OVER VAPOR BARRIER PER ARCHITECTURAL OVER 4" A.B.C. OVER PREPARED SUBGRADE PER GEOTECHNICAL REPORT.
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8. DEPRESSION IN CONCRETE SLAB ON GRADE. COORDINATE SIZE AND LOCATION WITH ARCHITECTURAL DRAWINGS. SEE TYPICAL DETAIL 11.
9. 16" WIDE CONCRETE STEM WITH (2) #4 CONT AT TOP.

BREAKLINE SEE SHEET S2.03

BREAKLINE SEE SHEET S2.05

T.O.F. EL. -1' - 0" TYP. U.N.O.

T.O.C. 0' - 0" TYP. U.N.O.

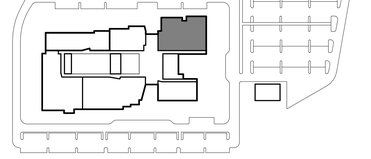
CONC C.J. TYP

5' - 0"

T.O.F. -1' - 0"

FOUNDATION PLAN - Nursing & Clinics

SCALE: 1/8" = 1'-0"



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Foundation Plan - Nursing + Clinics

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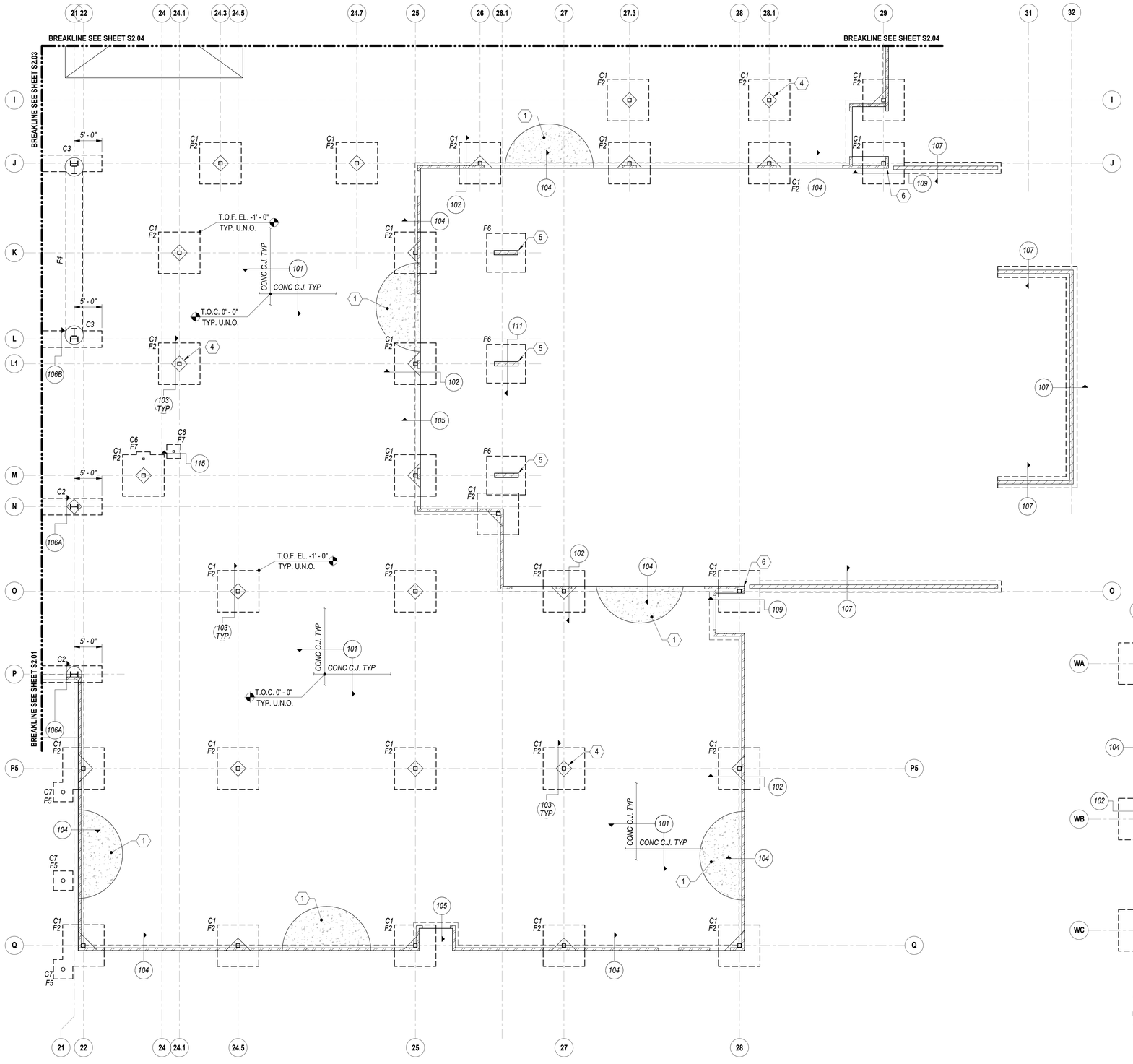

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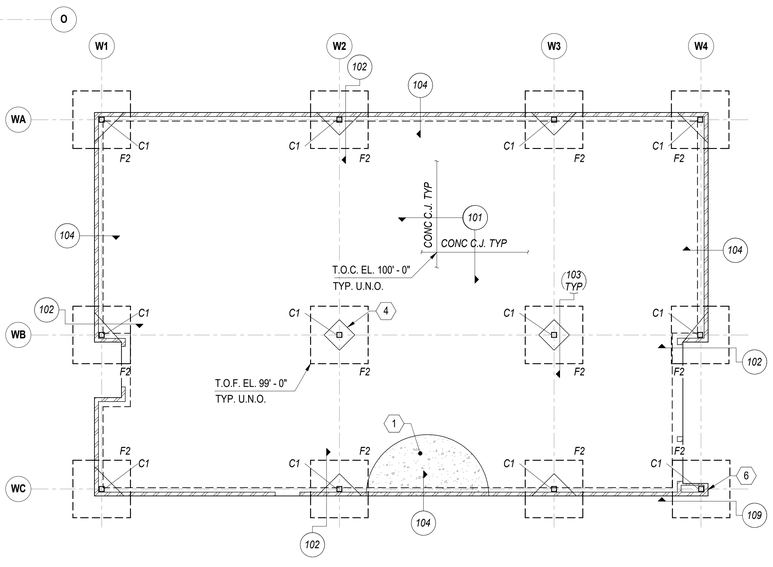
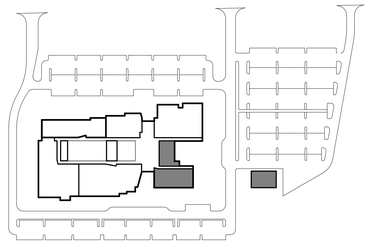
FOUNDATION PLAN - Managed Health & Warehouse

SCALE: 1/8" = 1'-0"



FOUNDATION PLAN - Warehouse

SCALE: 1/8" = 1'-0"



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Foundation Plan - Managed Health + Warehouse

S2.3

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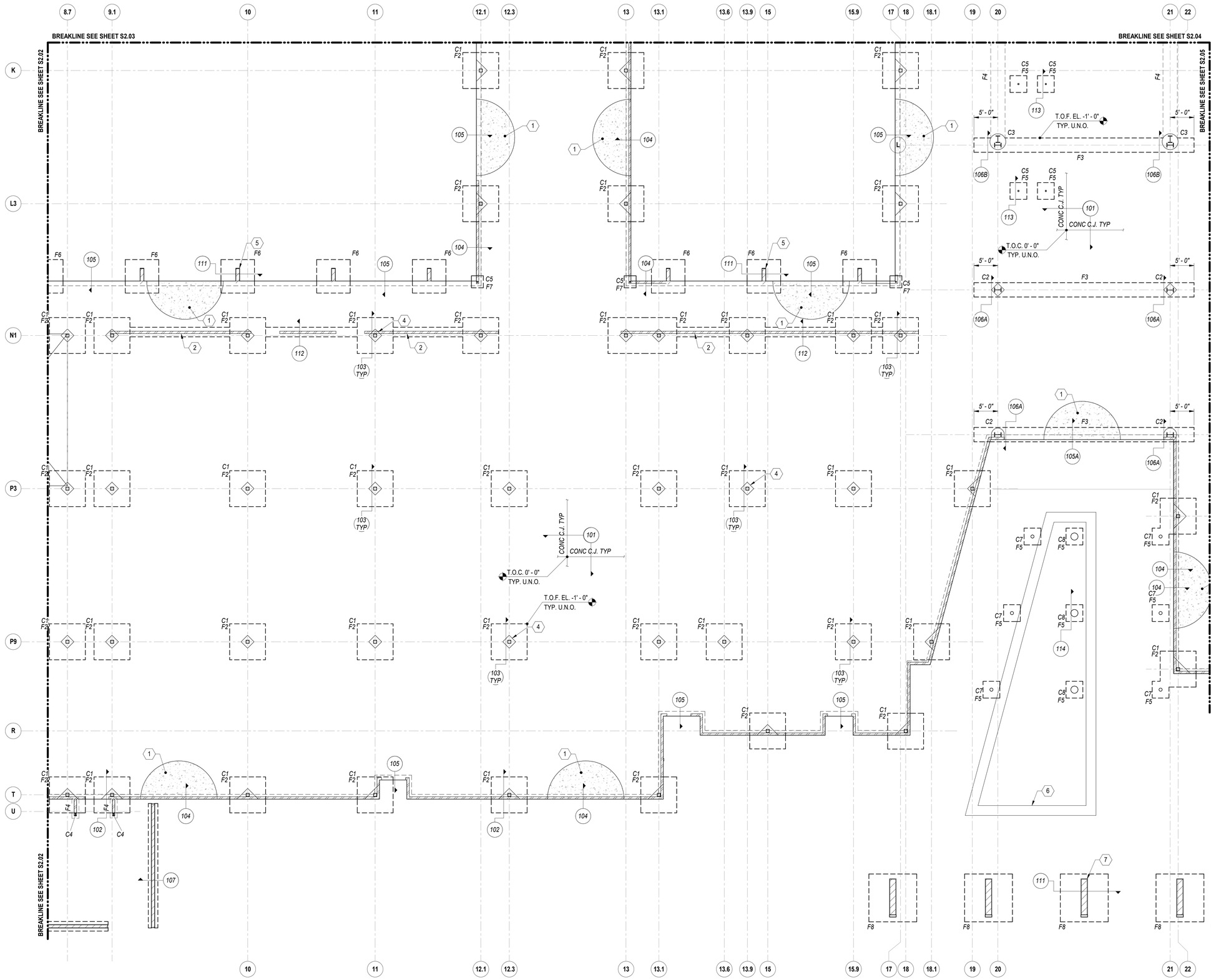

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FOUNDATION PLAN - Center Spirit

SCALE: 1/8" = 1'-0"

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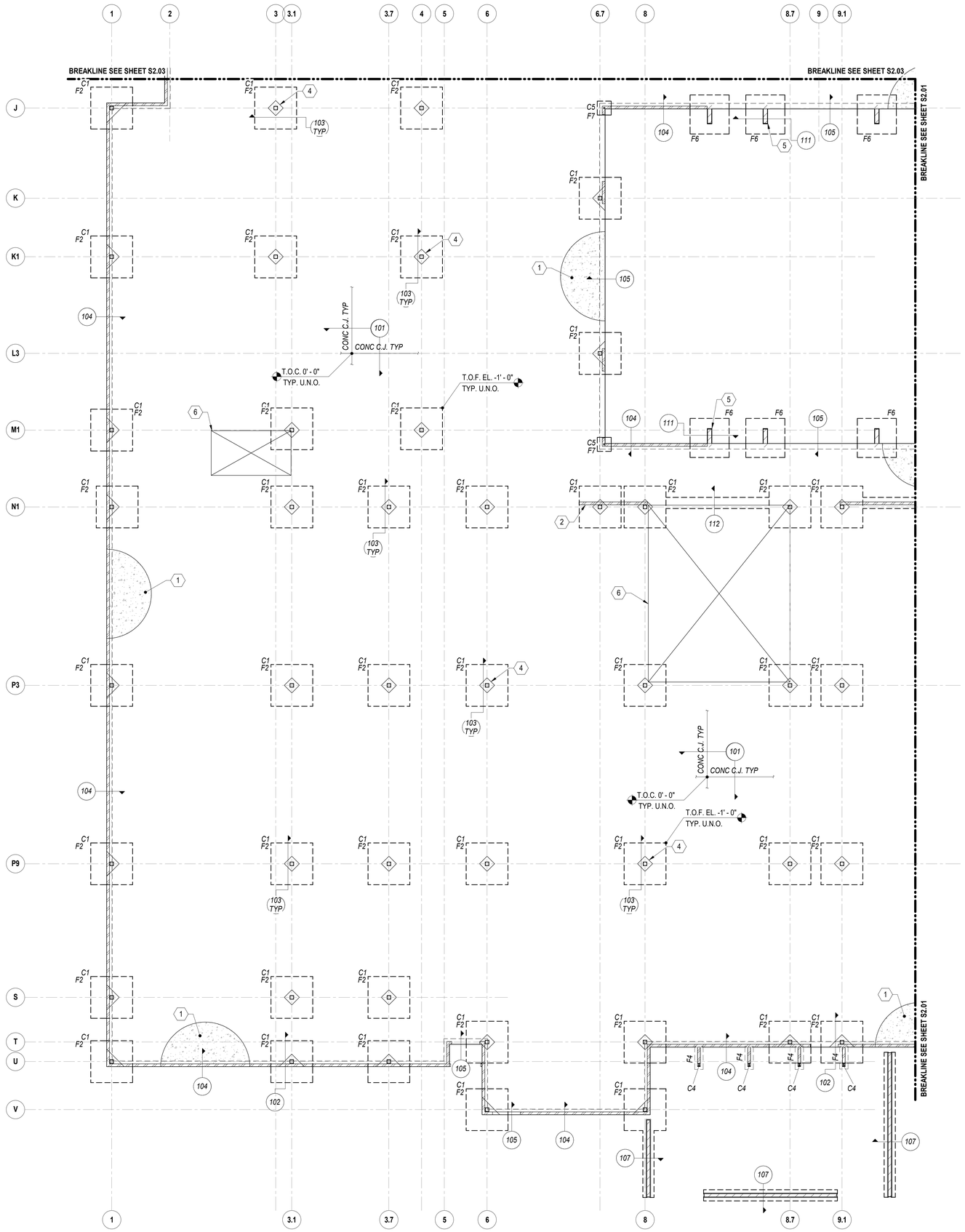

FOUNDATION PLAN - Area 2 Social Services

SCALE: 1/8" = 1'-0"

FOUNDATION KEYNOTES:

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Foundation Plan - Social Services

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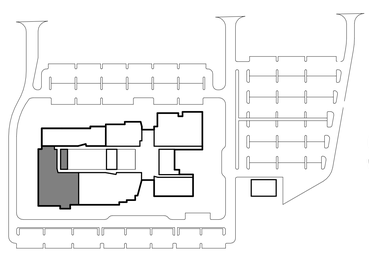

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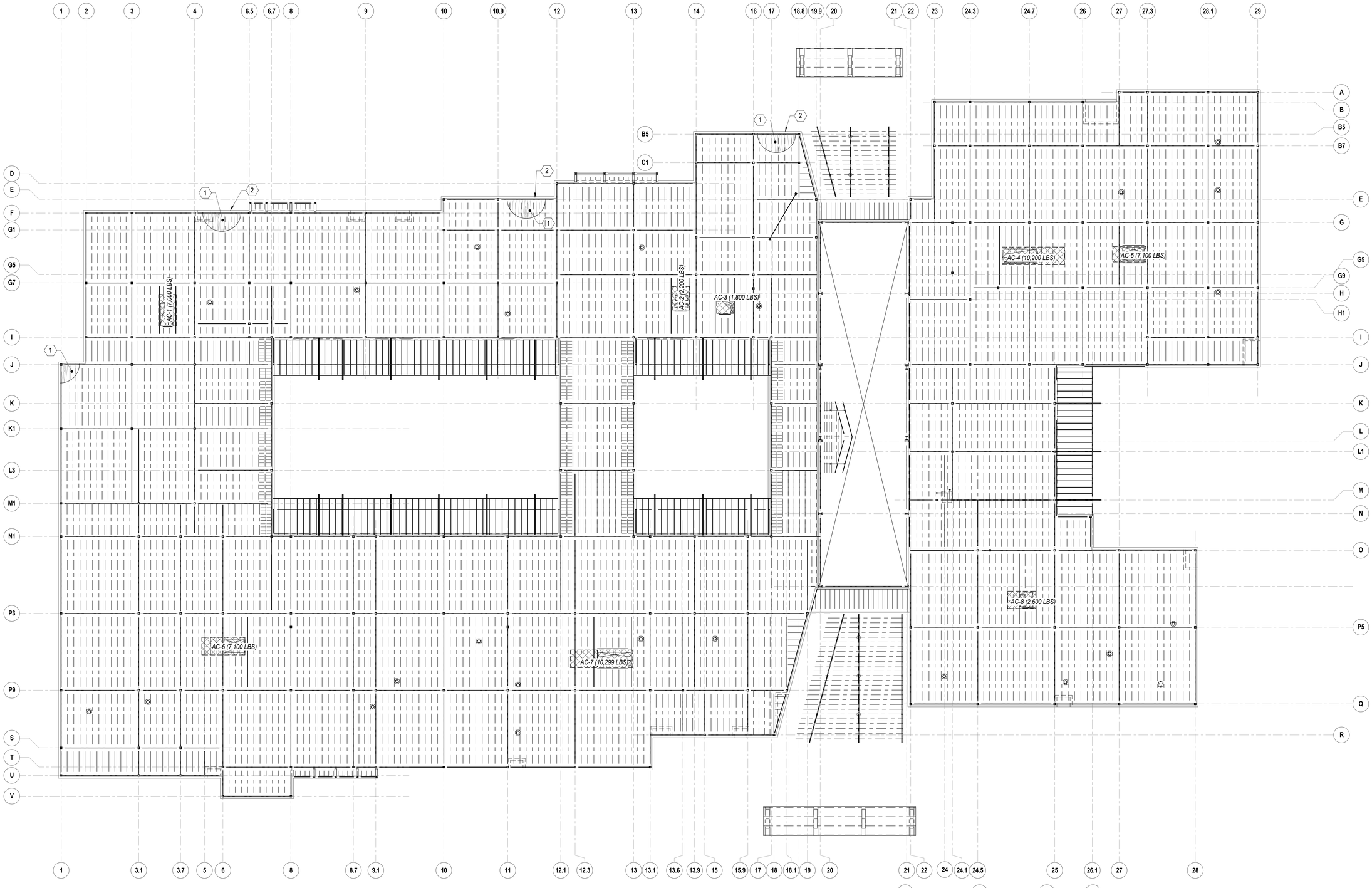
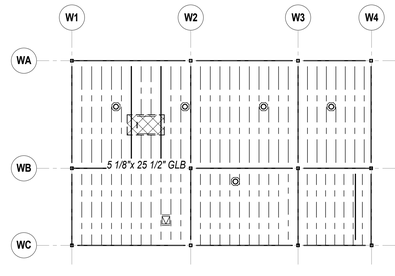


ROOF FRAMING PLAN OVERALL

SCALE: 1/16" = 1'-0"



ROOF FRAMING PLAN OVERALL WAREHOUSE

SCALE: 1/16" = 1'-0"

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Registered Professional Engineer (Structural)
CERTIFICATE NO.
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DAVID M. GIBBENS
DATE SIGNED
ARIZONA, U.S.A.
Expires 12/31/19

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Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

Roof Framing Plan - Overall

S3.0

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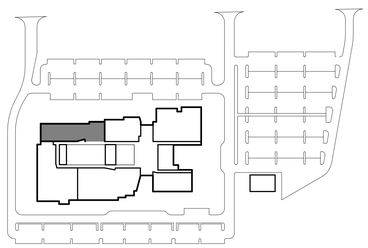
FRAMING KEYNOTES:

1. 1/2" W.S.P. ROOF SHEATHING, ATTACHMENT PER G.S.N.
2. TYPICAL: STEEL STUD WALL.
3. SIMPSON BA48 HANGER WITH (18) 16D NAILS, TYPICAL.
4. SIMPSON HW HANGER WITH (4) 16D AND (2) 10D NAILS, TYPICAL.
5. SKYLIGHT OPENING. COORDINATE SIZE AND LOCATION WITH ARCHITECTURAL DRAWINGS. SEE TYPICAL DETAILS FOR FRAMING AT OPENINGS.
6. DETAIL 225 SHALL APPLY AT THESE BOUNDARIES TO SUPPORT WALL ABOVE STOREFRONT OPENING BELOW.
7. PROVIDE (2) 600S162-43 (SIDE BY SIDE) BOUNDARY STUDS AT FULL HEIGHT TRANSITION BETWEEN DETAIL 201 AND DETAIL 225 SUPPORT FROM GLULAM BEAM ABOVE.
8. LINTEL PER TYPICAL LINTEL SCHEDULE.
9. DIAGONAL BRACES AT 16" O.C.



ROOF FRAMING PLAN - Sewa U'usim

SCALE: 1/8" = 1'-0"



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Roof Framing Plan - Sewa U'usim

S3.1

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FRAMING KEYNOTES:

1. 1/2" W.S.P. ROOF SHEATHING, ATTACHMENT PER G.S.N.
2. TYPICAL: STEEL STUD WALL.
3. SIMPSON W38 HANGER WITH (4) 10D NAILS, TYPICAL.
4. SIMPSON BA48 HANGER WITH (18) 16D NAILS, TYPICAL.
5. SIMPSON HW HANGER WITH (4) 16D AND (2) 10D NAILS, TYPICAL.
6. SIMPSON HW612 HANGER WITH (6) 10D NAILS, TYPICAL.
7. SIMPSON HWU HANGER WITH (8) 16D NAILS, TYPICAL.
8. 1 1/2", 20GA. STEE B-DECK, ATTACHMENT PER G.S.N.
9. SKYLIGHT OPENING. COORDINATE SIZE AND LOCATION WITH ARCHITECTURAL DRAWINGS. SEE TYPICAL DETAILS FOR FRAMING AT OPENINGS.
10. LINTEL PER TYPICAL LINTEL SCHEDULE.
11. DETAIL 225 SHALL APPLY AT THESE BOUNDARIES TO SUPPORT WALL ABOVE STIREFRONT OPENING BELOW.
12. PROVIDE (2) 600S162-43 (SIDE BY SIDE) BOUNDARY STUDS AT FULL HEIGHT TRANSITION BETWEEN DETAIL 201 AND DETAIL 225 SUPPORT FROM GLULAM BEAM ABOVE.

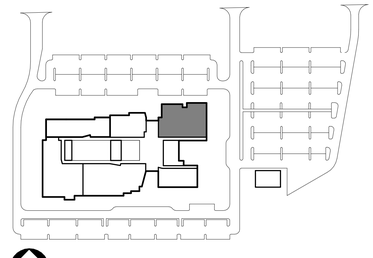
BREAKLINE SEE SHEET S3.03

BREAKLINE SEE SHEET S3.01

BREAKLINE SEE SHEET S3.05

ROOF FRAMING PLAN - Nursing & Clinics

SCALE: 1/8" = 1'-0"



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Roof Framing Plan - Nursing + Clinics

S3.2

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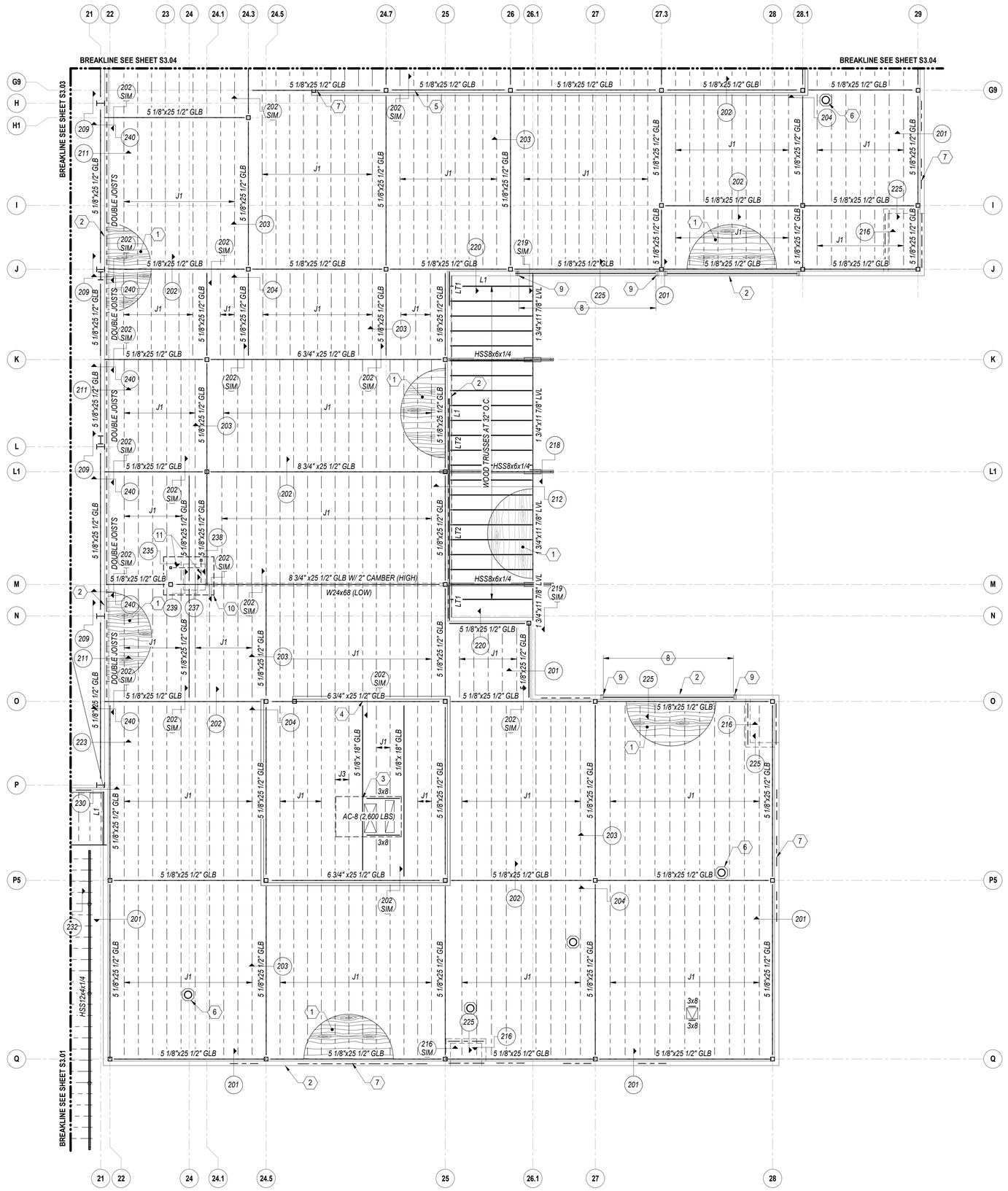
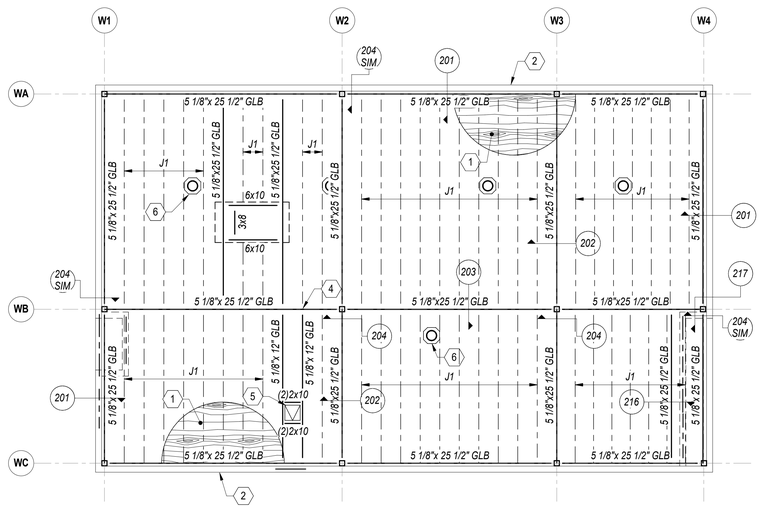


ROOF FRAMING PLAN - Managed Health

SCALE: 1/8" = 1'-0"

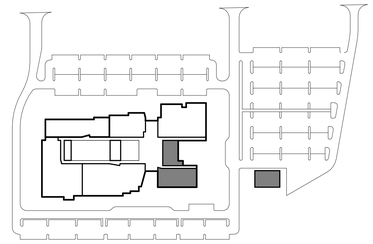


ROOF FRAMING PLAN - Warehouse

SCALE: 1/8" = 1'-0"

FRAMING KEYNOTES:

1. 1/2" W.S.P. ROOF SHEATHING, ATTACHMENT PER G.S.N.
2. TYPICAL: STEEL STUD WALL.
3. SIMPSON W38 HANGER WITH (4) 10D NAILS, TYPICAL.
4. SIMPSON HW HANGER WITH (4) 16D AND (2) 10D NAILS, TYPICAL.
5. ROOF HATCH, COORDINATE SIZE AND LOCATION WITH ARCHITECTURAL AND MECHANICAL DRAWINGS. SEE TYPICAL DETAIL FOR FRAMING AROUND OPENING.
6. SKYLIGHT OPENING. COORDINATE SIZE AND LOCATION WITH ARCHITECTURAL DRAWINGS. SEE TYPICAL DETAILS FOR FRAMING AT OPENINGS.
7. LINTEL PER TYPICAL LINTEL SCHEDULE.
8. DETAIL 225 SHALL APPLY AT THESE BOUNDARIES TO SUPPORT WALL ABOVE STOREFRONT OPENING.
9. PROVIDE (2) 600S162-43 (SIDE BY SIDE) BOUNDARY STUDS AT FULL HEIGHT TRANSITION BETWEEN DETAIL 201 AND DETAIL 225 SUPPORT FROM GLULAM BEAM ABOVE.
10. REFER TO OPERABLE PARTITION MANUFACTURER SPECIFICATIONS FOR CENTERLINE DIMENSIONS OF STACKING TRACK LOCATIONS IN ORDER TO DETERMINE FINAL LAYOUT.
11. W8x15 (LOW).



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Roof Framing Plan - Managed Health + Warehouse

S3.3

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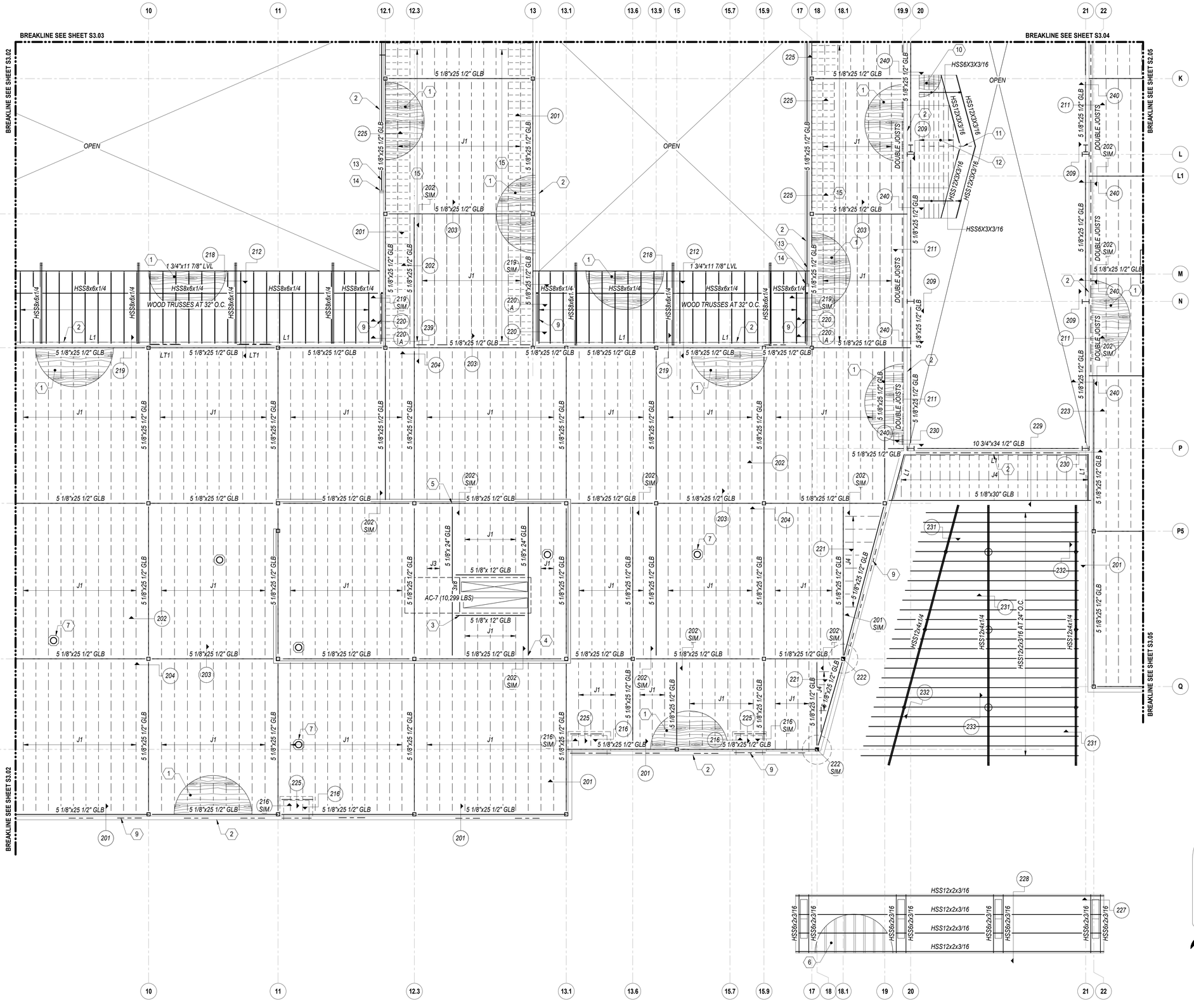
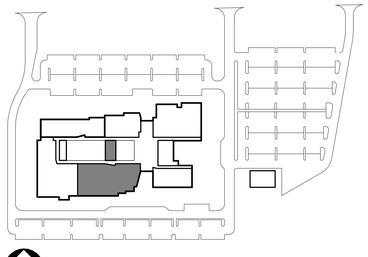


ROOF FRAMING PLAN - Center Spirit

SCALE: 1/8" = 1'-0"

FRAMING KEYNOTES:

1. 1/2" W.S.P. ROOF SHEATHING, ATTACHMENT PER G.S.N.
2. TYPICAL: STEEL STUD WALL.
3. SIMPSON W38 HANGER WITH (4) 10D NAILS, TYPICAL.
4. SIMPSON HW HANGER WITH (4) 16D AND (2) 10D NAILS, TYPICAL.
5. SIMPSON GLT5 HANGER WITH (16) N54A NAILS, TYPICAL.
6. 1 1/2", 20GA STEEL B-DECK, ATTACHMENT PER G.S.N.
7. SKYLIGHT OPENING, COORDINATE SIZE AND LOCATION WITH ARCHITECTURAL DRAWINGS. SEE TYPICAL DETAILS FOR FRAMING AT OPENINGS.
8. SUSPENDED WALL BRACING PER DETAIL 225 TO EXTENTS OF LARGE STOREFRONT OPENING.
9. LINTEL PER TYPICAL LINTEL SCHEDULE.
10. 1/2" ROOF SHEATHING, ATTACH WITH #12 SCREWS AT 6" O.C. EDGE, 12" O.C. FIELD.
11. SIMPSON CS16 STRAP ON SHEATHING, WITH #12 SCREWS AT 4" O.C. ON JOIST BLOCKING WITH (2) #12 SCREWS TO EACH JOIST.
12. 1200S200-54 AT 24" O.C.
13. DETAIL 225 SHALL APPLY AT THESE BOUNDARIES TO SUPPORT WALL ABOVE STOREFRONT OPENING BELOW.
14. PROVIDE (2) 600S162-43 (SIDE BY SIDE) BOUNDARY STUDS AT FULL HEIGHT TRANSITION BETWEEN DETAIL 201 AND DETAIL 225 SUPPORT FROM GLULAM BEAM ABOVE.
15. DIAGONAL BRACES AT 16" O.C.



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Roof Framing Plan - Center Spirit

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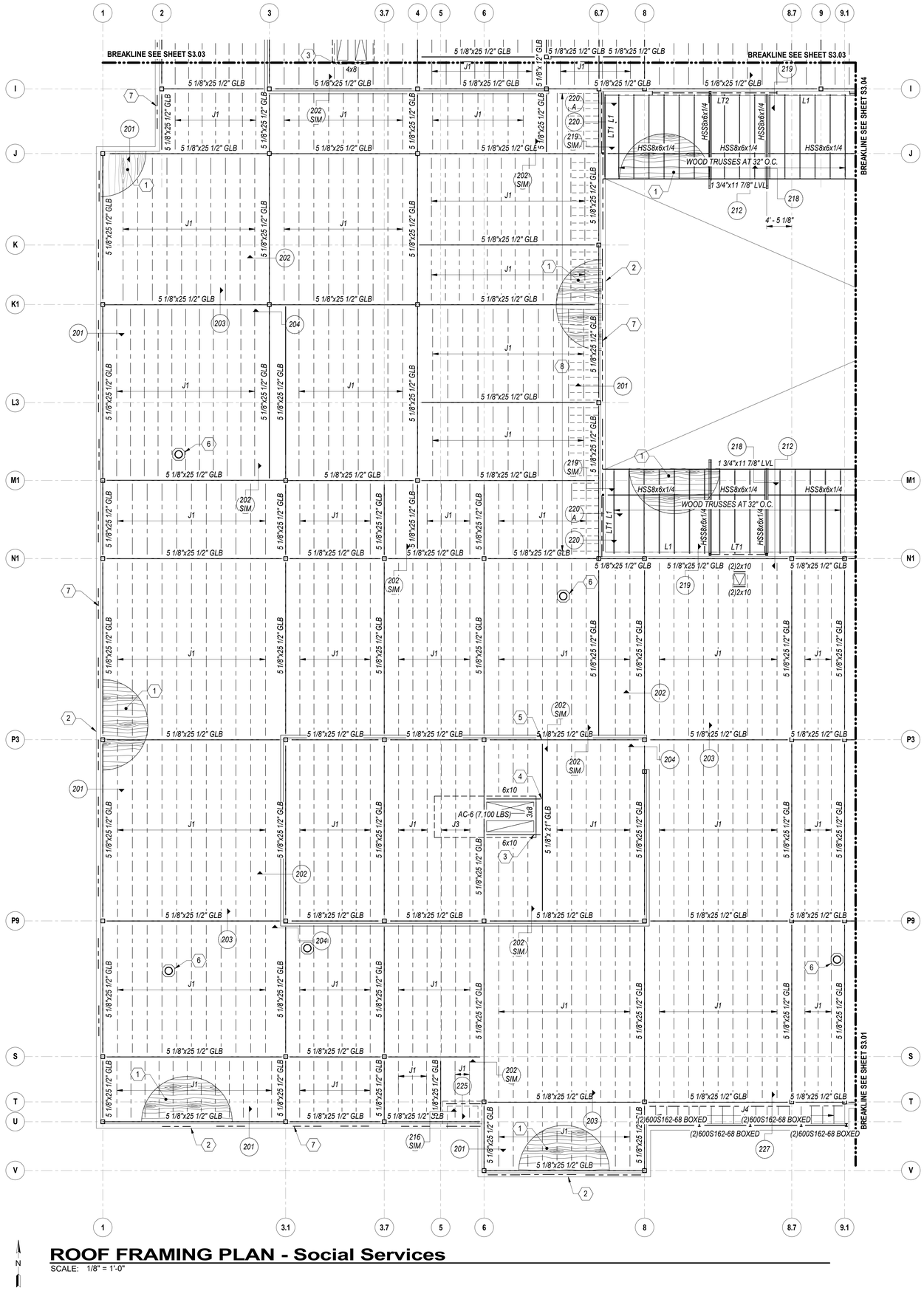


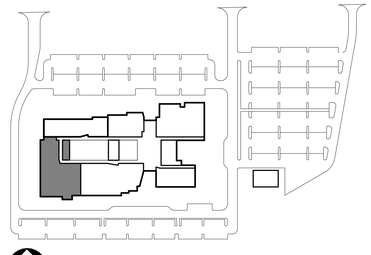
ROOF FRAMING PLAN - Social Services

SCALE: 1/8" = 1'-0"

N

FRAMING KEYNOTES:

1. 1/2" W.S.P. ROOF SHEATHING, ATTACHMENT PER G.S.N.
2. TYPICAL: STEEL STUD WALL.
3. SIMPSON W38 HANGER WITH (4) 10D NAILS, TYPICAL.
4. SIMPSON WNP610 HANGER WITH (5) 10D NAILS, TYPICAL.
5. SIMPSON HWU HANGER WITH (8) 16D AND (6) 10D NAILS, TYPICAL.
6. SKYLIGHT OPENING. COORDINATE SIZE AND LOCATION WITH ARCHITECTURAL DRAWINGS. SEE TYPICAL DETAILS FOR FRAMING AT OPENINGS.
7. LINTEL PER TYPICAL LINTEL SCHEDULE.
8. DIAGONAL BRACES AT 16" O.C.



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Roof Framing Plan - Social Services

S3.5

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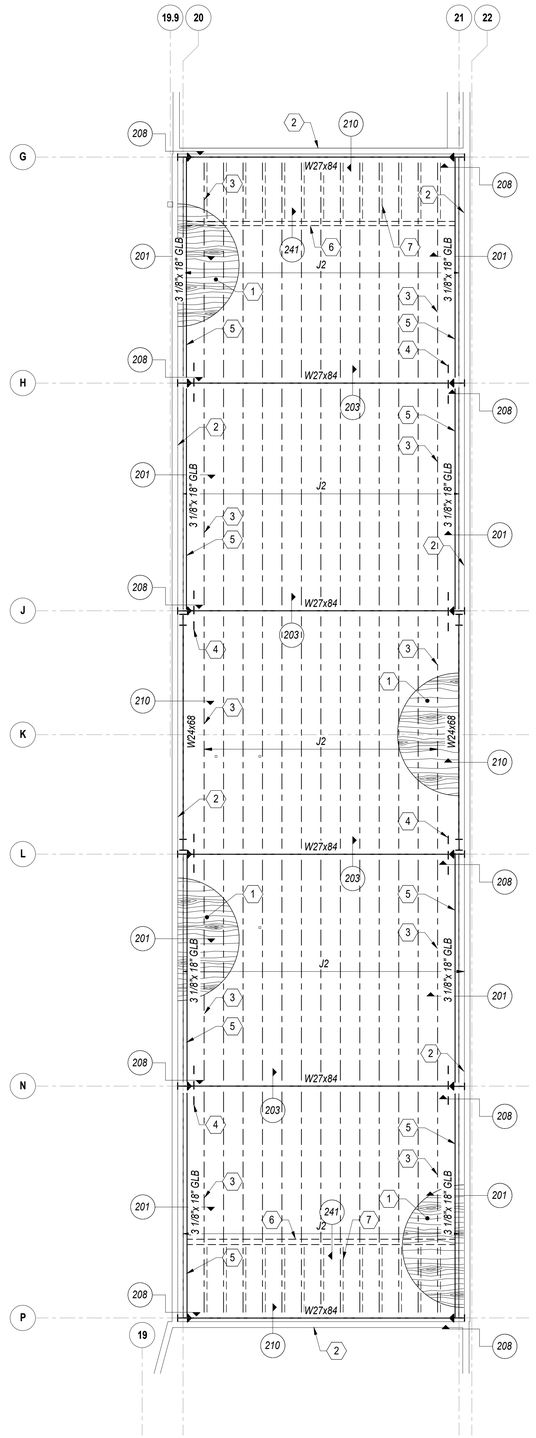
FRAMING KEYNOTES:

1. 1/2" W.S.P. ROOF SHEATHING, ATTACHMENT PER G.S.N.
2. TYPICAL: STEEL STUD WALL.
3. DESIGN JOIST FOR EXTRA 170 PLF DEAD LOAD WHERE WALL HANGS.
4. SIMPSON MST48 STRAP, TYPICAL.
5. 3 1/8"x18" GLB DRAG STRUT.
6. SUSPENDED SOFFIT WALL BELOW, DESIGN EACH JOIST FOR 480 LB DL POINT LOAD.
7. 600S162-33 DIAGONAL STUD SOFFIT WALL BRACE AT 32" O.C. CONNECT TO ROOF BEAM WITH 18GA. FRAMING CLIP WITH (3) #12 WOOD SCREWS AND TO STUDS/BOTTOM TRACK WITH (3) #12 TEK SCREWS.



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ROOF FRAMING PLAN - High Roof

SCALE: 1/8" = 1'-0"

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High Roof Framing Plan

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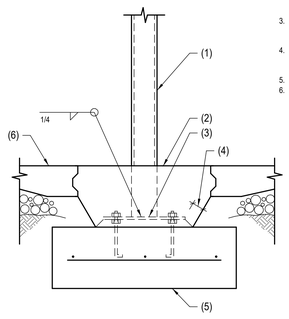
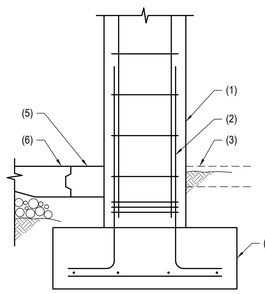


NOTES:

1. STEEL COLUMN.
2. CONCRETE CLOSURE POUR AROUND COLUMN PER TYPICAL DETAIL.
3. STEEL BASE PLATE WITH DOUBLE NUTS OVER 1 1/2"± DRYPACK.
4. 3" MIN CONCRETE COVER ALL AROUND STEEL BELOW GRADE.
5. CONCRETE FOOTING.
6. CONCRETE SLAB ON GRADE.

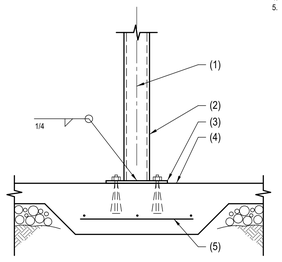
113 INTERIOR STEEL COLUMN FOOTING
SCALE: NOT TO SCALE 238-015



NOTES:

1. CONCRETE COLUMN.
2. DOWELS TO MATCH AND LAP VERTICAL COLUMN REINFORCING PER G.S.N.
3. FINISHED GRADE OR CONCRETE SLAB WHERE OCCURS.
4. CONCRETE FOOTING.
5. CONCRETE CLOSURE POUR WHERE SHOWN ON PLAN. SEE TYPICAL DETAIL.
6. CONCRETE SLAB ON GRADE.

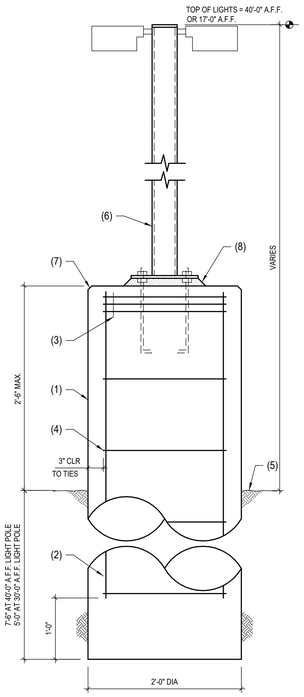
114 EXTERIOR CONCRETE COLUMN FOOTING
SCALE: NOT TO SCALE 244-001



NOTES:

1. CENTERLINE OF COLUMN AND THICKENED SLAB.
2. STEEL COLUMN.
3. STEEL BASE PLATE WITH 3/4" DIA. EXPANSION BOLTS.
4. CONCRETE SLAB ON GRADE.
5. FOOTING REINFORCING.

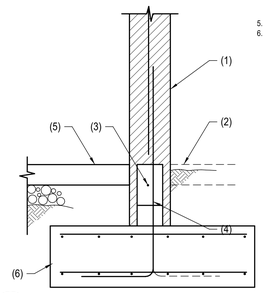
115 STEEL COLUMN AT THICKENED CONCRETE SLAB
SCALE: NOT TO SCALE 238-016



NOTES:

1. CONCRETE SHAFT (f'c = 3000 PSI) SPECIAL INSPECTION REQUIRED.
2. (4) #7 VERTICAL REINFORCING.
3. 3 TIES IN TOP 5" OF SHAFT.
4. #4 TIES AT 12" O.C.
5. FINISH GRADE.
6. POLE, BASE PLATE AND ANCHOR BOLTS BY OTHERS. POLE & CONNECTIONS SHALL BE RATED FOR 100 MPH WIND LOADING.
7. 3/4" CHAMFER ALL AROUND.
8. 1 1/2" MIN, 5000 PSI NON-SHRINK GROUT.

110 CAISSON LIGHT POLE SUPPORT
SCALE: NOT TO SCALE 298-003

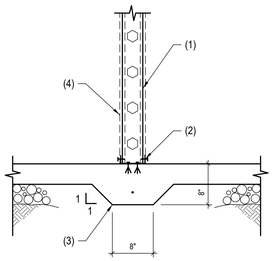


NOTES:

1. MASONRY WALL.
2. FINISHED GRADE OR CONCRETE SLAB WHERE OCCURS.
3. (1) #4 CONTINUOUS.
4. DOWELS TO MATCH AND LAP VERTICAL WALL REINFORCING PER G.S.N. - ALTERNATE BENDS.
5. CONCRETE SLAB ON GRADE, AS OCCURS.
6. CONCRETE FOOTING.

NOTE:
AT CONTRACTOR'S OPTION, USE CONCRETE STEM WALL WITH SAME REINFORCING.

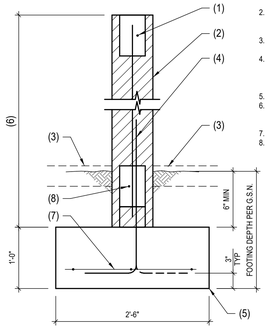
111 EXTERIOR MASONRY WALL FOOTING
SCALE: NOT TO SCALE 221-004



NOTES:

1. STEEL STUD WALL.
2. STEEL TRACK WITH (2) SHOT PINS AT 24" O.C.
3. THICKENED CONCRETE SLAB WITH (1) #4 CONT. AT BOTT.
4. SHEATHING MATERIAL AND ATTACHMENT AS OCCURS.

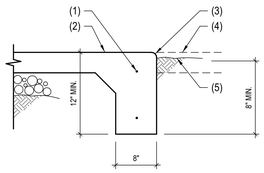
112 STEEL STUD WALL AT CONCRETE SLAB
SCALE: NOT TO SCALE 118058-112-S40



NOTES:

1. (1) #5 CONTINUOUS IN 8" DEEP BOND BEAM.
2. 8" MASONRY WALL WITH #5 VERTICALS AT 32" O.C.
   - GROUT SOLID BELOW GRADE.
3. FINISHED GRADE OR CONCRETE SLAB WHERE OCCURS. DOWELS TO MATCH AND LAP VERTICAL WALL REINFORCING PER G.S.N. - ALTERNATE BENDS.
4. CONCRETE FOOTING.
5. FOR TOP OF WALL, SEE ARCHITECTURAL DRAWINGS - 8'-0" MAXIMUM.
6. (3) #4 CONTINUOUS.
7. (1) #4 CONTINUOUS IN BOND BEAM.

107 8'-0" MAXIMUM FREESTANDING MASONRY WALL AND FOOTING
SCALE: NOT TO SCALE 290-008



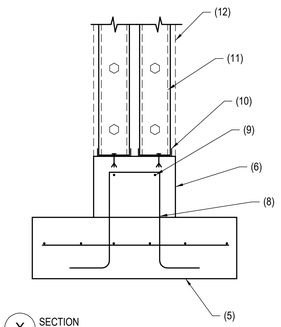
NOTES:

1. (1) #4 CONTINUOUS TOP AND BOTTOM.
2. CONCRETE SLAB ON GRADE.
3. TOOLED EDGE.
4. CONCRETE SLAB WHERE OCCURS.
5. FINISHED GRADE.

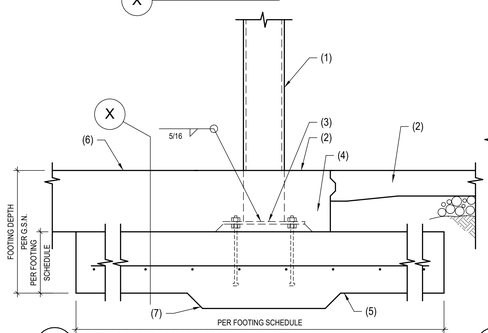
108 CONCRETE TURNDOWN AT BUILDING EDGE
SCALE: NOT TO SCALE 202-001

NOTES:

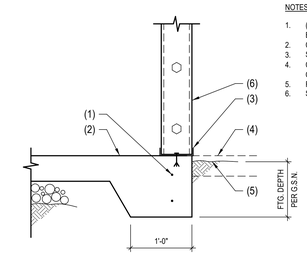
1. STEEL COLUMN.
2. CONCRETE SLAB OR FINISHED GRADE, AS OCCURS.
3. STEEL BASE PLATE WITH DOUBLE NUTS OVER 1 1/2"± DRYPACK.
4. 3" MIN CONCRETE COVER ALL AROUND STEEL BELOW GRADE.
5. CONCRETE FOOTING.
6. 16" WIDE CONCRETE STEM WALL.
7. THICKENED CONCRETE AT ANCHOR BOLTS PER SCHEDULE.
8. #4 BENT DOWELS AT 16" O.C.
9. (2) #4 CONTINUOUS.
10. STEEL TRACK WITH P.A.F. AT 16" O.C.
11. STEEL STUD WALL.
12. CLADDING MATERIAL AS OCCURS.



X SECTION



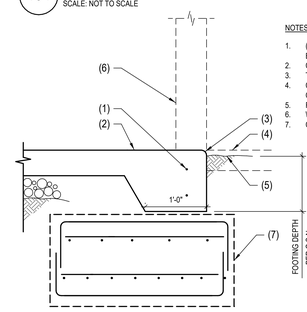
109 EXTERIOR STEEL COLUMN FOOTING WITH STEM WALL
SCALE: NOT TO SCALE 238-015



NOTES:

1. (1) #4 CONTINUOUS TOP AND BOTTOM.
2. CONCRETE SLAB ON GRADE.
3. STEEL TRACK.
4. CONCRETE SLAB WHERE OCCURS.
5. FINISHED GRADE.
6. STEEL STUD WALL.

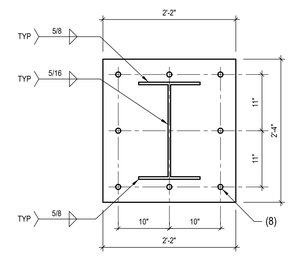
104 CONCRETE TURNDOWN AT BUILDING EDGE
SCALE: NOT TO SCALE 118058-X-DETAILS-104



NOTES:

1. (1) #4 CONTINUOUS TOP AND BOTTOM.
2. CONCRETE SLAB ON GRADE.
3. TOOLED EDGE.
4. CONCRETE SLAB WHERE OCCURS.
5. FINISHED GRADE.
6. WALL BEYOND.
7. COMBINED FOOTING AT 105A.

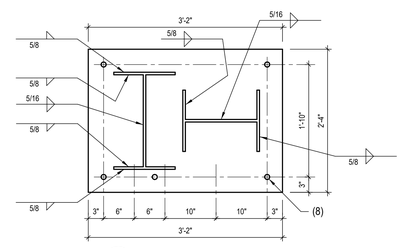
105 CONCRETE TURNDOWN AT BUILDING EDGE
A AS NOTED SCALE: NOT TO SCALE 118058-X-DETAILS-105



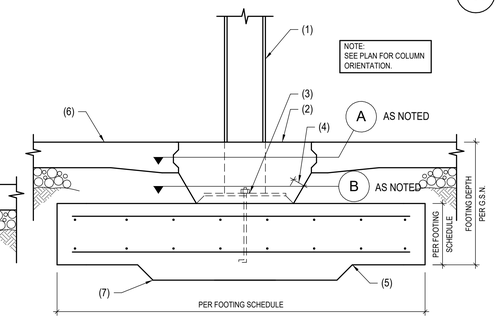
NOTES:

1. STEEL COLUMN.
2. CONCRETE CLOSURE POUR AROUND COLUMN PER TYPICAL DETAIL.
3. STEEL BASE PLATE WITH DOUBLE NUTS OVER 1 1/2"± DRYPACK.
4. 3" MIN CONCRETE COVER ALL AROUND STEEL BELOW GRADE.
5. CONCRETE FOOTING.
6. CONCRETE SLAB ON GRADE.
7. THICKENED CONCRETE AT ANCHOR BOLTS PER SCHEDULE.
8. 1.8125" DIA. BOLT HOLE. (TYP.)

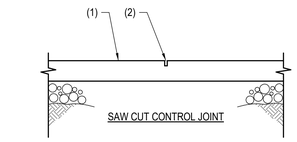
A BASE PLATE



B BASE PLATE

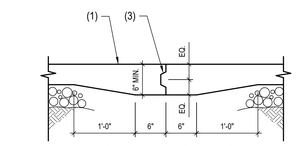


106 INTERIOR STEEL COLUMN FOOTING
A AS NOTED
B AS NOTED
SCALE: NOT TO SCALE 118058-106-S40



NOTES:

1. CONCRETE SLAB ON GRADE.
2. SAWCUT - 1/8" WIDE x 1/4 SLAB THICKNESS IN DEPTH CUT SHALL BE MADE SOON ENOUGH TO PREVENT SHRINKAGE CRACKING, BUT NOT SO SOON AS TO CAUSE SPALLING OF THE CONCRETE WHILE SAWING. WORK MUST BE ACCOMPLISHED WITHIN 24 HOURS OF CONCRETE PLACEMENT.
3. CONTINUOUS KEY - SEE TYPICAL KEY IN CONCRETE DETAIL.



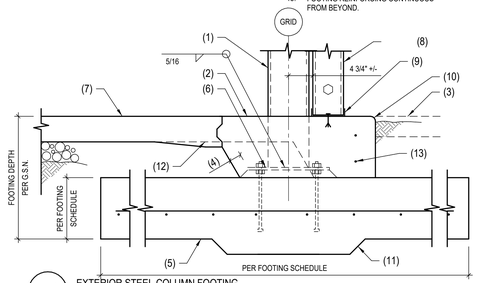
NOTES:

A. "TOOL WET JOINT", "ZIP STRIP", ETC. SHALL MATCH SAWCUT REQUIREMENTS.
B. KEYED JOINTS NEED ONLY OCCUR AT EXPOSED EDGES DURING PLACEMENT UNLESS SPECIFICALLY NOTED ON THE PLANS

101 TYPICAL JOINTS IN CONCRETE SLAB ON GRADE
SCALE: NOT TO SCALE 201-001-TYP

NOTES:

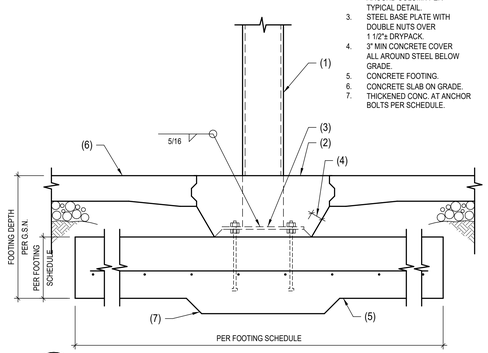
1. STEEL COLUMN.
2. CONCRETE CLOSURE POUR PER TYPICAL DETAIL.
3. FINISHED GRADE OR CONCRETE SLAB AS OCCURS.
4. 3" MINIMUM CONCRETE COVER AROUND ALL STEEL BELOW GRADE.
5. CONCRETE FOOTING.
6. STEEL BASE PLATE WITH DOUBLE NUTS OVER 1 1/2"± DRYPACK.
7. CONCRETE SLAB ON GRADE.
8. STEEL STUD WALL.
9. STEEL TRACK.
10. TOOLED EDGE.
11. THICKENED CONCRETE AT ANCHOR BOLTS PER SCHEDULE.
12. CONCRETE TURNDOWN BEYOND.
13. FOOTING REINFORCING CONTINUOUS FROM BEYOND.



102 EXTERIOR STEEL COLUMN FOOTING
SCALE: NOT TO SCALE 238-006

NOTES:

1. STEEL COLUMN.
2. CONCRETE CLOSURE POUR AROUND COLUMN PER TYPICAL DETAIL.
3. STEEL BASE PLATE WITH DOUBLE NUTS OVER 1 1/2"± DRYPACK.
4. 3" MIN CONCRETE COVER ALL AROUND STEEL BELOW GRADE.
5. CONCRETE FOOTING.
6. CONCRETE SLAB ON GRADE.
7. THICKENED CONC. AT ANCHOR BOLTS PER SCHEDULE.



103 INTERIOR STEEL COLUMN FOOTING
SCALE: NOT TO SCALE 238-015

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DATE SIGNED
ARIZONA, U.S.A.
Expires 12/31/19

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date
11/16/18

revisions

Pascua Yaqui Tribe
Health Services Center II
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Tucson, AZ 85746

Foundation Details

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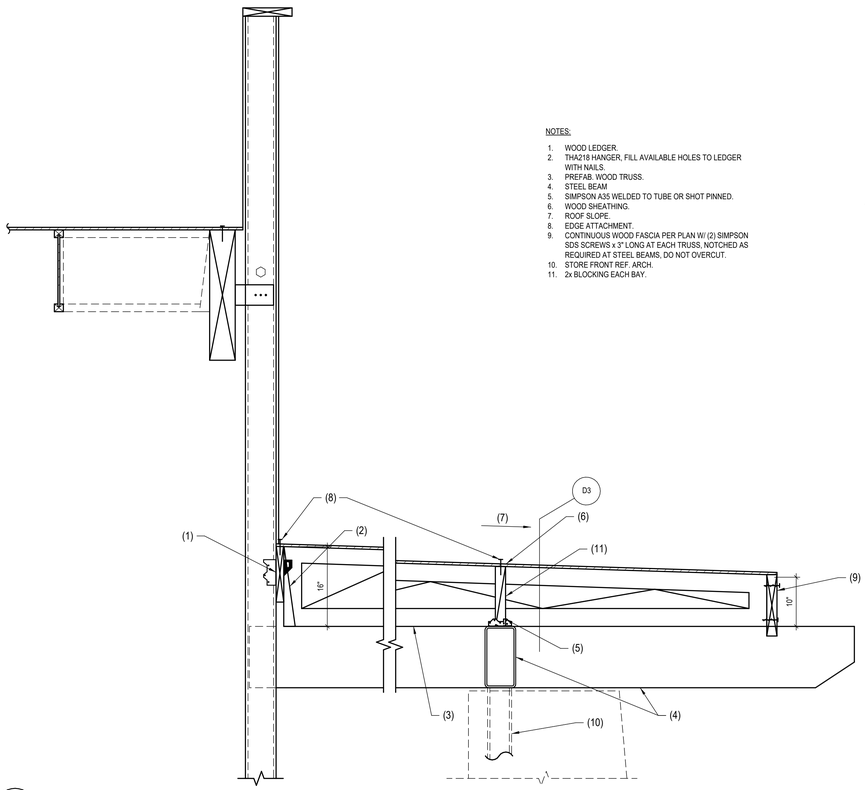
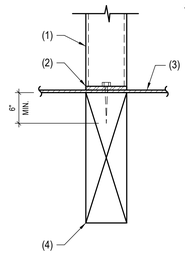


NOTES:

1. WOOD LEDGER.
2. THA218 HANGER, FILL AVAILABLE HOLES TO LEDGER WITH NAILS.
3. PREFAB. WOOD TRUSS.
4. STEEL BEAM
5. SIMPSON A35 WELDED TO TUBE OR SHOT PINNED.
6. WOOD SHEATHING.
7. ROOF SLOPE.
8. EDGE ATTACHMENT.
9. CONTINUOUS WOOD FASCIA PER PLAN W/ (2) SIMPSON SDS SCREWS x 3" LONG AT EACH TRUSS, NOTCHED AS REQUIRED AT STEEL BEAMS, DO NOT OVERCUT.
10. STORE FRONT REF. ARCH.
11. 2x BLOCKING EACH BAY.

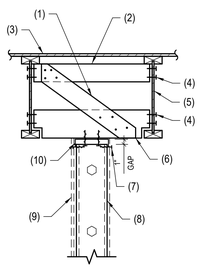
212 SECTION
SCALE: NOT TO SCALE 118058-X-DETAILS-212



NOTES:

1. HSS8x8x3/8 COLUMN.
2. STEEL BASE PL. 3/4x8x1'-2" WITH (2) 3/4" DIA. LAG SCREWS.
3. ROOF SHEATHING PER PLAN.
4. WOOD BEAM PER PLAN.

215 SCREEN WALL COLUMN TO WOOD BEAM
SCALE: NOT TO SCALE 118058-X-DETAILS-215



NOTES:

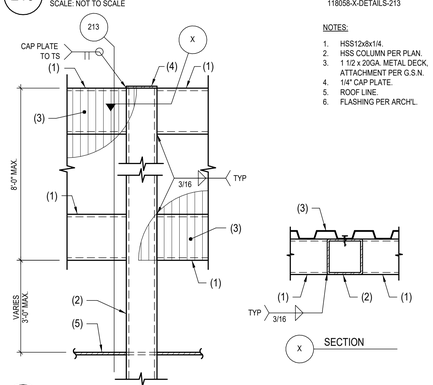
1. 2x4 DIAGONAL BRACING AT 32" O.C. WITH (4) 10d NAILS AT ENDS.
2. 2x4 BLOCKING SPACED AT 32" O.C.
3. ROOF SHEATHING.
4. (2) 16d NAILS THROUGH WEB TO BLOCKING.
5. WOOD I-JOIST.
6. 2x6 BLOCKING NOTCHED AT ENDS, SPACED AT 32" O.C.
7. #12 SCREWS, EACH SIDE, FROM STUD TO TRACK.
8. STEEL STUD WALL.
9. SHEATHING MATERIAL AND ATTACHMENT AS OCCURS.
10. 18 GAGE DEEP LEG SLIP TRACK W/ (2) #12 WOOD SCREWS TO WOOD BLOCK.

216 NON-BEARING STEEL STUD WALL AT WOOD I-JOIST
SCALE: NOT TO SCALE 118058-X-DETAILS-216

NOTES:

1. HSS12x8x1/4.
2. HSS COLUMN PER PLAN.
3. 1 1/2 x 20GA. METAL DECK, ATTACHMENT PER G.S.N.
4. FLASHING PER ARCHITECTURAL.
5. ROOF LINE.

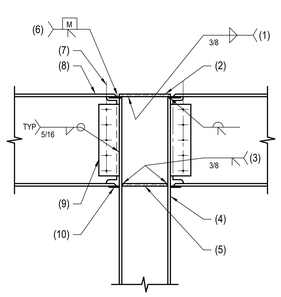
213 SCREEN WALL AT ROOF
SCALE: NOT TO SCALE 118058-X-DETAILS-213



NOTES:

1. HSS12x8x1/4.
2. HSS COLUMN PER PLAN.
3. 1 1/2 x 20GA. METAL DECK, ATTACHMENT PER G.S.N.
4. 1/4" CAP PLATE.
5. ROOF LINE.
6. FLASHING PER ARCH'L.

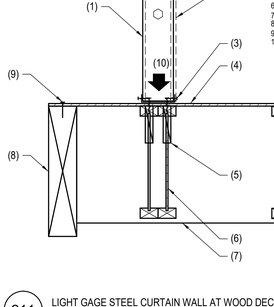
214 SCREEN WALL AT ROOF
SCALE: NOT TO SCALE 118058-X-DETAILS-214



NOTES:

1. WELD BOTH PLATES.
2. A992, GR 50 STEEL CONTINUITY PLATE - THICKNESS TO MATCH BEAM FLANGE (1/2" MINIMUM).
3. WELD EACH PLATE - TYP.
4. STEEL COLUMN.
5. A992, GR 50 STEEL CONTINUITY PLATE - THICKNESS TO MATCH BEAM FLANGE (1/2" MINIMUM), AT LEVEL OF BOTTOM FLANGE FULL WIDTH OF COLUMN FLANGE EACH SIDE OF WEB - TYPICAL.
6. WELD TYPICAL TOP AND BOTTOM FLANGE.
7. FOR SIZE, TYPE AND NUMBER OF BOLTS, SEE TYPICAL BOLT SCHEDULE.
8. STEEL BEAM.
9. SHEAR PLATE PER TYPICAL CONNECTION DETAIL.
10. STEEL BACKER PLATE.

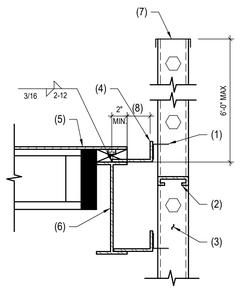
208 TYPICAL MOMENT CONNECTION - STEEL BEAM TO STEEL COLUMN
SCALE: NOT TO SCALE 118058-X-DETAILS-208



NOTES:

1. STEEL COLUMN.
2. 3/8" STEEL PLATE - EXTEND 1" PAST COLUMN FLANGES.
3. WOOD BEAM.
4. 1/4" BENT "U" PLATE WITH (2) 3/4" DIA. THRU-BOLTS.

209 WOOD BEAM AT STEEL COLUMN
SCALE: NOT TO SCALE 118058-X-DETAILS-209



NOTES:

1. SLIDE CLIP PER TYP DETAIL.
2. SOLID BLOCKING - SAME SIZE AND GAGE AS STUDS.
3. STEEL STUDS.
4. CONTINUOUS 1/4" BENT PLATE.
5. SHEATHING.
6. STEEL BEAM.
7. CONTINUOUS TOP TRACK.
8. AS REQUIRED - 12" MAX.

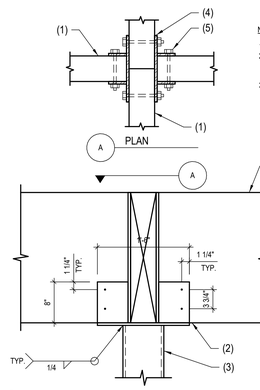
TYPICAL NOTES:
1. SEGMENT BENT PLATE TO RADIUS AS REQUIRED.

210 LIGHT GAGE STEEL CURTAIN WALL AT STEEL BEAM
SCALE: NOT TO SCALE 567-011

NOTES:

1. METAL STUD WALL.
2. SHEATHING AS OCCURS.
3. STEEL TRACK WITH #12 SCREWS AT 12" O.C.
4. SHEATHING.
5. 2x WOOD BLOCKING.
6. PLYWOOD WEB FILLER.
7. GLULAM BEYOND.
8. WOOD BEAM.
9. EDGE ATTACHMENT.
10. DESIGN JOISTS FOR ADDITIONAL 255 PLF DL AT SUPPORTED WALL.

211 LIGHT GAGE STEEL CURTAIN WALL AT WOOD DECK
SCALE: NOT TO SCALE 118058-X-DETAILS-203

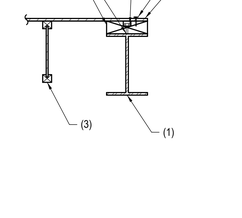


NOTES:

1. WOOD BEAM.
2. 1/4" BENT STEEL "U" PLATE WITH (8) 3/4" DIA. THRU-BOLTS, (2) PER BEAM.
3. STEEL COLUMN.

NOTE:
EQUIVALENT SIMPSON CCO COLUMN CAP MAY BE USED AT CONTRACTOR'S OPTION.

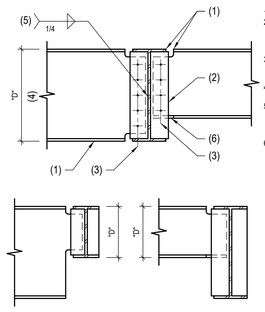
204 WOOD BEAMS AT STEEL COLUMN
SCALE: NOT TO SCALE 118058-X-DETAILS-204



NOTES:

1. STEEL BEAM.
2. SHEATHING.
3. PLYWOOD WEB FILLER.
4. 1/2" STUDS WELDED TO STEEL BEAM AT 2'-0" O.C.
5. 4x WOOD NAILER WITH 1" MAX. COUNTERSINK.
6. WOOD I-JOIST.
7. JOIST HANGER.

205 WOOD I-JOIST AT STEEL BEAM
SCALE: NOT TO SCALE 616-004



NOTES:

1. STEEL BEAM.
2. 3/8" STEEL SHEAR PLATE - USE 5/8" STEEL SHEAR PLATE WHERE "D" = 27" OR GREATER.
3. FOR SIZE, TYPE AND NUMBER OF BOLTS, SEE TYPICAL BOLT SCHEDULE.
4. "D" = LESSER OF BEAM DEPTHS AS OCCURS.
5. WELD 3 SIDES TYPICAL - USE SAME CONNECTION AT STIFFENER PLATES WHEN REQUIRED.
6. COPE NEAR SIDE OF BEAM FLANGE TO CLEAR STIFFENER.

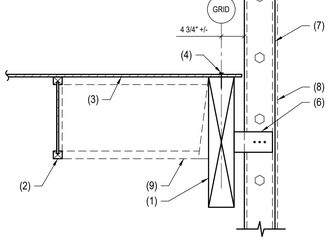
NOTE:
AT ONE SIDED CONNECTIONS, INSTALL 3/8" STIFFENER PLATE OPPOSITE SHEAR PLATE.

206 TYPICAL FRAMED BEAM TO BEAM CONNECTION
SCALE: NOT TO SCALE 513-010-TYP

NOTES:

1. STEEL BEAM.
2. SHEATHING.
3. WOOD I-JOIST.
4. 1/2" STUDS WELDED TO STEEL BEAM AT 2'-0" O.C.
5. 4x WOOD NAILER WITH 1" MAX. COUNTERSINK.
6. EDGE ATTACHMENT.

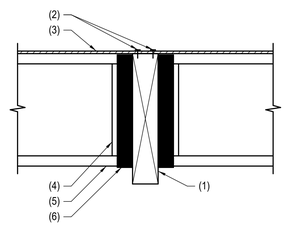
207 WOOD SHEATHING AT STEEL BEAM
SCALE: NOT TO SCALE 616-004



NOTES:

1. WOOD BEAM
2. WOOD I-JOIST.
3. WSP SHEATHING.
4. EDGE NAILING.
5. CONTINUOUS TOP TRACK.
6. SIMPSON SCB 47.5 AT EVERY STUD TO BEAM.
7. STEEL STUD WALL.
8. SHEATHING MATERIAL AND ATTACHMENT AS OCCURS.
9. BEARING JOISTS AS OCCURS.

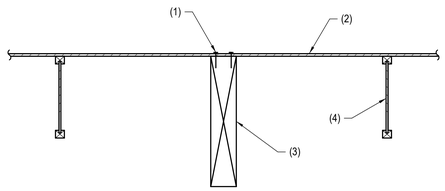
201 WOOD BEAM AT STEEL STUD WALL
SCALE: NOT TO SCALE 118058-X-DETAILS-201



NOTES:

1. WOOD BEAM.
2. DOUBLE EDGE ATTACHMENT U.N.O.
3. SHEATHING.
4. WEB STIFFENER.
5. WOOD I-JOIST.
6. JOIST HANGER.

202 WOOD I-JOIST AT WOOD BEAM
SCALE: NOT TO SCALE 615-003



NOTES:

1. EDGE ATTACHMENT U.N.O.
2. SHEATHING.
3. WOOD BEAM.
4. WOOD I-JOIST.

203 WSP SHEATHING AT WOOD BEAM
SCALE: NOT TO SCALE 118058-X-DETAILS-203

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Project Number: 118058

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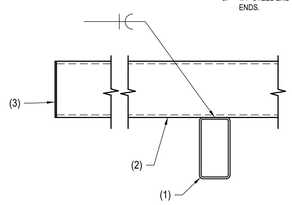
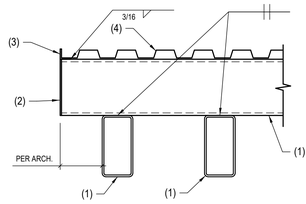
NOTES:
1. STEEL BEAM.
2. STEEL JOIST.
3. 1/4" STEEL END LATE, BOTH ENDS.



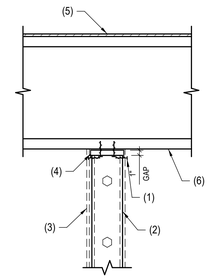
231 STEEL JOIST AT STEEL BEAM
SCALE: NOT TO SCALE 118058-X-DETAILS-231

NOTES:
1. STEEL BEAM.
2. 1/4" STEEL CAP PLATE.
3. L2x2x1/4" EDGE ANGLE, CONTINUOUS.
4. STEEL DECK.



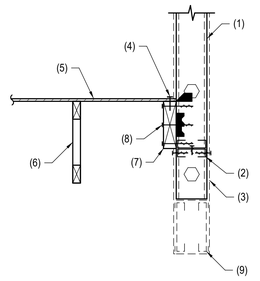
227 STEEL CANOPY EDGE
SCALE: NOT TO SCALE 118058-X-DETAILS-227

NOTES:
1. #12 SCREWS, EACH SIDE, FROM STUD TO TRACK.
2. STEEL STUD WALL.
3. SHEATHING MATERIAL AND ATTACHMENT AS OCCURS.
4. 16 GAGE DEEP LEG SLIP TRACK W/ (2) #12 WOOD SCREWS TO WOOD BLOCK.
5. WSP SHEATHING.
6. WOOD I-JOIST.



224 NON-BEARING STEEL STUD WALL AT WOOD I-JOIST
SCALE: NOT TO SCALE 118058-X-DETAILS-217

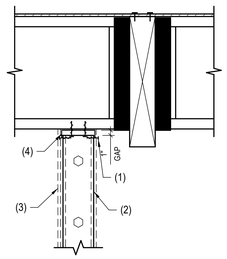
NOTES:
1. STEEL STUD WALL.
2. DOUBLE BLOCKING AT BOTTOM OF LEDGER. ATTACH WITH (3) #8 SCREWS TOGETHER.
3. SHEATHING MATERIAL AND ATTACHMENT AS OCCURS.
4. EDGE ATTACHMENT.
5. WSP SHEATHING.
6. WOOD TRUSS.
7. WOOD LEDGER.
8. (3) #8 SCREWS PER BLOCK.
9. STEEL STUD LINTEL AT 220A.



220 NON-BEARING STEEL STUD WALL AT WOOD I-JOIST
SCALE: NOT TO SCALE (A) AS NOTED 118058-X-DETAILS-220

NOTES:
1. #12 SCREWS, EACH SIDE, FROM STUD TO TRACK.
2. STEEL STUD WALL.
3. SHEATHING MATERIAL AND ATTACHMENT AS OCCURS.
4. 16 GAGE DEEP LEG SLIP TRACK W/ (2) #12 WOOD SCREWS TO WOOD BLOCK.

FOR INFORMATION NOT SHOWN SEE DETAIL 202.

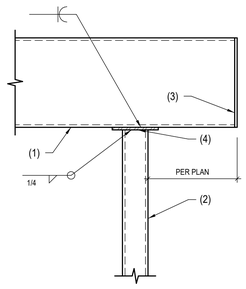


217 NON-BEARING STEEL STUD WALL AT WOOD I-JOIST
SCALE: NOT TO SCALE 118058-X-DETAILS-217

NOTES:
1. STEEL BEAM.
2. (2) #5 IN 8" DEEP CONT. BOND BEAM.
3. MASONRY WALL.
4. 1/2" +/- DRY PACK AT EMBED PLATES.
5. 1/2"x7"x8" EMBED PLATE W/ (2) 3/4" DIA. A.B.'s, PLACE AT ENDS OF MASONRY PIER AND SPACE AT 24" O.C. MAX.
6. 12" WOOD TRUSS.
7. SHEATHING.
8. TRUSS BLOCKING

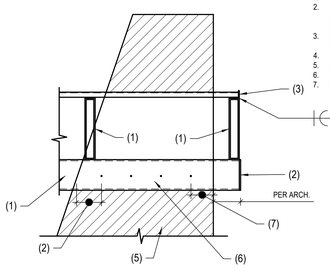
FOR INFORMATION NOT SHOWN SEE DETAIL 212.

NOTES:
1. STEEL BEAM.
2. STEEL COLUMN.
3. 1/4" END PLATE.
4. 1/2" CAP PLATE, 8" LONG.



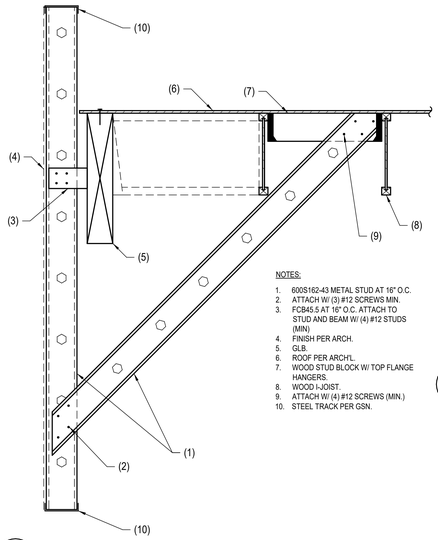
232 STEEL BEAM TO STEEL COLUMN
SCALE: NOT TO SCALE 515-037

NOTES:
1. STEEL BEAM.
2. 1/4" STEEL CAP PLATE, INTERRUPT AT MASONRY PIER AS REQUIRED.
3. L2x2x1/4" EDGE ANGLE, CONTINUOUS.
4. STEEL DECK.
5. MASONRY PIER.
6. 3/4" DIA. ANCHORS AT 8" O.C.
7. 4" MIN.



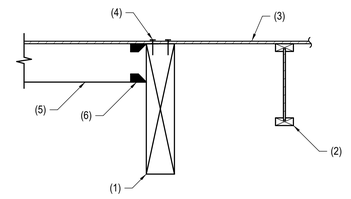
228 EXTERIOR CANOPY BEAM TO MASONRY PIER
SCALE: NOT TO SCALE 118058-X-DETAILS-228

NOTES:
1. 600S162-43 METAL STUD AT 16" O.C.
2. ATTACH W/ (3) #12 SCREWS MIN.
3. FCB45.5 AT 16" O.C. ATTACH TO STUD AND BEAM W/ (4) #12 STUDS (MIN)
4. FINISH PER ARCH.
5. GLB.
6. ROOF PER ARCH'L.
7. WOOD STUD BLOCK W/ TOP FLANGE HANGERS.
8. WOOD I-JOIST.
9. ATTACH W/ (4) #12 SCREWS (MIN.)
10. STEEL TRACK PER GSN.



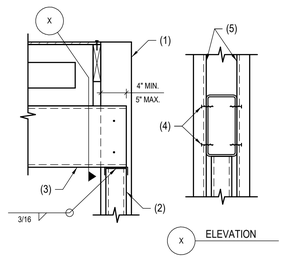
225 NON-BEARING STEEL STUD WALL AT WOOD I-JOIST
SCALE: NOT TO SCALE 118058-X-DETAILS-217

NOTES:
1. WOOD BEAM.
2. WOOD I-JOIST.
3. WSP SHEATHING.
4. DOUBLE EDGE NAILING.
5. WOOD JOIST.
6. JOIST HANGER.



221 WOOD JOIST AT WOOD BEAM
SCALE: NOT TO SCALE 118058-X-DETAILS-221

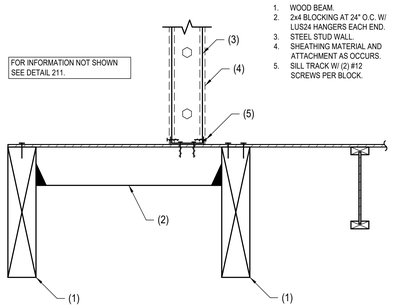
NOTES:
1. STEEL STUD WALL.
2. STEEL COLUMN.
3. STEEL BEAM.
4. (2) #12 SCREWS TO STEEL BEAM.
5. PLACE STEEL STUD ON EACH SIDE OF BEAM.



219 STEEL BEAM AT STEEL STUD WALL
SCALE: NOT TO SCALE 118058-X-DETAILS-219

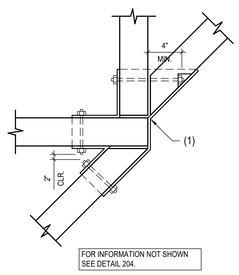
NOTES:
1. WOOD BEAM.
2. 2x4 BLOCKING AT 24" O.C. W/ LUS24 HANGERS EACH END.
3. STEEL STUD WALL.
4. SHEATHING MATERIAL AND ATTACHMENT AS OCCURS.
5. SILL TRACK W/ (2) #12 SCREWS PER BLOCK.

FOR INFORMATION NOT SHOWN SEE DETAIL 211.



223 STEEL STUD WALL AT WOOD DECK
SCALE: NOT TO SCALE 118058-X-DETAILS-221

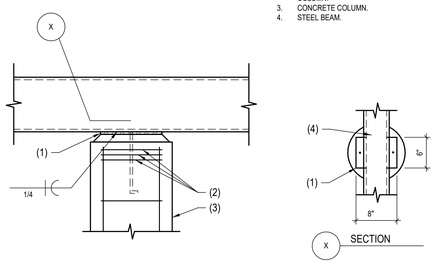
NOTES:
1. 3/8" BENT PLATES AT EXTENDED DIAGONAL CONNECTIONS.



FOR INFORMATION NOT SHOWN SEE DETAIL 204.

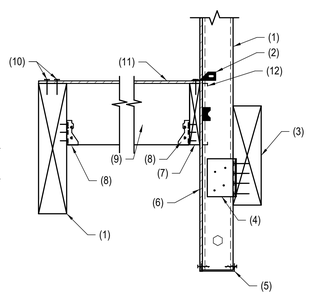
222 PLAN VIEW - WOOD BEAM AT STEEL COLUMN
SCALE: NOT TO SCALE 118058-X-DETAILS-221

NOTES:
1. 1/2" x 6" x 0'-8" STEEL BEARING PLATE W/ (2) 3/4" DIA. ANCHORS WELDED TO BASE PLATE AT 5" SPACING OVER 1 1/2"± DRYPACK.
2. (3) #3 TIES IN TOP 5" OF COLUMN.
3. CONCRETE COLUMN.
4. STEEL BEAM.



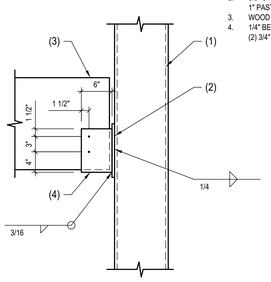
233 STEEL BEAM AT CONCRETE COLUMN
SCALE: NOT TO SCALE 518-011

NOTES:
1. STEEL STUD.
2. SIMPSON #3 AT EACH STUD WITH #10 SCREWS TO STUD AND 10D NAILS TO LEDGER.
3. WOOD BEAM.
4. 16 GA. FRAMING ANGLE (STIFF CLIP) WITH (3) SIMPSON SDS 1/4" x 3" SCREWS TO BEAM AND (3) #12 SCREWS TO EACH STUD.
5. 600T200-43 TRACK WITH (2) #12 SCREWS AT EACH STUD.
6. 1/2" WSP SHEATHING.
7. WOOD LEDGER.
8. SIMPSON LUS HANGER.
9. WOOD JOIST.
10. EDGE NAILING.
11. WSP WALL SHEATHING.
12. 1200S162-43 BLOCK WITH SIMPSON A34 EACH END.



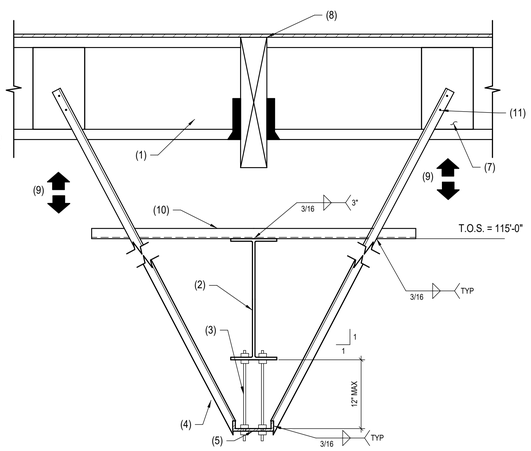
229 ATTACHED ROOF AT SUSPENDED ENTRY WALL
SCALE: NOT TO SCALE 118058-X-DETAILS-229

NOTES:
1. STEEL COLUMN.
2. 3/8" STEEL PLATE - EXTEND 1" PAST COLUMN FLANGES.
3. WOOD BEAM.
4. 1/4" BENT "U" PLATE WITH (2) 3/4" DIA. THRU-BOLTS.



230 WOOD BEAM AT STEEL COLUMN
SCALE: NOT TO SCALE 638-100

NOTES:
1. STEEL STUD.
2. 5/8" DIA. ALL THREAD WITH DOUBLE NUTS TOP AND BOTTOM AT 4'-0" O.C.
3. STEEL ANGLE BRACE L2 1/2x2 1/2x3/16 EACH SIDE AT 8' O.C.
4. CONTINUOUS STEEL CHANNEL MC8x18.7.
5. ALL THREADED ROD WITH DOUBLE NUTS. TOP AND BOTTOM TO MATCH FOLDING PARTITION.
6. WOOD I-JOIST PER PLANS.
7. WEB STIFFENER PER JOIST MANUFACTURER
8. STEEL BEAM PER PLANS.
9. GLUE LAM. BEAM ABOVE.
10. JOIST SHALL BE DESIGNED FOR AN ADDITIONAL LOAD OF 480 LBS UP AND DOWN AT BRACE LOCATIONS.
11. STEEL ANGLE BRACE L2.5x2.5x3/16 AT 1/3 POINTS OF BEAM (+/- 2' EITHER WAY)
12. W/ (2) 1/2" THRU BOLTS.



226 FOLDING PARTITION SUPPORT
SCALE: NOT TO SCALE 598-513

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Registered Professional Engineer (Structural)
CERTIFICATE NO.
45795
DAVID M. GIBBENS
DATE SIGNED
ARIZONA, U.S.A.
Expires 12/31/19

THIS ELECTRONIC SIGNATURE HAS BEEN AUTHORIZED BY ME THIS: 11/29/18

job
1717

date
11/16/18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

Framing Details

S5.1

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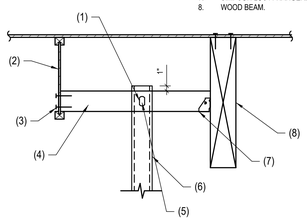
NOTES:

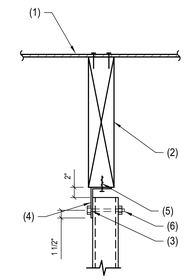
1. 1-1/2" VERTICALLY SLOTTED HOLE.
2. WOOD I-JOIST.
3. (4) 16D NAILS.
4. 4x4 BLOCKING.
5. ¾" THROUGH BOLT, COLUMN TO BLOCKING. FINGER TIGHTEN AND UPSET THREADS.
6. STEEL COLUMN.
7. SIMPSON LUS44 HANGER.
8. WOOD BEAM.



238 STEEL COLUMN AT WOOD FRAMING.
SCALE: NOT TO SCALE 118058-X-DETAILS-203

NOTES:

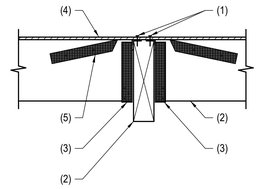
1. WSP SHEATHING.
2. WOOD BEAM.
3. 1-1/2" VERTICALLY SLOTTED HOLE IN ANGLE.
4. L6x4x¼"x8" LONG, LLV
5. (2) ¾"x6" LAG SCREWS x 4" SACING.
6. ¾" THROUGH BOLT, FINGER TIGHTEN AND UPSET THREADS.



235 STEEL COLUMN AT WOOD BEAM
SCALE: NOT TO SCALE

NOTES:

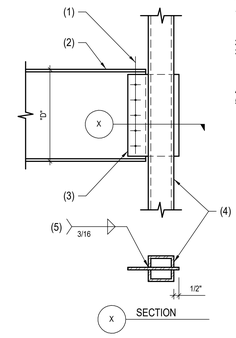
1. EDGE ATTACHMENT U.N.O.
2. WOOD BEAM.
3. SIMPSON HW TYPE BEAM HANGER.
4. SHEATHING.
5. SIMPSON HSA TYPE STRAP WITH (2) 3/4" DIA. THRU-BOLTS EACH SIDE OF BEAM.



239 WOOD BEAM CHORD TIES AT WOOD BEAM
SCALE: NOT TO SCALE 636-003

NOTES:

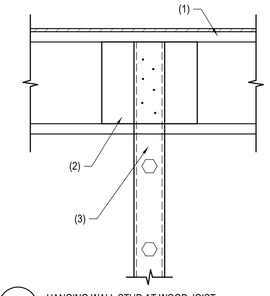
1. FOR SIZE, TYPE AND NUMBER OF BOLTS, SEE TYPICAL BOLT SCHEDULE.
2. STEEL BEAM.
3. 3/8" STEEL THRU PLATE - 5/8" STEEL THRU PLATE WHERE "D" > 27" OR GREATER.
4. STEEL COLUMN.
5. WELD BOTH SIDES - TYPICAL.



236 STEEL BEAM TO STEEL COLUMN CONNECTION
SCALE: NOT TO SCALE 514-022

NOTES:

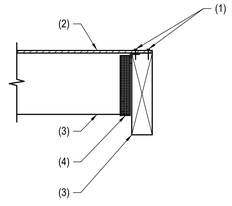
1. WOOD JOIST.
2. WEB FILLER PER JOIST MANUF.
3. 600S162-33 WALL STUD, EXTEND EVERY OTHER STUD (32" O.C.) INTO AND CONNECT TO JOIST WITH (3) #8 SIMPSON SDS SCREWS.



241 HANGING WALL STUD AT WOOD JOIST
SCALE: NOT TO SCALE 118058-X-DETAILS-241

NOTES:

1. EDGE ATTACHMENT U.N.O.
2. SHEATHING.
3. WOOD BEAM.
4. SIMPSON HW TYPE BEAM HANGER.

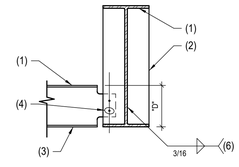


NOTE:
DAP BEAM AS REQUIRED.

240 WOOD BEAM AT WOOD BEAM
SCALE: NOT TO SCALE 636-021

NOTES:

1. STEEL BEAM.
2. 3/8" STIFFENER PLATE.
3. SET BOTTOM OF BEAMS FLUSH.
4. BOLT SIZE AND MEMBER PER BOLT SCHEDULE.
5. 3/8" SHEAR PLATE.
6. 3 SIDES TYPICAL.



237 STEEL BEAM AT STEEL BEAM
SCALE: NOT TO SCALE 513-040

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Registered Professional Engineer (Structural)
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S5.2

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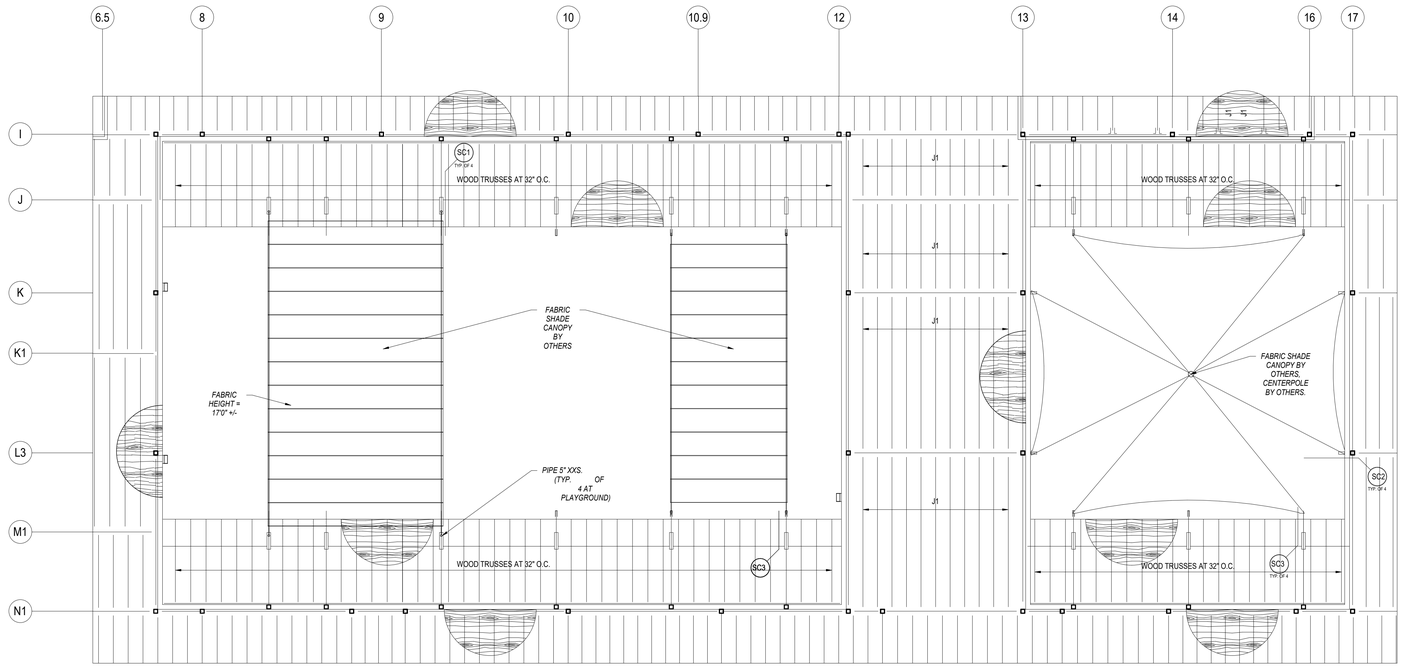
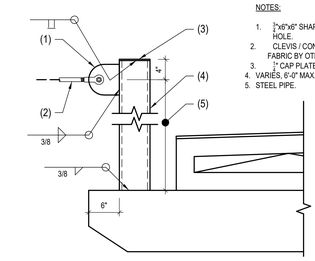
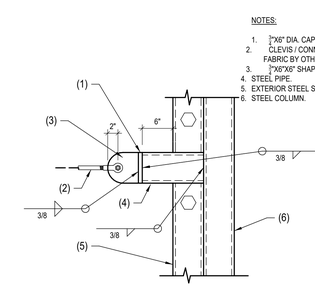




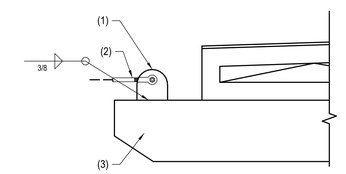
SC1 SHADE FABRIC SUPPORT PIPE

SCALE: NOT TO SCALE



SC2 SHADE FABRIC SUPPORT PIPE AT STEEL COLUMN

SCALE: NOT TO SCALE



SC3 SHADE FABRIC SUPPORT AT STEEL BEAM

SCALE: NOT TO SCALE

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revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

Shade Canopy Plan and Details

S6.0

SCHNEIDER
STRUCTURAL ENGINEERS
CREATING ELEGANT SOLUTIONS
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Project Number: 118058

UNLESS THIS DRAWING IS SIGNED AND SEALED BY A LICENSED STRUCTURAL ENGINEER, IT IS A PRELIMINARY DESIGN AND SHALL NOT BE USED FOR CONSTRUCTION.

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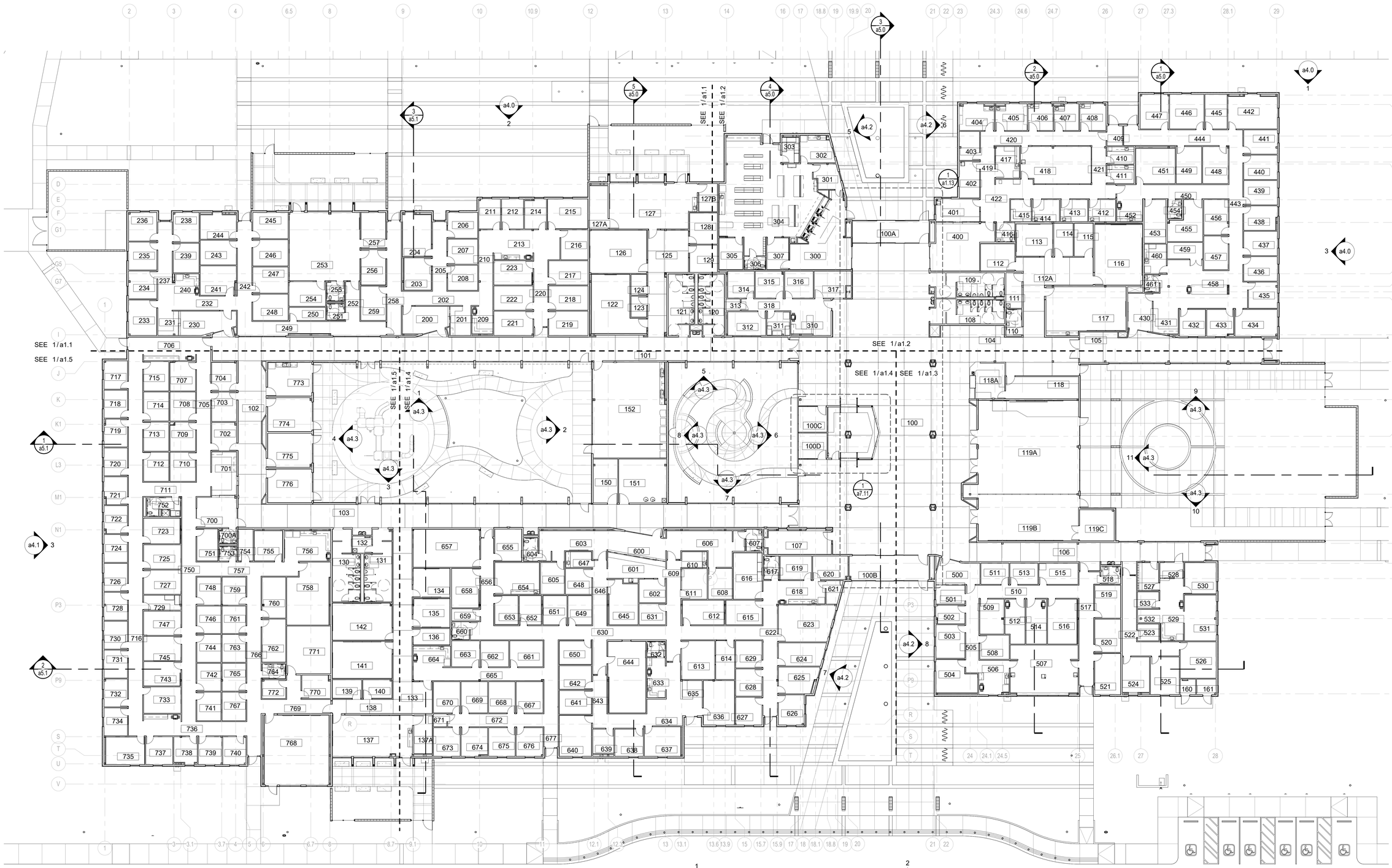
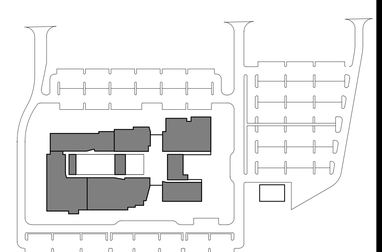


1 a1.0 **reference floor plan - overall**
1/16" = 1'-0"

north

general notes

1. DO NOT SCALE DRAWINGS. COORDINATE ALL WORK BETWEEN ARCHITECTURAL, STRUCTURAL, CIVIL, MECHANICAL, PLUMBING, COMMUNICATIONS AND ELECTRICAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE IMPLEMENTATION OF WORK.
2. REFER TO PLUMBING, MECHANICAL AND ELECTRICAL DRAWINGS FOR ALL APPLICABLE CODES FOR REQUIRED CLEARANCES OF EQUIPMENT.
3. PROVIDE ACCESS PANELS IN WALLS AND CEILINGS WHERE REQUIRED.
4. PROVIDE MOISTURE RESISTANT GWB IN RESTROOMS & WALLS WHERE PLUMBING OCCURS.
5. USE CERAMIC TILE BACKING BOARD AT ALL CERAMIC TILE.
6. SEAL ALL PENETRATIONS. CONTRACTOR MAY USE FIRE OR SOUND CAULKING AT THEIR OPTION.
7. FURNITURE IS GRAYED OUT FOR CLARITY. SEE FURNITURE PLANS FOR MORE INFORMATION.
8. SEE SHEET a8.6 AND a8.7 FOR WINDOW AND DOOR FRAMES.
9. SEE SHEET a9.0 FOR WALL TYPES.
10. **PHARAMCY: ALL SHADED WALLS SHALL HAVE ALL LAYERS OF GWB BE IMPACT RESISTANT TO DECK.**



north **keyplan**
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REGISTERED ARCHITECT
CERTIFICATE NO. 37165
KEVIN A. BARBER
DATE SIGNED 11/16/18
ARIZONA U.S.A.

job
1717

date
11.16.18

revisions

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Health Services Center II
4567 W Tetakusim Rd
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reference floor plan - overall

a1.0

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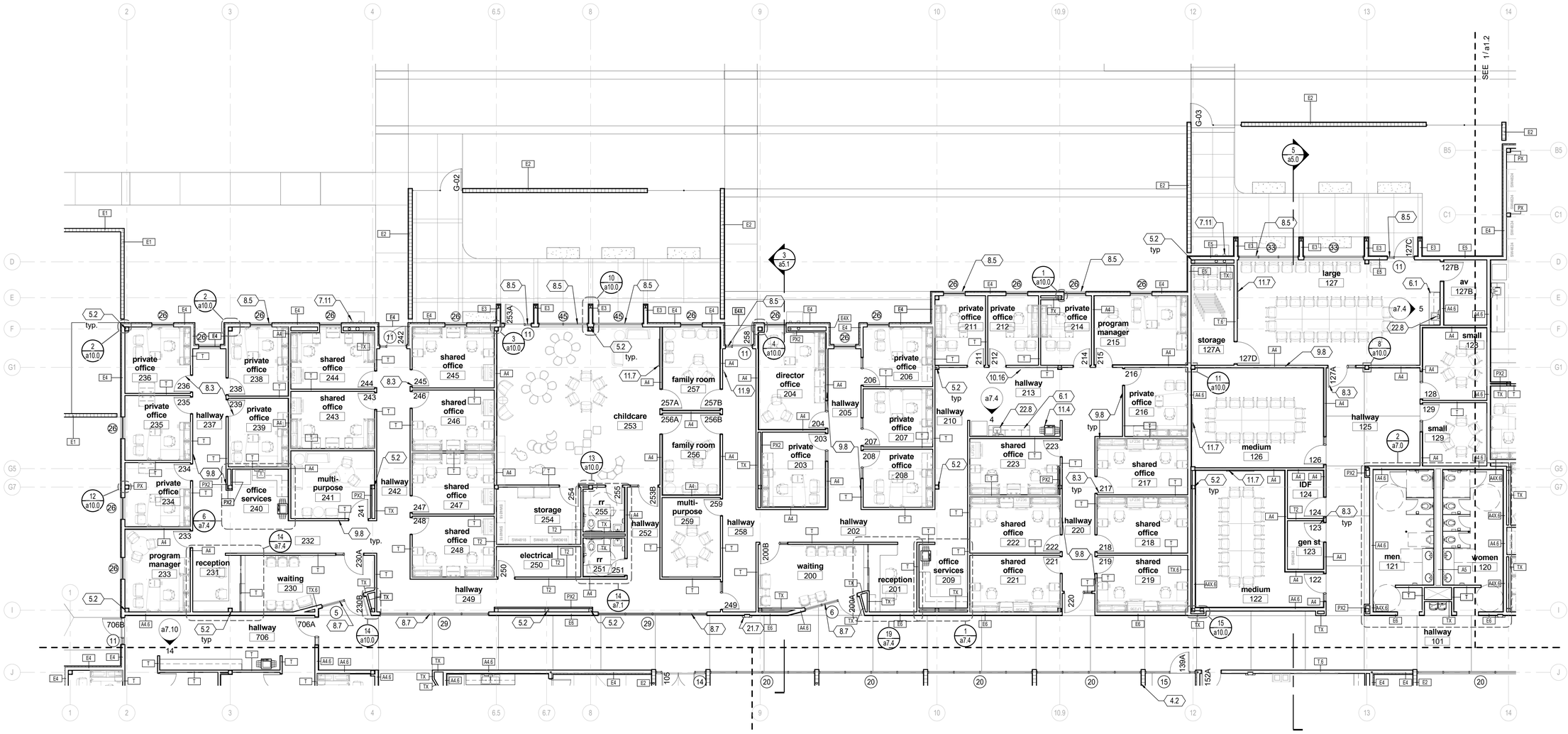

reference floor - Sewa U'usim

1/a1.1 1/8" = 1'-0"

north

keynotes

4.2	8" CMU SUPPORT PIERS WITH SANDSTONE TILE. SEE WALL TYPE SHEET A9.0.
5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
6.1	CUSTOM MILLWORK SEE INTERIOR ELEVATIONS FOR MORE INFORMATION
7.11	ROOF DRAIN NOZZLE. SEE ELEVATIONS. COORDINATE WITH PLUMBING FOR PRIMARY AND SECONDARY LOCATIONS.
8.3	SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
8.7	ALUMINUM STOREFRONT WITH 1/4" CLEAR GLAZING.
9.8	METAL FRAME & GYPSUM WALLBOARD PARTITION. SEE WALL TYPES SHEET A9.0.
10.16	TACK BOARD OR WHITEBOARD, SEE FURNITURE PLANS.
11.4	COPIER PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTIONS.
11.7	WALL MOUNTED TV SCREEN PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.
11.9	TIME CLOCK PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.
21.7	FIRE EXTINGUISHER. SEE SHEET A9.1.
22.8	SINK, SEE PLUMBING.

general notes

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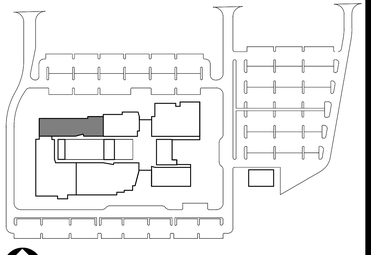
5. USE CERAMIC TILE BACKING BOARD AT ALL CERAMIC TILE.
6. SEAL ALL PENETRATIONS. CONTRACTOR MAY USE FIRE OR SOUND CAULKING AT THEIR OPTION.
7. FURNITURE IS GRAYED OUT FOR CLARITY. SEE FURNITURE PLANS FOR MORE INFORMATION.
8. SEE SHEET a8.6 AND a8.7 FOR WINDOW AND DOOR FRAMES.
9. SEE SHEET a9.0 FOR WALL TYPES.
10. **PHARAMCY: ALL SHADED WALLS SHALL HAVE ALL LAYERS OF GWB BE IMPACT RESISTANT TO DECK.**



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reference floor plan - Sewa U'usim

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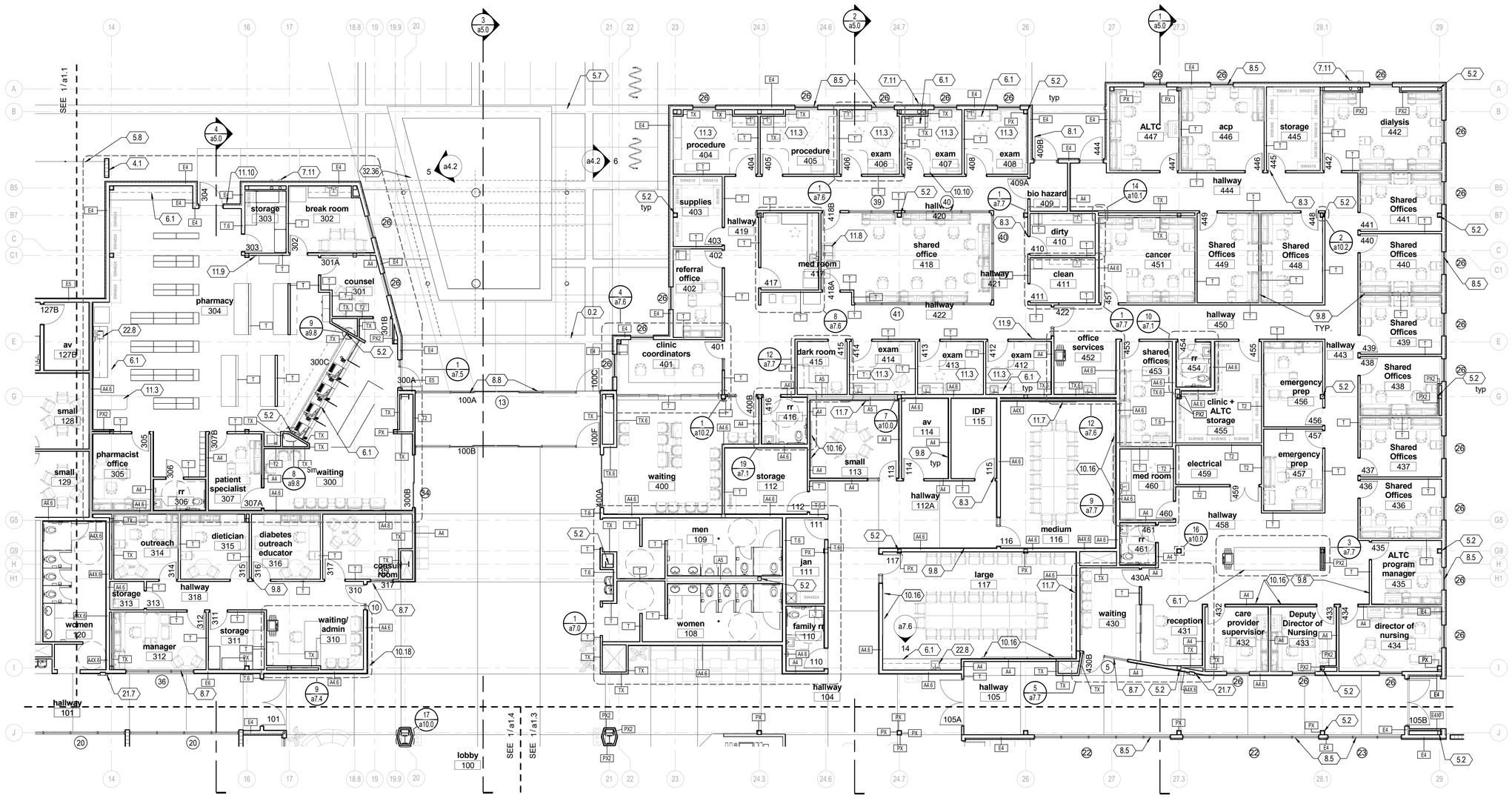

1 a1.2 **reference floor - Nursing + Clinics**
1/8" = 1'-0"

keynotes

0.2	LINE OF CANOPY ABOVE.
4.1	16" X 8" H 8" CMU WALL.
5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
5.7	ENTRY CANOPY - SEE STRUCTURAL DRAWINGS. SEE SHEET A7.13.
5.8	DECORATIVE WROUGHT IRON FENCE.
6.1	CUSTOM MILLWORK SEE INTERIOR ELEVATIONS FOR MORE INFORMATION
7.11	ROOF DRAIN NOZZLE. SEE ELEVATIONS. COORDINATE WITH PLUMBING FOR PRIMARY AND SECONDARY LOCATIONS.
8.1	HOLLOW METAL DOOR & FRAME. SEE DOOR SCHEDULE.
8.3	SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
8.7	ALUMINUM STOREFRONT WITH 1/4" CLEAR GLAZING.
8.8	ALUMINUM SLIDER. SEE DOOR SCHEDULE.
9.8	METAL FRAME & GYPSUM WALLBOARD PARTITION. SEE WALL TYPES SHEET A9.0.
10.10	PRIVACY CURTAIN AND TRACK.
10.16	TACK BOARD OR WHITEBOARD, SEE FURNITURE PLANS.
10.18	LITERATURE RACKS. SEE FURNITURE PLANS FOR MORE INFORMATION.
11.3	MEDICAL EQUIPMENT PROVIDED BY OWNER. PROVIDE DATA AND ELECTRICAL AS NEEDED.
11.7	WALL MOUNTED TV SCREEN PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.
11.8	PRINTER PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.
11.9	TIME CLOCK PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.
11.10	DOOR BELL. SEE ELECTRICAL DRAWINGS.
21.7	FIRE EXTINGUISHER. SEE SHEET A9.1.
22.8	SINK, SEE PLUMBING.
32.36	MASONRY SEAT WALL WITH CONCRETE CAP PER DETAIL 1 SHEET x1.5.

general notes

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4. PROVIDE MOISTURE RESISTANT GWB IN RESTROOMS & WALLS WHERE PLUMBING OCCURS.
5. USE CERAMIC TILE BACKING BOARD AT ALL CERAMIC TILE.
6. SEAL ALL PENETRATIONS. CONTRACTOR MAY USE FIRE OR SOUND CAULKING AT THEIR OPTION.
7. FURNITURE IS GRAYED OUT FOR CLARITY. SEE FURNITURE PLANS FOR MORE INFORMATION.
8. SEE SHEET a8.6 AND a8.7 FOR WINDOW AND DOOR FRAMES.
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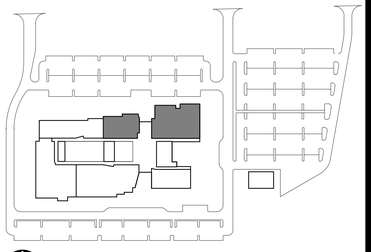
10. **PHARAMCY: ALL SHADED WALLS SHALL HAVE ALL LAYERS OF GWB BE IMPACT RESISTANT TO DECK.**



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reference floor plan - Nursing + Clinics

a1.2

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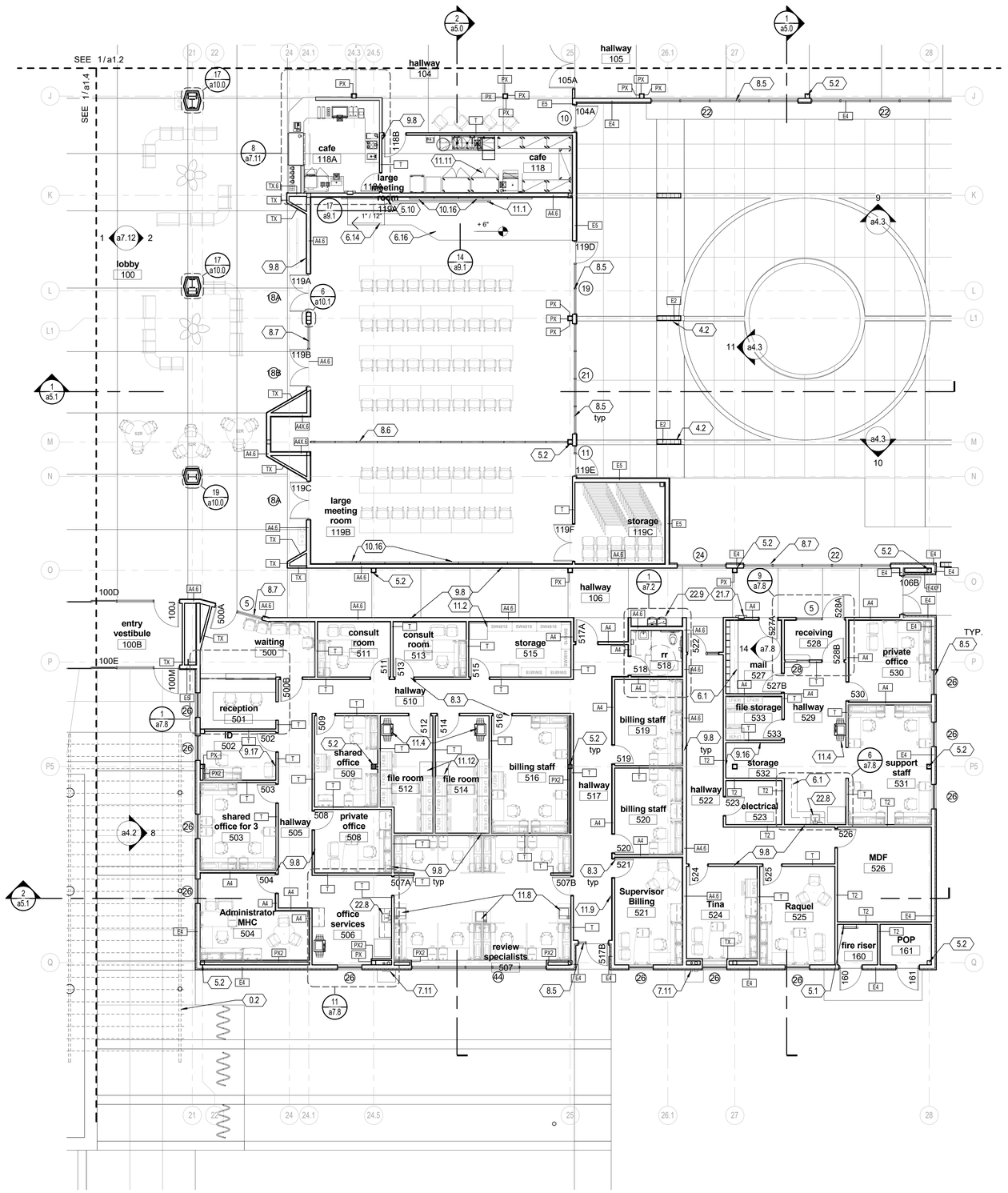
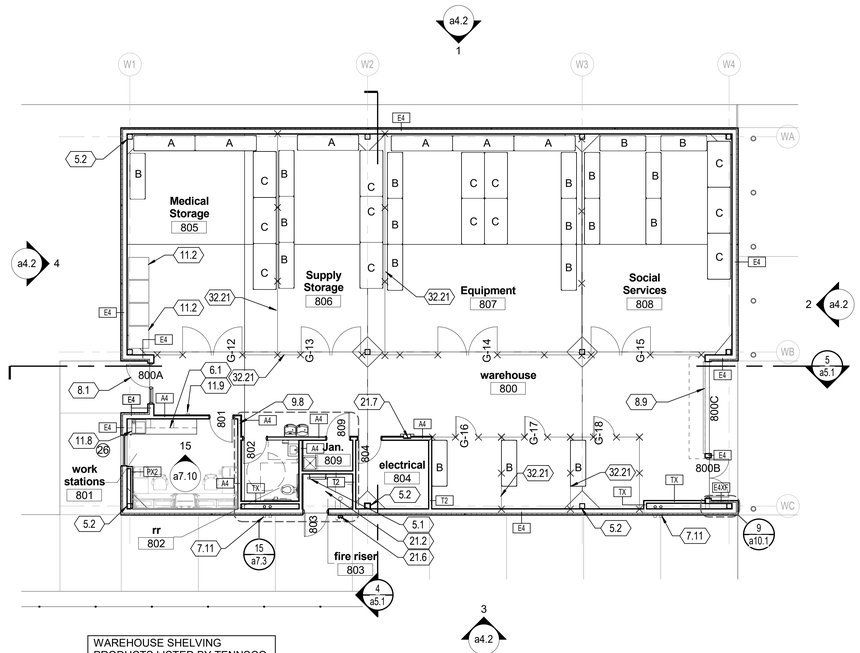


1 reference floor - Health Budget + Managed Health / Billing
a1.3 1/8" = 1'-0"

north



WAREHOUSE SHELVING
PRODUCTS LISTED BY TENNSCO
Z LINE RACK SHELVING

A	96"W X 24"D X 84"H #RXHS - 962496
B	72"W X 24"D X 84"H #RXHS - 722484
C	72"W X 36"D X 84"H #RXHS - 723684

2 reference floor - Warehouse
a1.3 1/8" = 1'-0"

north

keynotes

0.2	LINE OF CANOPY ABOVE.
4.2	8" CMU SUPPORT PIERS WITH SANDSTONE TILE. SEE WALL TYPE SHEET A9.0.
5.1	ROOF ACCESS STEEL. LADDER WITH SAFETY UP-POST. SEE SHEET A9.4.
5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
5.10	PAINTED STEEL HANDRAIL. SEE DETAIL 4/A9.1.
6.1	CUSTOM MILLWORK SEE INTERIOR ELEVATIONS FOR MORE INFORMATION
6.14	WOOD FRAME RAMP UP TO PLATFORM. MAX SLOPE 1"/12" FINISH TO MATCH PLATFORM.
6.16	RAISED WOOD FRAMED PLATFORM. SEE SHEET A9.1.
7.11	ROOF DRAIN NOZZLE. SEE ELEVATIONS. COORDINATE WITH PLUMBING FOR PRIMARY AND SECONDARY LOCATIONS.
8.1	HOLLOW METAL DOOR & FRAME. SEE DOOR SCHEDULE.
8.3	SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
8.6	FOLDING PARTITION. SEE SHEET A9.8.
8.7	ALUMINUM STOREFRONT WITH 1/4" CLEAR GLAZING.
8.9	OVERHEAD DOOR. SEE DOOR SCHEDULE.
9.8	METAL FRAME & GYPSUM WALLBOARD PARTITION. SEE WALL TYPES SHEET A9.0.
9.16	INSTALL PVC WALL PANELS TO 4'-0" A.F.F.
9.17	GREEN SCREEN, OWNER PROVIDED.
10.16	TACK BOARD OR WHITEBOARD, SEE FURNITURE PLANS.
11.1	ELECTRIC MOVIE SCREEN. SEE SHEET A9.1.
11.2	REFRIGERATOR PROVIDED BY OWNER. PROVIDE ELECTRICAL AND WATER CONNECTION. COORDINATE WITH ELECTRICAL AND PLUMBING.
11.4	COPIER PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTIONS.
11.8	PRINTER PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.
11.9	TIME CLOCK PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.
11.11	KITCHEN EQUIPMENT. SEE FOOD SERVICE SHEETS FOR MORE INFORMATION.
11.12	INDUSTRIAL SHREDDER BY OWNER. PROVIDE ELECTRICAL CONNECTION.
21.2	FIRE RISER ROOM.
21.6	FIRE DEPARTMENT CONNECTION, SEE PLUMBING.
21.7	FIRE EXTINGUISHER. SEE SHEET A9.1.
22.8	SINK, SEE PLUMBING.
22.9	DRINKING FOUNTAIN, SEE PLUMBING.
32.21	8'-0" HIGH 9 GA CHAIN LINK FENCING AND GATES.

general notes

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8. SEE SHEET a8.6 AND a8.7 FOR WINDOW AND DOOR FRAMES.
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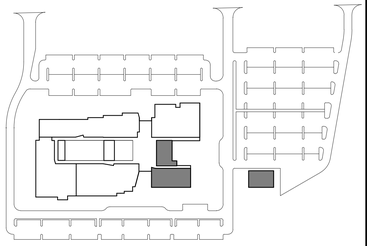

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reference floor plan - Managed Health + Warehouse

a1.3

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keynotes

4.1	16" X 8" H 8" CMU WALL.
4.2	8" CMU SUPPORT PIERS WITH SANDSTONE TILE. SEE WALL TYPE SHEET A9.0.
5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
5.14	STEEL COLUMN BY SHADE MANUFACTURE. COORDINATE WITH STRUCTURAL AND LANDSCAPE.
6.1	CUSTOM MILLWORK SEE INTERIOR ELEVATIONS FOR MORE INFORMATION
7.11	ROOF DRAIN NOZZLE. SEE ELEVATIONS. COORDINATE WITH PLUMBING FOR PRIMARY AND SECONDARY LOCATIONS.
8.1	HOLLOW METAL DOOR & FRAME. SEE DOOR SCHEDULE.
8.3	SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
8.7	ALUMINUM STOREFRONT WITH 1/4" CLEAR GLAZING.
8.14	ALUMINUM FRAME WITH 3-FORM GLASS
8.16	ALUMINUM FRAME WITH 1/4" GLASS AND 3-FORM GLASS
9.8	METAL FRAME & GYPSUM WALLBOARD PARTITION. SEE WALL TYPES SHEET A9.0.
10.16	TACK BOARD OR WHITEBOARD, SEE FURNITURE PLANS.
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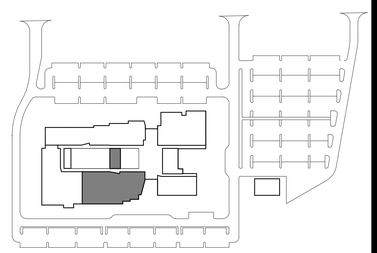
11.9	TIME CLOCK PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.
21.7	FIRE EXTINGUISHER. SEE SHEET A9.1.
22.3	MOP SINK W/ PVC PANEL WAINSCOT TO 4'-0" A.F.F.
22.8	SINK, SEE PLUMBING.
22.15	WATER HEATER, SEE PLUMBING.
32.10	LANDSCAPE AREA. SEE LANDSCAPE DRAWINGS.
32.22	PLAYGROUND FALL SURFACE. SEE LANDSCAPE DRAWINGS FOR MORE INFORMATION.
32.31	SITE FURNITURE. SEE LANDSCAPE DRAWINGS.
32.36	MASONRY SEAT WALL WITH CONCRETE CAP PER DETAIL 1 SHEET x1.5.

1 a1.4 **reference floor - Centered Spirit**
1/8" = 1'-0"

north



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reference floor plan - Centered Spirit

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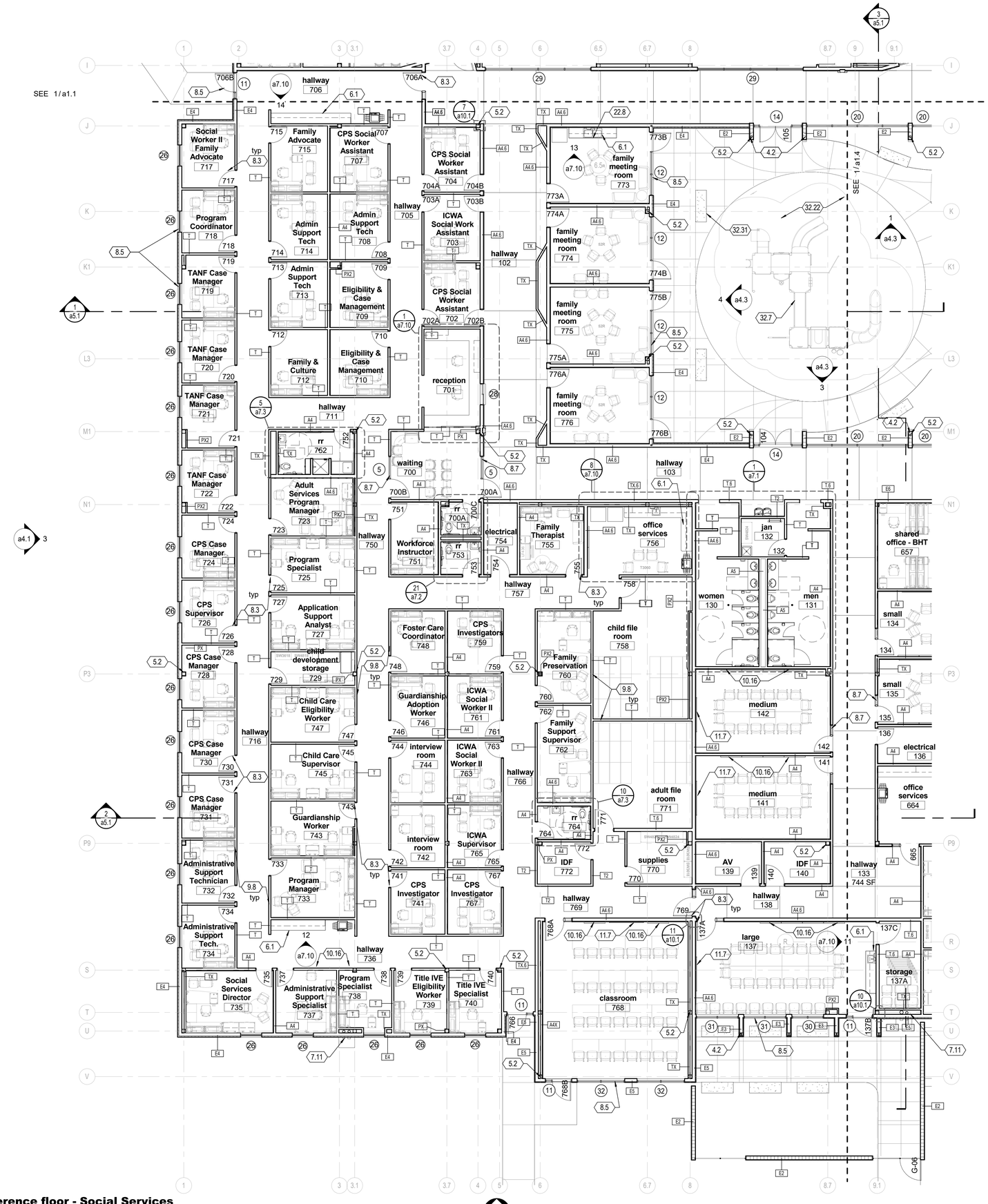

reference floor - Social Services
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4.2	8" CMU SUPPORT PIERS WITH SANDSTONE TILE. SEE WALL TYPE SHEET A9.0.
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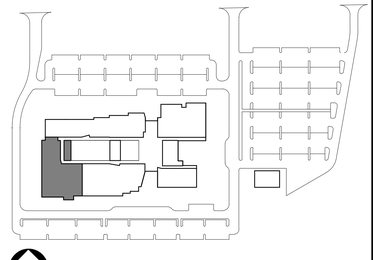
8.3	SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
8.7	ALUMINUM STOREFRONT WITH 1/4" CLEAR GLAZING.
9.8	METAL FRAME & GYPSUM WALLBOARD PARTITION. SEE WALL TYPES SHEET A9.0.
10.16	TACK BOARD OR WHITEBOARD, SEE FURNITURE PLANS.
11.7	WALL MOUNTED TV SCREEN PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.
22.8	SINK, SEE PLUMBING.
32.7	PLAYGROUND PLAY AREA. REFER TO LANDSCAPE DRAWINGS.
32.22	PLAYGROUND FALL SURFACE. SEE LANDSCAPE DRAWINGS FOR MORE INFORMATION.
32.31	SITE FURNITURE. SEE LANDSCAPE DRAWINGS.



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job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
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reference floor plan - Social Services

a1.5

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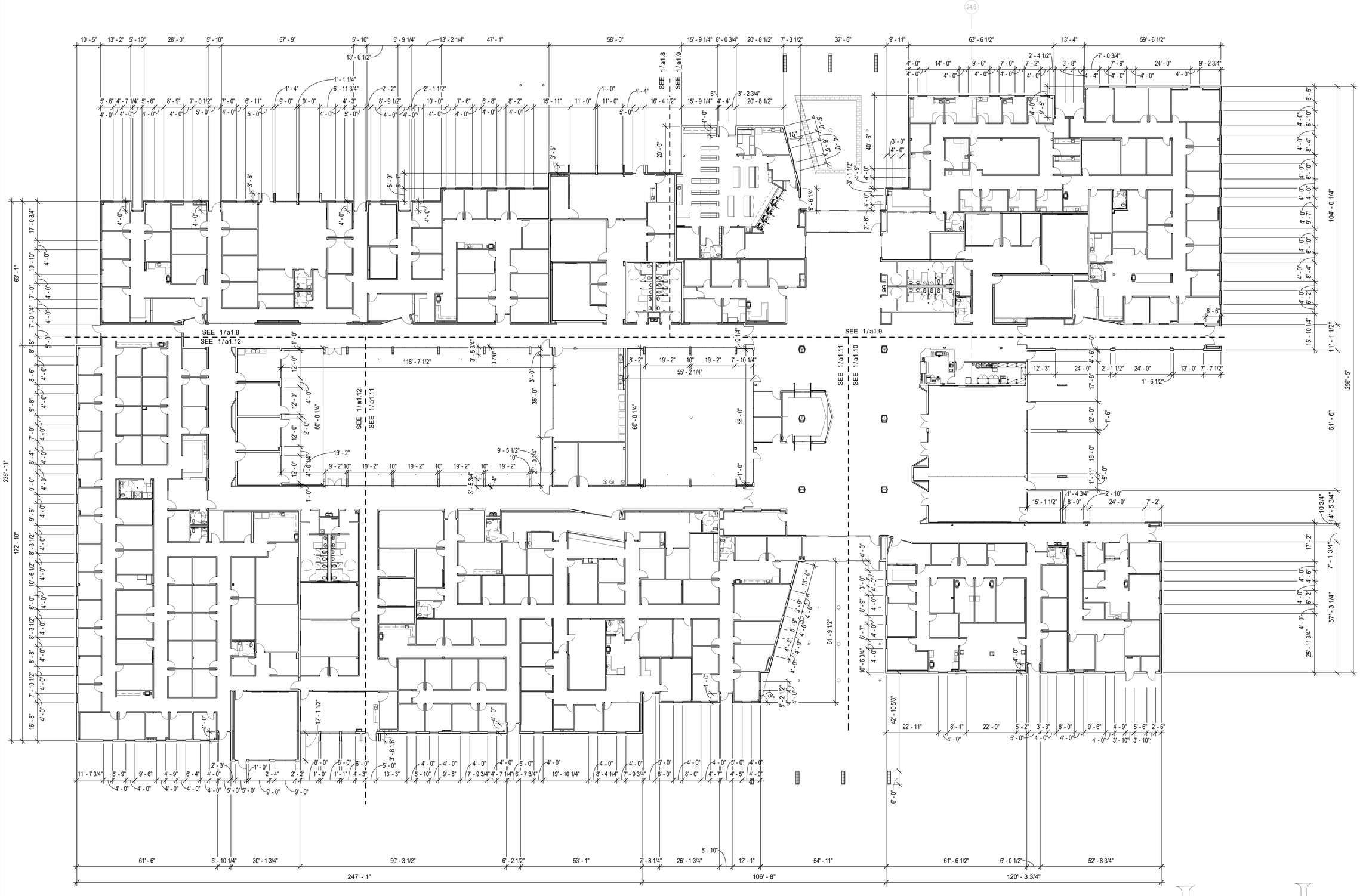
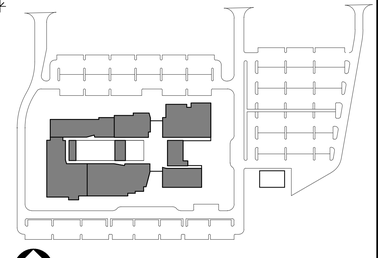


1 a1.6 **dimension floor plan - overall**
1/16" = 1'-0"

north

general notes

1. DIMENSIONS ARE TO FACE OF MASONRY, FACE OF STEM WALL OR SLAB, FACE OF STUD AND CENTER OF COLUMN, U.N.O. DO NOT SCALE DRAWINGS.
2. COORDINATE ALL WORK BETWEEN ARCHITECTURAL, STRUCTURAL, CIVIL, MECHANICAL, PLUMBING, COMMUNICATIONS AND ELECTRICAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE IMPLEMENTATION OF WORK.



north **keyplan**
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dimension floor plan - overall (building)

a1.6

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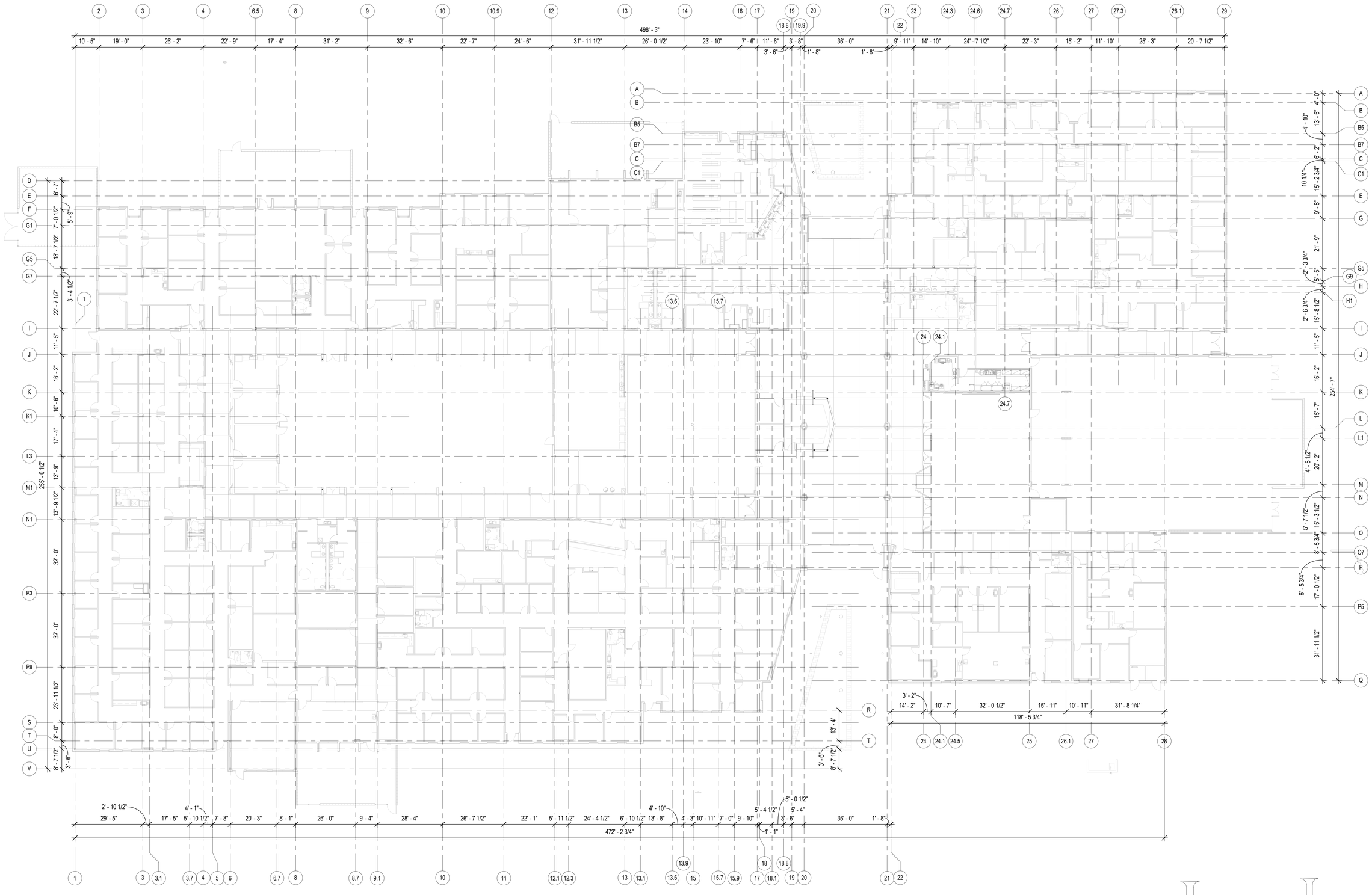

1 / a1.7 **dimension floor plan - overall GRID**

1/16" = 1'-0"

north

general notes

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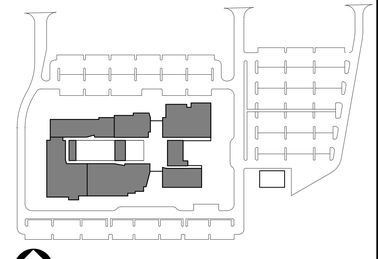

north **keyplan**

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dimension floor plan - overall (grid)

a1.7

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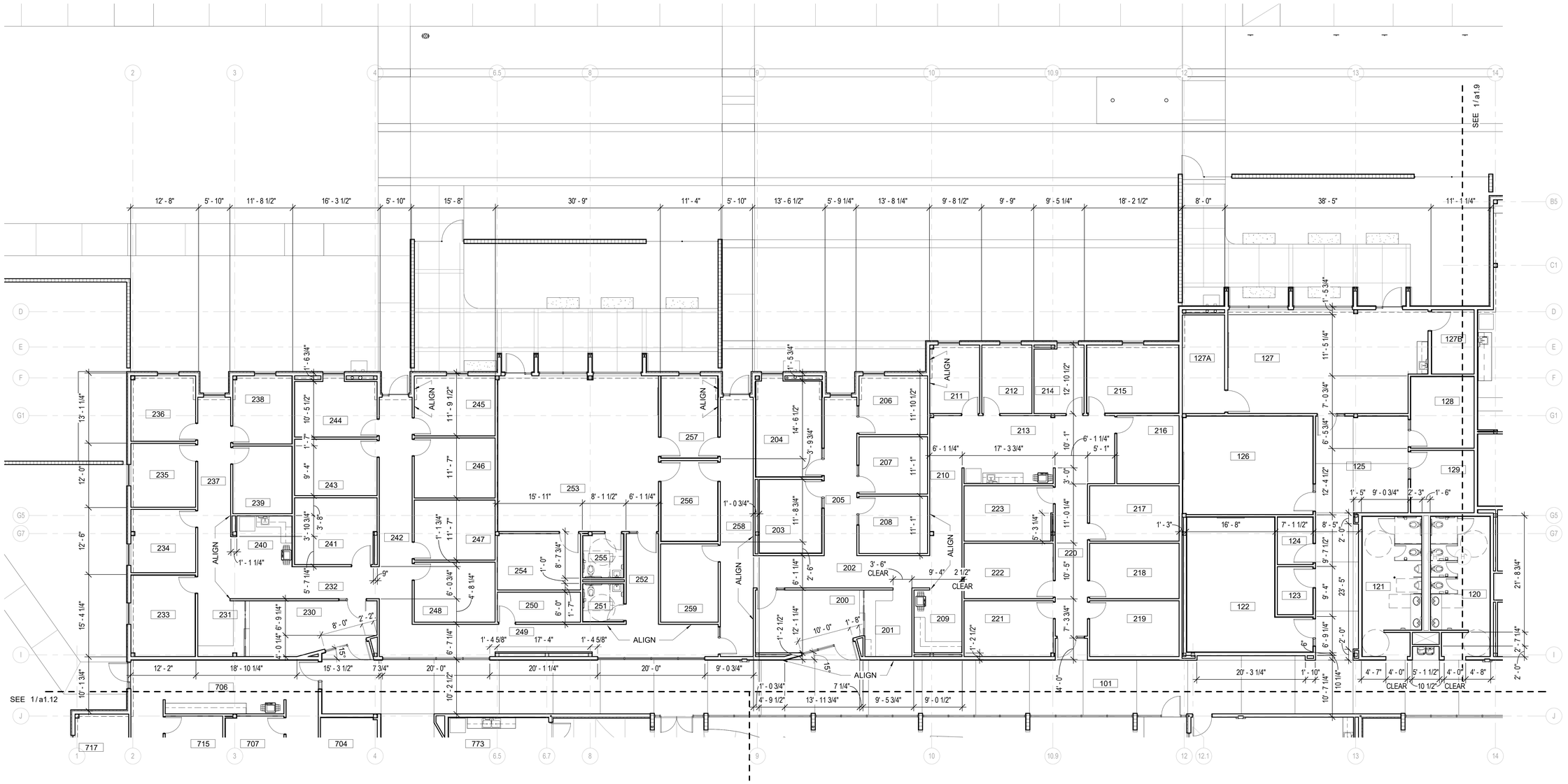

dimension floor plan - Sewa U'usim

1/a1.8 1/8" = 1'-0"

general notes

1. DIMENSIONS ARE TO FACE OF MASONRY, FACE OF STEM WALL OR SLAB, FACE OF STUD AND CENTER OF COLUMN, U.N.O. DO NOT SCALE DRAWINGS.
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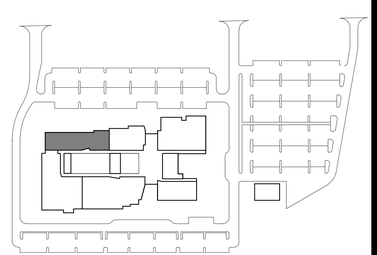

north **keyplan**

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dimension floor plan - Sewa U'usim

a1.8

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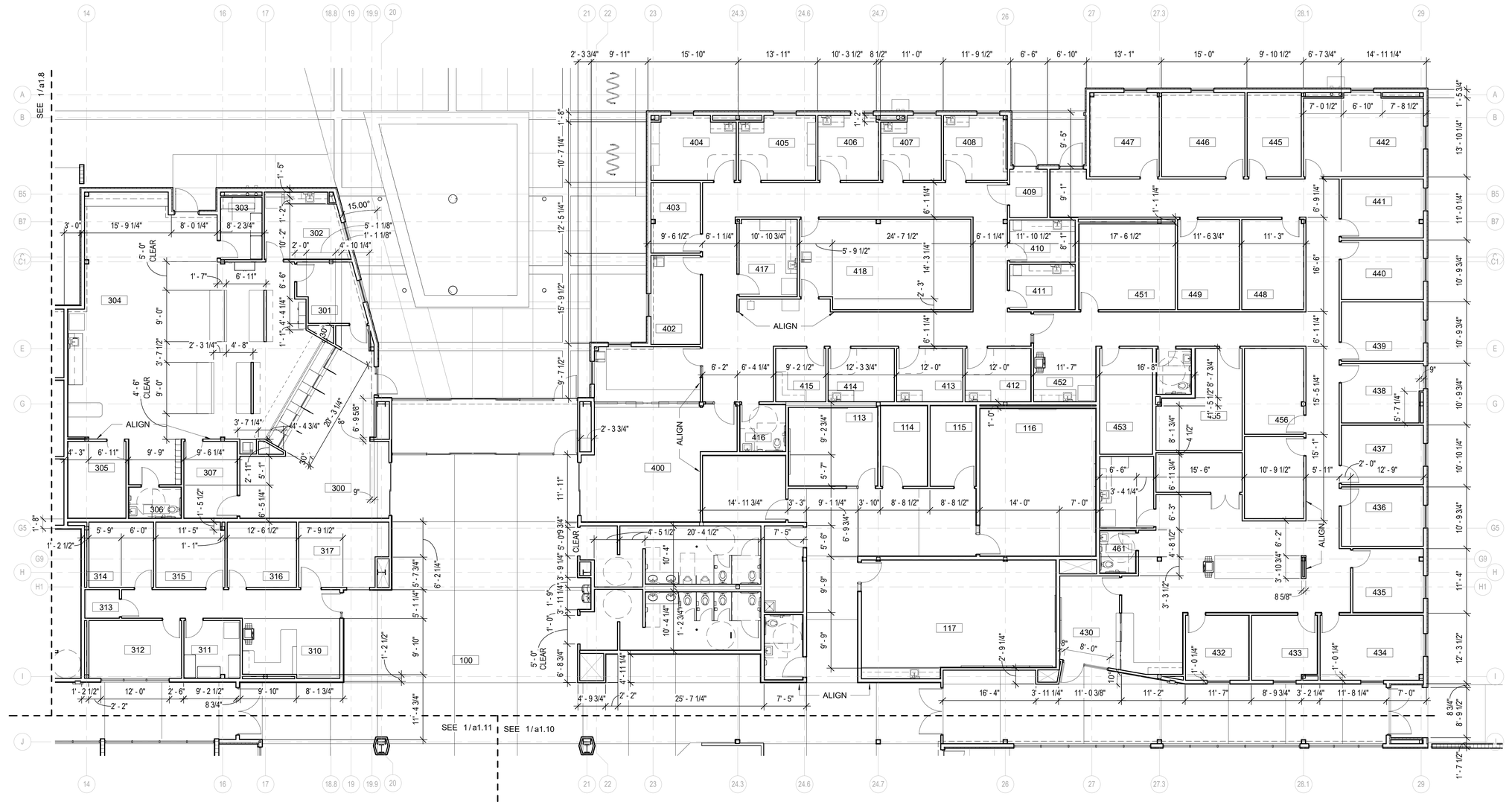

dimension floor plan - Nursing + Clinics

1/8" = 1'-0"

north

general notes

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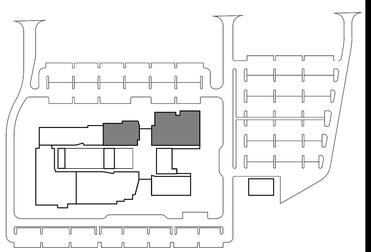

north **keyplan**

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dimension floor plan - Nursing + Clinics

a1.9

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general notes

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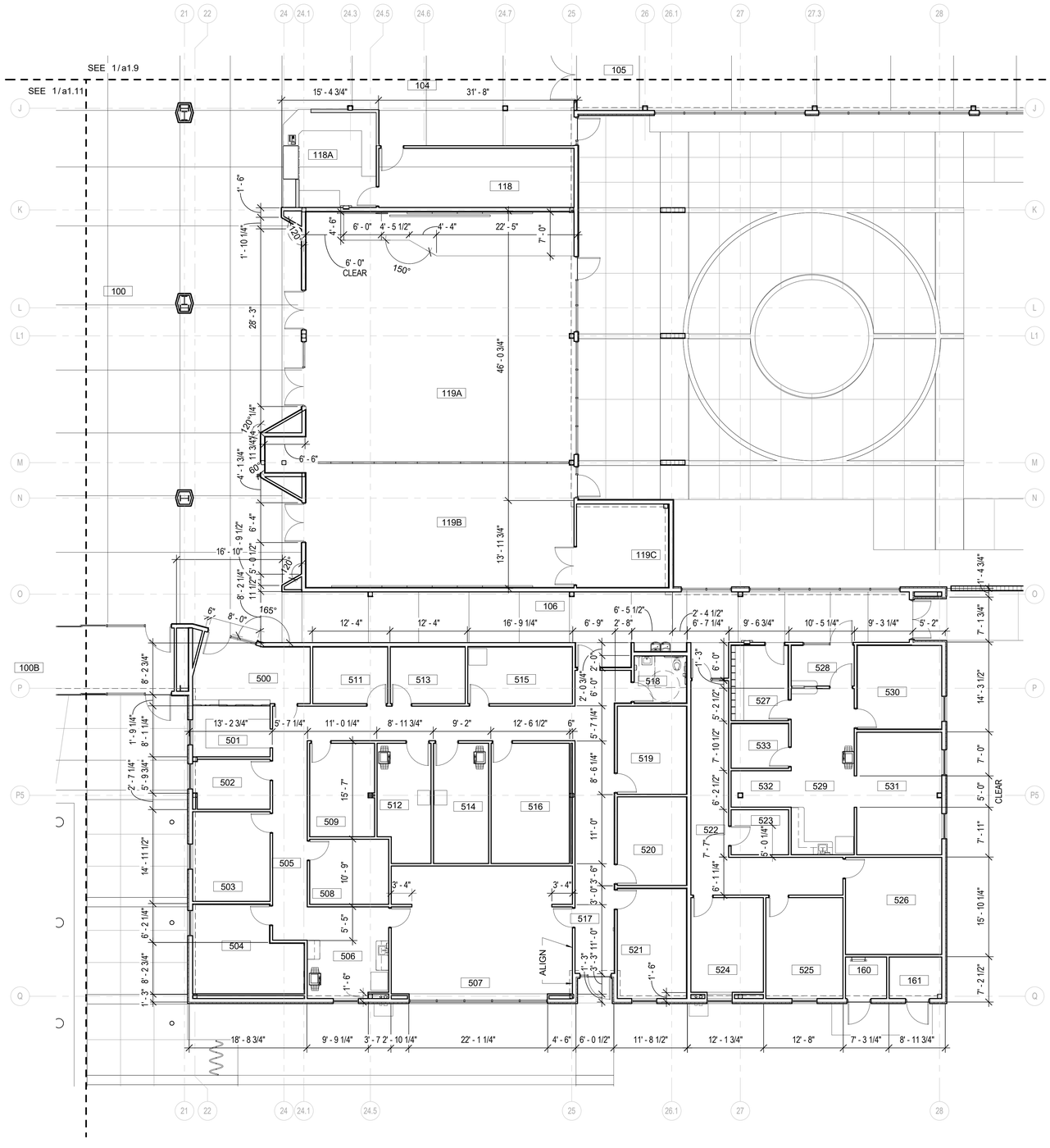
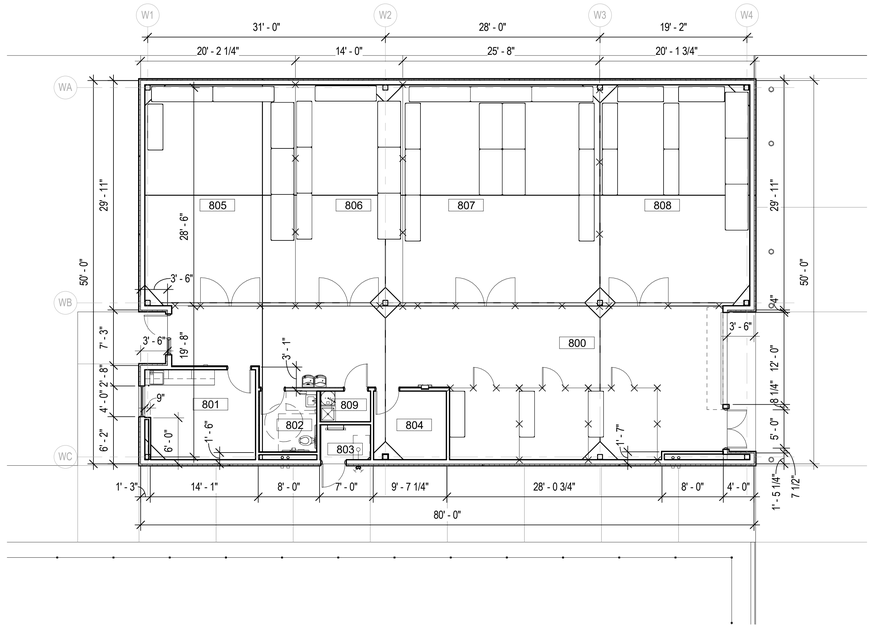
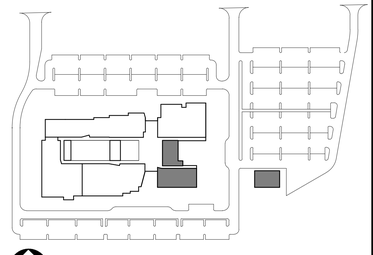


1 a1.10 **dimension floor plan - Health Budget + Managed Health / Billing**
1/8" = 1'-0"



2 a1.10 **dimension floor plan - Warehouse**
1/8" = 1'-0"



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dimension floor plan - Managed Health + Warehouse

a1.10

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general notes

1. DIMENSIONS ARE TO FACE OF MASONRY, FACE OF STEM WALL OR SLAB, FACE OF STUD AND CENTER OF COLUMN, U.N.O. DO NOT SCALE DRAWINGS.
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1 a1.11 **dimension floor plan - Centered Spirit**
1/8" = 1'-0"

north

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dimension floor plan - Centered Spirit

a1.11

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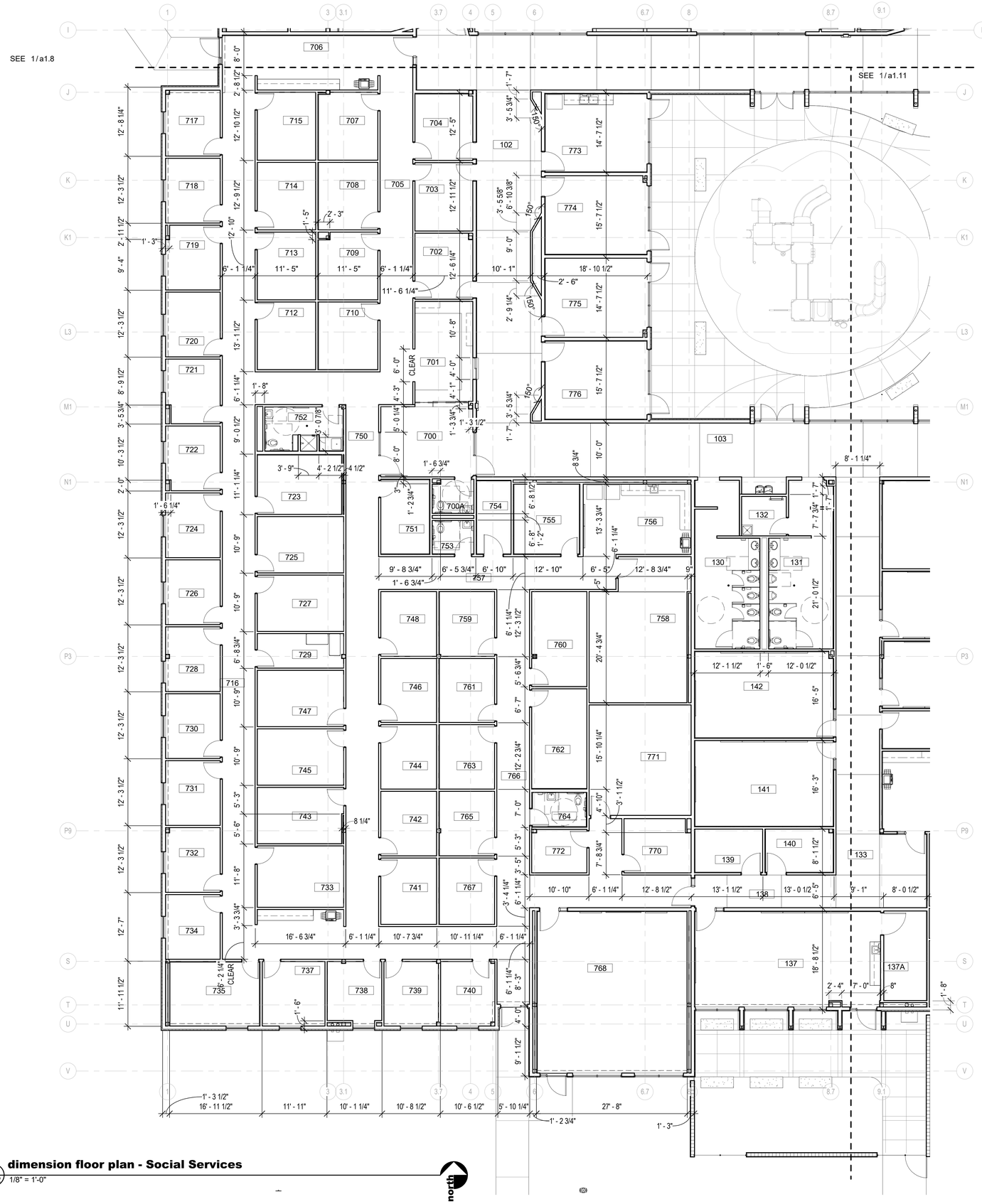

1 a1.12 **dimension floor plan - Social Services**
1/8" = 1'-0"

general notes

1. DIMENSIONS ARE TO FACE OF MASONRY, FACE OF STEM WALL OR SLAB, FACE OF STUD AND CENTER OF COLUMN, U.N.O. DO NOT SCALE DRAWINGS.
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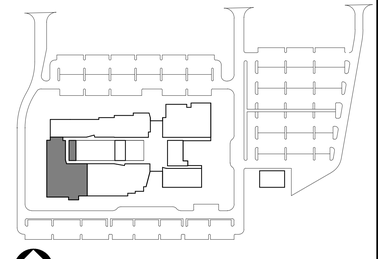

keyplan
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dimension floor plan - Social Services

a1.12

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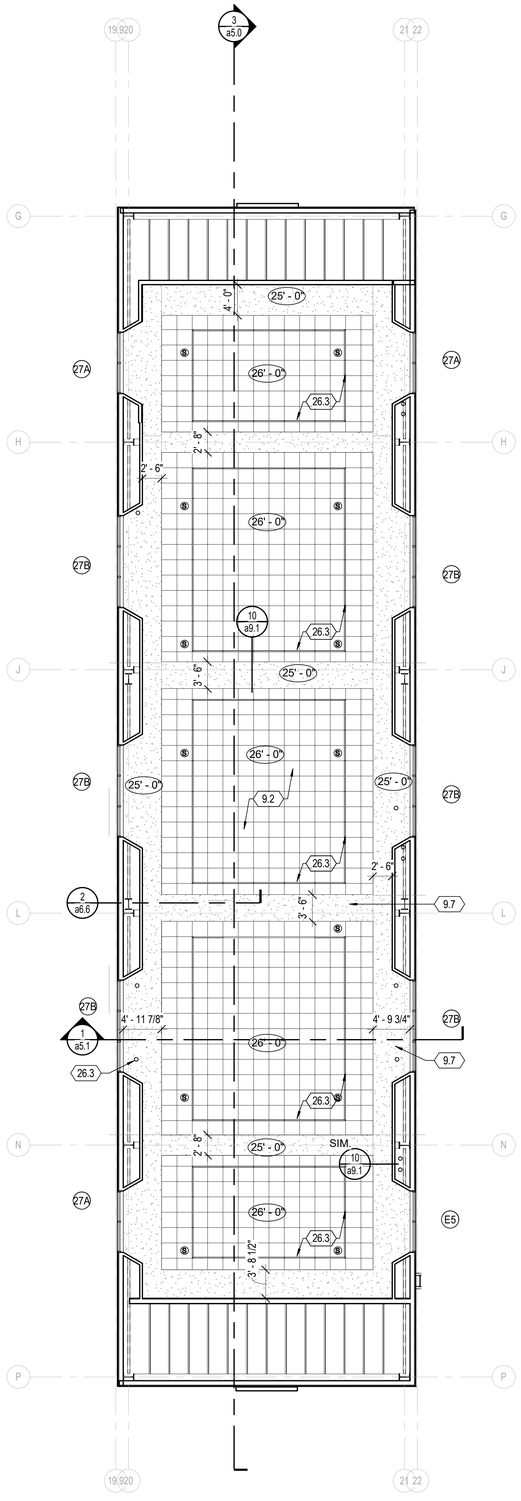
lobby view looking south



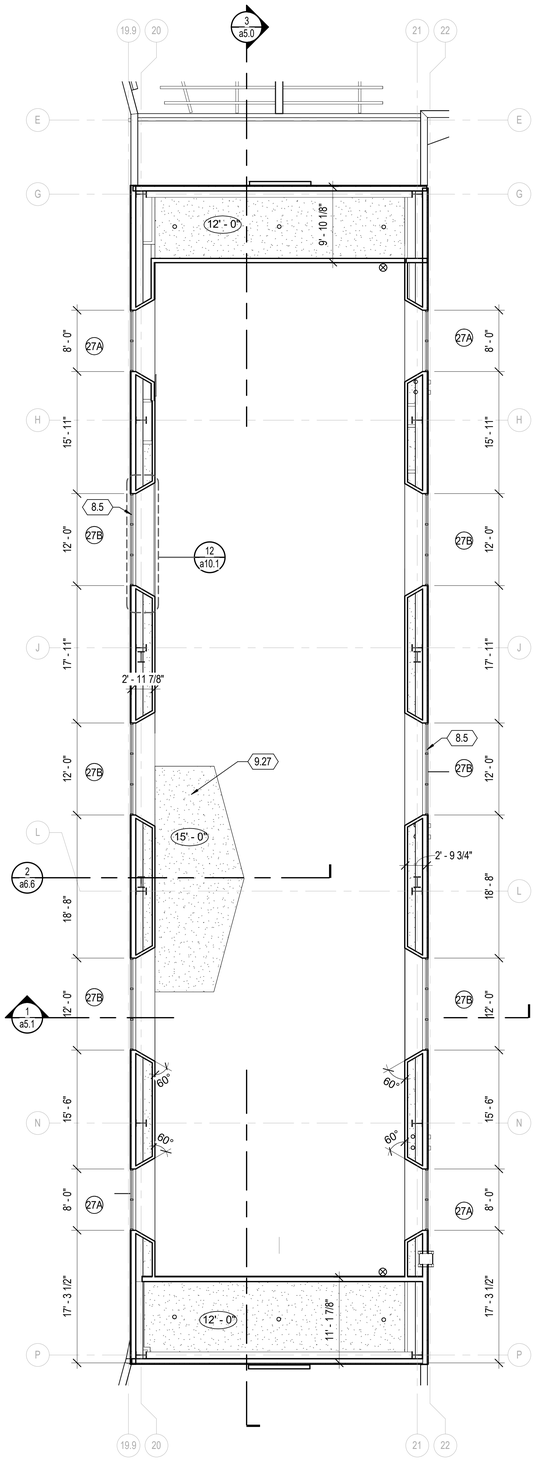
lobby view looking north



reflected ceiling plan - lobby - (cut line at 24'-0" a.f.f)

2 / a1.13 1/8" = 1'-0"

north



dimension floor plan - lobby - (cut line at 24'-0" a.f.f.)

1 / a1.13 1/8" = 1'-0"

north

general notes

1. DIMENSIONS ARE TO FACE OF MASONRY, FACE OF STEM WALL OR SLAB, FACE OF STUD AND CENTER OF COLUMN, U.N.O. DO NOT SCALE DRAWINGS.
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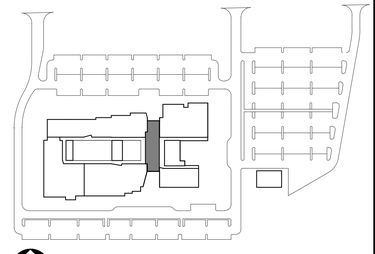
keynotes

8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
9.2	SUSPENDED ACOUSTICAL TILE CEILING SYSTEM. SEE SHEET A9.1.
9.7	GYPSUM WALLBOARD SOFFIT ON METAL FRAMING. SEE SHEET A9.1.
9.27	5/8" GWB OVER 3/4" PLYWOOD ON 3 5/8" X 20 GAUGE STUDS AT 24" O.C.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.



north

keyplan

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dimension floor plan - lobby

a1.13

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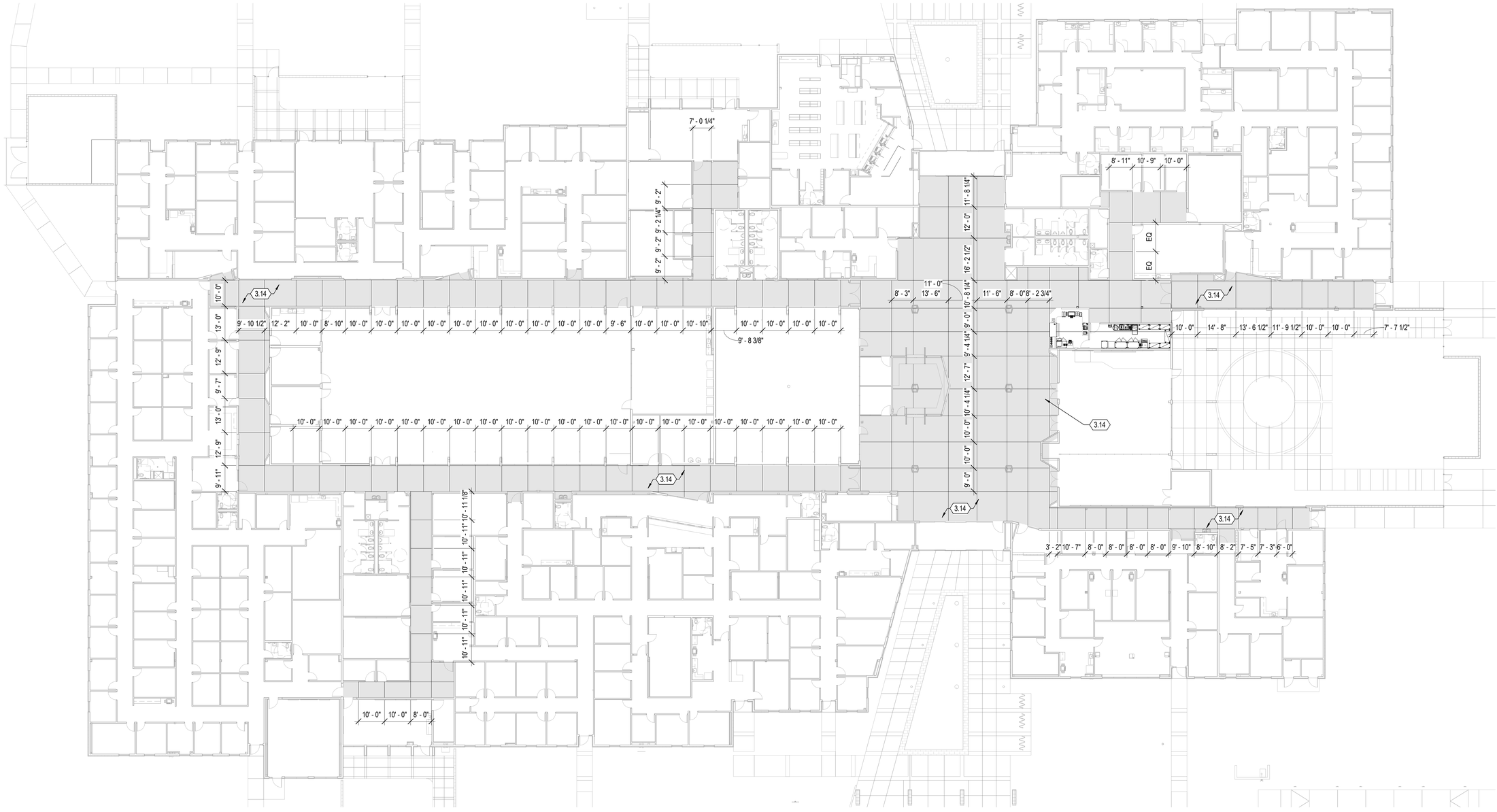

1 a1.14 **dimension floor plan - concrete score pattern**

1/16" = 1'-0"

north

general notes

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2. JOINTS SHALL BE SAW CUT PER STRUCTURAL NOTES.
3. JOINTS SHALL BE CLEANED AND FILLED WITH COLORED GROUT AFTER FLOOR IS STAINED.
4. AT COLUMN POUR BACK, OSE ZIPPER STYLE EXPANSION MATERIAL AND CAULK FINAL JOINT.

keynotes

3.14 EXPOSED CONCRETE SLAB WITH STAIN/ SEALER SYSTEM.

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dimension floor plan - concrete score pattern

a1.14

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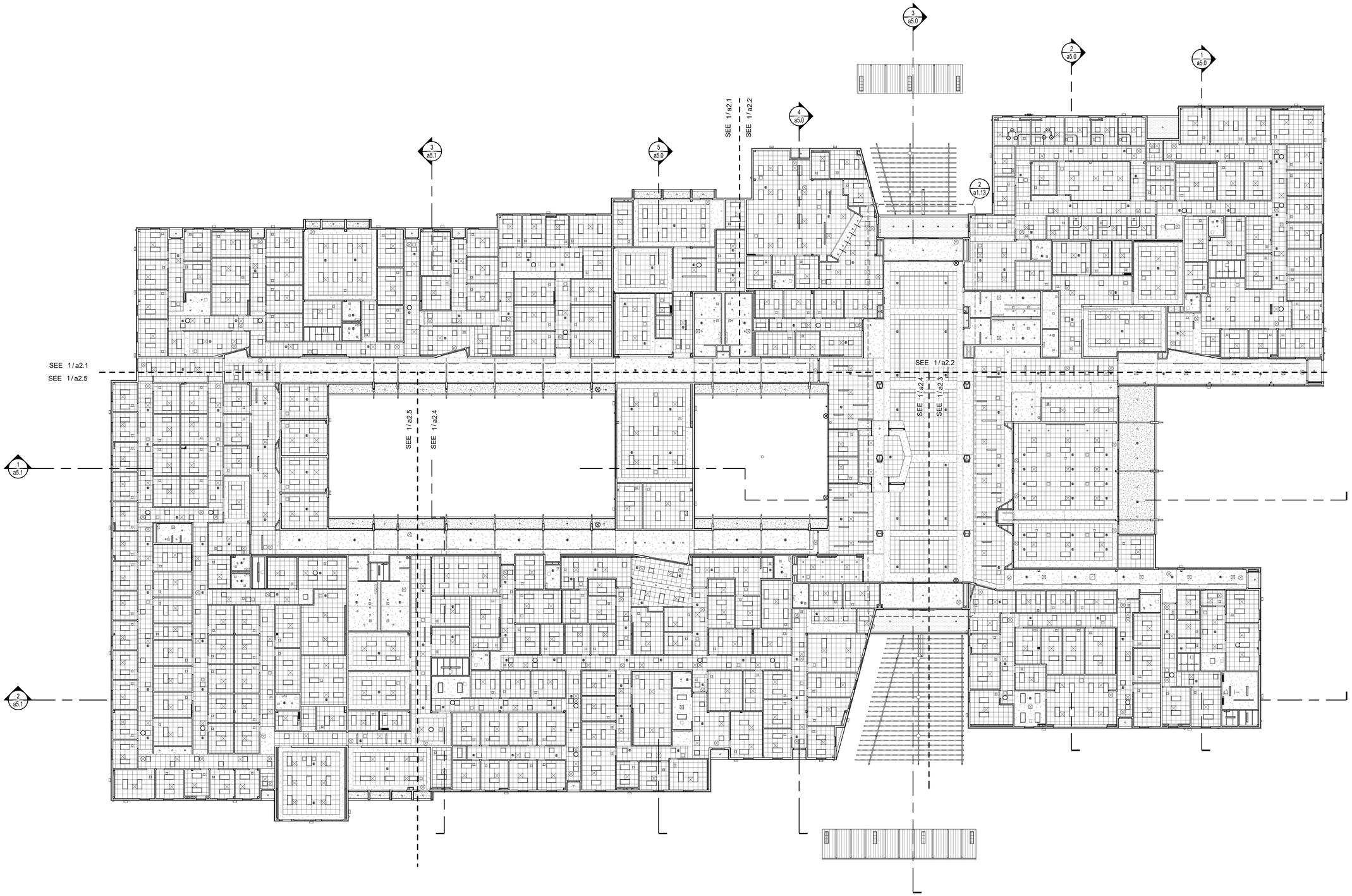


1 a2.0 **reflected ceiling plan - overall**
1/16" = 1'-0"

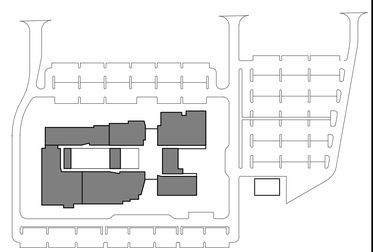
north

RCP legend

- 2' x 2' SUSPENDED CEILING GRID ASSEMBLY
- 2' x 2' LIGHT FIXTURE
- 2' x 4' LIGHT FIXTURE
- EXTERIOR WALL PACK
- RECESSED CAN LAMP
- EXIT SIGN
- LINEAR LIGHT FIXTURE
- (S) SPEAKER
- SKYLIGHT
- EMERGENCY LIGHTING
- MECHANICAL SUPPLY REGISTER
- MECHANICAL RETURN REGISTER
- MECHANICAL EXHAUST REGISTER
- GYPSUM WALLBOARD SOFFIT / CEILING
- ROOF HATCH

general notes

1. DO NOT SCALE DRAWINGS. COORDINATE ALL WORK BETWEEN ARCHITECTURAL, STRUCTURAL, CIVIL, MECHANICAL, PLUMBING, COMMUNICATIONS AND ELECTRICAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE IMPLEMENTATION OF WORK.
2. REFER TO PLUMBING, MECHANICAL AND ELECTRICAL DRAWINGS FOR ALL APPLICABLE CODES FOR REQUIRED CLEARANCES OF EQUIPMENT.
3. REFER TO SHEET A1.13 FOR LOBBY CEILING.



north **keyplan**
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reflected ceiling plan - overall

a2.0

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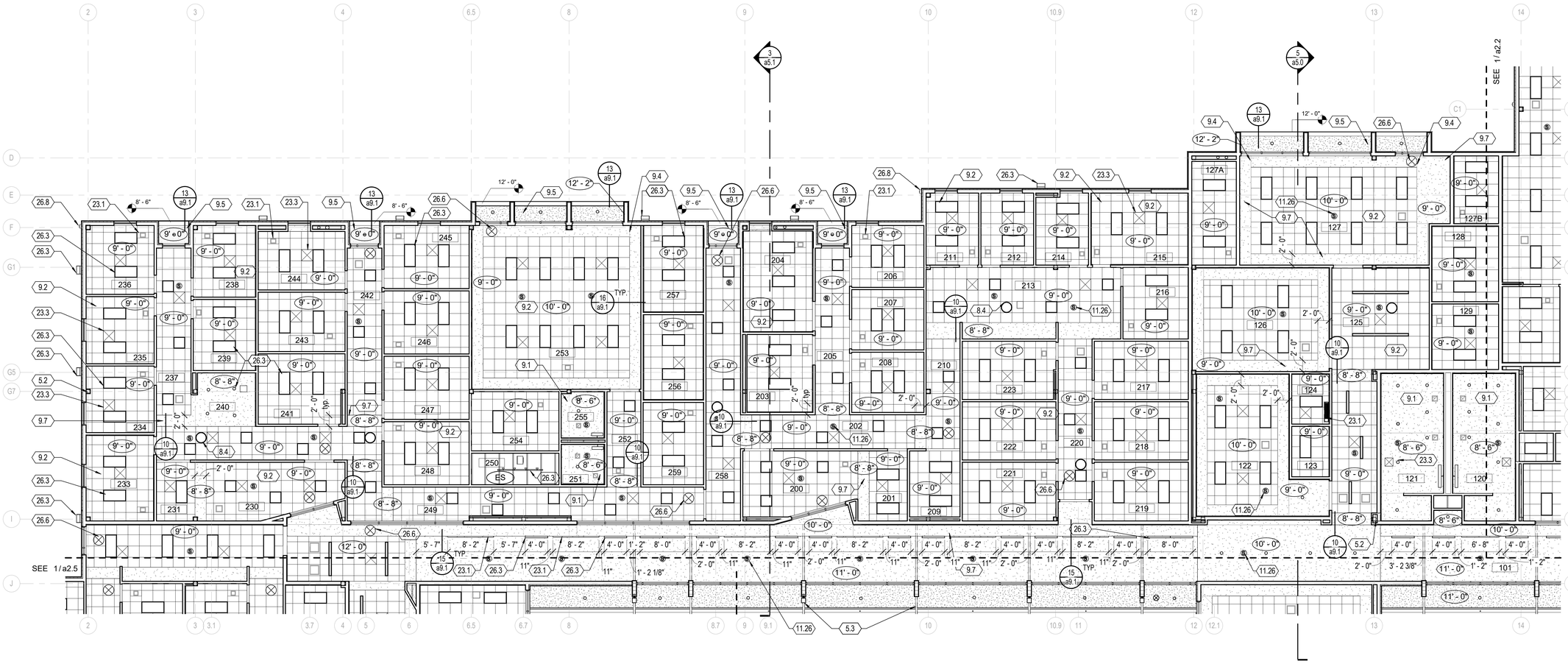


1 / a2.1 reflected ceiling plan - sewa u'usim

1/8" = 1'-0"

north

keynotes

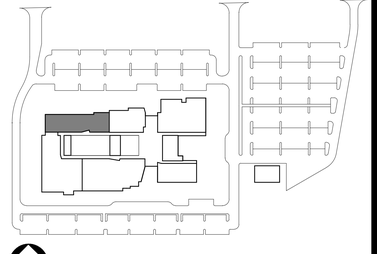
5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
5.3	STEEL BEAM, SEE STRUCTURAL.
8.4	SKYLIGHT, TYP: SOLATUBE 750 DS. COORDINATE IN CEILINGS.
9.1	GYPSUM WALLBOARD CEILING ON SUSPENDED METAL FRAMING. SEE SHEET A9.1.
9.2	SUSPENDED ACOUSTICAL TILE CEILING SYSTEM. SEE SHEET A9.1.
9.4	GYPSUM WALLBOARD CONTROL JOINT
9.5	EIFS SYSTEM ON METAL FRAMING SYSTEM. JOINTS AS SHOWN. MULTI-COLORED.
9.7	GYPSUM WALLBOARD SOFFIT ON METAL FRAMING. SEE SHEET A9.1.
11.26	CEILING MOUNTED SPEAKER CENTER WITHIN CEILING TILE. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.
23.1	MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS.
23.3	MECHANICAL DEVICE - SEE MECHANICAL DRAWINGS.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.
26.6	EXIT SIGN. SEE ELECTRICAL DRAWINGS.
26.8	FUTURE SECURITY CAMERA LOCATION. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.

general notes

1. DO NOT SCALE DRAWINGS. COORDINATE ALL WORK BETWEEN ARCHITECTURAL, STRUCTURAL, CIVIL, MECHANICAL, PLUMBING, COMMUNICATIONS AND ELECTRICAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE IMPLEMENTATION OF WORK.
2. REFER TO PLUMBING, MECHANICAL AND ELECTRICAL DRAWINGS FOR ALL APPLICABLE CODES FOR REQUIRED CLEARANCES OF EQUIPMENT.
3. REFER TO SHEET A1.13 FOR LOBBY CEILING.

RCP legend

- 2' x 2' SUSPENDED CEILING GRID ASSEMBLY
- 2' x 2' LIGHT FIXTURE
- 2' x 4' LIGHT FIXTURE
- EXTERIOR WALL PACK
- RECESSED CAN LAMP
- EXIT SIGN
- LINEAR LIGHT FIXTURE
- SKYLIGHT
- EMERGENCY LIGHTING
- MECHANICAL SUPPLY REGISTER
- MECHANICAL RETURN REGISTER
- MECHANICAL EXHAUST REGISTER
- GYPSUM WALLBOARD SOFFIT / CEILING
- ROOF HATCH
- (S) SPEAKER



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job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

reflected ceiling plan - Sewa U'usim

a2.1

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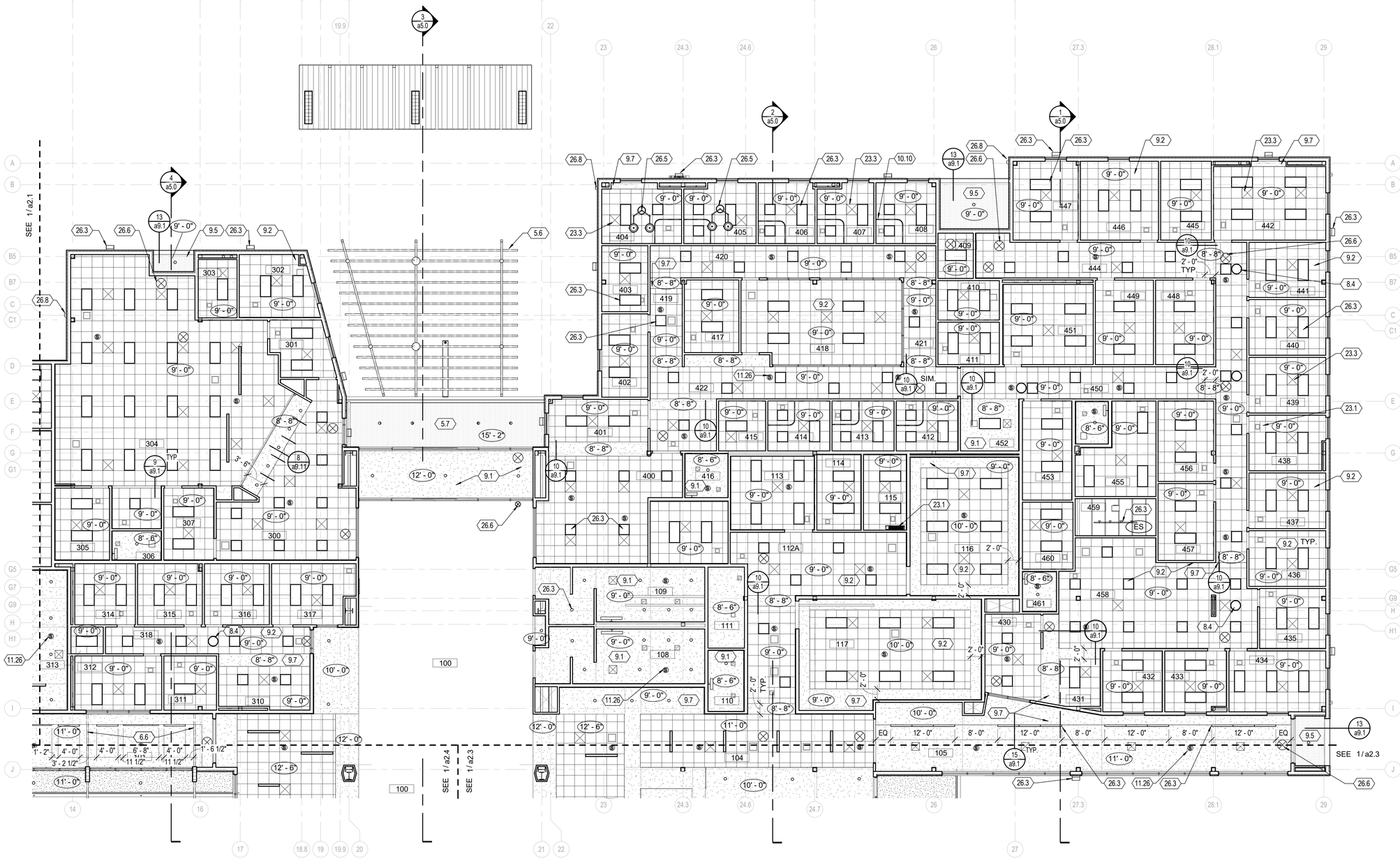


reflected ceiling plan - Nursing + Clinics

1/8" = 1'-0"

keynotes

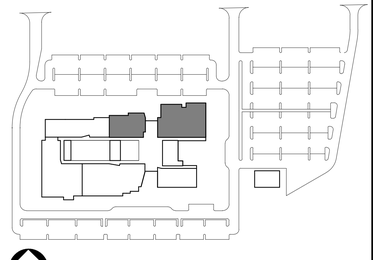
5.6	PAINTED STEEL TRELLIS - SEE STRUCTURAL DRAWINGS. SEE SHEET A7.13.
5.7	ENTRY CANOPY - SEE STRUCTURAL DRAWINGS. SEE SHEET A7.13.
6.6	WOOD STRUCTURE - SEE STRUCTURAL DRAWINGS.
8.4	SKYLIGHT, TYP: SOLATUBE 750 DS. COORDINATE IN CEILINGS.
9.1	GYPSUM WALLBOARD CEILING ON SUSPENDED METAL FRAMING. SEE SHEET A9.1.
9.2	SUSPENDED ACOUSTICAL TILE CEILING SYSTEM. SEE SHEET A9.1.
9.5	EIFS SYSTEM ON METAL FRAMING SYSTEM. JOINTS AS SHOWN. MULTI-COLORED.
9.7	GYPSUM WALLBOARD SOFFIT ON METAL FRAMING. SEE SHEET A9.1.
10.10	PRIVACY CURTAIN AND TRACK.
11.26	CEILING MOUNTED SPEAKER CENTER WITHIN CEILING TILE. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.
23.1	MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS.
23.3	MECHANICAL DEVICE - SEE MECHANICAL DRAWINGS.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.
26.5	PROCEDURE LIGHT. SEE ELECTRICAL.
26.6	EXIT SIGN. SEE ELECTRICAL DRAWINGS.
26.8	FUTURE SECURITY CAMERA LOCATION. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.

RCP legend

- 2' x 2' SUSPENDED CEILING GRID ASSEMBLY
- 2' x 2' LIGHT FIXTURE
- 2' x 4' LIGHT FIXTURE
- EXTERIOR WALL PACK
- RECESSED CAN LAMP
- EXIT SIGN
- LINEAR LIGHT FIXTURE
- SKYLIGHT
- EMERGENCY LIGHTING
- MECHANICAL SUPPLY REGISTER
- MECHANICAL RETURN REGISTER
- MECHANICAL EXHAUST REGISTER
- GYPSUM WALLBOARD SOFFIT / CEILING
- ROOF HATCH
- (S) SPEAKER

general notes

1. DO NOT SCALE DRAWINGS. COORDINATE ALL WORK BETWEEN ARCHITECTURAL, STRUCTURAL, CIVIL, MECHANICAL, PLUMBING, COMMUNICATIONS AND ELECTRICAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE IMPLEMENTATION OF WORK.
2. REFER TO PLUMBING, MECHANICAL AND ELECTRICAL DRAWINGS FOR ALL APPLICABLE CODES FOR REQUIRED CLEARANCES OF EQUIPMENT.
3. REFER TO SHEET A1.13 FOR LOBBY CEILING.



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reflected ceiling plan - Nursing + Clinics

a2.2

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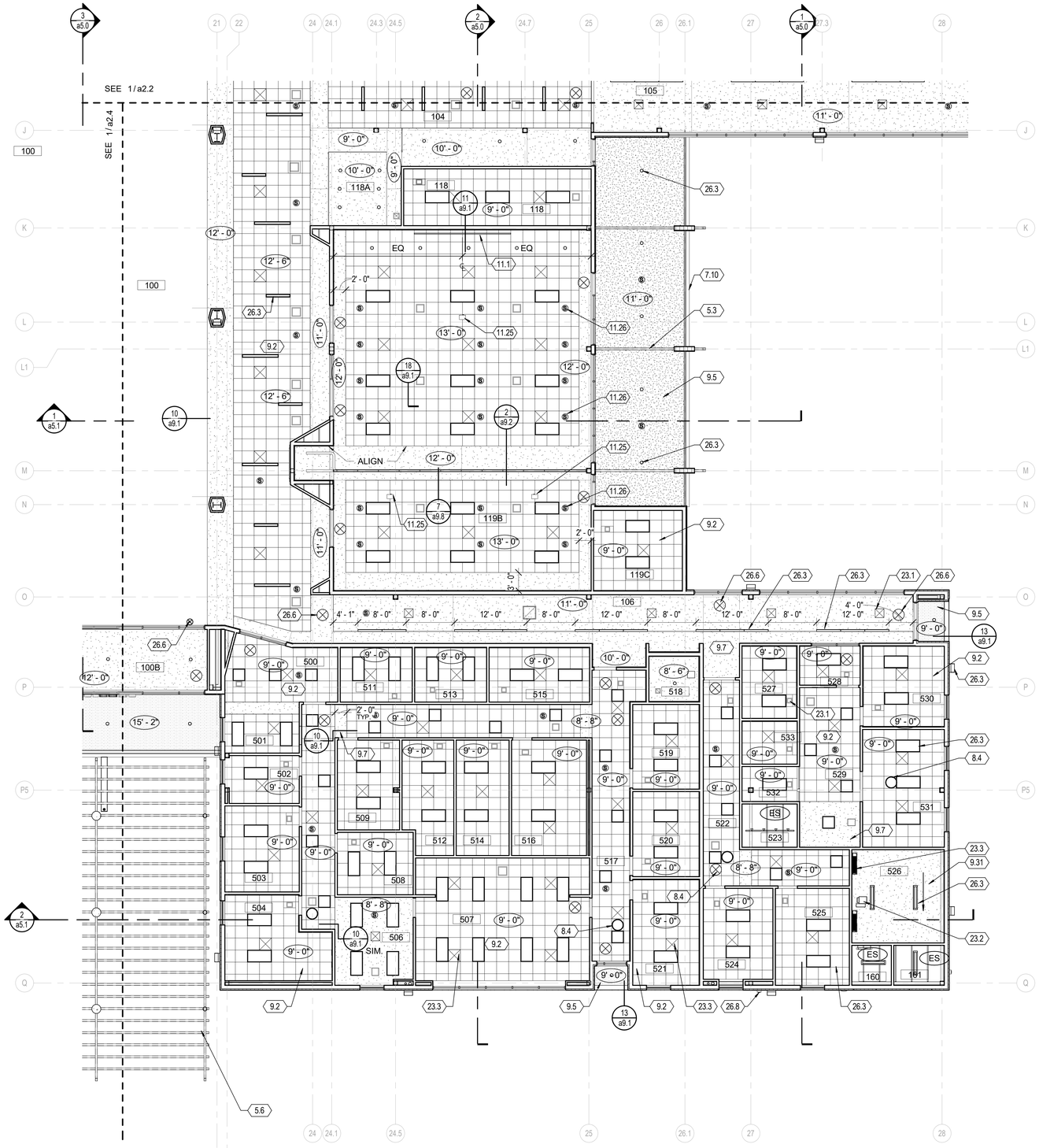
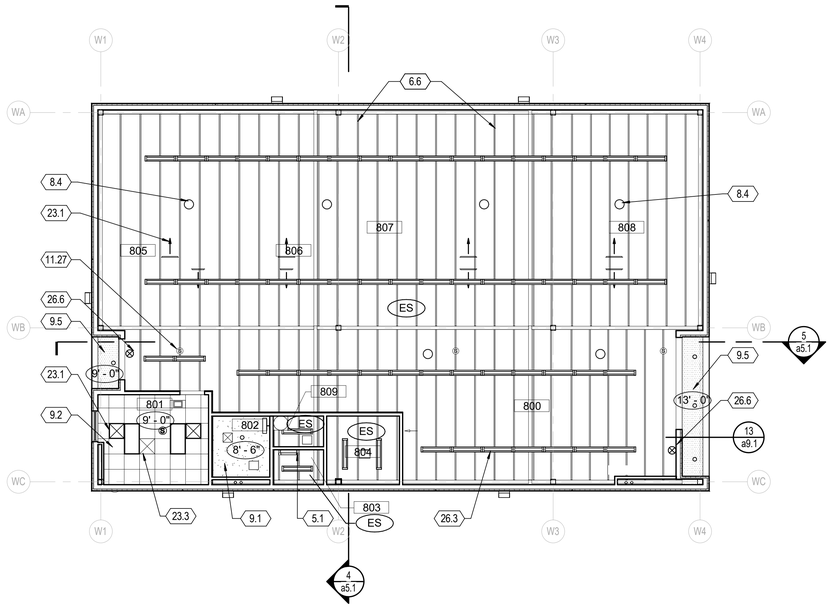


1 a2.3 **reflected ceiling plan - Health Budget + Managed Health / Billing**

1/8" = 1'-0"

north



2 a2.3 **reflected ceiling plan - warehouse**

1/8" = 1'-0"

north

RCP legend

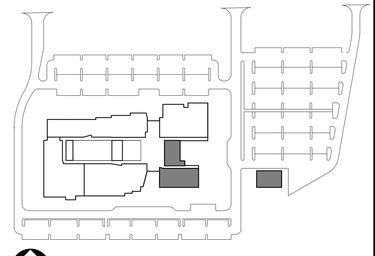
- 2' x 2' SUSPENDED CEILING GRID ASSEMBLY
- 2' x 2' LIGHT FIXTURE
- 2' x 4' LIGHT FIXTURE
- EXTERIOR WALL PACK
- RECESSED CAN LAMP
- EXIT SIGN
- LINEAR LIGHT FIXTURE
- SKYLIGHT
- EMERGENCY LIGHTING
- MECHANICAL SUPPLY REGISTER
- MECHANICAL RETURN REGISTER
- MECHANICAL EXHAUST REGISTER
- GYPSUM WALLBOARD SOFFIT / CEILING
- ROOF HATCH
- (s) SPEAKER

general notes

1. DO NOT SCALE DRAWINGS. COORDINATE ALL WORK BETWEEN ARCHITECTURAL, STRUCTURAL, CIVIL, MECHANICAL, PLUMBING, COMMUNICATIONS AND ELECTRICAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE IMPLEMENTATION OF WORK.
2. REFER TO PLUMBING, MECHANICAL AND ELECTRICAL DRAWINGS FOR ALL APPLICABLE CODES FOR REQUIRED CLEARANCES OF EQUIPMENT.
3. REFER TO SHEET A1.13 FOR LOBBY CEILING.

keynotes

5.1	ROOF ACCESS STEEL. LADDER WITH SAFETY UP-POST. SEE SHEET A9.4.
5.3	STEEL BEAM, SEE STRUCTURAL.
5.6	PAINTED STEEL TRELLIS - SEE STRUCTURAL DRAWINGS. SEE SHEET A7.13.
6.6	WOOD STRUCTURE - SEE STRUCTURAL DRAWINGS.
7.10	22 GA. PRE-FINISHED SHEET METAL GUTTER.
8.4	SKYLIGHT, TYP: SOLATUBE 750 DS. COORDINATE IN CEILINGS.
9.1	GYPSUM WALLBOARD CEILING ON SUSPENDED METAL FRAMING. SEE SHEET A9.1.
9.2	SUSPENDED ACOUSTICAL TILE CEILING SYSTEM. SEE SHEET A9.1.
9.5	EIFS SYSTEM ON METAL FRAMING SYSTEM. JOINTS AS SHOWN. MULTI-COLORED.
9.7	GYPSUM WALLBOARD SOFFIT ON METAL FRAMING. SEE SHEET A9.1.
9.31	LAMINATE GWB TO BOTTOM OF JOIST.
11.1	ELECTRIC MOVIE SCREEN. SEE SHEET A9.1.
11.25	CEILING MOUNTED PROJECTOR. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.
11.26	CEILING MOUNTED SPEAKER CENTER WITHIN CEILING TILE. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.
11.27	SPEAKER, COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.
23.1	MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS.
23.2	MECHANICAL DUCTWORK - SEE MECHANICAL DRAWINGS.
23.3	MECHANICAL DEVICE - SEE MECHANICAL DRAWINGS.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.
26.6	EXIT SIGN. SEE ELECTRICAL DRAWINGS.
26.8	FUTURE SECURITY CAMERA LOCATION. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.



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11.16.18

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reflected ceiling plan - Managed Health + Warehouse

a2.3

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general notes

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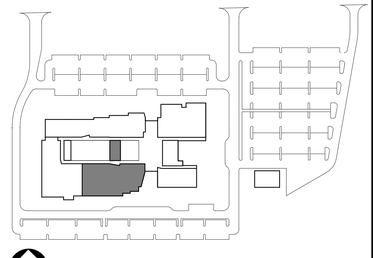
3. REFER TO SHEET A1.13 FOR LOBBY CEILING.

keynotes

5.3	STEEL BEAM, SEE STRUCTURAL.
5.7	ENTRY CANOPY - SEE STRUCTURAL DRAWINGS. SEE SHEET A7.13.
5.14	STEEL COLUMN BY SHADE MANUFACTURE. COORDINATE WITH STRUCTURAL AND LANDSCAPE.
8.4	SKYLIGHT, TYP: SOLATUBE 750 DS. COORDINATE IN CEILINGS.
9.1	GYPSUM WALLBOARD CEILING ON SUSPENDED METAL FRAMING. SEE SHEET A9.1.
9.2	SUSPENDED ACOUSTICAL TILE CEILING SYSTEM. SEE SHEET A9.1.
9.5	EIFS SYSTEM ON METAL FRAMING SYSTEM. JOINTS AS SHOWN. MULTI-COLORED.
9.7	GYPSUM WALLBOARD SOFFIT ON METAL FRAMING. SEE SHEET A9.1.
23.3	MECHANICAL DEVICE - SEE MECHANICAL DRAWINGS.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.
26.6	EXIT SIGN. SEE ELECTRICAL DRAWINGS.
26.8	FUTURE SECURITY CAMERA LOCATION. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.

RCP legend

- 2' x 2' SUSPENDED CEILING GRID ASSEMBLY
- 2' x 2' LIGHT FIXTURE
- 2' x 4' LIGHT FIXTURE
- EXTERIOR WALL PACK
- RECESSED CAN LAMP
- EXIT SIGN
- LINEAR LIGHT FIXTURE
- SKYLIGHT
- EMERGENCY LIGHTING
- MECHANICAL SUPPLY REGISTER
- MECHANICAL RETURN REGISTER
- MECHANICAL EXHAUST REGISTER
- GYPSUM WALLBOARD SOFFIT / CEILING
- ROOF HATCH
- SPEAKER



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1 a2.4 **reflected ceiling plan - Centered Spirit**
1/8" = 1'-0"

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Health Services Center II
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reflected ceiling plan - Centered Spirit

a2.4

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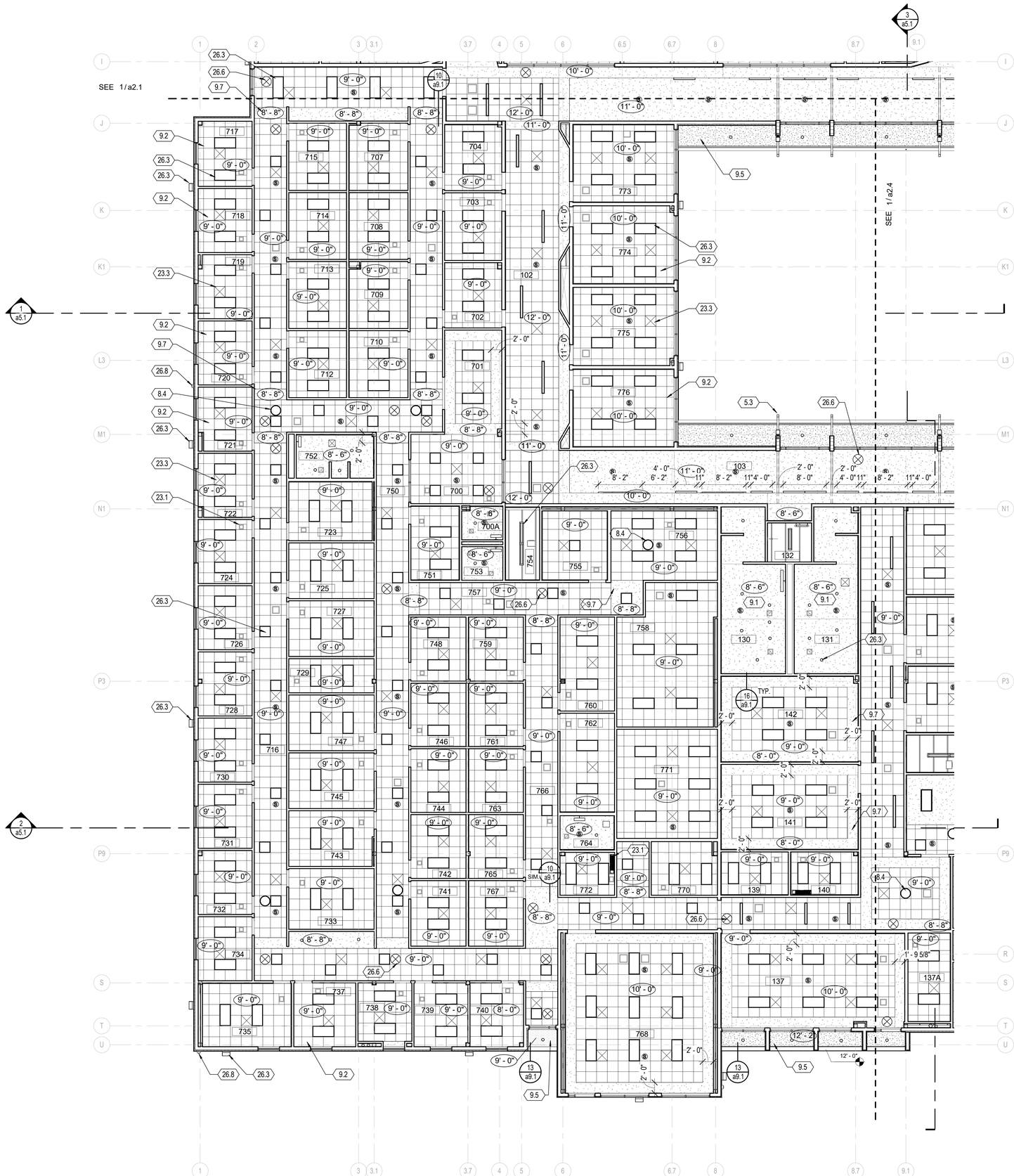

1 a2.5 **reflected ceiling plan - Social Services**
1/8" = 1'-0"

north

general notes

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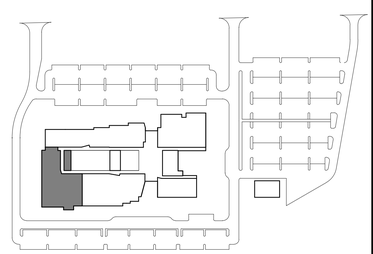
3. REFER TO SHEET A1.13 FOR LOBBY CEILING.

keynotes

5.3	STEEL BEAM, SEE STRUCTURAL.
8.4	SKYLIGHT, TYP: SOLATUBE 750 DS. COORDINATE IN CEILINGS.
9.1	GYPSUM WALLBOARD CEILING ON SUSPENDED METAL FRAMING. SEE SHEET A9.1.
9.2	SUSPENDED ACOUSTICAL TILE CEILING SYSTEM. SEE SHEET A9.1.
9.5	EIFS SYSTEM ON METAL FRAMING SYSTEM. JOINTS AS SHOWN. MULTI-COLORED.
9.7	GYPSUM WALLBOARD SOFFIT ON METAL FRAMING. SEE SHEET A9.1.
23.1	MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS.
23.3	MECHANICAL DEVICE - SEE MECHANICAL DRAWINGS.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.
26.6	EXIT SIGN. SEE ELECTRICAL DRAWINGS.
26.8	FUTURE SECURITY CAMERA LOCATION. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.

RCP legend

- 2' x 2' SUSPENDED CEILING GRID ASSEMBLY
- 2' x 2' LIGHT FIXTURE
- 2' x 4' LIGHT FIXTURE
- EXTERIOR WALL PACK
- RECESSED CAN LAMP
- EXIT SIGN
- LINEAR LIGHT FIXTURE
- SKYLIGHT
- EMERGENCY LIGHTING
- MECHANICAL SUPPLY REGISTER
- MECHANICAL RETURN REGISTER
- MECHANICAL EXHAUST REGISTER
- GYPSUM WALLBOARD SOFFIT / CEILING
- ROOF HATCH
- SPEAKER



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reflected ceiling plan - Social Services

a2.5

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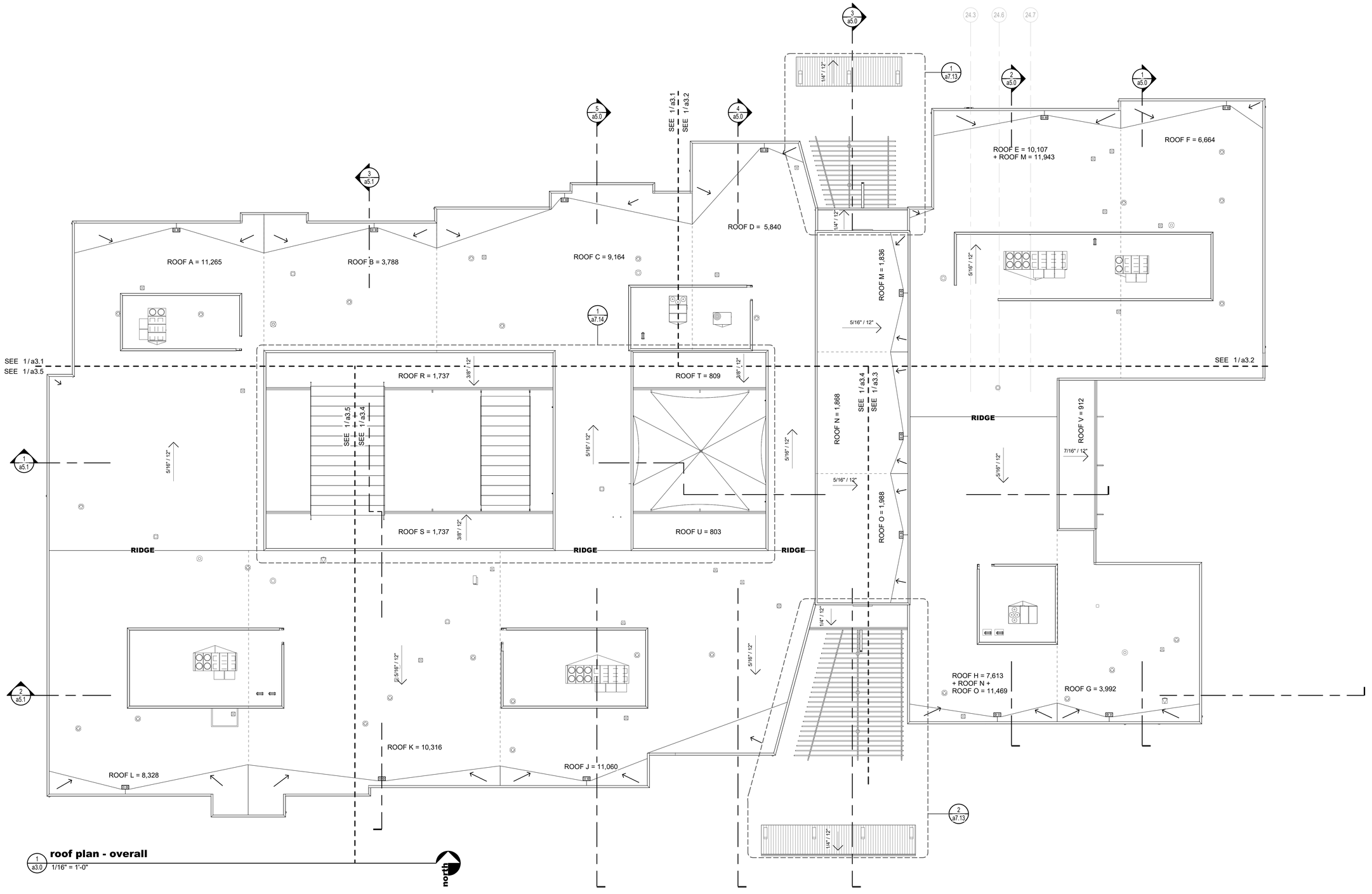


1 a3.0 **roof plan - overall**
1/16" = 1'-0"

north

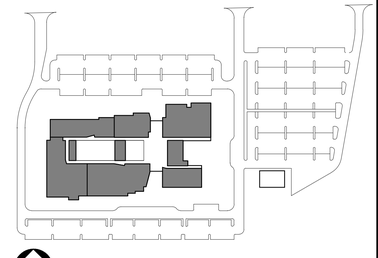
2012 IPC (TABLE 1106.2 (2) + 1106.6) BASED UPON 3" RAINFALL RATE PER HOUR - OVERALL								
	ROOF AREA			PRIMARY ROOF DRAIN		SECONDARY (EMERGENCY) OVERFLOW		
				SIZE OF VERTICAL LEADER AND SCUPPER OPENING *			SIZE OF SCUPPER (2" WATER HEAD MAX)	
ROOF	ROOF AREA	VERTICAL WALL AREA	TOTAL AREA	REQUIRED	PROVIDED	GPM	REQUIRED	PROVIDED
A	11,265 SF	427 SF	11,692 SF	6" Ø	6" Ø	368	6" Ø	6" Ø
B	3,788 SF	250 SF	4,038 SF	4" Ø	4" Ø	119	4" Ø	4" Ø
C	9,164 SF	533 SF	9,697 SF	5" Ø	6" Ø	303	5" Ø	6" Ø
D	5,840 SF	1967 SF	7,807 SF	5" Ø	6" Ø	228	5" Ø	6" Ø
E	10,107 SF	812 SF	10,919 SF	6" Ø	6" Ø	341	6" Ø	6" Ø
F	6,664 SF	314 SF	6,978 SF	5" Ø	6" Ø	207	5" Ø	6" Ø
G	3,992 SF	768 SF	4,760 SF	4" Ø	4" Ø	149	4" Ø	4" Ø
H	7,613 SF	303 SF	7,916 SF	6" Ø	6" Ø	247	6" Ø	6" Ø
J	11,060 SF	417 SF	11,477 SF	6" Ø	6" Ø	362	6" Ø	6" Ø
K	10,316 SF	207 SF	10,523 SF	6" Ø	6" Ø	166	6" Ø	6" Ø
L	8,328 SF	237 SF	8,565 SF	5" Ø	6" Ø	265	5" Ø	6" Ø

2012 IPC (TABLE 1106.2 (2) + 1106.6) BASED UPON 3" RAINFALL RATE PER HOUR - OVERALL									
	ROOF AREA			PRIMARY ROOF DRAIN			SECONDARY (EMERGENCY) OVERFLOW		
				SIZE OF VERTICAL LEADER AND SCUPPER OPENING *			SIZE OF SCUPPER (2" WATER HEAD MAX)		
ROOF	ROOF AREA	VERTICAL WALL AREA	TOTAL AREA	REQUIRED	PROVIDED	GPM	REQUIRED	PROVIDED	
M	1,836 SF	129 SF	1,965 SF	2 3/4" X 4 1/4"	3" X 4"	62	12" x 1.5"	12" x 4"	
N	1,868 SF	93 SF	1,961 SF	2 3/4" X 4 1/4"	3" X 4"	62	12" x 1.5"	12" x 4"	
O	1,988 SF	136 SF	2,124 SF	2 3/4" X 4 1/4"	3" X 4"	66	12" x 2"	12" x 4"	
P	2,093 SF	195 SF	2,288 SF	3" Ø	4" Ø	71	3" Ø	4" Ø	
Q	1,755 SF	176 SF	1,931 SF	3" Ø	4" Ø	61	3" Ø	4" Ø	

* SIZES LISTED ARE CLEAR OPENING PROVIDED
** COORDINATE W/ WATER HARVESTING SYSTEM - SEE LANDSCAPE

general notes

1. DO NOT SCALE DRAWINGS. COORDINATE ALL WORK BETWEEN ARCHITECTURAL, STRUCTURAL, MECHANICAL, PLUMBING, COMMUNICATIONS AND ELECTRICAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE IMPLEMENTATION OF WORK.
2. SEE MECHANICAL, PLUMBING AND ELECTRICAL FOR ALL PENETRATIONS THROUGH ROOFS. REFER TO TYPICAL DETAILS.
3. REFER TO MECHANICAL, PLUMBING AND ELECTRICAL DRAWINGS FOR ADDITIONAL ROOF MOUNTED EQUIPMENT.
4. AT ALL PARAPETS EXTEND ROOFING SYSTEM UP PARAPET AND UNDER CAP FLASHING U.N.O.
5. REFER TO ROOF DETAILS ON SHEET a9.3 thru a9.6.
6. ROOF HEIGHTS SHOWN ARE TOP ROOF UNO.



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roof plan - overall

a3.0

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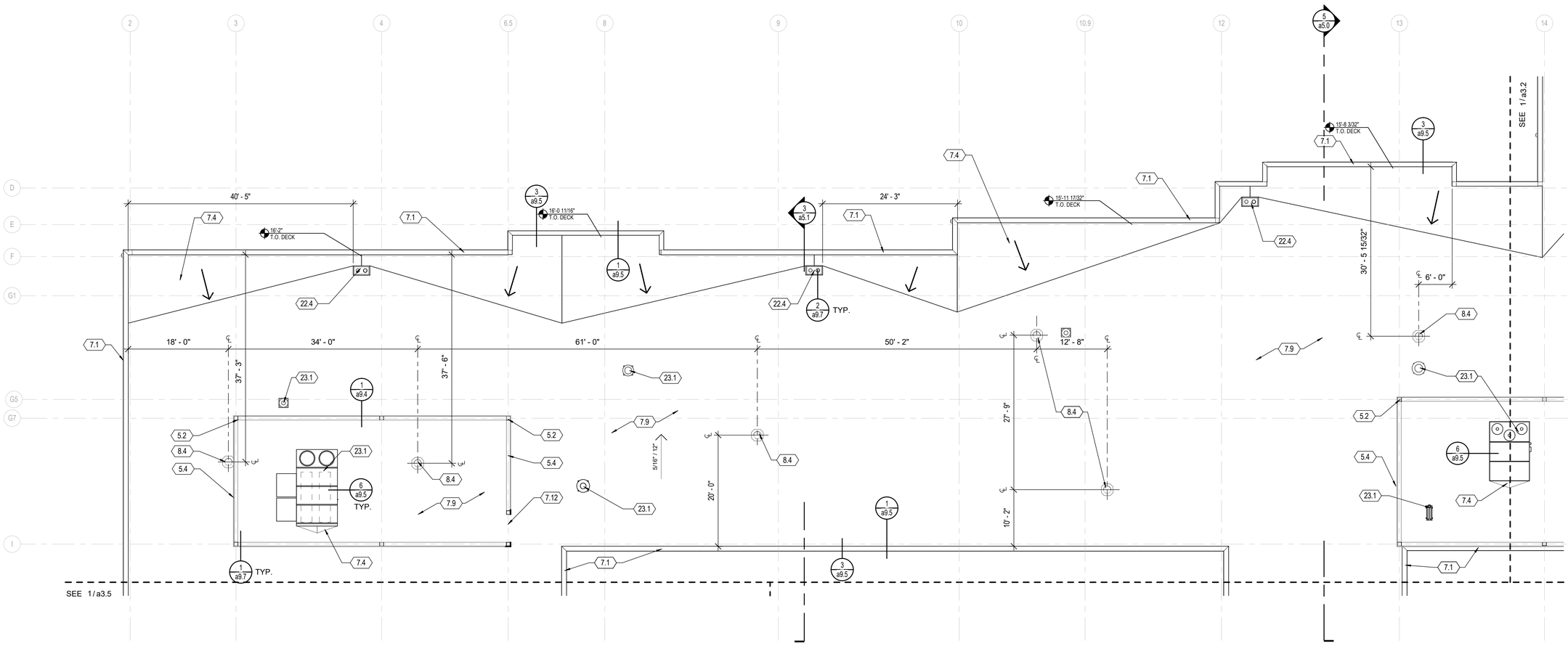
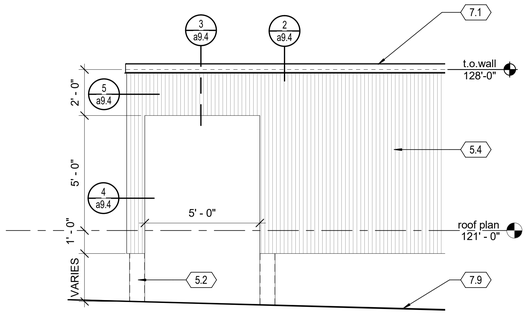


roof plan - sewa u'usim

1/a3.1 — 1/8" = 1'-0"



typical mechanical screen opening

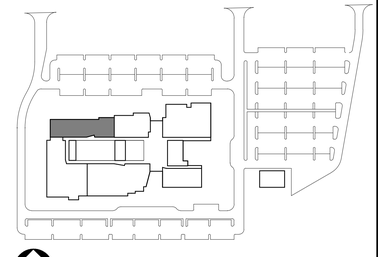
2/a3.1 — 3/8" = 1'-0"

keynotes

5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
5.4	ROOF TOP EQUIPMENT SCREEN. STEEL COLUMNS, STEEL TUBE BEAMS, AND PRE-FINISHED METAL PANELS. SEE DETAIL 1/A9.4. PROVIDE 5'-0" WIDE OPENING AS INDICATED.
7.1	PRE-FINISHED CAP FLASHING.
7.4	TAPERED INSULATION CRICKET. ENSURE DRAINAGE TO SCUPPERS 1/8"/FT. MIN..
7.9	ROOFING SYSTEM OVER POLYISOCYANURATE, R-20 MINIMUM ON WOOD STRUCTURE.
7.12	5'-0" WIDE OPENING IN SCREEN WALL
8.4	SKYLIGHT, TYP: SOLATUBE 750 DS. COORDINATE IN CEILINGS.
22.4	PRIMARY AND SECONDARY ROOF DRAIN IN SUMP. SEE PLUMBING.
23.1	MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS.

general notes

1. DO NOT SCALE DRAWINGS. COORDINATE ALL WORK BETWEEN ARCHITECTURAL, STRUCTURAL, MECHANICAL, PLUMBING, COMMUNICATIONS AND ELECTRICAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE IMPLEMENTATION OF WORK.
2. SEE MECHANICAL, PLUMBING AND ELECTRICAL FOR ALL PENETRATIONS THROUGH ROOFS. REFER TO TYPICAL DETAILS.
3. REFER TO MECHANICAL, PLUMBING AND ELECTRICAL DRAWINGS FOR ADDITIONAL ROOF MOUNTED EQUIPMENT.
4. AT ALL PARAPETS EXTEND ROOFING SYSTEM UP PARAPET AND UNDER CAP FLASHING U.N.O.
5. REFER TO ROOF DETAILS ON SHEET a9.3 thru a9.6.
6. ROOF HEIGHTS SHOWN ARE TOP ROOF UNO.



keyplan

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job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

roof plan - Sewa U'usim

a3.1

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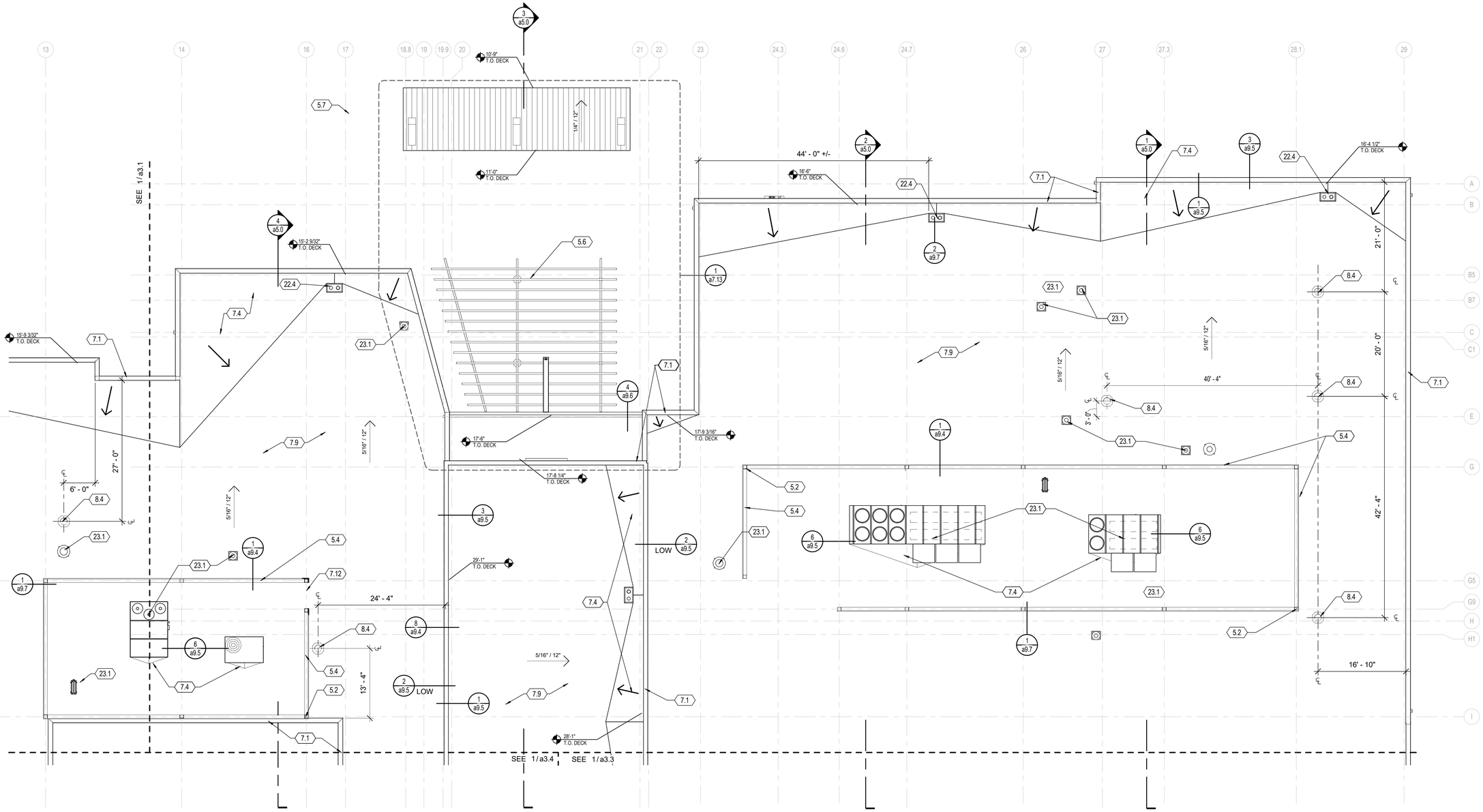

roof plan - Nursing + Clinics

1/8" = 1'-0"

north

keynotes

5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
5.4	ROOF TOP EQUIPMENT SCREEN. STEEL COLUMNS, STEEL TUBE BEAMS, AND PRE-FINISHED METAL PANELS. SEE DETAIL 1/A9.4. PROVIDE 5'-0" WIDE OPENING AS INDICATED.
5.6	PAINTED STEEL TRELLIS - SEE STRUCTURAL DRAWINGS. SEE SHEET A7.13.
5.7	ENTRY CANOPY - SEE STRUCTURAL DRAWINGS. SEE SHEET A7.13.
7.1	PRE-FINISHED CAP FLASHING.
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general notes

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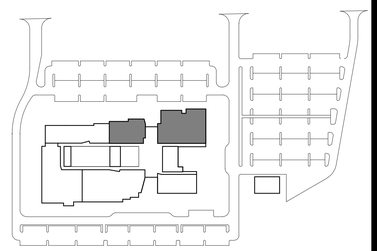

north

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Pascua Yaqui Tribe
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roof plan - Nursing + Clinics

a3.2

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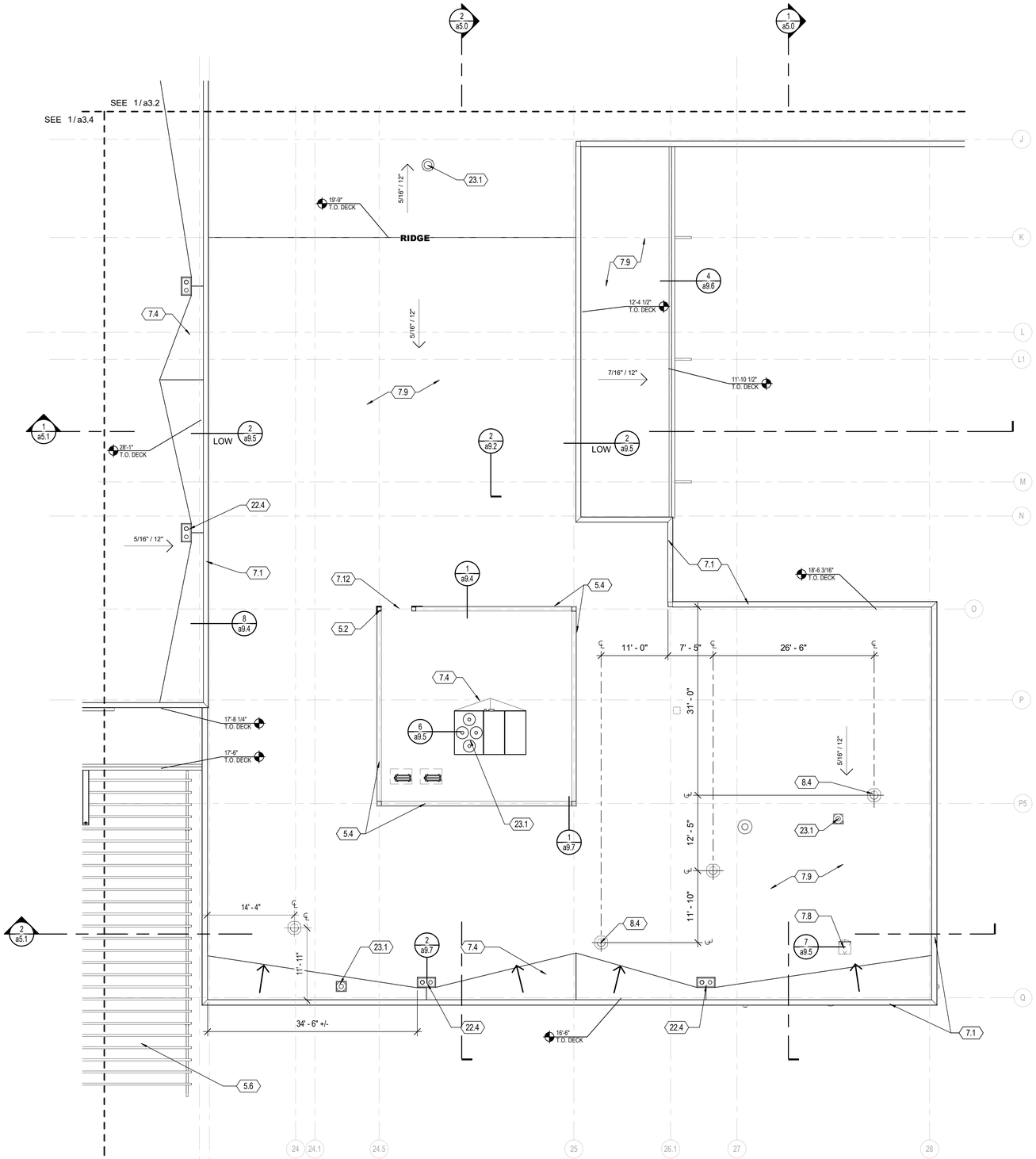
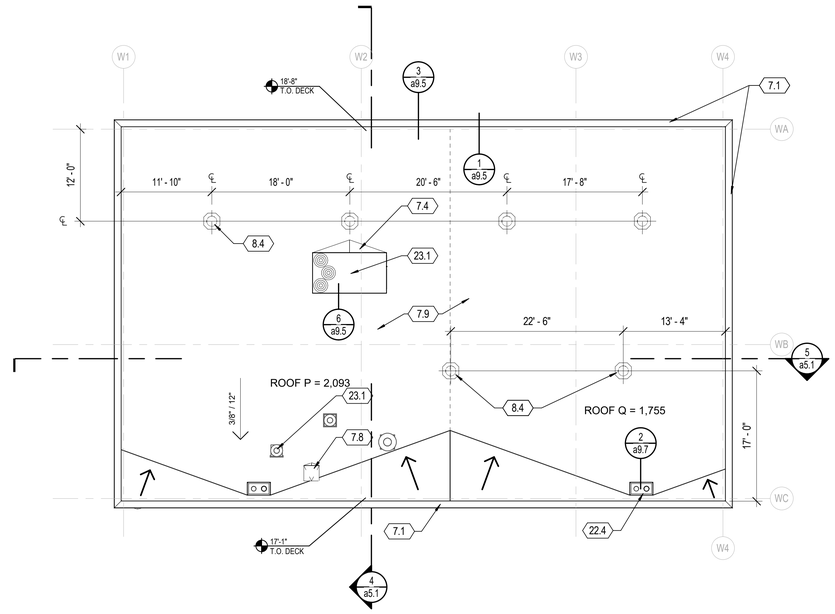


roof plan - Health Budget + Managed Health / Billing

1 a3.3 — 1/8" = 1'-0"

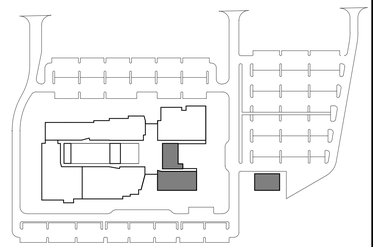
north



roof plan - warehouse

2 a3.3 — 1/8" = 1'-0"

north



north **keyplan**

n.t.s.

keynotes

5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
5.4	ROOF TOP EQUIPMENT SCREEN. STEEL COLUMNS, STEEL TUBE BEAMS, AND PRE-FINISHED METAL PANELS. SEE DETAIL 1/A9.4. PROVIDE 5'-0" WIDE OPENING AS INDICATED.
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5.7	ENTRY CANOPY - SEE STRUCTURAL DRAWINGS. SEE SHEET A7.13.
7.1	PRE-FINISHED CAP FLASHING.
7.4	TAPERED INSULATION CRICKET. ENSURE DRAINAGE TO SCUPPERS 1/8"/FT. MIN..
7.8	ROOF ACCESS HATCH WITH RAILING & LADDER WITH SAFETY POST. ROOF FLASHING PER DETAIL 7 ON SHEET A9.5.
7.9	ROOFING SYSTEM OVER POLYISOCYANURATE, R-20 MINIMUM ON WOOD STRUCTURE.
7.12	5'-0" WIDE OPENING IN SCREEN WALL
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22.4	PRIMARY AND SECONDARY ROOF DRAIN IN SUMP. SEE PLUMBING.
23.1	MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS.

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Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

roof plan - Managed Health + Warehouse

a3.3

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general notes

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7.12	5'-0" WIDE OPENING IN SCREEN WALL
8.4	SKYLIGHT, TYP: SOLATUBE 750 DS. COORDINATE IN CEILINGS.
9.29	SHADE CANOPY BY MANUFACTURE. COORDINATE WITH STRUCTURAL AND LANDSCAPE.
22.4	PRIMARY AND SECONDARY ROOF DRAIN IN SUMP. SEE PLUMBING.
23.1	MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS.

1 a3.4 **roof plan - centered spirit**
1/8" = 1'-0"

north

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roof plan - Centered Spirit

a3.4

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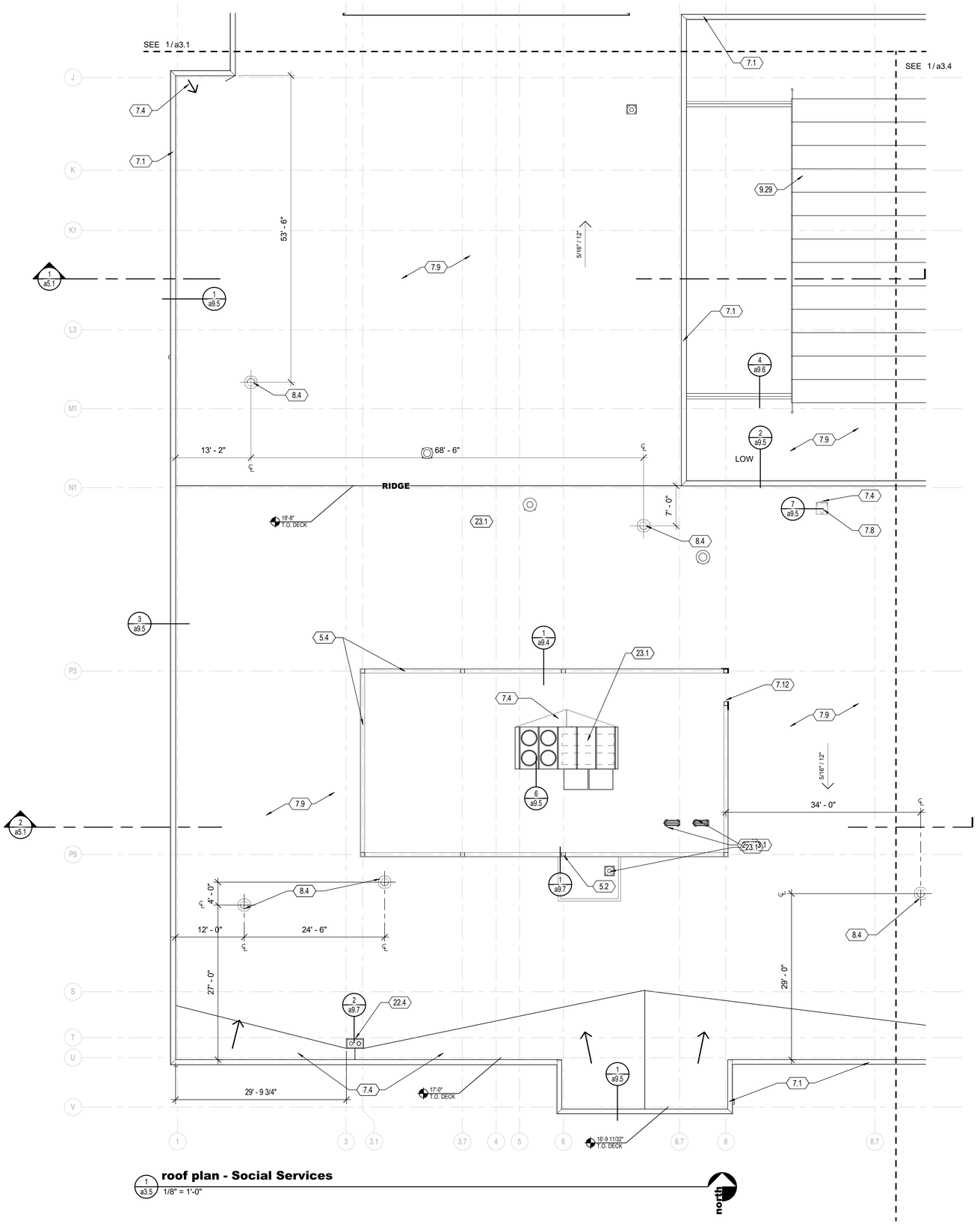

1 a3.5 **roof plan - Social Services**
1/8" = 1'-0"

north

general notes

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keynotes

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7.12	5'-0" WIDE OPENING IN SCREEN WALL
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9.29	SHADE CANOPY BY MANUFACTURE. COORDINATE WITH STRUCTURAL AND LANDSCAPE.
22.4	PRIMARY AND SECONDARY ROOF DRAIN IN SUMP. SEE PLUMBING.
23.1	MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS.

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11.16.18

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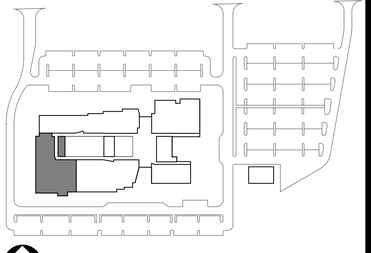
Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

roof plan - Social Services

a3.5



north **keyplan**
n.t.s.

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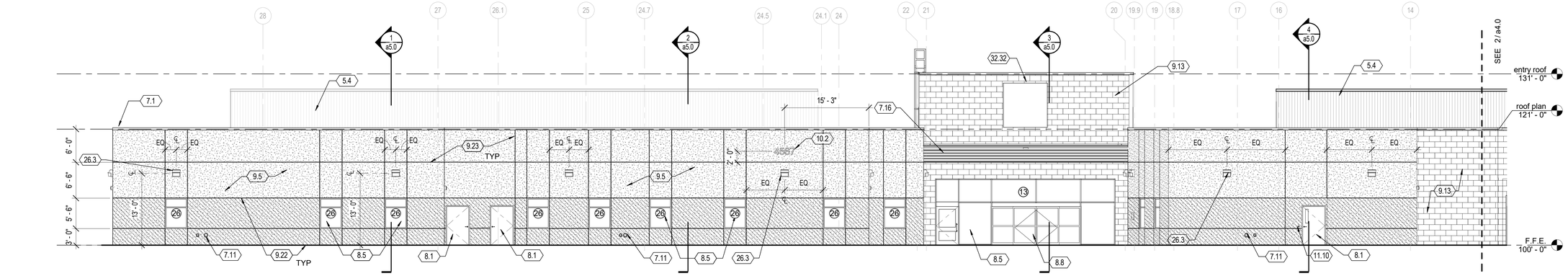
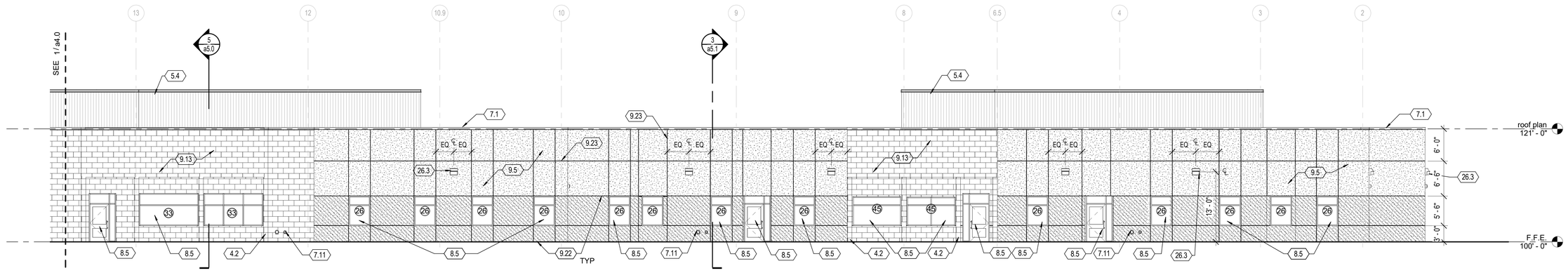
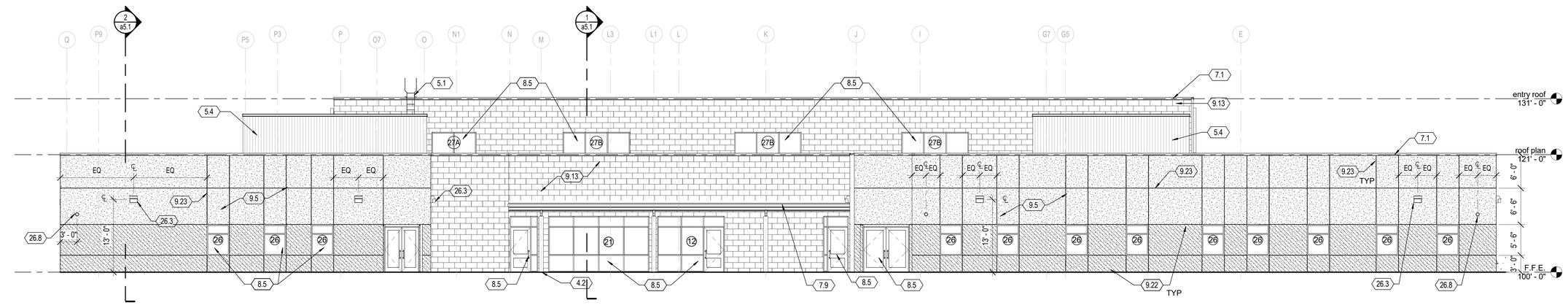


1 a4.0 **north elevation**
1/8" = 1'-0"



2 a4.0 **north elevation**
1/8" = 1'-0"



3 a4.0 **east elevation**
1/8" = 1'-0"

general notes

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3. LOCATE CONTROL JOINTS AND EXPANSION JOINTS PER STRUCTURAL AND MANUFACTURERS REQUIREMENTS . VERIFY ALL JOINTS NOT SHOWN WITH ARCHITECT PRIOR TO INSTALLATION.
4. PREP, PRIME AND PAINT ALL EXPOSED STEEL STRUCTURE, DECK AND SIDING.
5. SEE SHEET a8.6 AND a8.7 FOR WINDOW TYPES.

keynotes

4.2	8" CMU SUPPORT PIERS WITH SANDSTONE TILE. SEE WALL TYPE SHEET A9.0.
5.1	ROOF ACCESS STEEL. LADDER WITH SAFETY UP-POST. SEE SHEET A9.4.
5.4	ROOF TOP EQUIPMENT SCREEN. STEEL COLUMNS, STEEL TUBE BEAMS, AND PRE-FINISHED METAL PANELS. SEE DETAIL 1/A9.4. PROVIDE 5'-0" WIDE OPENING AS INDICATED.
7.1	PRE-FINISHED CAP FLASHING.
7.9	ROOFING SYSTEM OVER POLYISOCYANURATE, R-20 MINIMUM ON WOOD STRUCTURE.
7.11	ROOF DRAIN NOZZLE. SEE ELEVATIONS. COORDINATE WITH PLUMBING FOR PRIMARY AND SECONDARY LOCATIONS.
7.16	24 GA. PRE-FINISHED U-PANEL
8.1	HOLLOW METAL DOOR & FRAME. SEE DOOR SCHEDULE.
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
8.8	ALUMINUM SLIDER. SEE DOOR SCHEDULE.
9.5	EIFS SYSTEM ON METAL FRAMING SYSTEM. JOINTS AS SHOWN. MULTI-COLORED.
9.13	SANDSTONE TILES ON METAL FRAMING
9.22	IMPACT RESISTANT MESH IN EIFS. BOTTOM 8'-4" AROUND ENTIRE BUILDING.
9.23	EIFS 3/4" "V' GROOVE REVEAL, SEE SHEET A9.2.
10.2	15" HIGH BUILDING NUMBERS.
11.10	DOOR BELL. SEE ELECTRICAL DRAWINGS.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.
26.8	FUTURE SECURITY CAMERA LOCATION. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.
32.32	PREPARE WALL FOR BACKLIT EXTERIOR SIGNAGE. COORDINATE WITH ELECTRICAL.

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Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

building elevations

a4.0

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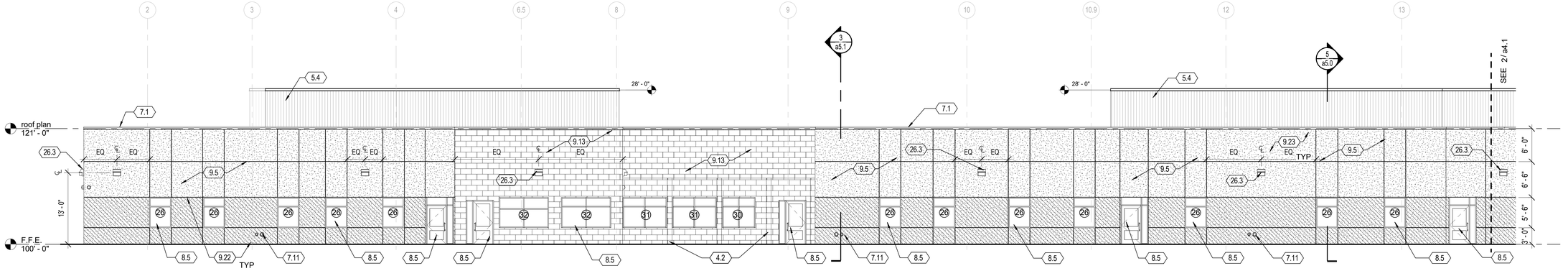
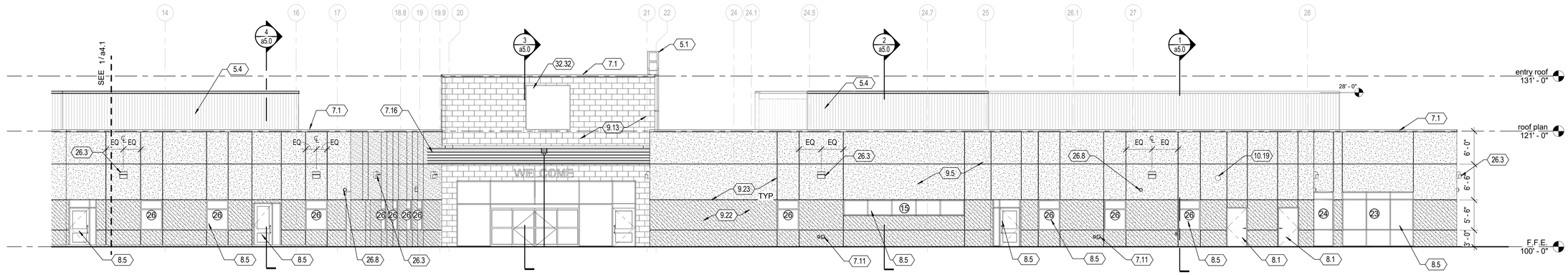
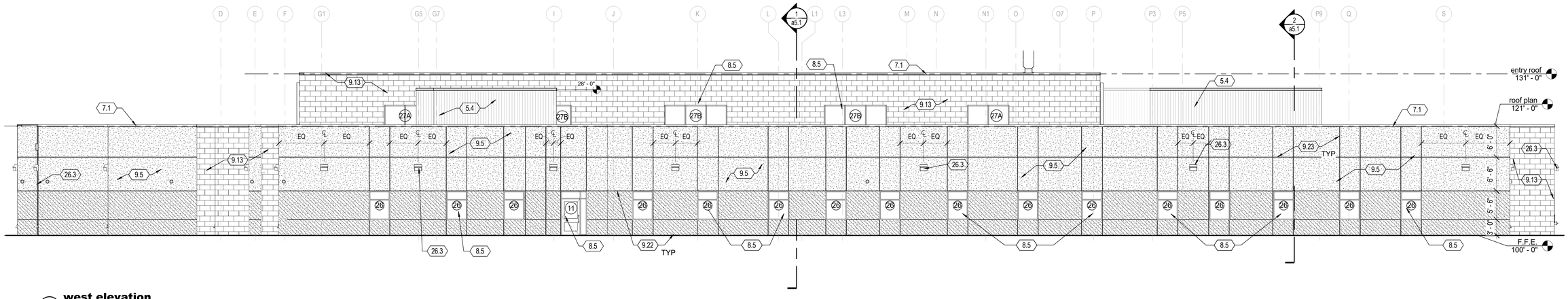


1 a4.1 **south elevation**
1/8" = 1'-0"



2 a4.1 **south elevation**
1/8" = 1'-0"



3 a4.1 **west elevation**
1/8" = 1'-0"

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keynotes

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10.19	ALARM BELL
26.3	LIGHT FIXTURE, SEE ELECTRICAL.
26.8	FUTURE SECURITY CAMERA LOCATION. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.
32.32	PREPARE WALL FOR BACKLIT EXTERIOR SIGNAGE. COORDINATE WITH ELECTRICAL.

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REGISTERED ARCHITECT
37165
KEVIN A.
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job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

building elevations

a4.1

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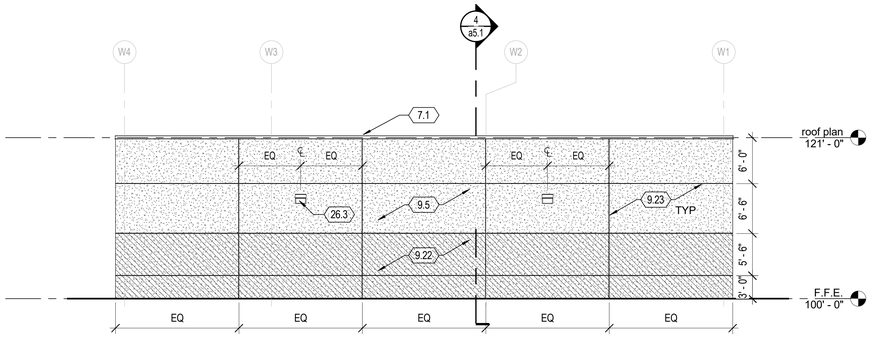
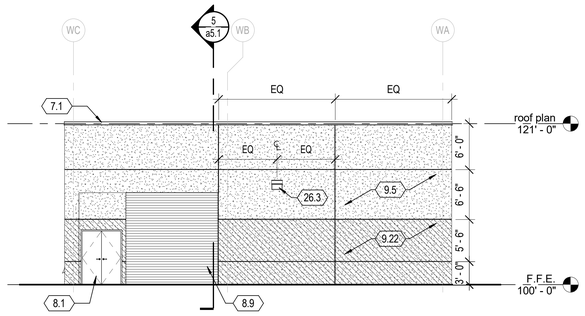
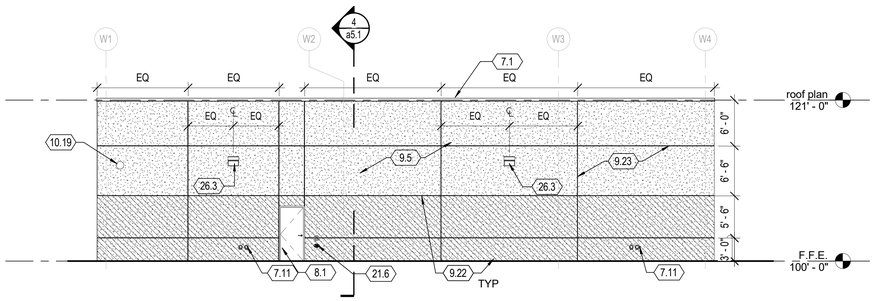


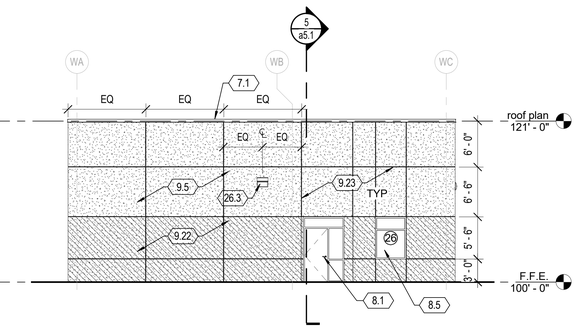
1 a4.2 **warehouse - north elevation**
1/8" = 1'-0"



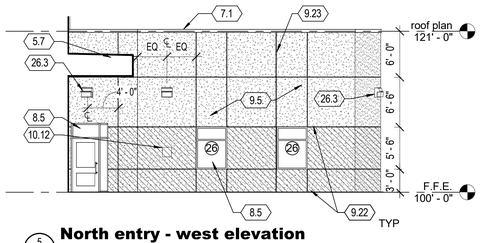
2 a4.2 **warehouse - east elevation**
1/8" = 1'-0"



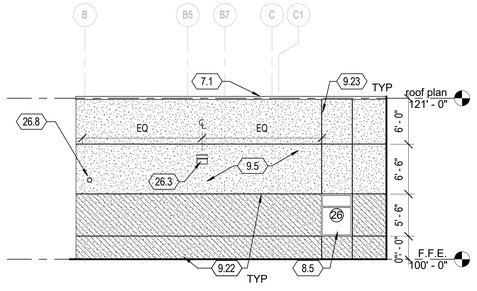
3 a4.2 **warehouse - south elevation**
1/8" = 1'-0"



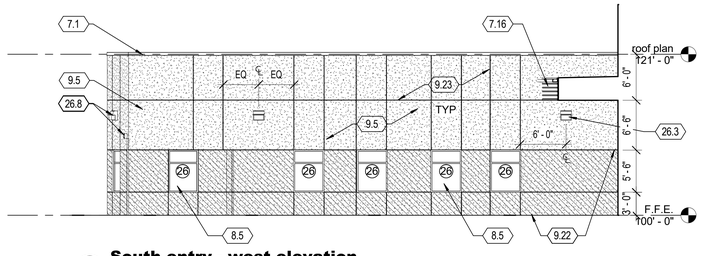
4 a4.2 **warehouse - west elevation**
1/8" = 1'-0"



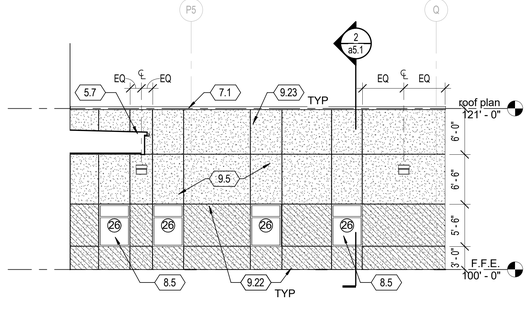
5 a4.2 **North entry - west elevation**
1/8" = 1'-0"



6 a4.2 **North entry - east elevation**
1/8" = 1'-0"



7 a4.2 **South entry - west elevation**
1/8" = 1'-0"



8 a4.2 **South entry - east elevation**
1/8" = 1'-0"

general notes

1. DO NOT SCALE DRAWINGS. COORDINATE ALL WORK BETWEEN CIVIL, LANDSCAPE, STRCUTURAL, ARCHITECTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS. CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO BEGINNING OF WORK.
2. REFER TO PLUMBING, MECHANICAL AND ELECTRICAL DRAWINGS AND ALL APPLICABLE CODES FOR REQUIRED CLEARANCES OF EQUIPMENT.HATCH REGION ON WALLS INDICATES A SECOND EFIS COLOR.
3. LOCATE CONTROL JOINTS AND EXPANSION JOINTS PER STRUCTURAL AND MANUFACTURERS REQUIREMENTS . VERIFY ALL JOINTS NOT SHOWN WITH ARCHITECT PRIOR TO INSTALLATION.
4. PREP, PRIME AND PAINT ALL EXPOSED STEEL STRUCTURE, DECK AND SIDING.
5. SEE SHEET a8.6 AND a8.7 FOR WINDOW TYPES.

keynotes

5.7	ENTRY CANOPY - SEE STRUCTURAL DRAWINGS. SEE SHEET A7.13.
7.1	PRE-FINISHED CAP FLASHING.
7.11	ROOF DRAIN NOZZLE. SEE ELEVATIONS. COORDINATE WITH PLUMBING FOR PRIMARY AND SECONDARY LOCATIONS.
7.16	24 GA. PRE-FINISHED U-PANEL
8.1	HOLLOW METAL DOOR & FRAME. SEE DOOR SCHEDULE.
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
8.9	OVERHEAD DOOR. SEE DOOR SCHEDULE.
9.5	EIFS SYSTEM ON METAL FRAMING SYSTEM. JOINTS AS SHOWN. MULTI-COLORED.
9.22	IMPACT RESISTANT MESH IN EIFS. BOTTOM 8'-4" AROUND ENTIRE BUILDING.
9.23	EIFS 3/4" 'V' GROOVE REVEAL, SEE SHEET A9.2.
10.12	DEDICATION PLAQUE, SEE SHEET 8/X1.5.
10.19	ALARM BELL
21.6	FIRE DEPARTMENT CONNECTION, SEE PLUMBING.
23.1	MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.
26.8	FUTURE SECURITY CAMERA LOCATION. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.

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building elevations

a4.2

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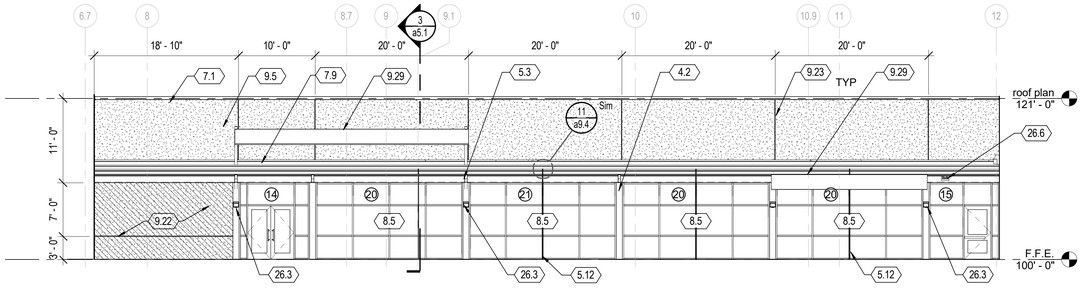
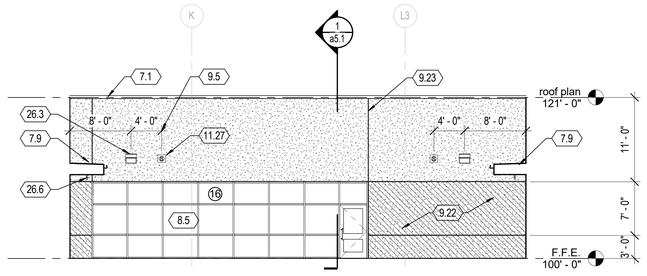


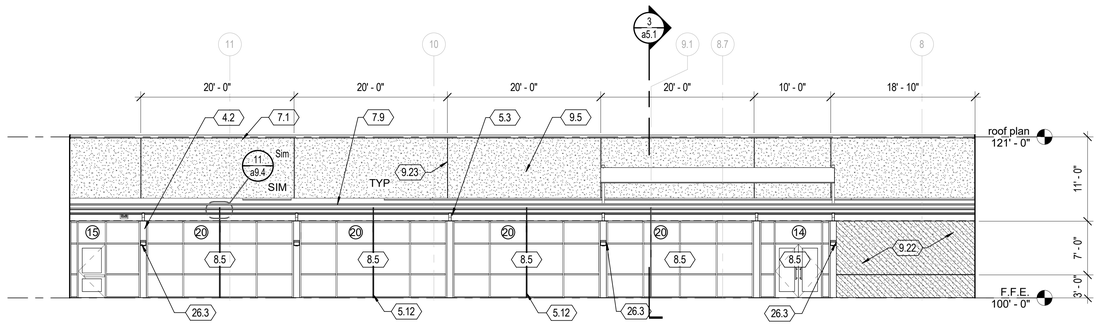
1 a4.3 playground courtyard - north elevation

1/8" = 1'-0"



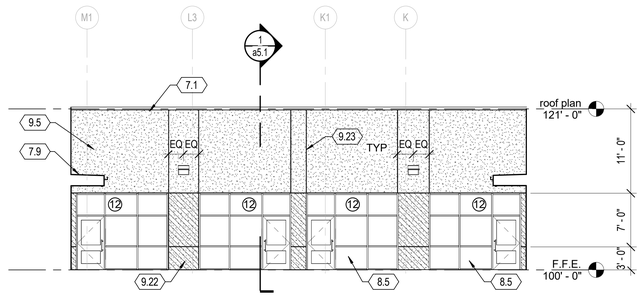
2 a4.3 playground courtyard - east elevation

1/8" = 1'-0"



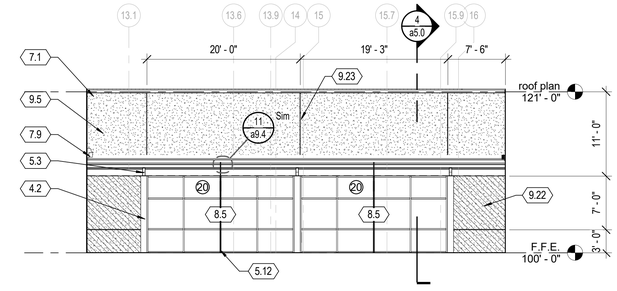
3 a4.3 playground courtyard - south elevation

1/8" = 1'-0"



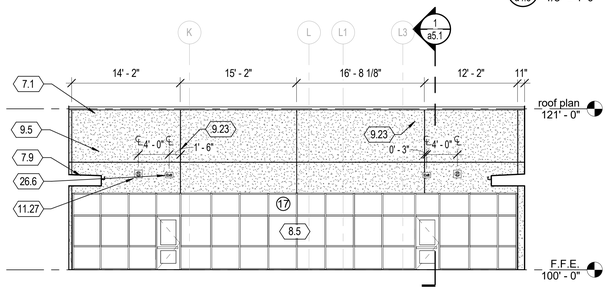
4 a4.3 playground courtyard - west elevation

1/8" = 1'-0"



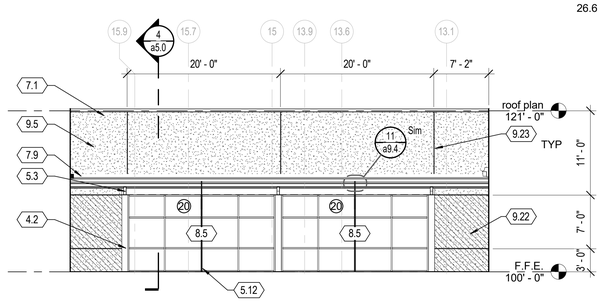
5 a4.3 meditation courtyard - north elevation

1/8" = 1'-0"



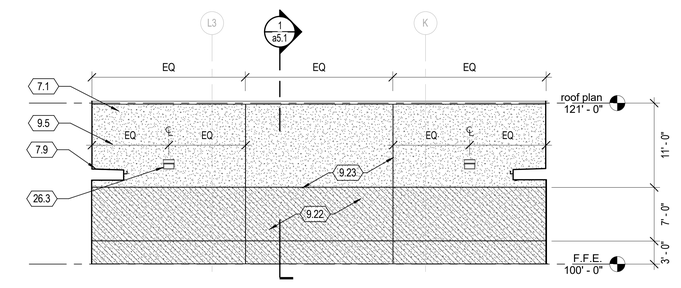
6 a4.3 meditation courtyard - east elevation

1/8" = 1'-0"



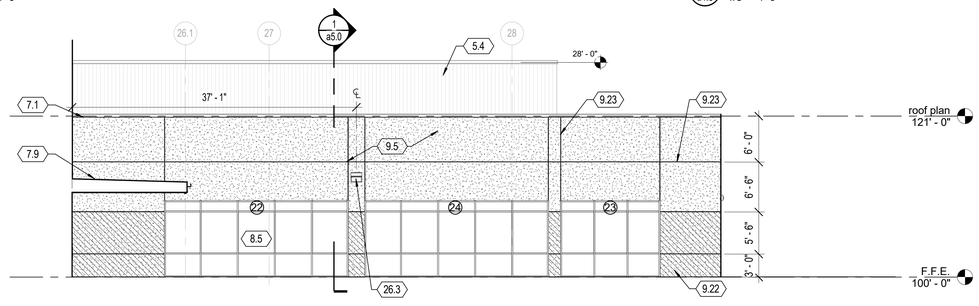
7 a4.3 meditation courtyard - south elevation

1/8" = 1'-0"



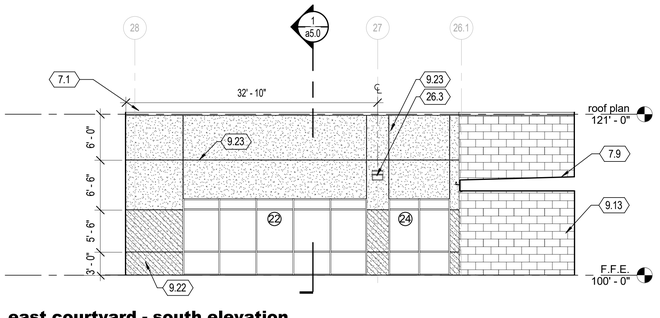
8 a4.3 meditation courtyard - west elevation

1/8" = 1'-0"



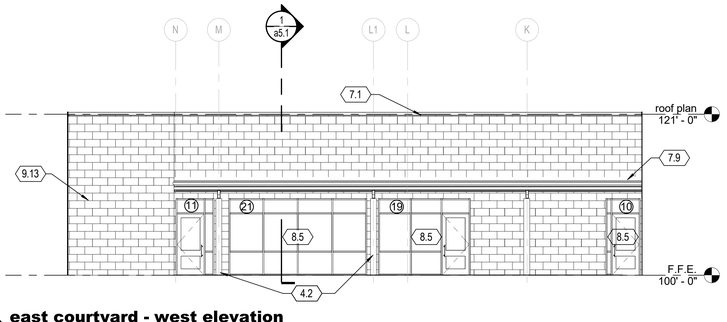
9 a4.3 east courtyard - north elevation

1/8" = 1'-0"



10 a4.3 east courtyard - south elevation

1/8" = 1'-0"



11 a4.3 east courtyard - west elevation

1/8" = 1'-0"

general notes

1. DO NOT SCALE DRAWINGS. COORDINATE ALL WORK BETWEEN CIVIL, LANDSCAPE, STRCUTURAL, ARCHITECTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS. CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO BEGINNING OF WORK.
2. REFER TO PLUMBING, MECHANICAL AND ELECTRICAL DRAWINGS AND ALL APPLICABLE CODES FOR REQUIRED CLEARANCES OF EQUIPMENT.HATCH REGION ON WALLS INDICATES A SECOND EFIS COLOR.
3. LOCATE CONTROL JOINTS AND EXPANSION JOINTS PER STRUCTURAL AND MANUFACTURERS REQUIREMENTS . VERIFY ALL JOINTS NOT SHOWN WITH ARCHITECT PRIOR TO INSTALLATION.
4. PREP, PRIME AND PAINT ALL EXPOSED STEEL STRUCTURE, DECK AND SIDING.
5. SEE SHEET a8.6 AND a8.7 FOR WINDOW TYPES.

keynotes

4.2	8" CMU SUPPORT PIERS WITH SANDSTONE TILE. SEE WALL TYPE SHEET A9.0.
5.3	STEEL BEAM, SEE STRUCTURAL.
5.4	ROOF TOP EQUIPMENT SCREEN. STEEL COLUMNS, STEEL TUBE BEAMS, AND PRE-FINISHED METAL PANELS. SEE DETAIL 1/A9.4. PROVIDE 5'-0" WIDE OPENING AS INDICATED.
5.12	GUTTER CHAINS. SEE SHEET A9.4.
7.1	PRE-FINISHED CAP FLASHING.
7.9	ROOFING SYSTEM OVER POLYISOCYANURATE, R-20 MINIMUM ON WOOD STRUCTURE.
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
9.5	EIFS SYSTEM ON METAL FRAMING SYSTEM. JOINTS AS SHOWN. MULTI-COLORED.
9.13	SANDSTONE TILES ON METAL FRAMING
9.22	IMPACT RESISTANT MESH IN EIFS. BOTTOM 8'-4" AROUND ENTIRE BUILDING.
9.23	EIFS 3/4" 'V' GROOVE REVEAL, SEE SHEET A9.2.
9.29	SHADE CANOPY BY MANUFACTURE. COORDINATE WITH STRUCTURAL AND LANDSCAPE.
11.27	SPEAKER. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.
26.6	EXIT SIGN. SEE ELECTRICAL DRAWINGS.

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revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

courtyard elevations

a4.3

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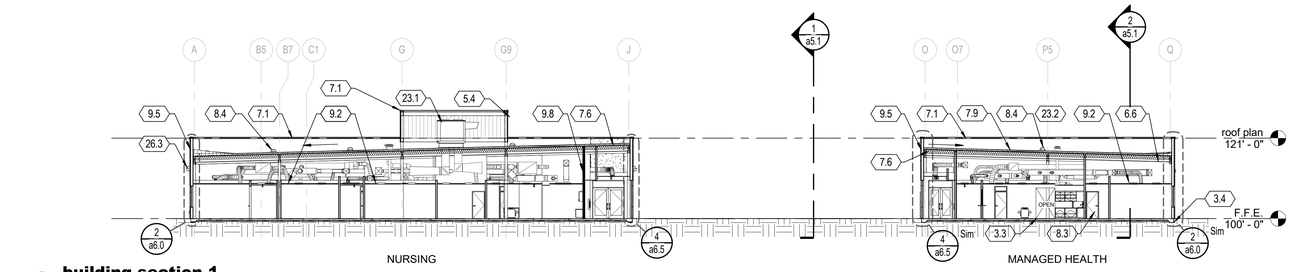
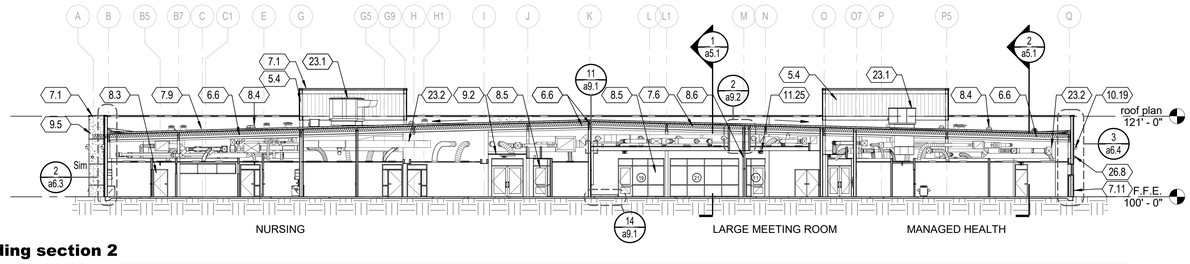
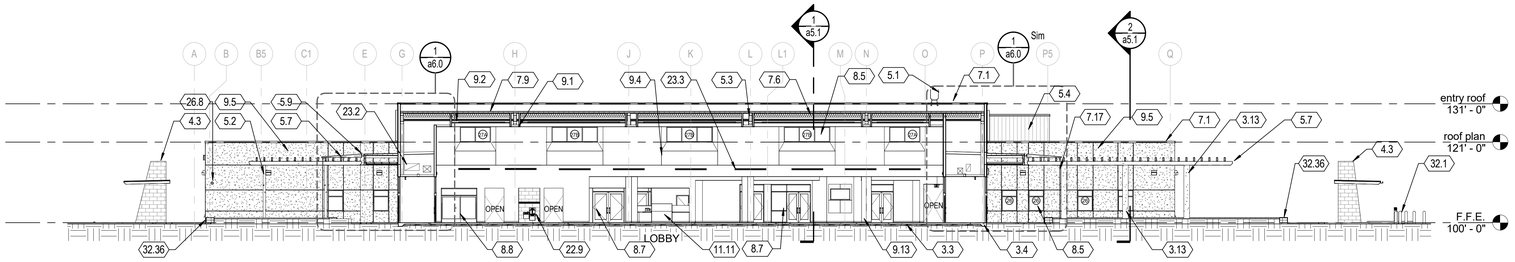


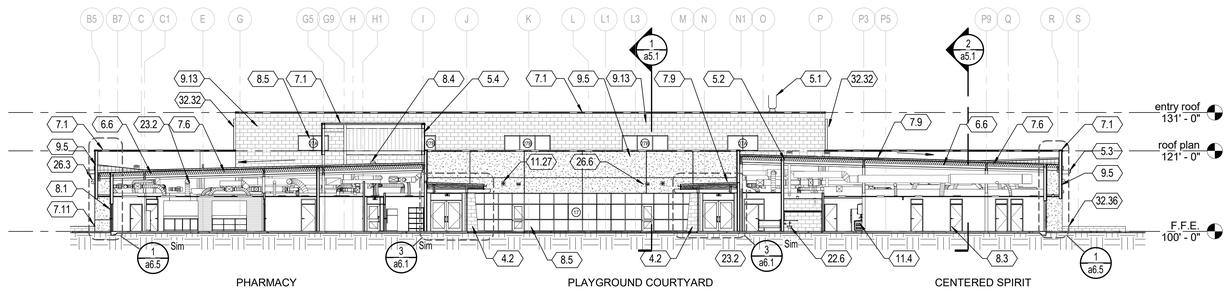
1 a5.0 **building section 1**
1/16" = 1'-0"



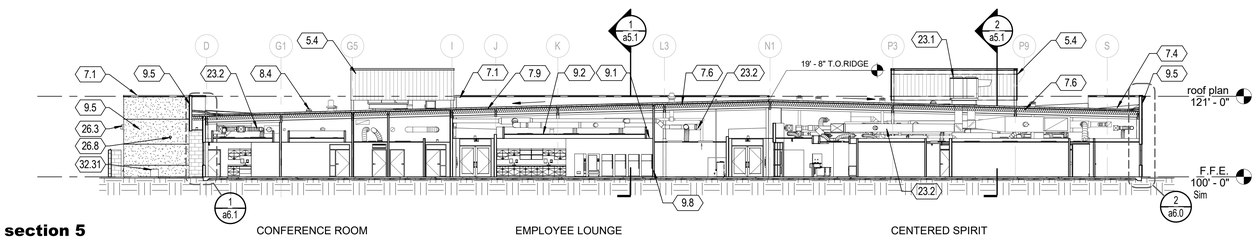
2 a5.0 **building section 2**
1/16" = 1'-0"



3 a5.0 **building section 3**
1/16" = 1'-0"



4 a5.0 **building section 4**
1/16" = 1'-0"



5 a5.0 **building section 5**
1/16" = 1'-0"

general notes

1. DO NOT SCALE DRAWINGS. COORDINATE ALL WORK BETWEEN ARCHITECTURAL, STRUCTURAL, CIVIL, MECHANICAL, PLUMBING, COMMUNICATIONS AND ELECTRICAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE IMPLEMENTATION OF WORK.

keynotes

3.3	4" THICK REINFORCED CONCRETE SLAB, VAPOR BARRIER, 4" ABC, SEE STRUCTURAL
3.4	CONCRETE FOOTING. SEE STRUCTURAL DRAWINGS.
3.13	CONCRETE COLUMN. SEE STRUCTURAL.
4.2	8" CMU SUPPORT PIERS WITH SANDSTONE TILE. SEE WALL TYPE SHEET A9.0.
4.3	16" CMU SUPPORT PIERS WITH SANDSTONE TILE. SEE WALL TYPE SHEET A9.0.
5.1	ROOF ACCESS STEEL. LADDER WITH SAFETY UP-POST. SEE SHEET A9.4.
5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
5.3	STEEL BEAM, SEE STRUCTURAL.
5.4	ROOF TOP EQUIPMENT SCREEN. STEEL COLUMNS, STEEL TUBE BEAMS, AND PRE-FINISHED METAL PANELS. SEE DETAIL 1/A9.4. PROVIDE 5'-0" WIDE OPENING AS INDICATED.
5.7	ENTRY CANOPY - SEE STRUCTURAL DRAWINGS. SEE SHEET A7.13.
5.9	PAINTED STEEL GUTTER
6.6	WOOD STRUCTURE - SEE STRUCTURAL DRAWINGS.
7.1	PRE-FINISHED CAP FLASHING.
7.4	TAPERED INSULATION CRICKET. ENSURE DRAINAGE TO SCUPPERS 1/8"/FT. MIN..
7.6	R-38 BATT INSULATION AT ROOF DECK WITH FOIL FACING.
7.9	ROOFING SYSTEM OVER POLYISOCYANURATE, R-20 MINIMUM ON WOOD STRUCTURE.
7.11	ROOF DRAIN NOZZLE. SEE ELEVATIONS. COORDINATE WITH PLUMBING FOR PRIMARY AND SECONDARY LOCATIONS.
7.17	PRE-FINISHED GUTTER BOX. EXTEND TO PLANTER. FLAT BOTTOM, SLOPED INTERIOR PAN. BOX IS 12" WIDE. REFER TO ROOF PLAN(S) FOR LENGTH.
8.1	HOLLOW METAL DOOR & FRAME. SEE DOOR SCHEDULE.
8.3	SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
8.4	SKYLIGHT, TYP: SOLATUBE 750 DS. COORDINATE IN CEILINGS.
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
8.6	FOLDING PARTITION. SEE SHEET A9.8.
8.7	ALUMINUM STOREFRONT WITH 1/4" CLEAR GLAZING.
8.8	ALUMINUM SLIDER. SEE DOOR SCHEDULE.
9.1	GYPSUM WALLBOARD CEILING ON SUSPENDED METAL FRAMING. SEE SHEET A9.1.
9.2	SUSPENDED ACOUSTICAL TILE CEILING SYSTEM. SEE SHEET A9.1.
9.4	GYPSUM WALLBOARD CONTROL JOINT
9.5	EIFS SYSTEM ON METAL FRAMING SYSTEM. JOINTS AS SHOWN. MULTI-COLORED.
9.8	METAL FRAME & GYPSUM WALLBOARD PARTITION. SEE WALL TYPES SHEET A9.0.
9.13	SANDSTONE TILES ON METAL FRAMING
10.19	ALARM BELL
11.4	COPIER PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTIONS.
11.11	KITCHEN EQUIPMENT. SEE FOOD SERVICE SHEETS FOR MORE INFORMATION.
11.25	CEILING MOUNTED PROJECTOR. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.
11.27	SPEAKER. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.
22.6	TOILET, SEE PLUMBING.
22.9	DRINKING FOUNTAIN, SEE PLUMBING.
23.1	MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS.
23.2	MECHANICAL DUCTWORK - SEE MECHANICAL DRAWINGS.
23.3	MECHANICAL DEVICE - SEE MECHANICAL DRAWINGS.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.
26.6	EXIT SIGN. SEE ELECTRICAL DRAWINGS.
26.8	FUTURE SECURITY CAMERA LOCATION. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.
32.1	DECORATIVE CONCRETE BOLLARD. SEE CIVIL.
32.31	SITE FURNITURE. SEE LANDSCAPE DRAWINGS.
32.32	PREPARE WALL FOR BACKLIT EXTERIOR SIGNAGE. COORDINATE WITH ELECTRICAL.
32.36	MASONRY SEAT WALL WITH CONCRETE CAP PER DETAIL 1 SHEET x1.5.

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building sections

a5.0

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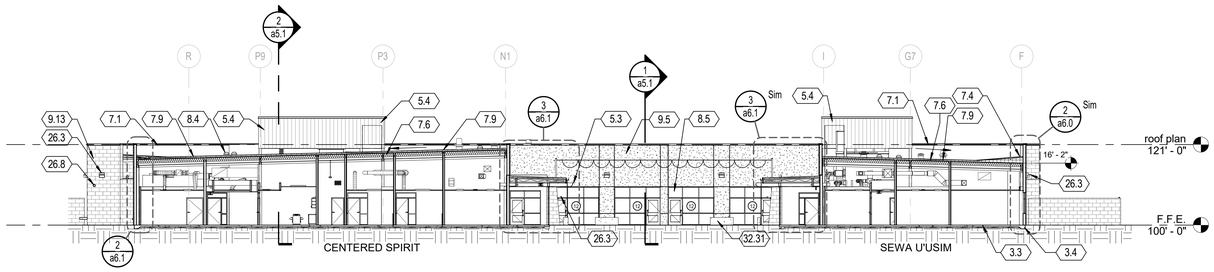
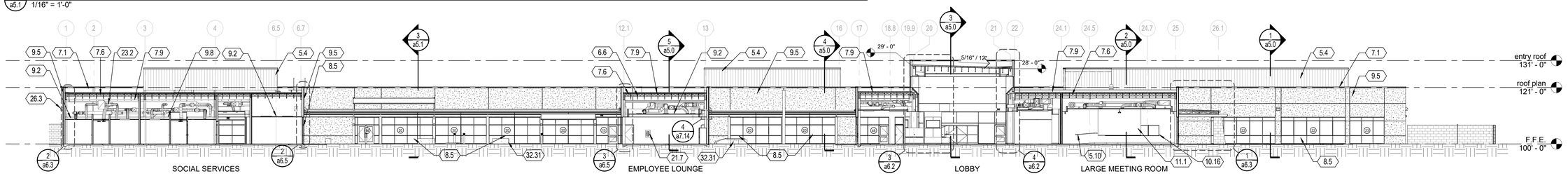


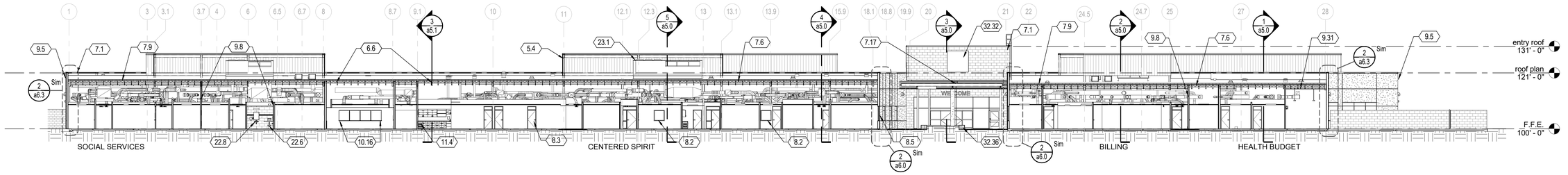
building section 6

3 / a5.1 1/16" = 1'-0"



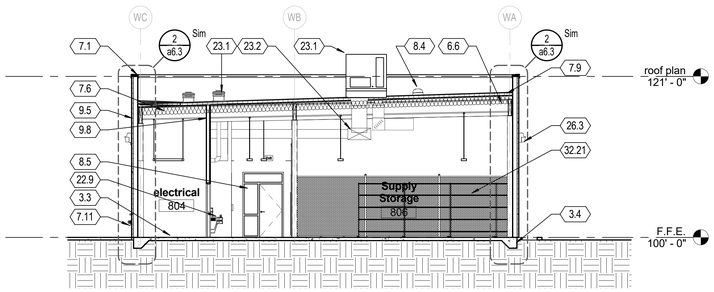
building section 7

1 / a5.1 1/16" = 1'-0"



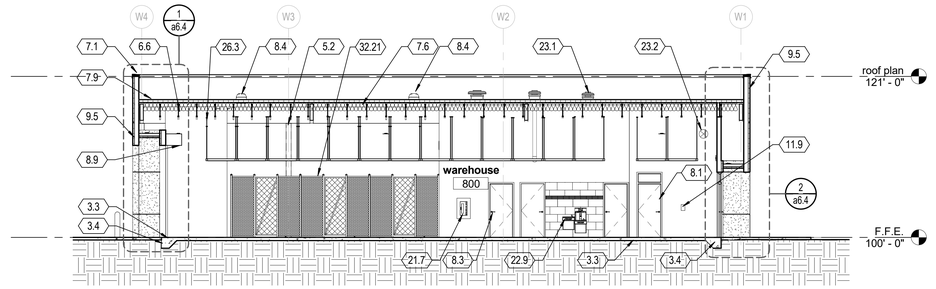
building section 8

2 / a5.1 1/16" = 1'-0"



w.h. building section 1

4 / a5.1 1/8" = 1'-0"



w.h. building section 2

5 / a5.1 1/8" = 1'-0"

general notes

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keynotes

3.3	4" THICK REINFORCED CONCRETE SLAB, VAPOR BARRIER, 4" ABC, SEE STRUCTURAL
3.4	CONCRETE FOOTING. SEE STRUCTURAL DRAWINGS.
5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
5.3	STEEL BEAM, SEE STRUCTURAL.
5.4	ROOF TOP EQUIPMENT SCREEN. STEEL COLUMNS, STEEL TUBE BEAMS, AND PRE-FINISHED METAL PANELS. SEE DETAIL 1/A9.4. PROVIDE 5'-0" WIDE OPENING AS INDICATED.
5.10	PAINTED STEEL HANDRAIL. SEE DETAIL 4/A9.1.
6.6	WOOD STRUCTURE - SEE STRUCTURAL DRAWINGS.
7.1	PRE-FINISHED CAP FLASHING.
7.4	TAPERED INSULATION CRICKET. ENSURE DRAINAGE TO SCUPPERS 1/8"/FT. MIN..
7.6	R-38 BATT INSULATION AT ROOF DECK WITH FOIL FACING.
7.9	ROOFING SYSTEM OVER POLYISOCYANURATE, R-20 MINIMUM ON WOOD STRUCTURE.
7.11	ROOF DRAIN NOZZLE. SEE ELEVATIONS. COORDINATE WITH PLUMBING FOR PRIMARY AND SECONDARY LOCATIONS.
7.17	PRE-FINISHED GUTTER BOX. EXTEND TO PLANTER. FLAT BOTTOM, SLOPED INTERIOR PAN. BOX IS 12" WIDE. REFER TO ROOF PLAN(S) FOR LENGTH.
8.1	HOLLOW METAL DOOR & FRAME. SEE DOOR SCHEDULE.
8.2	HOLLOW METAL WINDOW FRAME WITH GLAZING. SEE WINDOW FRAME TYPES.
8.3	SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
8.4	SKYLIGHT, TYP: SOLATUBE 750 DS. COORDINATE IN CEILINGS.
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
8.9	OVERHEAD DOOR. SEE DOOR SCHEDULE.
9.2	SUSPENDED ACOUSTICAL TILE CEILING SYSTEM. SEE SHEET A9.1.
9.5	EIFS SYSTEM ON METAL FRAMING SYSTEM. JOINTS AS SHOWN. MULTI-COLORED.
9.8	METAL FRAME & GYPSUM WALLBOARD PARTITION. SEE WALL TYPES SHEET A9.0.
9.13	SANDSTONE TILES ON METAL FRAMING
9.31	LAMINATE GWB TO BOTTOM OF JOIST.
10.16	TACK BOARD OR WHITEBOARD, SEE FURNITURE PLANS.
11.1	ELECTRIC MOVIE SCREEN. SEE SHEET A9.1.
11.4	COPIER PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTIONS.
11.9	TIME CLOCK PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.
21.7	FIRE EXTINGUISHER. SEE SHEET A9.1.
22.6	TOILET, SEE PLUMBING.
22.8	SINK, SEE PLUMBING.
22.9	DRINKING FOUNTAIN, SEE PLUMBING.
23.1	MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS.
23.2	MECHANICAL DUCTWORK - SEE MECHANICAL DRAWINGS.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.
26.8	FUTURE SECURITY CAMERA LOCATION. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.
32.21	8'-0" HIGH 9 GA CHAIN LINK FENCING AND GATES.
32.31	SITE FURNITURE. SEE LANDSCAPE DRAWINGS.
32.32	PREPARE WALL FOR BACKLIT EXTERIOR SIGNAGE. COORDINATE WITH ELECTRICAL.
32.36	MASONRY SEAT WALL WITH CONCRETE CAP PER DETAIL 1 SHEET x1.5.

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Health Services Center II
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Tucson, AZ 85746

building sections

a5.1

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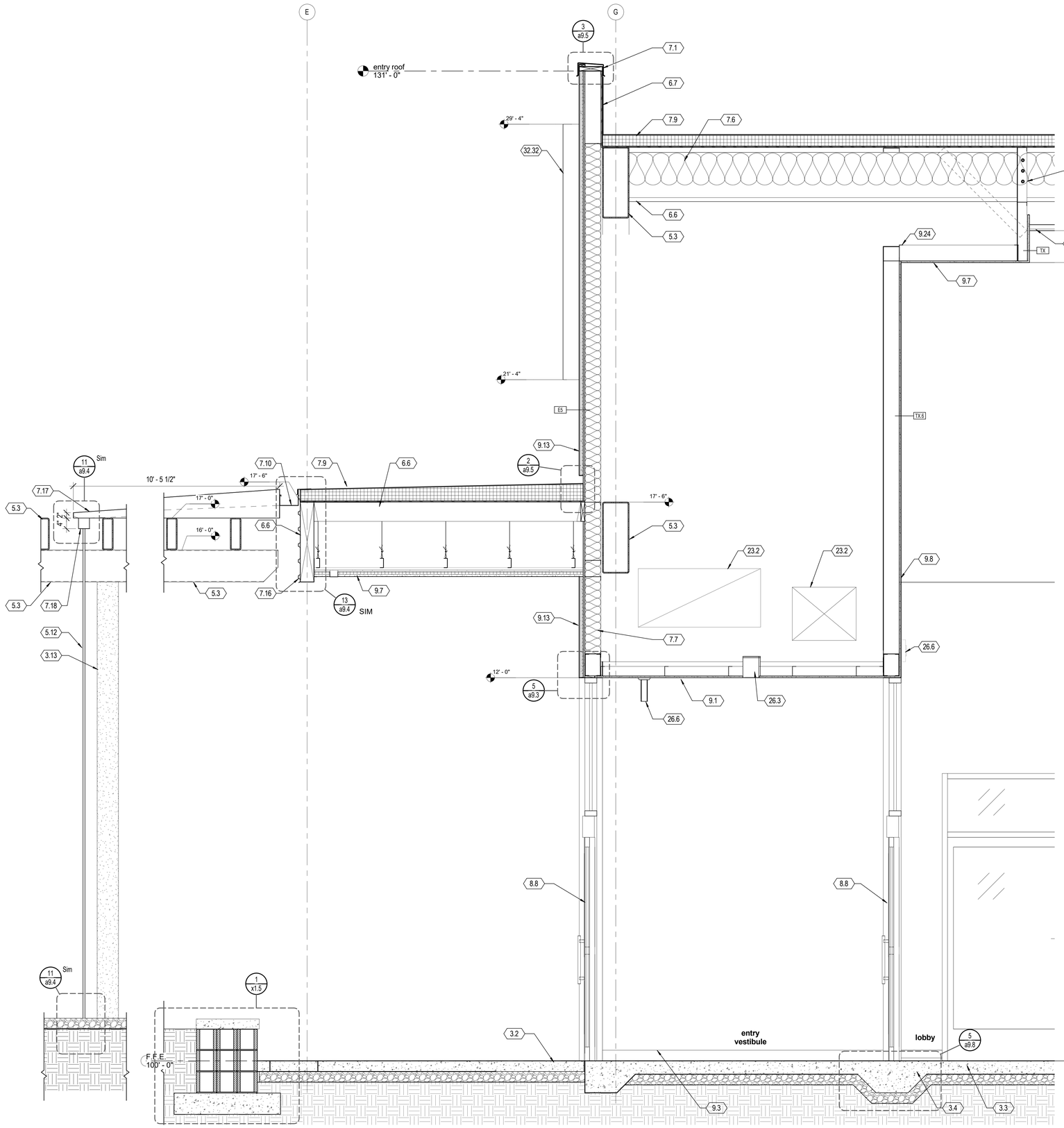

1 a6.0 **typical stone @ enty door (high rake)**
3/4" = 1'-0"

2 a6.0 **typical EIFS w/ window (low)**
3/4" = 1'-0"

general notes

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2. REFER TO STRUCTURAL FOR ALL MEMBER SIZES AND CONFIGURATIONS.

keynotes

3.2	4" CONCRETE SIDEWALK ON COMPACTED SUBGRADE. SCORE AS INDICATED. SEE DETAILS 2 & 3 SHEET X1.6 FOR TYPICAL JOINT CONDITIONS.
3.3	4" THICK REINFORCED CONCRETE SLAB, VAPOR BARRIER, 4" ABC, SEE STRUCTURAL
3.4	CONCRETE FOOTING. SEE STRUCTURAL DRAWINGS.
3.13	CONCRETE COLUMN. SEE STRUCTURAL.
5.3	STEEL BEAM, SEE STRUCTURAL.
5.12	GUTTER CHAINS. SEE SHEET A9.4.
6.6	WOOD STRUCTURE - SEE STRUCTURAL DRAWINGS.
6.7	INSTALL MOISTURE RESISTANT EXTERIOR GRADE PLYWOOD ON BACKSIDE OF ALL PARAPETS.
7.1	PRE-FINISHED CAP FLASHING.
7.4	TAPERED INSULATION CRICKET. ENSURE DRAINAGE TO SCUPPERS 1/8"/FT. MIN..
7.6	R-38 BATT INSULATION AT ROOF DECK WITH FOIL FACING.
7.7	R-19 BATT INSULATION AT EXTERIOR WALLS.
7.9	ROOFING SYSTEM OVER POLYISOCYANURATE, R-20 MINIMUM ON WOOD STRUCTURE.
7.10	22 GA. PRE-FINISHED SHEET METAL GUTTER.
7.16	24 GA. PRE-FINISHED U-PANEL
7.17	PRE-FINISHED GUTTER BOX. EXTEND TO PLANTER. FLAT BOTTOM, SLOPED INTERIOR PAN. BOX IS 12" WIDE. REFER TO ROOF PLAN(S) FOR LENGTH.
7.18	3"Ø X 4"H DISCHARGE WITH 3/4"Ø STAINLESS STEEL PIN WITH CHAIN ATTACHED. REFER TO DETAIL ON SHEET A9.4.
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
8.8	ALUMINUM SLIDER. SEE DOOR SCHEDULE.
9.1	GYPSUM WALLBOARD CEILING ON SUSPENDED METAL FRAMING. SEE SHEET A9.1.
9.2	SUSPENDED ACOUSTICAL TILE CEILING SYSTEM. SEE SHEET A9.1.
9.3	WALL BASE. SEE FINISH PLANS. SEE SHEET A9.1.
9.5	EIFS SYSTEM ON METAL FRAMING SYSTEM. JOINTS AS SHOWN. MULTI-COLORED.
9.7	GYPSUM WALLBOARD SOFFIT ON METAL FRAMING. SEE SHEET A9.1.
9.8	METAL FRAME & GYPSUM WALLBOARD PARTITION. SEE WALL TYPES SHEET A9.0.
9.13	SANDSTONE TILES ON METAL FRAMING
9.24	FASTEN SOFFIT TRACK TO EACH STUD WITH (2) #10 SELF TAPPING SCREWS
9.25	VERTICAL SOFFIT MEMBERS SHALL BE SECURED TO WOOD JOISTS WEBS WITH (3) #10 WOOD SCREWS.
23.2	MECHANICAL DUCTWORK - SEE MECHANICAL DRAWINGS.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.
26.6	EXIT SIGN. SEE ELECTRICAL DRAWINGS.
32.32	PREPARE WALL FOR BACKLIT EXTERIOR SIGNAGE. COORDINATE WITH ELECTRICAL.

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a6.0

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keynotes

3.3	4" THICK REINFORCED CONCRETE SLAB, VAPOR BARRIER, 4" ABC, SEE STRUCTURAL
3.4	CONCRETE FOOTING. SEE STRUCTURAL DRAWINGS.
4.3	16" CMU SUPPORT PIERS WITH SANDSTONE TILE. SEE WALL TYPE SHEET A9.0.
4.4	SANDSTONE TILE.
5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
5.3	STEEL BEAM, SEE STRUCTURAL.
5.12	GUTTER CHAINS. SEE SHEET A9.4.
6.6	WOOD STRUCTURE - SEE STRUCTURAL DRAWINGS.
6.7	INSTALL MOISTURE RESISTANT EXTERIOR GRADE PLYWOOD ON BACKSIDE OF ALL PARAPETS.
7.1	PRE-FINISHED CAP FLASHING.
7.4	TAPERED INSULATION CRICKET. ENSURE DRAINAGE TO SCUPPERS 1/8"/FT. MIN..
7.6	R-38 BATT INSULATION AT ROOF DECK WITH FOIL FACING.
7.7	R-19 BATT INSULATION AT EXTERIOR WALLS.
7.9	ROOFING SYSTEM OVER POLYISOCYANURATE, R-20 MINIMUM ON WOOD STRUCTURE.
7.10	22 GA. PRE-FINISHED SHEET METAL GUTTER.
7.11	ROOF DRAIN NOZZLE. SEE ELEVATIONS. COORDINATE WITH PLUMBING FOR PRIMARY AND SECONDARY LOCATIONS.
7.15	ROOF DRAIN LEADER CONCEALED IN WALL, SEE PLUMBING DRAWINGS
7.16	24 GA. PRE-FINISHED U-PANEL
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
9.1	GYPSUM WALLBOARD CEILING ON SUSPENDED METAL FRAMING. SEE SHEET A9.1.
9.2	SUSPENDED ACOUSTICAL TILE CEILING SYSTEM. SEE SHEET A9.1.
9.3	WALL BASE. SEE FINISH PLANS. SEE SHEET A9.1.
9.5	EIFS SYSTEM ON METAL FRAMING SYSTEM. JOINTS AS SHOWN. MULTI-COLORED.
9.7	GYPSUM WALLBOARD SOFFIT ON METAL FRAMING. SEE SHEET A9.1.
9.8	METAL FRAME & GYPSUM WALLBOARD PARTITION. SEE WALL TYPES SHEET A9.0.
9.13	SANDSTONE TILES ON METAL FRAMING
9.29	SHADE CANOPY BY MANUFACTURE. COORDINATE WITH STRUCTURAL AND LANDSCAPE.
22.4	PRIMARY AND SECONDARY ROOF DRAIN IN SUMP. SEE PLUMBING.
23.1	MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS.
23.2	MECHANICAL DUCTWORK - SEE MECHANICAL DRAWINGS.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.

general notes

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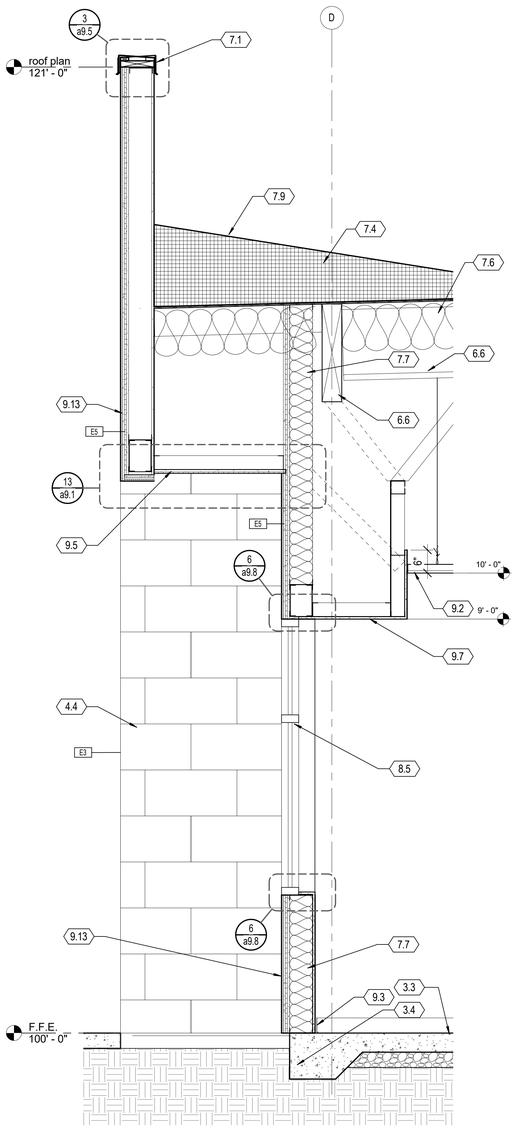
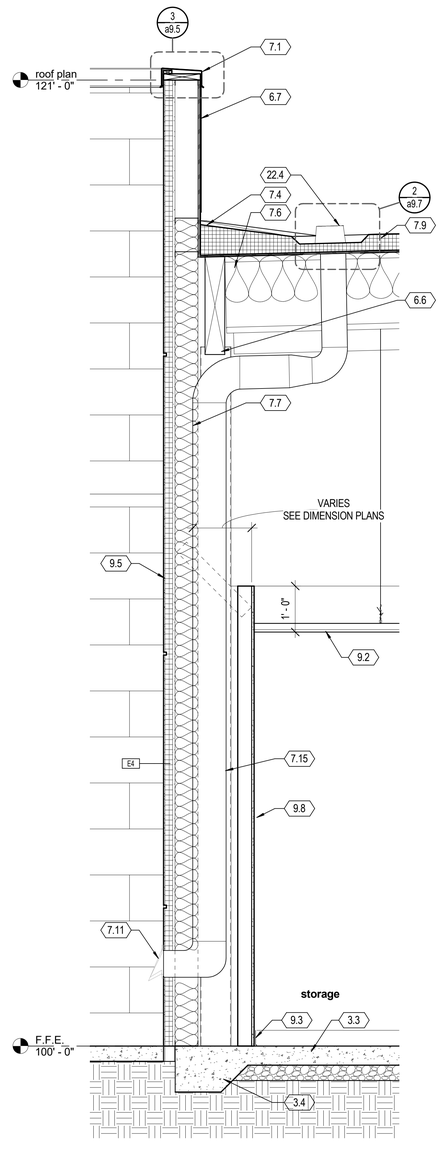
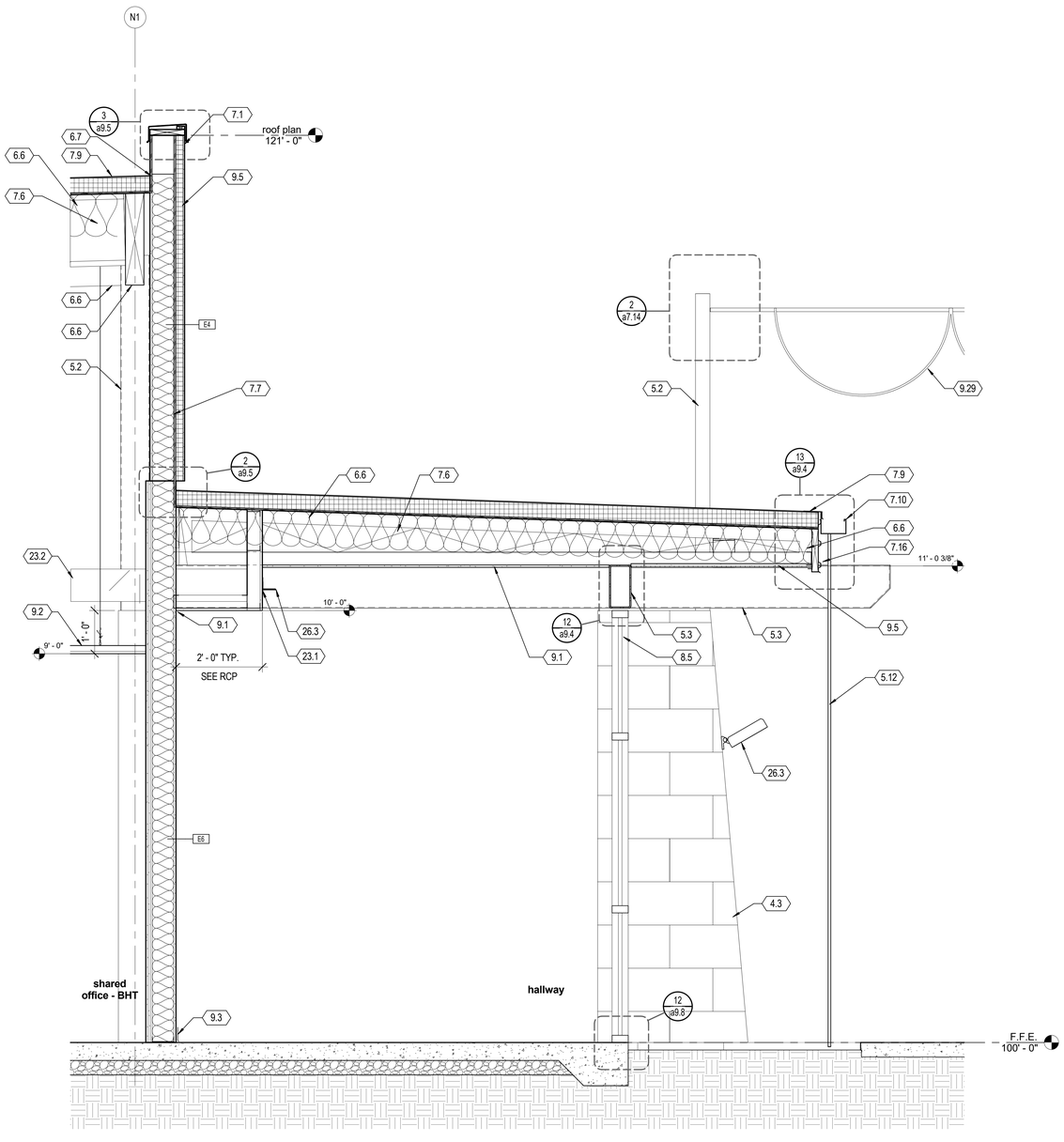


1 a6.1 **typical stone veneer**
3/4" = 1'-0"



2 a6.1 **typical section at roof drain**
3/4" = 1'-0"



3 a6.1 **wall section - corridor/ courtyard**
3/4" = 1'-0"

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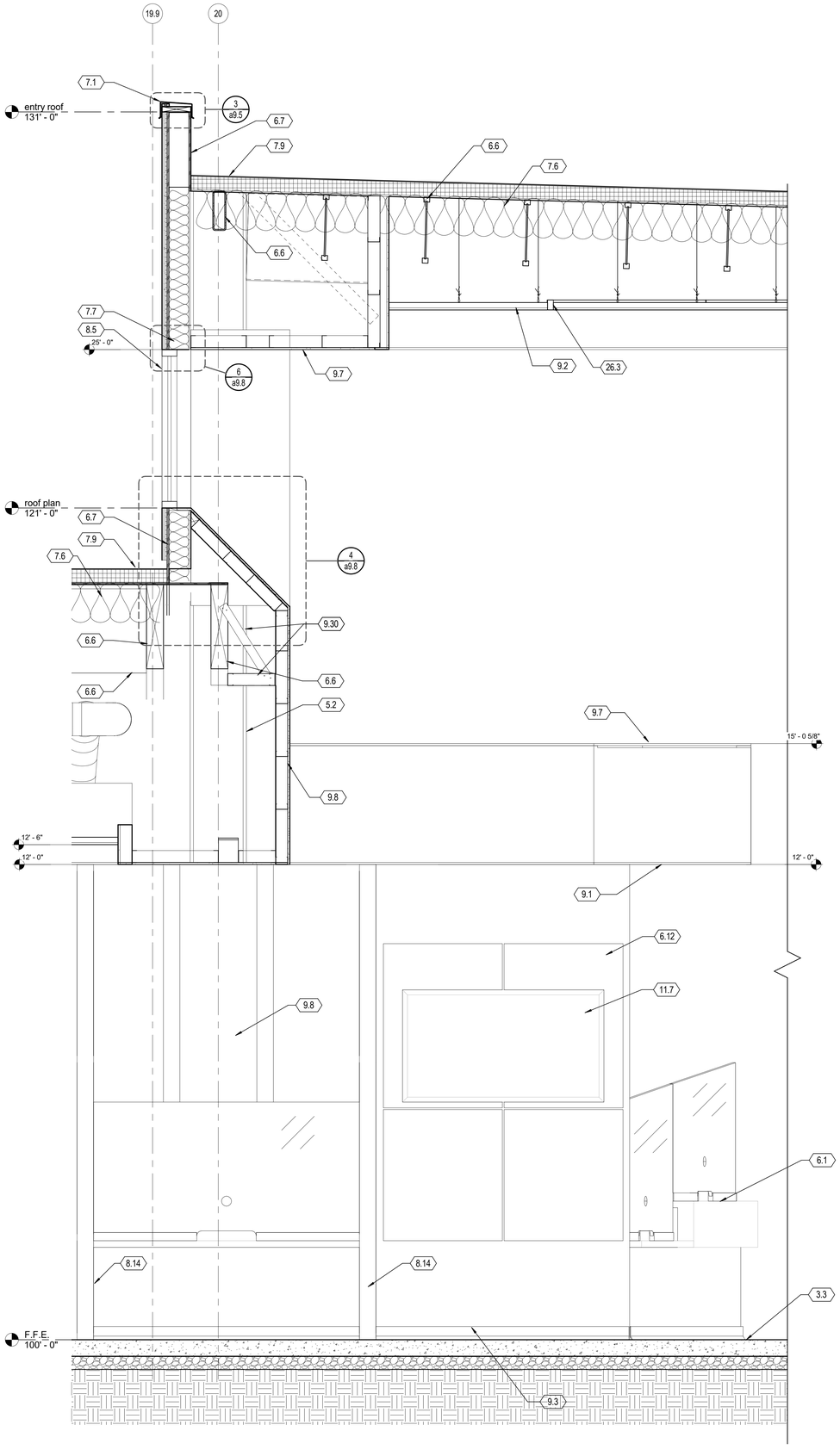
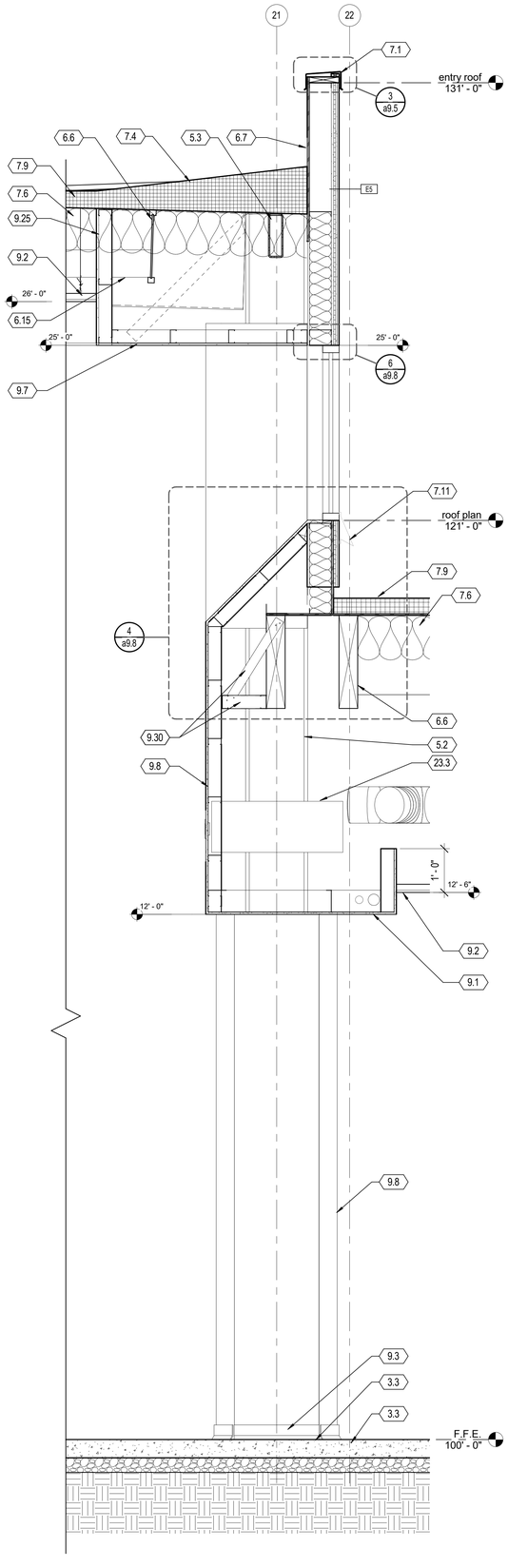


3 a6.2 **wall section - lobby**

3/4" = 1'-0"



4 a6.2 **wall section - lobby**

3/4" = 1'-0"

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2. REFER TO STRUCTURAL FOR ALL MEMBER SIZES AND CONFIGURATIONS.

keynotes

3.3	4" THICK REINFORCED CONCRETE SLAB, VAPOR BARRIER, 4" ABC, SEE STRUCTURAL
5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
5.3	STEEL BEAM, SEE STRUCTURAL.
6.1	CUSTOM MILLWORK SEE INTERIOR ELEVATIONS FOR MORE INFORMATION
6.6	WOOD STRUCTURE - SEE STRUCTURAL DRAWINGS.
6.7	INSTALL MOISTURE RESISTANT EXTERIOR GRADE PLYWOOD ON BACKSIDE OF ALL PARAPETS.
6.12	PLASTIC LAMINATE PANELS WITH REVEALS.
6.15	2X8 CROSS BLOCKING BETWEEN TJI'S PER MANUFACTURE. SUPPORT SOFFIT.
7.1	PRE-FINISHED CAP FLASHING.
7.4	TAPERED INSULATION CRICKET. ENSURE DRAINAGE TO SCUPPERS 1/8"/FT. MIN..
7.6	R-38 BATT INSULATION AT ROOF DECK WITH FOIL FACING.
7.7	R-19 BATT INSULATION AT EXTERIOR WALLS.
7.9	ROOFING SYSTEM OVER POLYISOCYANURATE, R-20 MINIMUM ON WOOD STRUCTURE.
7.11	ROOF DRAIN NOZZLE. SEE ELEVATIONS. COORDINATE WITH PLUMBING FOR PRIMARY AND SECONDARY LOCATIONS.
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
8.14	ALUMINUM FRAME WITH 3-FORM GLASS
9.1	GYPSUM WALLBOARD CEILING ON SUSPENDED METAL FRAMING. SEE SHEET A9.1.
9.2	SUSPENDED ACOUSTICAL TILE CEILING SYSTEM. SEE SHEET A9.1.
9.3	WALL BASE. SEE FINISH PLANS. SEE SHEET A9.1.
9.7	GYPSUM WALLBOARD SOFFIT ON METAL FRAMING. SEE SHEET A9.1.
9.8	METAL FRAME & GYPSUM WALLBOARD PARTITION. SEE WALL TYPES SHEET A9.0.
9.25	VERTICAL SOFFIT MEMBERS SHALL BE SECURED TO WOOD JOISTS WEBS WITH (3) #10 WOOD SCREWS.
9.30	6" METAL FRAMING AT 24" O.C. 6" TRACK COUNTINOUS ALONG SOFFIT. USE (2) #10 TEK SCREWS AT EACH STUD INTO TRACK. USE 3 5/8" KICKERS AT EACH STUD. (2) #10'S INTO FRAMING AND (2) 1/8" X 1 1/4" WOOD SCREWS INTO BEAM.
11.7	WALL MOUNTED TV SCREEN PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.
23.3	MECHANICAL DEVICE - SEE MECHANICAL DRAWINGS.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.

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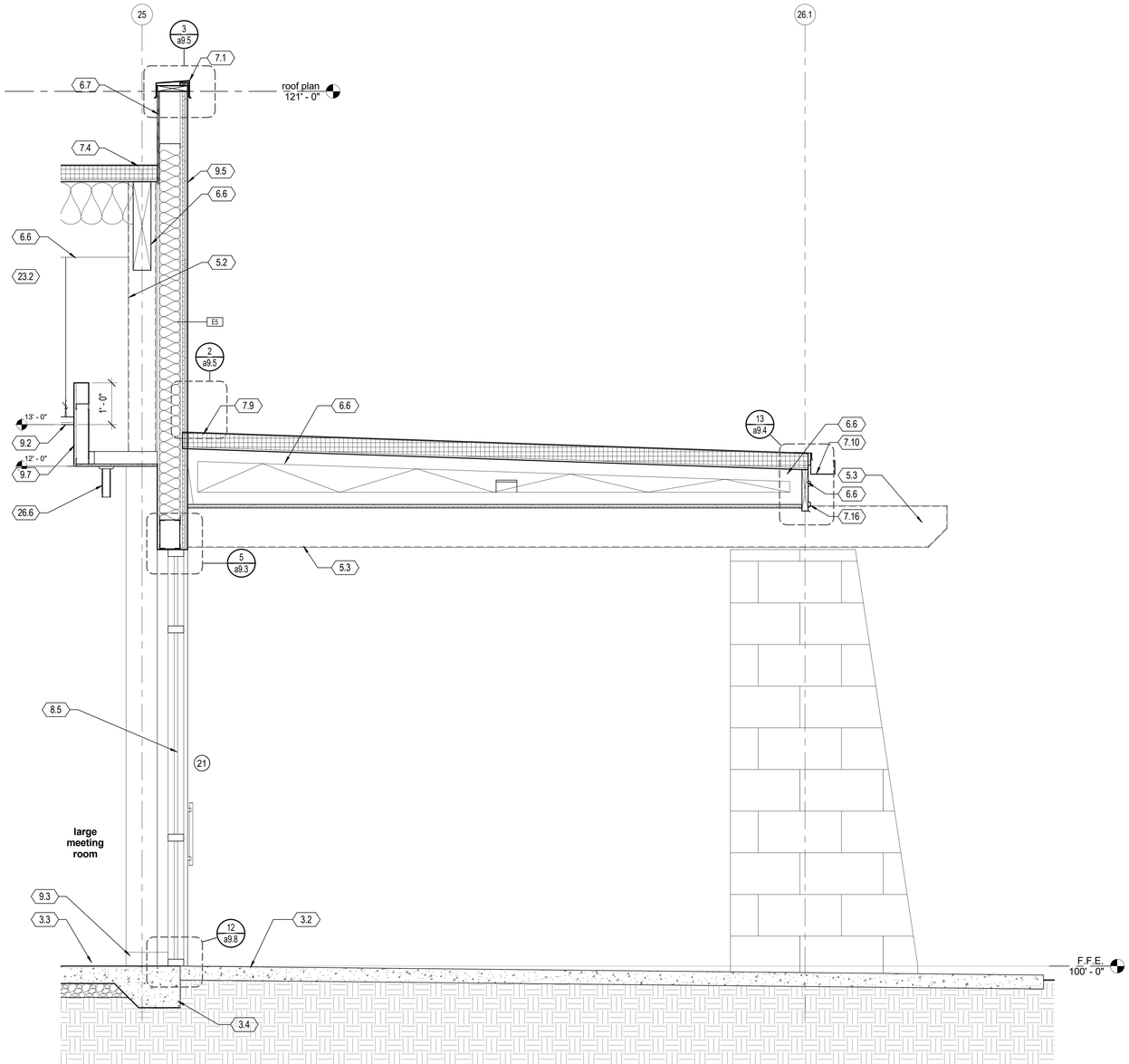
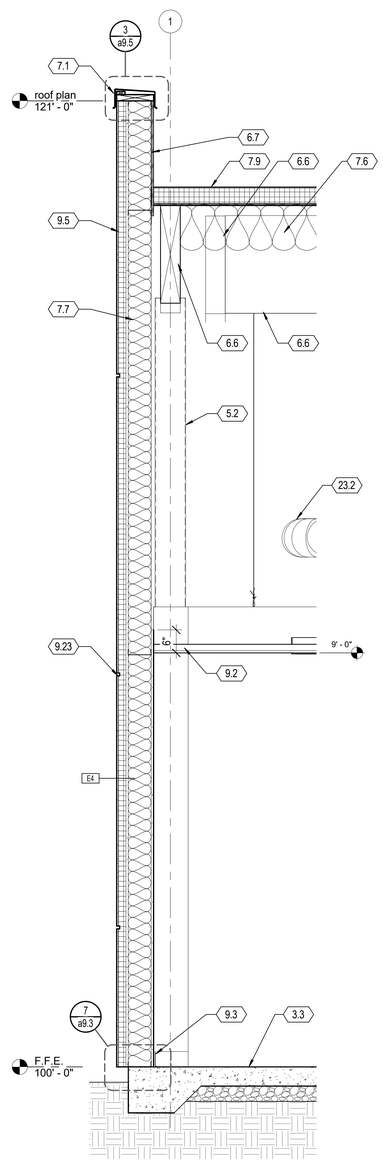


1 a6.3 **typical @ east courtyard**
3/4" = 1'-0"



2 a6.3 **typical eifs wall section**
3/4" = 1'-0"

keynotes

3.2	4" CONCRETE SIDEWALK ON COMPACTED SUBGRADE. SCORE AS INDICATED. SEE DETAILS 2 & 3 SHEET X1.6 FOR TYPICAL JOINT CONDITIONS.
3.3	4" THICK REINFORCED CONCRETE SLAB, VAPOR BARRIER, 4" ABC, SEE STRUCTURAL
3.4	CONCRETE FOOTING. SEE STRUCTURAL DRAWINGS.
5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
5.3	STEEL BEAM, SEE STRUCTURAL.
6.6	WOOD STRUCTURE - SEE STRUCTURAL DRAWINGS.
6.7	INSTALL MOISTURE RESISTANT EXTERIOR GRADE PLYWOOD ON BACKSIDE OF ALL PARAPETS.
7.1	PRE-FINISHED CAP FLASHING.
7.4	TAPERED INSULATION CRICKET. ENSURE DRAINAGE TO SCUPPERS 1/8"/FT. MIN..
7.6	R-38 BATT INSULATION AT ROOF DECK WITH FOIL FACING.
7.7	R-19 BATT INSULATION AT EXTERIOR WALLS.
7.9	ROOFING SYSTEM OVER POLYISOCYANURATE, R-20 MINIMUM ON WOOD STRUCTURE.
7.10	22 GA. PRE-FINISHED SHEET METAL GUTTER.
7.16	24 GA. PRE-FINISHED U-PANEL
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
9.2	SUSPENDED ACOUSTICAL TILE CEILING SYSTEM. SEE SHEET A9.1.
9.3	WALL BASE. SEE FINISH PLANS. SEE SHEET A9.1.
9.5	EIFS SYSTEM ON METAL FRAMING SYSTEM. JOINTS AS SHOWN. MULTI-COLORED.
9.7	GYPSUM WALLBOARD SOFFIT ON METAL FRAMING. SEE SHEET A9.1.
9.23	EIFS 3/4" 'V' GROOVE REVEAL, SEE SHEET A9.2.
23.2	MECHANICAL DUCTWORK - SEE MECHANICAL DRAWINGS.
26.6	EXIT SIGN. SEE ELECTRICAL DRAWINGS.

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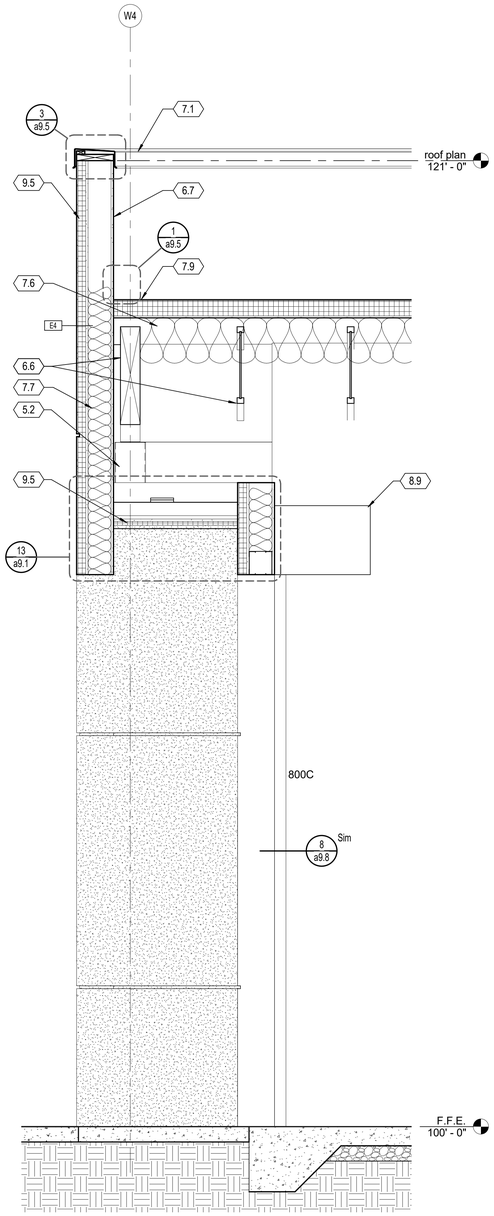
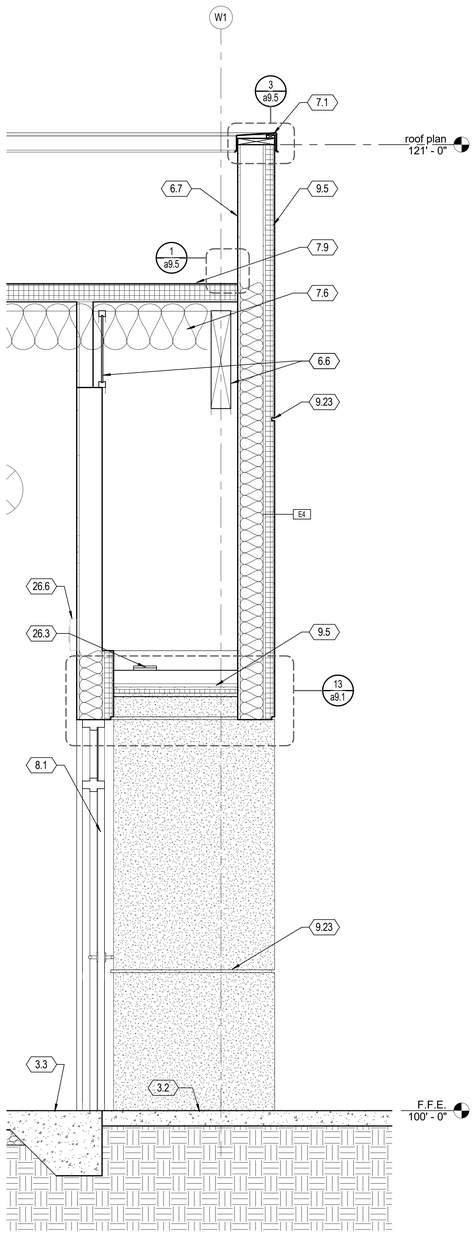


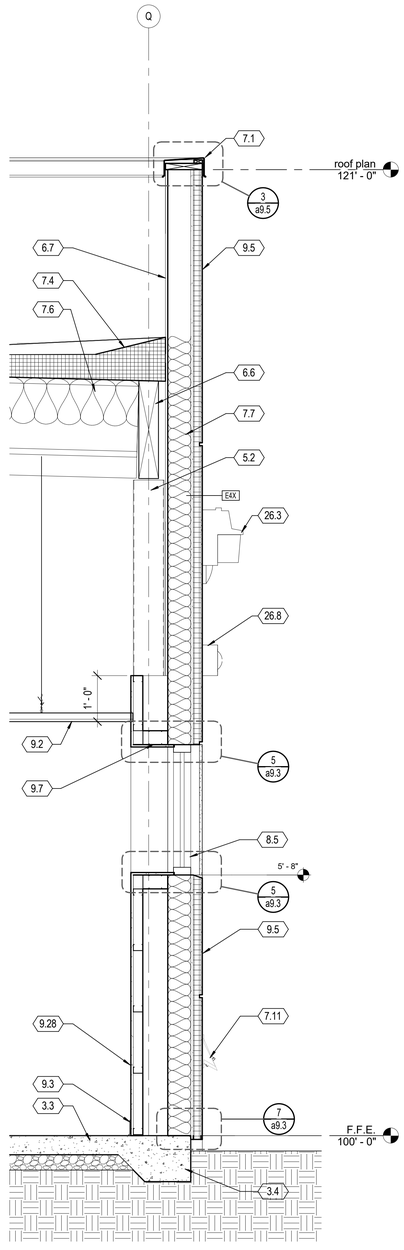
w.h. wall section - thru roll-up door

1 a6.4 3/4" = 1'-0"



w.h. wall section - thru hm door

2 a6.4 3/4" = 1'-0"



typical EIFS w/ window (high)

3 a6.4 3/4" = 1'-0"

keynotes

3.2	4" CONCRETE SIDEWALK ON COMPACTED SUBGRADE. SCORE AS INDICATED. SEE DETAILS 2 & 3 SHEET X1.6 FOR TYPICAL JOINT CONDITIONS.
3.3	4" THICK REINFORCED CONCRETE SLAB, VAPOR BARRIER, 4" ABC, SEE STRUCTURAL
3.4	CONCRETE FOOTING. SEE STRUCTURAL DRAWINGS.
5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
6.6	WOOD STRUCTURE - SEE STRUCTURAL DRAWINGS.
6.7	INSTALL MOISTURE RESISTANT EXTERIOR GRADE PLYWOOD ON BACKSIDE OF ALL PARAPETS.
7.1	PRE-FINISHED CAP FLASHING.
7.4	TAPERED INSULATION CRICKET. ENSURE DRAINAGE TO SCUPPERS 1/8"/FT. MIN..
7.6	R-38 BATT INSULATION AT ROOF DECK WITH FOIL FACING.
7.7	R-19 BATT INSULATION AT EXTERIOR WALLS.
7.9	ROOFING SYSTEM OVER POLYISOCYANURATE, R-20 MINIMUM ON WOOD STRUCTURE.
7.11	ROOF DRAIN NOZZLE. SEE ELEVATIONS. COORDINATE WITH PLUMBING FOR PRIMARY AND SECONDARY LOCATIONS.
8.1	HOLLOW METAL DOOR & FRAME. SEE DOOR SCHEDULE.
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
8.9	OVERHEAD DOOR. SEE DOOR SCHEDULE.
9.2	SUSPENDED ACOUSTICAL TILE CEILING SYSTEM. SEE SHEET A9.1.
9.3	WALL BASE. SEE FINISH PLANS. SEE SHEET A9.1.
9.5	EIFS SYSTEM ON METAL FRAMING SYSTEM. JOINTS AS SHOWN. MULTI-COLORED.
9.7	GYPSUM WALLBOARD SOFFIT ON METAL FRAMING. SEE SHEET A9.1.
9.23	EIFS 3/4" "V" GROOVE REVEAL, SEE SHEET A9.2.
9.28	5/8" GWB ON 3 5/8" X 20 GAUGE STUDS AT 16" O.C.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.
26.6	EXIT SIGN. SEE ELECTRICAL DRAWINGS.
26.8	FUTURE SECURITY CAMERA LOCATION. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.

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37165
KEVIN A. BARBER
ARIZONA U.S.A.

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

wall sections

a6.4

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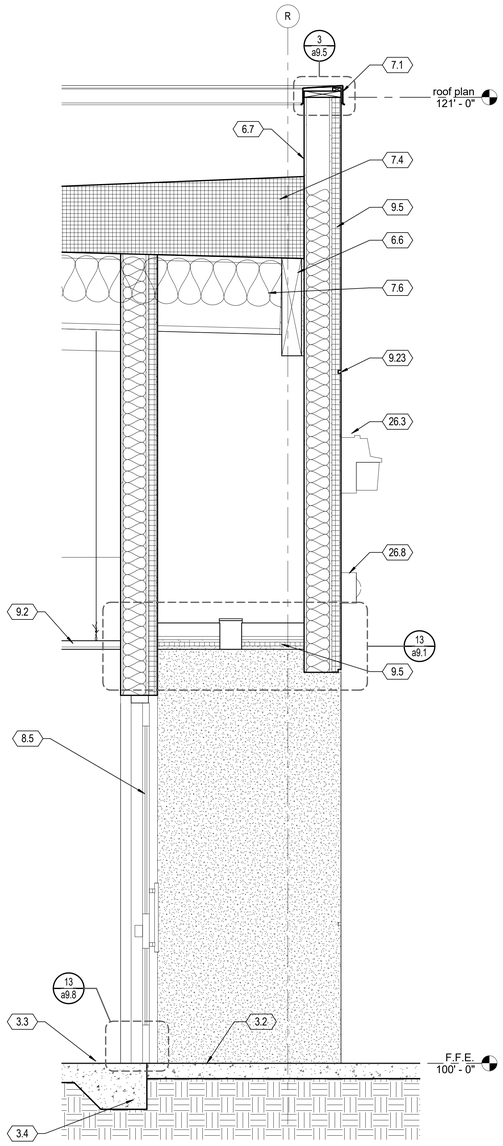
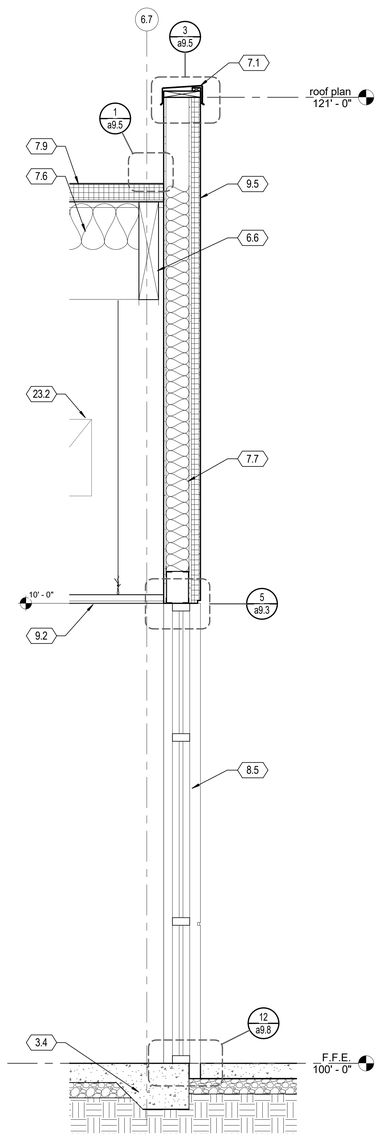
general notes

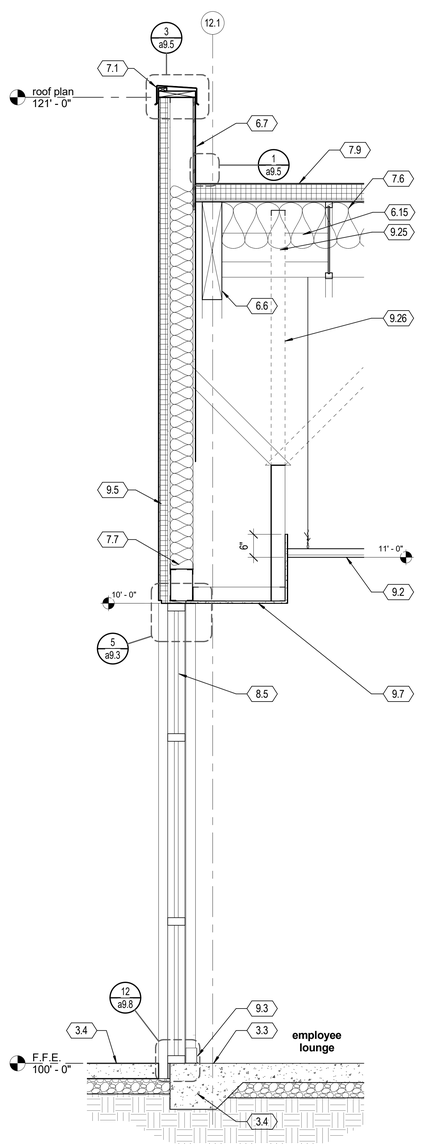
1. DO NOT SCALE DRAWINGS. COORDINATE ALL WORK BETWEEN ARCHITECTURAL, STRUCTURAL, CIVIL, MECHANICAL, PLUMBING, COMMUNICATIONS AND ELECTRICAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE IMPLEMENTATION OF WORK.
2. REFER TO STRUCTURAL FOR ALL MEMBER SIZES AND CONFIGURATIONS.



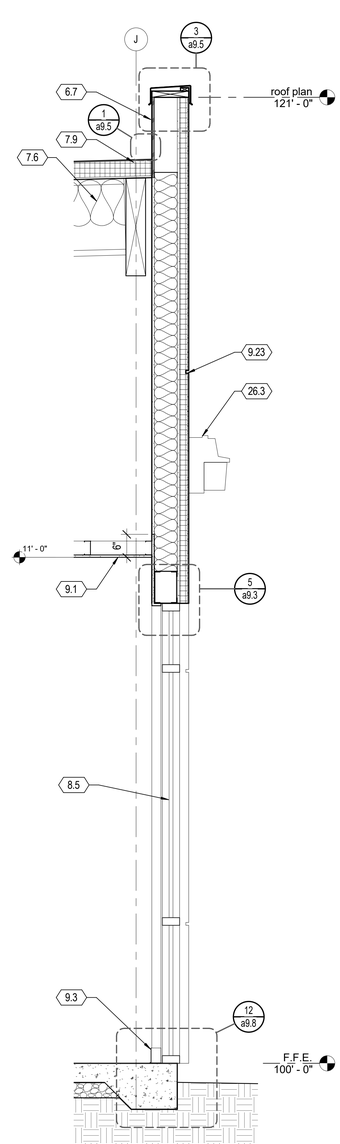
1 a6.5 wall section @ hallway entrance
3/4" = 1'-0"



2 a6.5 typical eifs wall section @ storefront
3/4" = 1'-0"



3 a6.5 wall section @ courtyard/ lounge
3/4" = 1'-0"



4 a6.5 typical eifs w/ storefront
3/4" = 1'-0"

keynotes

3.2	4" CONCRETE SIDEWALK ON COMPACTED SUBGRADE. SCORE AS INDICATED. SEE DETAILS 2 & 3 SHEET X1.6 FOR TYPICAL JOINT CONDITIONS.
3.3	4" THICK REINFORCED CONCRETE SLAB, VAPOR BARRIER, 4" ABC, SEE STRUCTURAL
3.4	CONCRETE FOOTING. SEE STRUCTURAL DRAWINGS.
6.6	WOOD STRUCTURE - SEE STRUCTURAL DRAWINGS.
6.7	INSTALL MOISTURE RESISTANT EXTERIOR GRADE PLYWOOD ON BACKSIDE OF ALL PARAPETS.
6.15	2X8 CROSS BLOCKING BETWEEN TJI'S PER MANUFACTURE. SUPPORT SOFFIT.
7.1	PRE-FINISHED CAP FLASHING.
7.4	TAPERED INSULATION CRICKET. ENSURE DRAINAGE TO SCUPPERS 1/8"/FT. MIN..
7.6	R-38 BATT INSULATION AT ROOF DECK WITH FOIL FACING.
7.7	R-19 BATT INSULATION AT EXTERIOR WALLS.
7.9	ROOFING SYSTEM OVER POLYISOCYANURATE, R-20 MINIMUM ON WOOD STRUCTURE.
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
9.1	GYPSUM WALLBOARD CEILING ON SUSPENDED METAL FRAMING. SEE SHEET A9.1.
9.2	SUSPENDED ACOUSTICAL TILE CEILING SYSTEM. SEE SHEET A9.1.
9.3	WALL BASE. SEE FINISH PLANS. SEE SHEET A9.1.
9.5	EIFS SYSTEM ON METAL FRAMING SYSTEM. JOINTS AS SHOWN. MULTI-COLORED.
9.7	GYPSUM WALLBOARD SOFFIT ON METAL FRAMING. SEE SHEET A9.1.
9.23	EIFS 3/4" 'V' GROOVE REVEAL, SEE SHEET A9.2.
9.25	VERTICAL SOFFIT MEMBERS SHALL BE SECURED TO WOOD JOISTS WEBS WITH (3) #10 WOOD SCREWS.
9.26	EXTEND STUDS VERTICALLY TO STRUCTURE. 4'-0" O.C.
23.2	MECHANICAL DUCTWORK - SEE MECHANICAL DRAWINGS.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.
26.8	FUTURE SECURITY CAMERA LOCATION. COORDINATE WITH ELECTRICAL AND COMMUNICATIONS.

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a6.5

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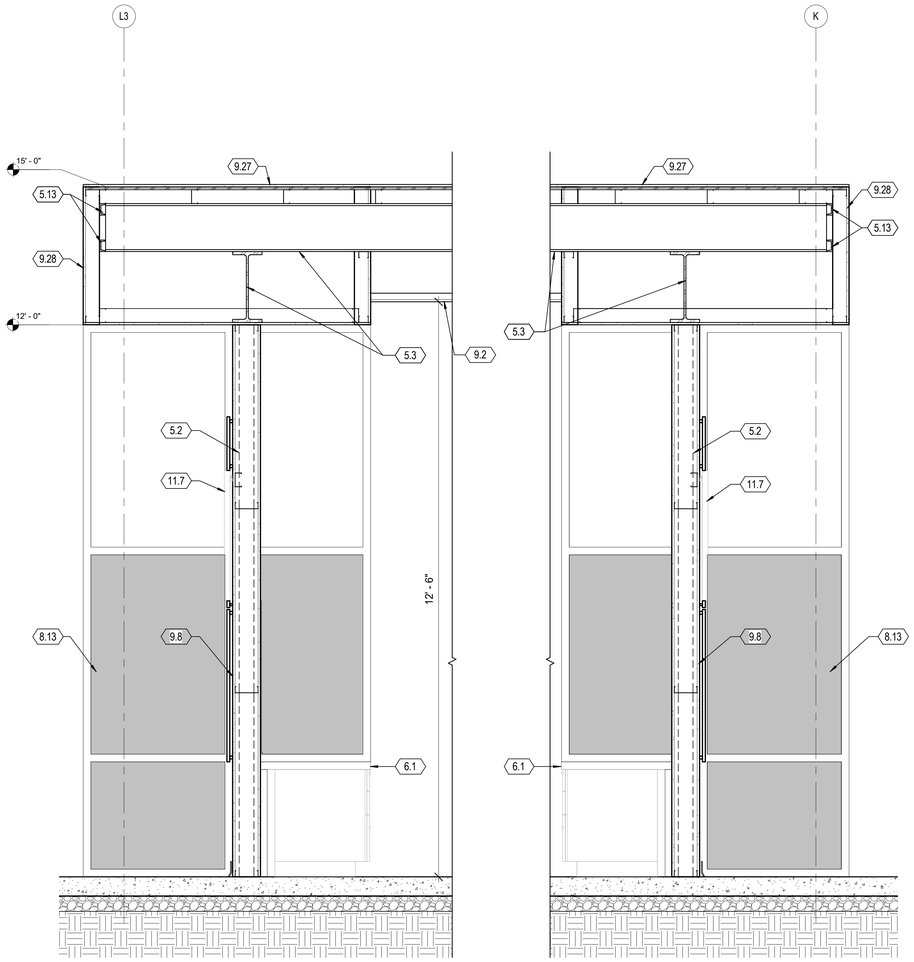
keynotes

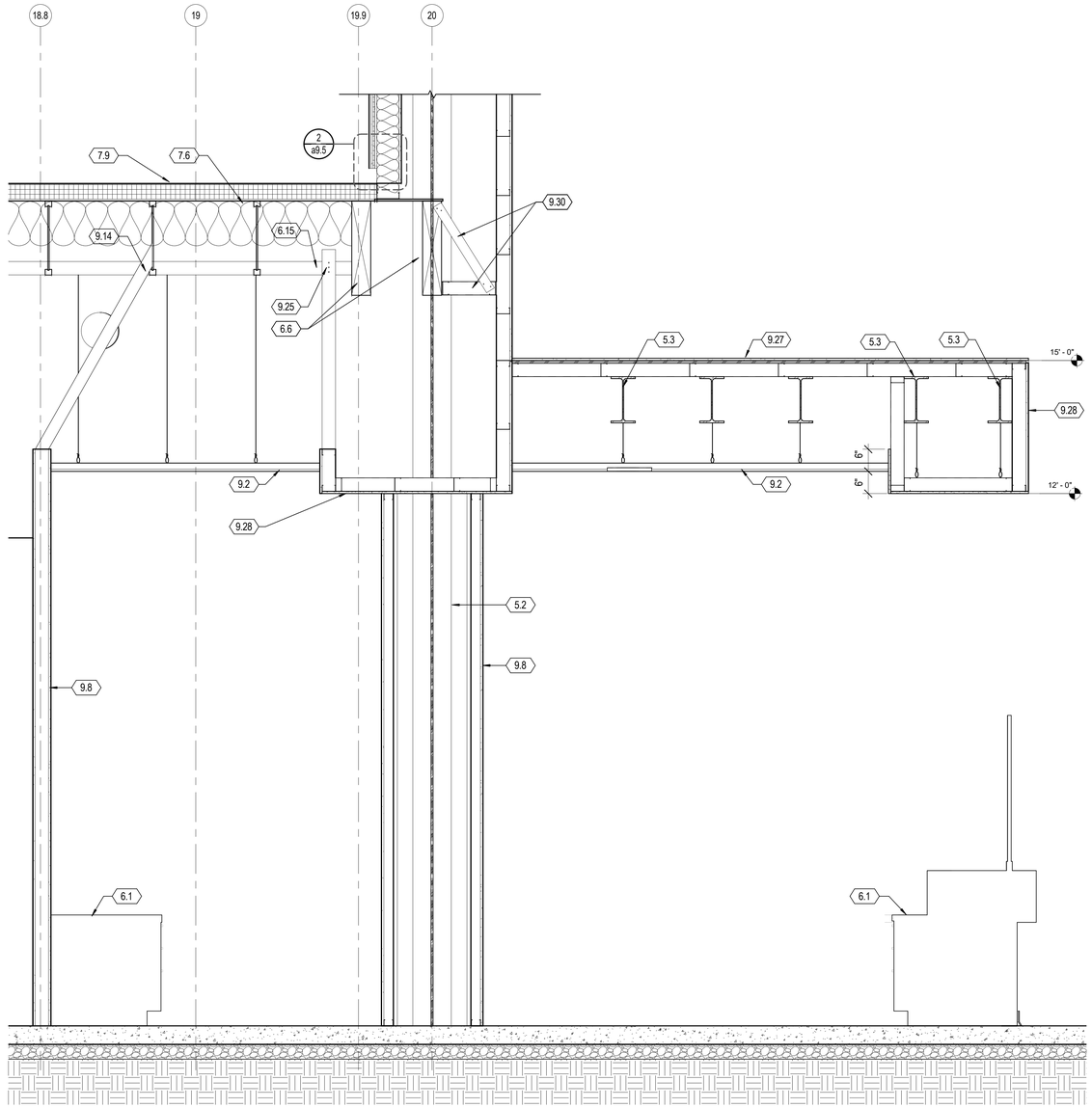
5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
5.3	STEEL BEAM, SEE STRUCTURAL.
5.13	3" STEEL CHANNELS TOP AND BOTTOM OF BEAM TO SUPPORT SOFFIT, WELD EACH STUD.
6.1	CUSTOM MILLWORK SEE INTERIOR ELEVATIONS FOR MORE INFORMATION
6.6	WOOD STRUCTURE - SEE STRUCTURAL DRAWINGS.
6.15	2X8 CROSS BLOCKING BETWEEN TJI'S PER MANUFACTURE. SUPPORT SOFFIT.
7.6	R-38 BATT INSULATION AT ROOF DECK WITH FOIL FACING.
7.9	ROOFING SYSTEM OVER POLYISOCYANURATE, R-20 MINIMUM ON WOOD STRUCTURE.
8.13	DECORATIVE FILM IN SAFETY LAMINATED GLASS SECTION SET IN ALUMINUM STOREFRONT. SEE SHEETS A9.10 & A9.11.
9.2	SUSPENDED ACOUSTICAL TILE CEILING SYSTEM. SEE SHEET A9.1.
9.8	METAL FRAME & GYPSUM WALLBOARD PARTITION. SEE WALL TYPES SHEET A9.0.
9.14	3 5/8" BRACE AT 48" O.C. TYP.
9.25	VERTICAL SOFFIT MEMBERS SHALL BE SECURED TO WOOD JOISTS WEBS WITH (3) #10 WOOD SCREWS.
9.27	5/8" GWB OVER 3/4" PLYWOOD ON 3 5/8" X 20 GAUGE STUDS AT 24" O.C.
9.28	5/8" GWB ON 3 5/8" X 20 GAUGE STUDS AT 16" O.C.
9.30	6" METAL FRAMING AT 24" O.C. 6" TRACK COUNTINIOUS ALONG SOFFIT. USE (2) #10 TEK SCREWS AT EACH STUD INTO TRACK. USE 3 5/8" KICKERS AT EACH STUD. (2) #10'S INTO FRAMING AND (2) 1/8" X 1 1/4" WOOD SCREWS INTO BEAM.
11.7	WALL MOUNTED TV SCREEN PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.

general notes

1. DO NOT SCALE DRAWINGS. COORDINATE ALL WORK BETWEEN ARCHITECTURAL, STRUCTURAL, CIVIL, MECHANICAL, PLUMBING, COMMUNICATIONS AND ELECTRICAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE IMPLEMENTATION OF WORK.
2. REFER TO STRUCTURAL FOR ALL MEMBER SIZES AND CONFIGURATIONS.



1 a6.6 **section at lobby**
3/4" = 1'-0"



2 a6.6 **section at welcome center**
3/4" = 1'-0"

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a6.6

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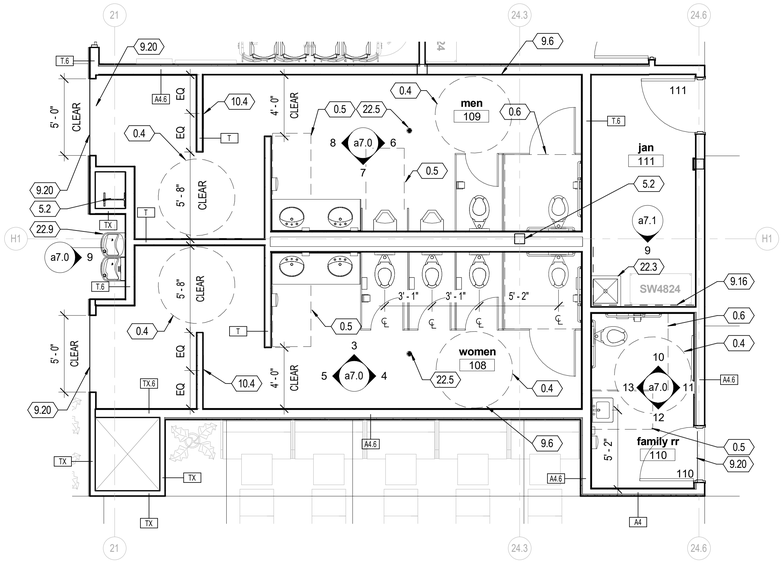
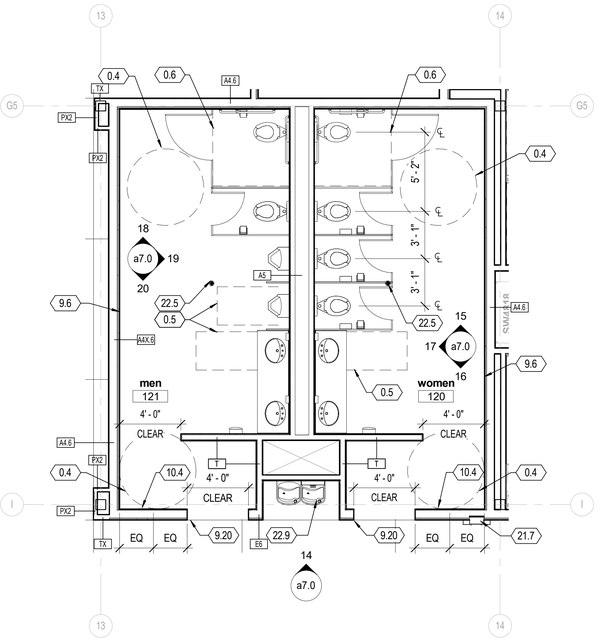
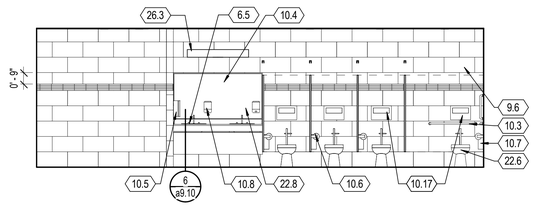


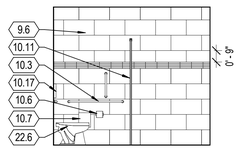
1 a7.0 **enlarged plan - 108, 109, 110, 111**
1/4" = 1'-0"



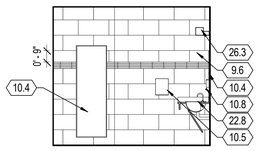
2 a7.0 **enlarged plan - 120, 121, 122**
1/4" = 1'-0"



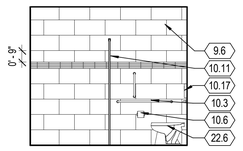
3 a7.0 **108 - north**
1/4" = 1'-0"



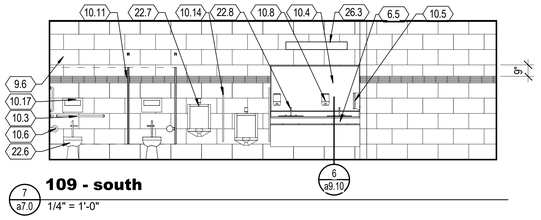
4 a7.0 **108 - east**
1/4" = 1'-0"



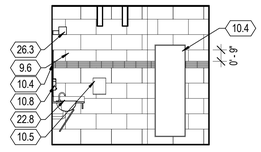
5 a7.0 **108 - west**
1/4" = 1'-0"



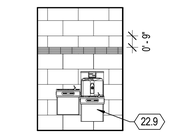
6 a7.0 **109 - east**
1/4" = 1'-0"



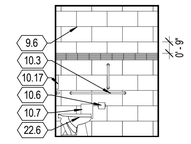
7 a7.0 **109 - south**
1/4" = 1'-0"



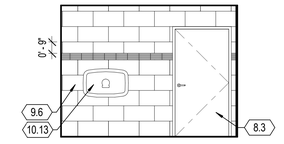
8 a7.0 **109 - west**
1/4" = 1'-0"



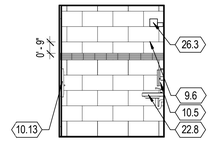
9 a7.0 **100 - east**
1/4" = 1'-0"



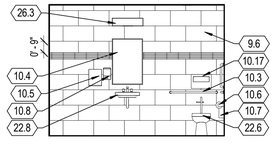
10 a7.0 **110 - north**
1/4" = 1'-0"



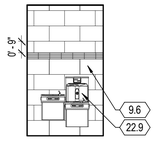
11 a7.0 **110 - east**
1/4" = 1'-0"



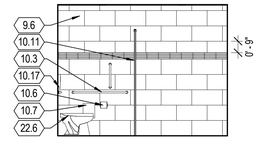
12 a7.0 **110 - south**
1/4" = 1'-0"



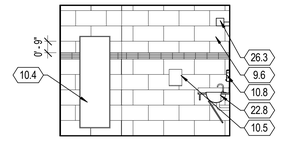
13 a7.0 **110 - west**
1/4" = 1'-0"



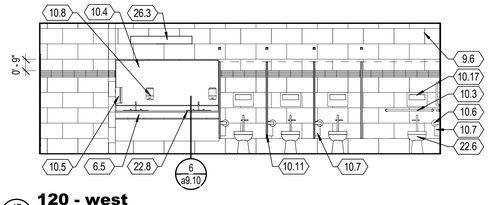
14 a7.0 **101 - north**
1/4" = 1'-0"



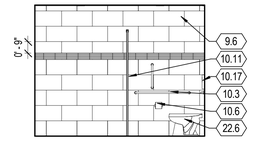
15 a7.0 **120 - north**
1/4" = 1'-0"



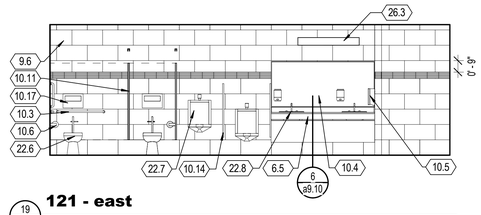
16 a7.0 **120 - south**
1/4" = 1'-0"



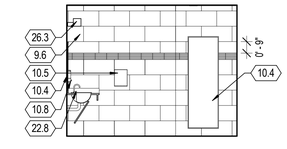
17 a7.0 **120 - west**
1/4" = 1'-0"



18 a7.0 **121 - north**
1/4" = 1'-0"



19 a7.0 **121 - east**
1/4" = 1'-0"



20 a7.0 **121 - south**
1/4" = 1'-0"

general notes

1. REFER TO g1.3 FOR TYPICAL MOUNTING HEIGHTS
2. ALL DIMENSIONS ARE TO FINISH FACE OR CENTERLINE U.N.O.
3. USE EPOXY PAINT IN ALL RESTROOMS, KITCHEN AREAS OR OFFICE SERVICE.
4. KEYNOTES FOR ELEVATIONS ARE TYPICAL TO THIS SHEET.
5. ACCENT TILE PATTERN SHALL BE ON ALL CERAMIC TILE WALLS U.N.O. PROVIDE BLOCKING AT ALL WALL MOUNTED ITEMS. SEE FINISH PLANS FOR MORE INFO.
6. FURNITURE IS DASHED FOR CLARITY. FOR MORE INFORMATION SEE FURNITURE SHEETS.
7. DASHED LINES WITHIN RESTROOM FLOOR PLAN INDICATE ADA REQUIRED CLEARANCES FOR TURNING AND FIXTURES.

keynotes

0.4	5'-0" DIA. TURNING SPACE PER ICC/ANSI 117.1, SECTION 304.3.1.
0.5	30" X 48" CLEAR FLOOR SPACE PER ICC/ANSI 117.1, SECTION 305.3.
0.6	60" X 56" CLEAR FLOOR SPACE PER ICC/ANSI 117.1, SECTION 604.3.
5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
6.5	SOLID SURFACE COUNTERTOP WITH 4" BACKSPLASH. COORDINATE WITH FINISH PLANS. RADIUS ALL OUTSIDE CORNERS. SEE SHEETS A9.10 & A9.11.
8.3	SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
9.6	CERAMIC TILE WITH ACCENT BAND. SEE FINISH PLANS FOR TILE PATTERN.
9.16	INSTALL PVC WALL PANELS TO 4'-0" A.F.F.
9.20	FLOOR TRANSITION. SEE FINISH DRAWINGS.
10.3	GRAB BARS PER ICC/ANSI 117.1, SECTION 604.5.1 & 604.5.2. PROVIDE WOOD BLOCKING.
10.4	MIRROR W/ SS PERIMETER FRAME. SEE SPECS.
10.5	PAPER TOWEL DISPENSER. PROVIDED BY VENDOR.
10.6	TOILET PAPER DISPENSER. EACH TOILET LOCATION
10.7	SANITARY NAPKIN DISPENSER.
10.8	SOAP DISPENSER.
10.11	FLOOR MOUNTED, OVERHEAD BRACED, HDPE TOILET PARTITION.
10.13	CHANGING STATION. PROVIDE WOOD BLOCKING.
10.14	1" HDPE URINAL PARTITION WITH VERTICAL BRACE SUPPORT, FULL HEIGHT.
10.17	TOILET SEAT COVER DISPENSER. PROVIDED BY VENDOR.
21.7	FIRE EXTINGUISHER. SEE SHEET A9.1.
22.3	MOP SINK W/ PVC PANEL WAINSCOT TO 4'-0" A.F.F.
22.5	FLOOR DRAIN, SEE PLUMBING. SLOPE FLOOR SLAB TO DRAIN.
22.6	TOILET, SEE PLUMBING.
22.7	URINAL, SEE PLUMBING.
22.8	SINK, SEE PLUMBING.
22.9	DRINKING FOUNTAIN, SEE PLUMBING.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.

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REGISTERED ARCHITECT
37165
KEVIN A. BARBER
ARIZONA U.S.A.

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

enlarged plans and interior elevations - restrooms

a7.0

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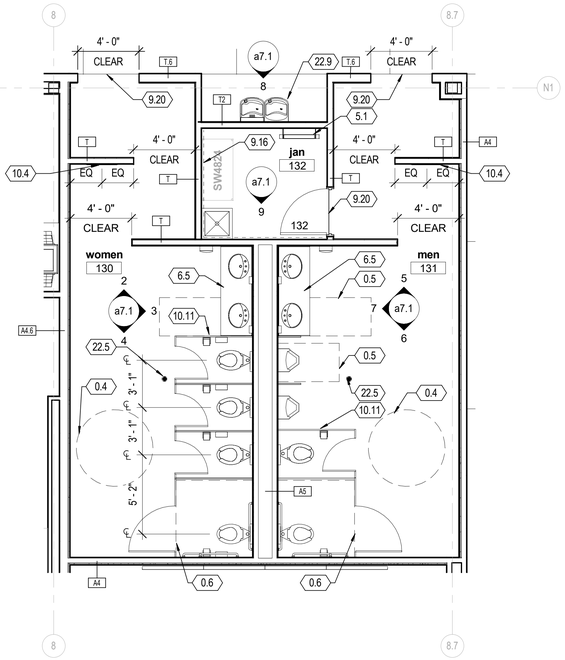
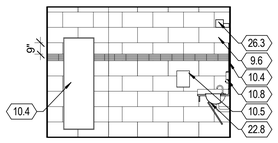
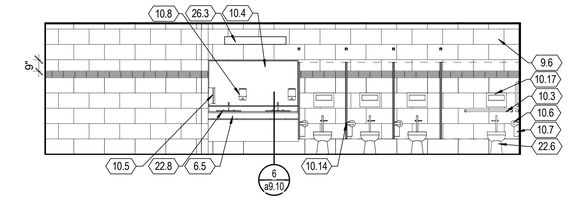


1 a7.1 **enlarged plan - 130, 131, 132**
1/4" = 1'-0"

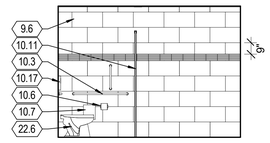
north



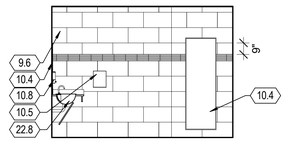
2 a7.1 **130 - north**
1/4" = 1'-0"



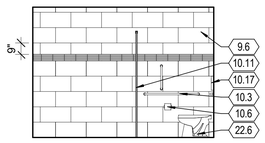
3 a7.1 **130 - east**
1/4" = 1'-0"



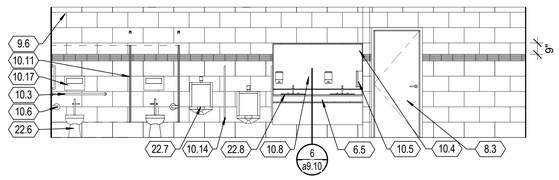
4 a7.1 **130 - south**
1/4" = 1'-0"



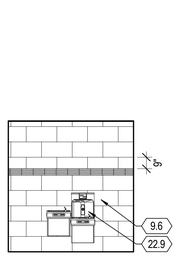
5 a7.1 **131 - north**
1/4" = 1'-0"



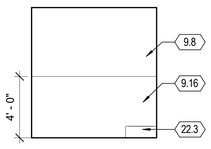
6 a7.1 **131 - south**
1/4" = 1'-0"



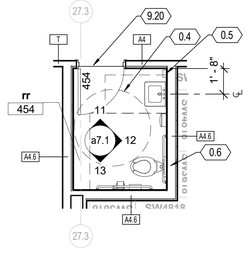
7 a7.1 **131 - west**
1/4" = 1'-0"



8 a7.1 **103 - south**
1/4" = 1'-0"

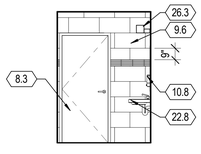


9 a7.1 **typ mop sink elevation**
1/4" = 1'-0"

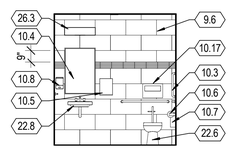


10 a7.1 **enlarged plan - 454 - restroom**
1/4" = 1'-0"

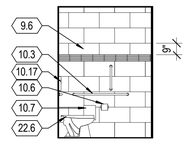
north



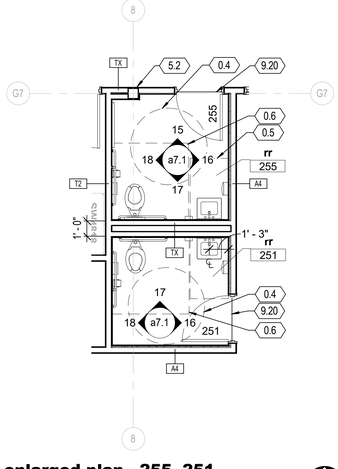
11 a7.1 **454 - north**
1/4" = 1'-0"



12 a7.1 **454 - west**
1/4" = 1'-0"

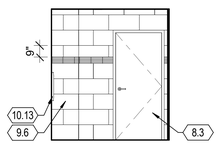


13 a7.1 **454 - south**
1/4" = 1'-0"

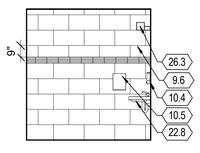


14 a7.1 **enlarged plan - 255, 251**
1/4" = 1'-0"

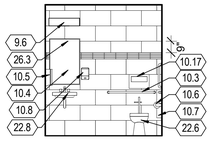
north



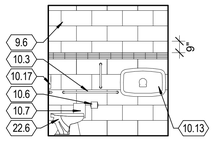
15 a7.1 **255 - north**
1/4" = 1'-0"



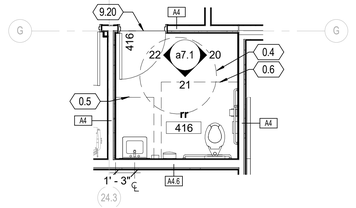
16 a7.1 **255 - east**
1/4" = 1'-0"



17 a7.1 **255 - south**
1/4" = 1'-0"

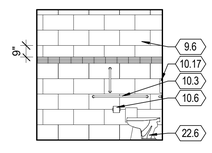


18 a7.1 **255 - west**
1/4" = 1'-0"

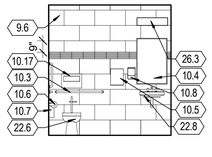


19 a7.1 **enlarged plan - 416 - restroom**
1/4" = 1'-0"

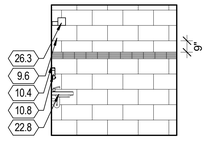
north



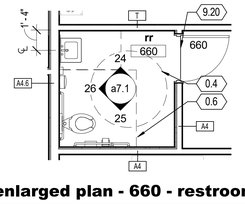
20 a7.1 **416 - east**
1/4" = 1'-0"



21 a7.1 **416 - south**
1/4" = 1'-0"

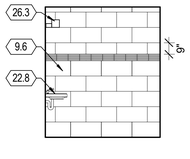


22 a7.1 **416 - west**
1/4" = 1'-0"

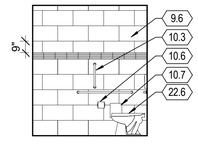


23 a7.1 **enlarged plan - 660 - restroom**
1/4" = 1'-0"

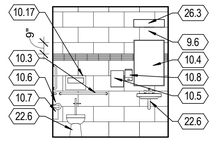
north



24 a7.1 **660 - north**
1/4" = 1'-0"



25 a7.1 **660 - south**
1/4" = 1'-0"



26 a7.1 **660 - west**
1/4" = 1'-0"

general notes

1. REFER TO g1.3 FOR TYPICAL MOUNTING HEIGHTS
2. ALL DIMENSIONS ARE TO FINISH FACE OR CENTERLINE U.N.O.
3. USE EPOXY PAINT IN ALL RESTROOMS, KITCHEN AREAS OR OFFICE SERVICE.
4. KEYNOTES FOR ELEVATIONS ARE TYPICAL TO THIS SHEET.
5. ACCENT TILE PATTERN SHALL BE ON ALL CERAMIC TILE WALLS U.N.O. PROVIDE BLOCKING AT ALL WALL MOUNTED ITEMS. SEE FINISH PLANS FOR MORE INFO.
6. FURNITURE IS DASHED FOR CLARITY. FOR MORE INFORMATION SEE FURNITURE SHEETS.
7. DASHED LINES WITHIN RESTROOM FLOOR PLAN INDICATE ADA REQUIRED CLEARANCES FOR TURNING AND FIXTURES.

keynotes

0.4	5'-0" DIA. TURNING SPACE PER ICC/ANSI 117.1, SECTION 304.3.1.
0.5	30" X 48" CLEAR FLOOR SPACE PER ICC/ANSI 117.1, SECTION 305.3.
0.6	60" X 56" CLEAR FLOOR SPACE PER ICC/ANSI 117.1, SECTION 604.3.
5.1	ROOF ACCESS STEEL. LADDER WITH SAFETY UP-POST. SEE SHEET A9.4.
5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
6.5	SOLID SURFACE COUNTERTOP WITH 4" BACKSPLASH. COORDINATE WITH FINISH PLANS. RADIUS ALL OUTSIDE CORNERS. SEE SHEETS A9.10 & A9.11.
8.3	SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
9.6	CERAMIC TILE WITH ACCENT BAND. SEE FINISH PLANS FOR TILE PATTERN.
9.8	METAL FRAME & GYPSUM WALLBOARD PARTITION. SEE WALL TYPES SHEET A9.0.
9.16	INSTALL PVC WALL PANELS TO 4'-0" A.F.F.
9.20	FLOOR TRANSITION. SEE FINISH DRAWINGS.
10.3	GRAB BARS PER ICC/ANSI 117.1, SECTION 604.5.1 & 604.5.2. PROVIDE WOOD BLOCKING.
10.4	MIRROR W/ SS PERIMETER FRAME. SEE SPECS.
10.5	PAPER TOWEL DISPENSER. PROVIDED BY VENDOR.
10.6	TOILET PAPER DISPENSER. EACH TOILET LOCATION
10.7	SANITARY NAPKIN DISPENSER.
10.8	SOAP DISPENSER.
10.11	FLOOR MOUNTED, OVERHEAD BRACED, HDPE TOILET PARTITION.
10.13	CHANGING STATION. PROVIDE WOOD BLOCKING.
10.14	1" HDPE URINAL PARTITION WITH VERTICAL BRACE SUPPORT, FULL HEIGHT.
10.17	TOILET SEAT COVER DISPENSER. PROVIDED BY VENDOR.
22.3	MOP SINK W/ PVC PANEL WAINSCOT TO 4'-0" A.F.F.
22.5	FLOOR DRAIN, SEE PLUMBING. SLOPE FLOOR SLAB TO DRAIN.
22.6	TOILET, SEE PLUMBING.
22.7	URINAL, SEE PLUMBING.
22.8	SINK, SEE PLUMBING.
22.9	DRINKING FOUNTAIN, SEE PLUMBING.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.

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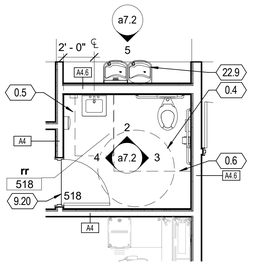
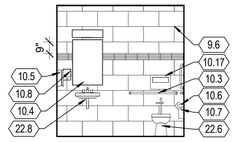
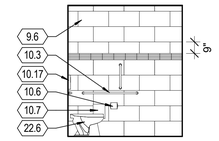


1 a7.2 **enlarged plan - 518 - restroom**
1/4" = 1'-0"

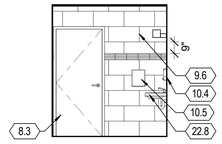
north



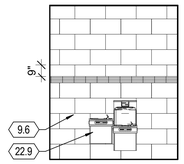
2 a7.2 **518 - restroom - north**
1/4" = 1'-0"



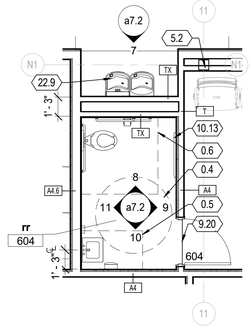
3 a7.2 **518 - restroom - east**
1/4" = 1'-0"



4 a7.2 **518 - restroom - west**
1/4" = 1'-0"

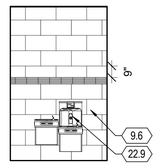


5 a7.2 **106 - south**
1/4" = 1'-0"

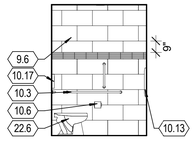


6 a7.2 **enlarged plan - 604 - restroom**
1/4" = 1'-0"

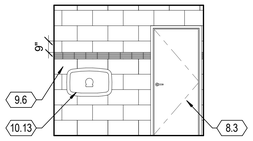
north



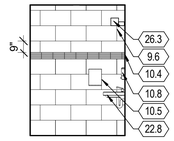
7 a7.2 **103 - drinking fountain**
1/4" = 1'-0"



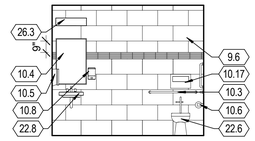
8 a7.2 **604 - restroom - north**
1/4" = 1'-0"



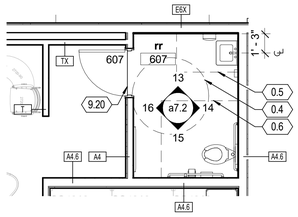
9 a7.2 **604 - restroom - east**
1/4" = 1'-0"



10 a7.2 **604 - restroom - south**
1/4" = 1'-0"

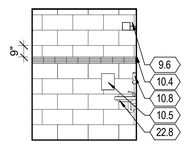


11 a7.2 **604 - restroom - west**
1/4" = 1'-0"

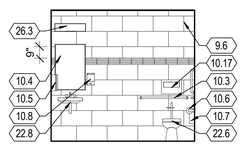


12 a7.2 **enlarged plan - 607 - restroom**
1/4" = 1'-0"

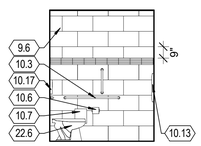
north



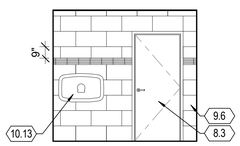
13 a7.2 **607 - restroom - north**
1/4" = 1'-0"



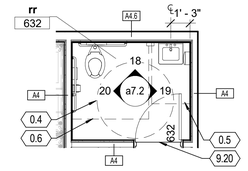
14 a7.2 **607 - restroom - east**
1/4" = 1'-0"



15 a7.2 **607 - restroom - south**
1/4" = 1'-0"

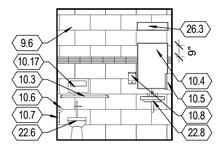


16 a7.2 **607 - restroom - west**
1/4" = 1'-0"

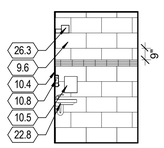


17 a7.2 **enlarged plan - 632 - restroom**
1/4" = 1'-0"

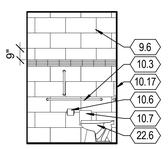
north



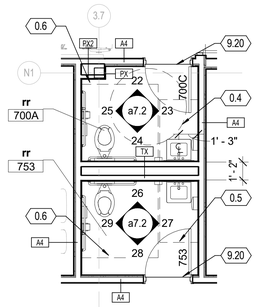
18 a7.2 **632 - restroom - north**
1/4" = 1'-0"



19 a7.2 **632 - restroom - east**
1/4" = 1'-0"



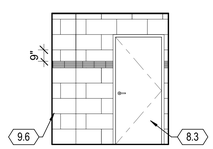
20 a7.2 **632 - restroom - west**
1/4" = 1'-0"



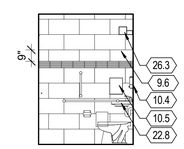
enlarged plan - 701 &753 - restroom

21 a7.2 1/4" = 1'-0"

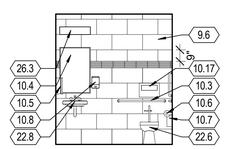
north



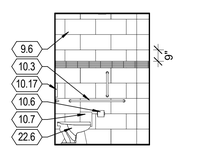
22 a7.2 **700A - restroom - north**
1/4" = 1'-0"



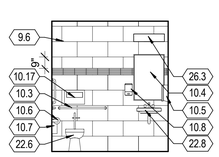
23 a7.2 **700A - restroom - east**
1/4" = 1'-0"



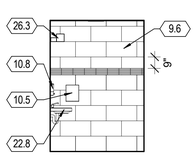
24 a7.2 **700A - restroom - south**
1/4" = 1'-0"



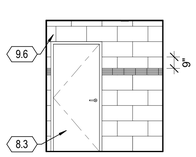
25 a7.2 **700A - restroom - west**
1/4" = 1'-0"



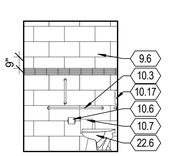
26 a7.2 **753 - restroom - north**
1/4" = 1'-0"



27 a7.2 **753 - restroom - east**
1/4" = 1'-0"



28 a7.2 **753 - restroom - south**
1/4" = 1'-0"



29 a7.2 **753 - restroom - west**
1/4" = 1'-0"

general notes

1. REFER TO g1.3 FOR TYPICAL MOUNTING HEIGHTS
2. ALL DIMENSIONS ARE TO FINISH FACE OR CENTERLINE U.N.O.
3. USE EPOXY PAINT IN ALL RESTROOMS, KITCHEN AREAS OR OFFICE SERVICE.
4. KEYNOTES FOR ELEVATIONS ARE TYPICAL TO THIS SHEET.
5. ACCENT TILE PATTERN SHALL BE ON ALL CERAMIC TILE WALLS U.N.O. PROVIDE BLOCKING AT ALL WALL MOUNTED ITEMS. SEE FINISH PLANS FOR MORE INFO.
6. FURNITURE IS DASHED FOR CLARITY. FOR MORE INFORMATION SEE FURNITURE SHEETS.
7. DASHED LINES WITHIN RESTROOM FLOOR PLAN INDICATE ADA REQUIRED CLEARANCES FOR TURNING AND FIXTURES.

keynotes

0.4	5'-0" DIA. TURNING SPACE PER ICC/ANSI 117.1, SECTION 304.3.1.
0.5	30" X 48" CLEAR FLOOR SPACE PER ICC/ANSI 117.1, SECTION 305.3.
0.6	60" X 56" CLEAR FLOOR SPACE PER ICC/ANSI 117.1, SECTION 604.3.
5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
8.3	SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
9.6	CERAMIC TILE WITH ACCENT BAND. SEE FINISH PLANS FOR TILE PATTERN.
9.20	FLOOR TRANSITION. SEE FINISH DRAWINGS.
10.3	GRAB BARS PER ICC/ANSI 117.1, SECTION 604.5.1 & 604.5.2. PROVIDE WOOD BLOCKING.
10.4	MIRROR W/ SS PERIMETER FRAME. SEE SPECS.
10.5	PAPER TOWEL DISPENSER. PROVIDED BY VENDOR.
10.6	TOILET PAPER DISPENSER. EACH TOILET LOCATION
10.7	SANITARY NAPKIN DISPENSER.
10.8	SOAP DISPENSER.
10.13	CHANGING STATION. PROVIDE WOOD BLOCKING.
10.17	TOILET SEAT COVER DISPENSER. PROVIDED BY VENDOR.
22.6	TOILET, SEE PLUMBING.
22.8	SINK, SEE PLUMBING.
22.9	DRINKING FOUNTAIN, SEE PLUMBING.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.

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REGISTERED ARCHITECT
37165
KEVIN A. BARBER
ARIZONA U.S.A.

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

enlarged plans and interior elevations - restrooms

a7.2

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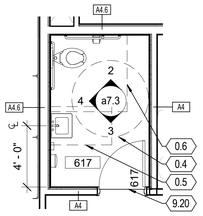
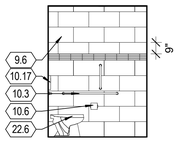
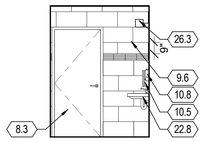


1 a7.3 **enlarged plan - 617 - restroom**
1/4" = 1'-0"

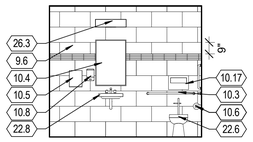
north



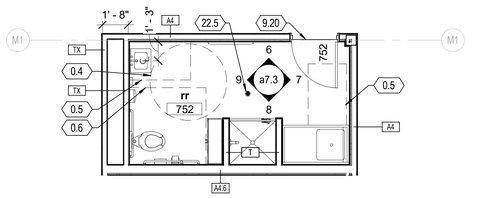
2 a7.3 **617 - north**
1/4" = 1'-0"



3 a7.3 **617 - south**
1/4" = 1'-0"

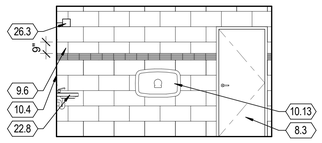


4 a7.3 **617 - west**
1/4" = 1'-0"

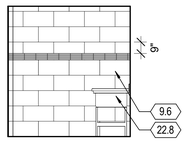


5 a7.3 **enlarged plan - 752 - restroom**
1/4" = 1'-0"

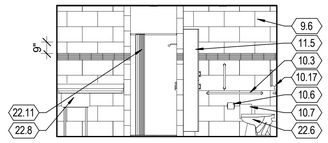
north



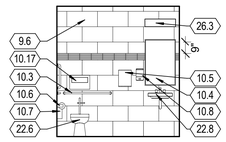
6 a7.3 **752 - restroom - north**
1/4" = 1'-0"



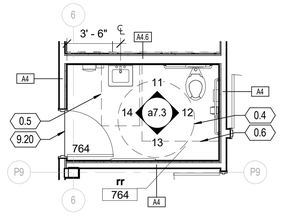
7 a7.3 **752 - restroom - east**
1/4" = 1'-0"



8 a7.3 **752 - restroom - south**
1/4" = 1'-0"

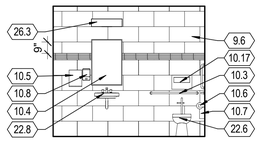


9 a7.3 **752 - restroom - west**
1/4" = 1'-0"

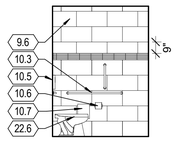


10 a7.3 **enlarged plan - 764 - restroom**
1/4" = 1'-0"

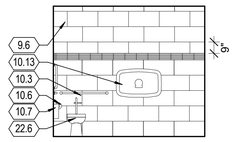
north



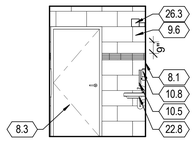
11 a7.3 **764 - restroom - north**
1/4" = 1'-0"



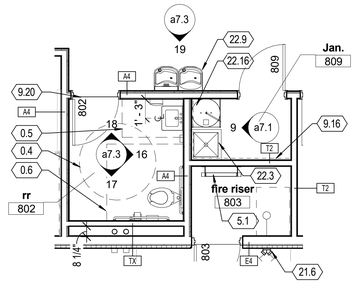
12 a7.3 **764 - restroom - east**
1/4" = 1'-0"



13 a7.3 **764 - restroom - south**
1/4" = 1'-0"

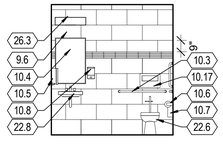


14 a7.3 **764 - restroom - west**
1/4" = 1'-0"

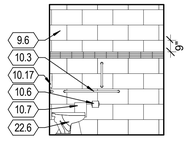


15 a7.3 **enlarged plan - warehouse**
1/4" = 1'-0"

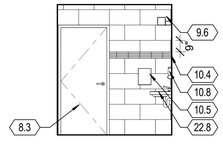
north



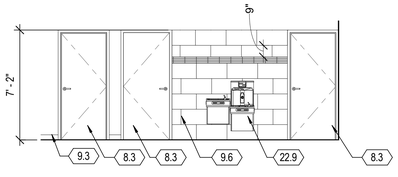
16 a7.3 **802 - restroom - east**
1/4" = 1'-0"



17 a7.3 **802 - restroom - south**
1/4" = 1'-0"



18 a7.3 **802 - restroom - north**
1/4" = 1'-0"



19 a7.3 **800 - south**
1/4" = 1'-0"

general notes

1. REFER TO g1.3 FOR TYPICAL MOUNTING HEIGHTS
2. ALL DIMENSIONS ARE TO FINISH FACE OR CENTERLINE U.N.O.
3. USE EPOXY PAINT IN ALL RESTROOMS, KITCHEN AREAS OR OFFICE SERVICE.
4. KEYNOTES FOR ELEVATIONS ARE TYPICAL TO THIS SHEET.
5. ACCENT TILE PATTERN SHALL BE ON ALL CERAMIC TILE WALLS U.N.O. PROVIDE BLOCKING AT ALL WALL MOUNTED ITEMS. SEE FINISH PLANS FOR MORE INFO.
6. FURNITURE IS DASHED FOR CLARITY. FOR MORE INFORMATION SEE FURNITURE SHEETS.
7. DASHED LINES WITHIN RESTROOM FLOOR PLAN INDICATE ADA REQUIRED CLEARANCES FOR TURNING AND FIXTURES.

keynotes

0.4	5'-0" DIA. TURNING SPACE PER ICC/ANSI 117.1, SECTION 304.3.1.
0.5	30" X 48" CLEAR FLOOR SPACE PER ICC/ANSI 117.1, SECTION 305.3.
0.6	60" X 56" CLEAR FLOOR SPACE PER ICC/ANSI 117.1, SECTION 604.3.
5.1	ROOF ACCESS STEEL. LADDER WITH SAFETY UP-POST. SEE SHEET A9.4.
8.1	HOLLOW METAL DOOR & FRAME. SEE DOOR SCHEDULE.
8.3	SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
9.3	WALL BASE. SEE FINISH PLANS. SEE SHEET A9.1.
9.6	CERAMIC TILE WITH ACCENT BAND. SEE FINISH PLANS FOR TILE PATTERN.
9.16	INSTALL PVC WALL PANELS TO 4'-0" A.F.F.
9.20	FLOOR TRANSITION. SEE FINISH DRAWINGS.
10.3	GRAB BARS PER ICC/ANSI 117.1, SECTION 604.5.1 & 604.5.2. PROVIDE WOOD BLOCKING.
10.4	MIRROR W/ SS PERIMETER FRAME. SEE SPECS.
10.5	PAPER TOWEL DISPENSER. PROVIDED BY VENDOR.
10.6	TOILET PAPER DISPENSER. EACH TOILET LOCATION
10.7	SANITARY NAPKIN DISPENSER.
10.8	SOAP DISPENSER.
10.13	CHANGING STATION. PROVIDE WOOD BLOCKING.
10.17	TOILET SEAT COVER DISPENSER. PROVIDED BY VENDOR.
11.5	LOCKERS. SEE FURNITURE PLANS.
21.6	FIRE DEPARTMENT CONNECTION, SEE PLUMBING.
22.3	MOP SINK W/ PVC PANEL WAINSCOT TO 4'-0" A.F.F.
22.5	FLOOR DRAIN, SEE PLUMBING. SLOPE FLOOR SLAB TO DRAIN.
22.6	TOILET, SEE PLUMBING.
22.8	SINK, SEE PLUMBING.
22.9	DRINKING FOUNTAIN, SEE PLUMBING.
22.11	SHOWER, SEE PLUMBING.
22.16	OVER HEAD WATER HEATER, SEE PLUMBING.
26.3	LIGHT FIXTURE, SEE ELECTRICAL.

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TUCSON, ARIZONA 85710
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REGISTERED ARCHITECT
37165
KEVIN A. BARBER
ARIZONA U.S.A.

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

enlarged plans and interior elevations - restrooms

a7.3

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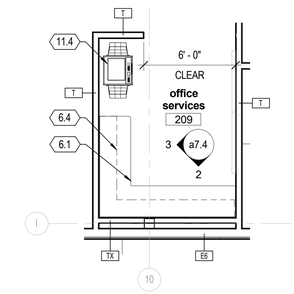
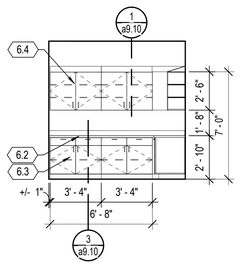


enlarged plan - 209 - office services

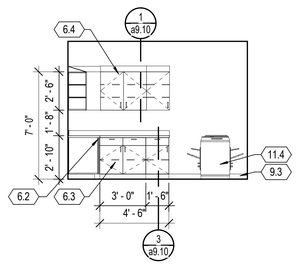
1 a7.4 — 1/4" = 1'-0"

north



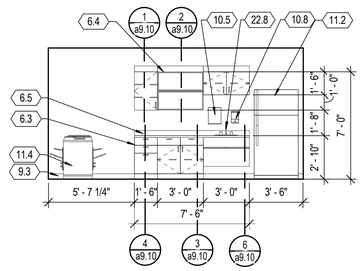
209 - office services - south

2 a7.4 — 1/4" = 1'-0"



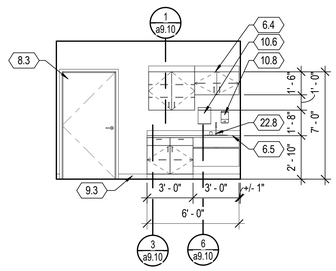
209 - office services - west

3 a7.4 — 1/4" = 1'-0"



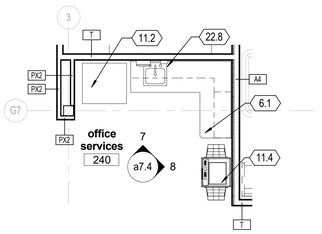
213- hallway - south

4 a7.4 — 1/4" = 1'-0"



129 - large - east

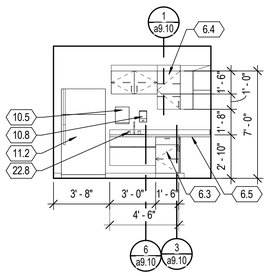
5 a7.4 — 1/4" = 1'-0"



enlarged plan - 240 - office services

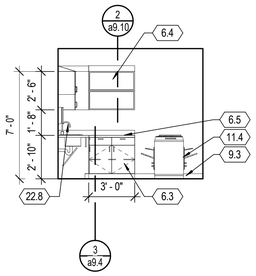
6 a7.4 — 1/4" = 1'-0"

north



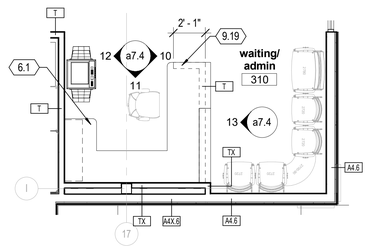
240 - office services - north

7 a7.4 — 1/4" = 1'-0"



240 - office services - east

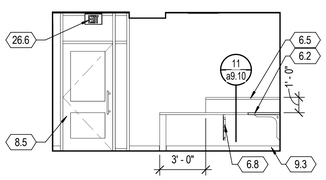
8 a7.4 — 1/4" = 1'-0"



enlarged plan - 310 - waiting/admin

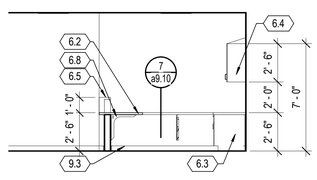
9 a7.4 — 1/4" = 1'-0"

north



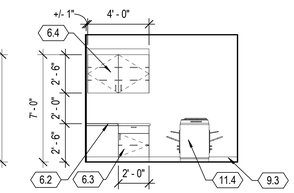
310 - waiting/admin - east

10 a7.4 — 1/4" = 1'-0"



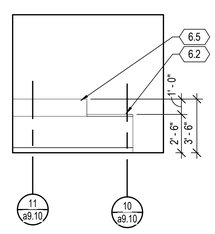
310 - waiting/admin - south

11 a7.4 — 1/4" = 1'-0"



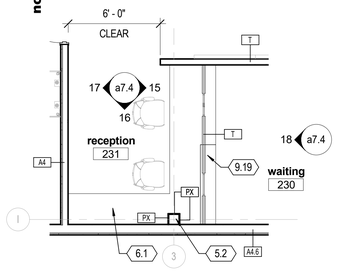
310 - admin - west

12 a7.4 — 1/4" = 1'-0"



310 - waiting - west

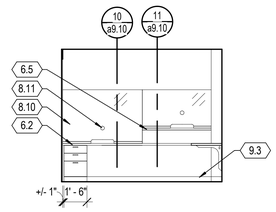
13 a7.4 — 1/4" = 1'-0"



enlarged plan - 230, 231 - waiting, reception

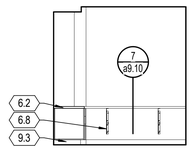
14 a7.4 — 1/4" = 1'-0"

north



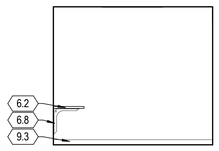
231 - reception - east

15 a7.4 — 1/4" = 1'-0"



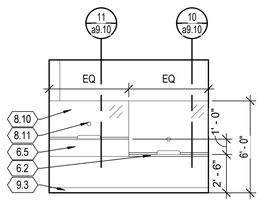
231 - reception - south

16 a7.4 — 1/4" = 1'-0"



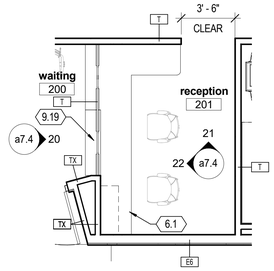
231 - reception - west

17 a7.4 — 1/4" = 1'-0"



230 - waiting - west

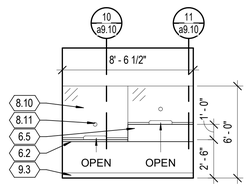
18 a7.4 — 1/4" = 1'-0"



enlarged plan - 201 - reception

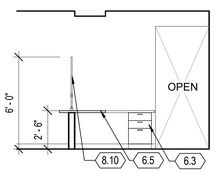
19 a7.4 — 1/4" = 1'-0"

north



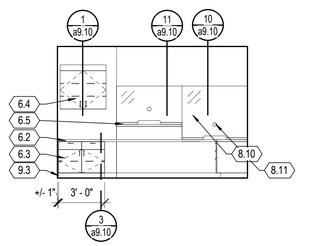
200 - waiting - east

20 a7.4 — 1/4" = 1'-0"



201 - reception - north

21 a7.4 — 1/4" = 1'-0"



201 - reception - west

22 a7.4 — 1/4" = 1'-0"

general notes

1. REFER TO g1.3 FOR TYPICAL MOUNTING HEIGHTS
2. ALL DIMENSIONS ARE TO FINISH FACE OR CENTERLINE U.N.O.
3. USE EPOXY PAINT IN ALL RESTROOMS, KITCHEN AREAS OR OFFICE SERVICE.
4. KEYNOTES FOR ELEVATIONS ARE TYPICAL TO THIS SHEET.
5. ACCENT TILE PATTERN SHALL BE ON ALL CERAMIC TILE WALLS U.N.O. PROVIDE BLOCKING AT ALL WALL MOUNTED ITEMS. SEE FINISH PLANS FOR MORE INFO.
6. FURNITURE IS DASHED FOR CLARITY. FOR MORE INFORMATION SEE FURNITURE SHEETS.
7. DASHED LINES WITHIN RESTROOM FLOOR PLAN INDICATE ADA REQUIRED CLEARANCES FOR TURNING AND FIXTURES.

keynotes

5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
6.1	CUSTOM MILLWORK SEE INTERIOR ELEVATIONS FOR MORE INFORMATION
6.2	PLASTIC LAMINATE COUNTER TOP (4" BACKSPLASH AT WET AREAS). RADIUS ALL OUTSIDE CORNERS.
6.3	24" DEEP BASE CABINET. SEE SHEETS A9.10 & A9.11.
6.4	14" DEEP UPPER CABINET W/ ADJUSTABLE SHELVES. SEE SHEETS A9.10 & A9.11.
6.5	SOLID SURFACE COUNTERTOP WITH 4" BACKSPLASH. COORDINATE WITH FINISH PLANS. RADIUS ALL OUTSIDE CORNERS. SEE SHEETS A9.10 & A9.11.
6.8	COUNTERTOP SUPPORT. SEE SHEETS A9.10 & A9.11.
8.3	SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
8.10	SAFETY GLASS 6'-0" A.F.F.
8.11	1/2" TEMPERED GLASS WITH PASS THROUGH AND 3" DIAMETER HOLE OPENING. SEE SHEETS A9.10 & A9.11.
9.3	WALL BASE. SEE FINISH PLANS. SEE SHEET A9.1.
9.19	METAL FRAME & GYPSUM WALLBOARD PARTITION BELOW TOP. SEE MILLWORK DETAILS SEE SHEETS A9.10 & A9.11 AND WALL TYPES, SHEET A9.0.
10.5	PAPER TOWEL DISPENSER. PROVIDED BY VENDOR.
10.6	TOILET PAPER DISPENSER. EACH TOILET LOCATION
10.8	SOAP DISPENSER.
11.2	REFRIGERATOR PROVIDED BY OWNER. PROVIDE ELECTRICAL AND WATER CONNECTION, COORDINATE WITH ELECTRICAL AND PLUMBING.
11.4	COPIER PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTIONS.
22.8	SINK, SEE PLUMBING.
26.6	EXIT SIGN. SEE ELECTRICAL DRAWINGS.

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REGISTERED ARCHITECT
CERTIFICATE NO.
37165
KEVIN A.
BARBER
ARIZONA U.S.A.

job
1717

date
11.16.18

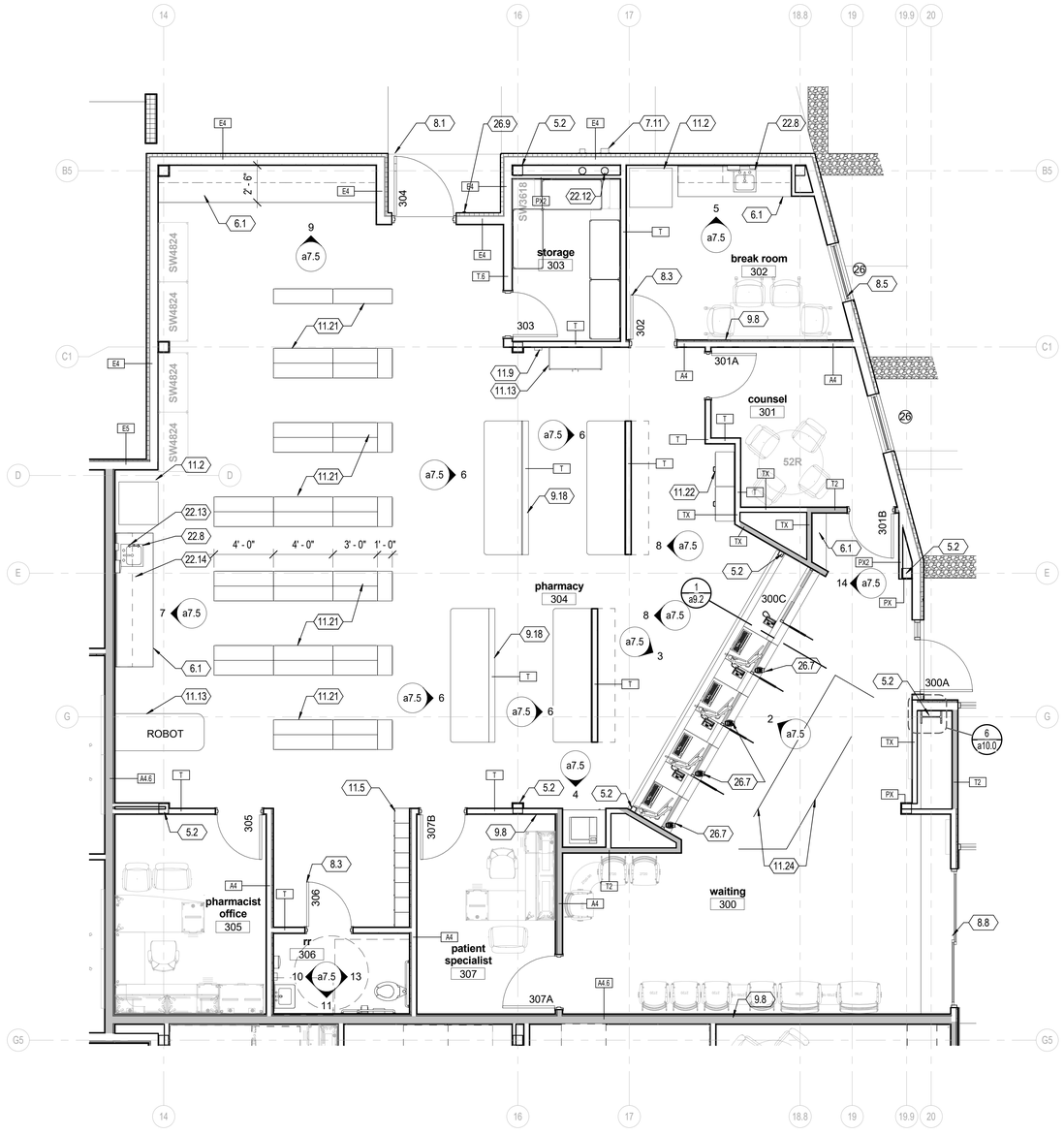
revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

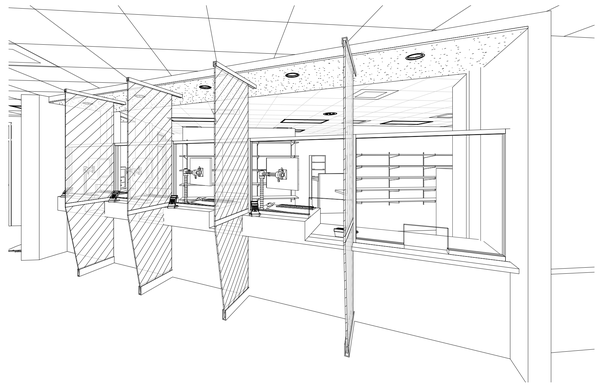
enlarged plans and interior elevations

a7.4

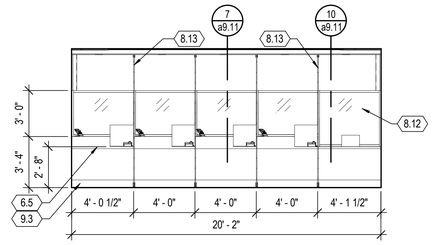
11/16/2018 2:34:38 PM C:\Active Revit Projects\1717 PYT Health Services Center II_Central File_cabrams.rvt



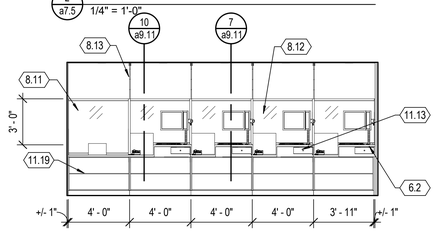
1 a7.5 **enlarged plan - pharmacy**
1/4" = 1'-0"



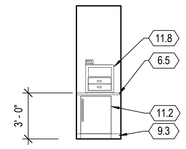
pharmacy counter



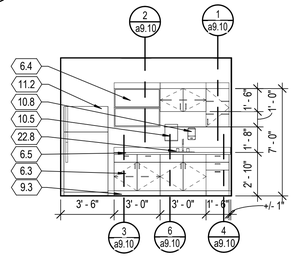
2 a7.5 **300 - pharmacy desk - west**
1/4" = 1'-0"



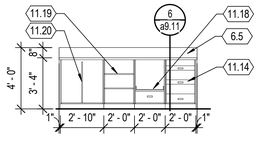
3 a7.5 **304 - pharmacy desk - east**
1/4" = 1'-0"



4 a7.5 **304 - pharmacy - south**
1/4" = 1'-0"



5 a7.5 **305 - break room - north**
1/4" = 1'-0"



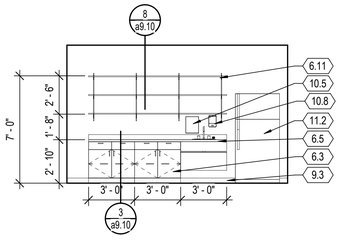
6 a7.5 **typical work station**
1/4" = 1'-0"
TYPICAL OF (4)

general notes

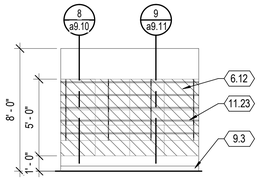
1. REFER TO g1.3 FOR TYPICAL MOUNTING HEIGHTS
2. ALL DIMENSIONS ARE TO FINISH FACE OR CENTERLINE U.N.O.
3. USE EPOXY PAINT IN ALL RESTROOMS, KITCHEN AREAS OR OFFICE SERVICE.
4. KEYNOTES FOR ELEVATIONS ARE TYPICAL TO THIS SHEET.
5. ACCENT TILE PATTERN SHALL BE ON ALL CERAMIC TILE WALLS U.N.O. PROVIDE BLOCKING AT ALL WALL MOUNTED ITEMS. SEE FINISH PLANS FOR MORE INFO.
6. FURNITURE IS DASHED FOR CLARITY. FOR MORE INFORMATION SEE FURNITURE SHEETS.
7. DASHED LINES WITHIN RESTROOM FLOOR PLAN INDICATE ADA REQUIRED CLEARANCES FOR TURNING AND FIXTURES.
8. **PHARAMCY: ALL SHADED WALLS SHALL HAVE ALL LAYERS OF GWB BE IMPACT RESISTANT TO DECK.**

keynotes

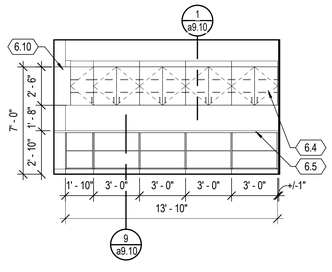
5.2 STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
6.1 CUSTOM MILLWORK SEE INTERIOR ELEVATIONS FOR MORE INFORMATION
6.2 PLASTIC LAMINATE COUNTER TOP (4" BACKSPLASH AT WET AREAS). RADIUS ALL OUTSIDE CORNERS.
6.3 24" DEEP BASE CABINET. SEE SHEETS A9.10 & A9.11.
6.4 14" DEEP UPPER CABINET W/ ADJUSTABLE SHELVES. SEE SHEETS A9.10 & A9.11.
6.5 SOLID SURFACE COUNTERTOP WITH 4" BACKSPLASH. COORDINATE WITH FINISH PLANS. RADIUS ALL OUTSIDE CORNERS. SEE SHEETS A9.10 & A9.11.
6.8 COUNTERTOP SUPPORT. SEE SHEETS A9.10 & A9.11.
6.10 PLASTIC LAMINATE IN FILL PANEL. SEE SHEETS A9.10 & A9.11.
6.11 3/4" PLASTIC LAMINATE SHELVES. SEE SHEETS A9.10 & A9.11.
6.12 PLASTIC LAMINATE PANELS WITH REVEALS.
7.11 ROOF DRAIN NOZZLE. SEE ELEVATIONS. COORDINATE WITH PLUMBING FOR PRIMARY AND SECONDARY LOCATIONS.
8.1 HOLLOW METAL DOOR & FRAME. SEE DOOR SCHEDULE.
8.3 SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
8.5 THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
8.8 ALUMINUM SLIDER. SEE DOOR SCHEDULE.
8.11 1/2" TEMPERED GLASS WITH PASS THROUGH AND 3" DIAMETER HOLE OPENING. SEE SHEETS A9.10 & A9.11.
8.12 1/2" TEMPERED GLASS WITH POLISHED EDGE. SET IN ALUMINUM BASE.
8.13 DECORATIVE FILM IN SAFETY LAMINATED GLASS SECTION SET IN ALUMINUM STOREFRONT. SEE SHEETS A9.10 & A9.11.
9.3 WALL BASE. SEE FINISH PLANS. SEE SHEET A9.1.
9.6 CERAMIC TILE WITH ACCENT BAND. SEE FINISH PLANS FOR TILE PATTERN.
9.8 METAL FRAME & GYPSUM WALLBOARD PARTITION. SEE WALL TYPES SHEET A9.0.
9.18 METAL FRAME & GYPSUM WALLBOARD PARTITION. TOP OF WALL AT 42" A.F.F. SEE SHEET A9.0.
10.3 GRAB BARS PER ICC/ANSI 117.1, SECTION 604.5.1 & 604.5.2. PROVIDE WOOD BLOCKING.
10.4 MIRROR W/ SS PERIMETER FRAME. SEE SPECS.
10.5 PAPER TOWEL DISPENSER. PROVIDED BY VENDOR.
10.6 TOILET PAPER DISPENSER. EACH TOILET LOCATION
10.7 SANITARY NAPKIN DISPENSER.
10.8 SOAP DISPENSER.
11.2 REFRIGERATOR PROVIDED BY OWNER. PROVIDE ELECTRICAL AND WATER CONNECTION, COORDINATE WITH ELECTRICAL AND PLUMBING.
11.5 LOCKERS. SEE FURNITURE PLANS.
11.8 PRINTER PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.
11.9 TIME CLOCK PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.
11.13 PHARMACEUTICAL EQUIPMENT PROVIDED BY OWNER. PROVIDED ELECTRICAL AND DATA AS NEEDED.
11.14 PHARMACEUTICAL CABINET. BOTTLE FILLER CABINET. SEE SPECS.
11.18 PHARMACEUTICAL CABINET. PHARMACY PRINTER CABINET. SEE SPECS.
11.19 PHARMACEUTICAL CABINET PHARMACY OPEN CABINET.
11.20 WALL MOUNTED BRACKET WITH (1) BAG HOLDER. SEE SPECS.
11.21 (8) SHELF HIGH BY 12" DEEP METAL SHELVING. SEE SPECS.
11.22 PHARMACEUTICAL PRESCRIPTION CABINETS. SEE SPECS.
11.23 WALL STANDARDS AND PHARMACY BAG RAIL SYSTEM. REFER TO SPECS. PROVIDE WOOD BLOCKING.
11.24 PEDESTRIAN CONTROL BARRIER. SEE SPECS.
22.6 TOILET, SEE PLUMBING.
22.8 SINK, SEE PLUMBING.
22.12 RAIN WATER PIPING.
22.13 EYE WASH, SEE PLUMBING.
22.14 REVERSE OSMOSIS SYSTEM. SEE PLUMBING.
26.3 LIGHT FIXTURE, SEE ELECTRICAL.
26.7 POINT OF SALE PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA AS REQUIRED.
26.9 DOORBELL, COORDINATE WITH ELECTRICAL.



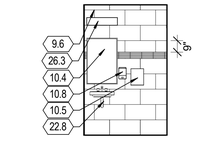
7 a7.5 **304 - pharmacy - west**
1/4" = 1'-0"



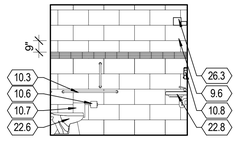
8 a7.5 **304 - pharmacy - med bag wall**
1/4" = 1'-0"



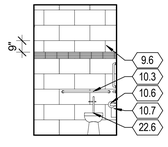
9 a7.5 **307 - delivery - north**
1/4" = 1'-0"



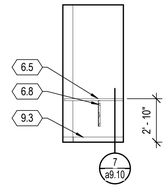
10 a7.5 **306 - restroom - west**
1/4" = 1'-0"



11 a7.5 **306 - south**
1/4" = 1'-0"



13 a7.5 **306 - east**
1/4" = 1'-0"



14 a7.5 **300 - literature counter**
1/4" = 1'-0"

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REGISTERED ARCHITECT
37165
KEVIN A. BARBER
ARIZONA U.S.A.

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

enlarged plans and interior elevations - pharmacy

a7.5

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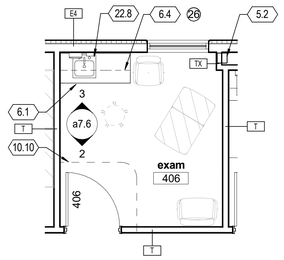
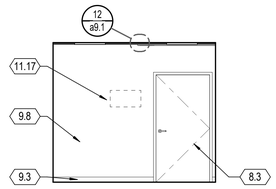
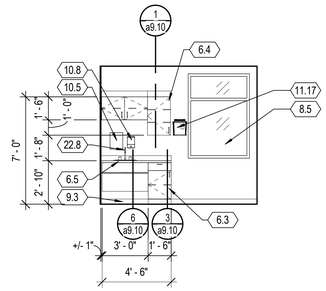


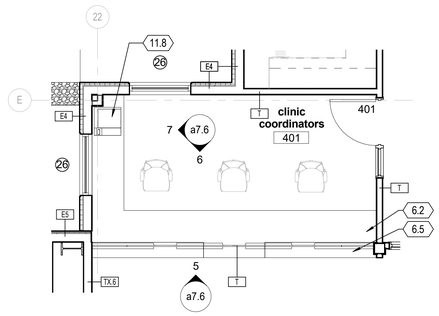
1 a7.6 **reference floor - typ. exam room**
1/4" = 1'-0"



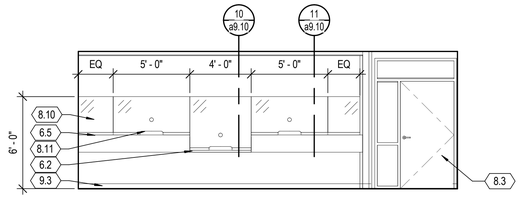
2 a7.6 **typ. exam room - at the door**
1/4" = 1'-0"



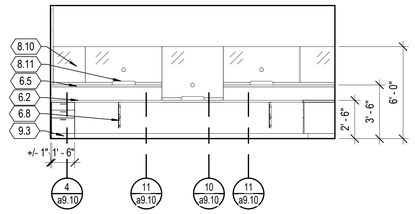
3 a7.6 **typ. exam room - at the sink**
1/4" = 1'-0"



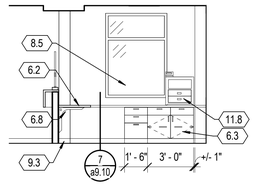
4 a7.6 **enlarged plan - 401 - clinic coordinators**
1/4" = 1'-0"



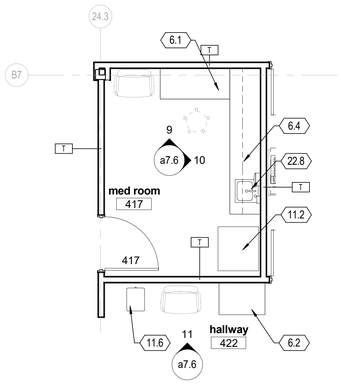
5 a7.6 **401 - clinic coordinators - north**
1/4" = 1'-0"



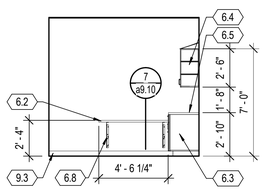
6 a7.6 **401 - clinic coordinators - south**
1/4" = 1'-0"



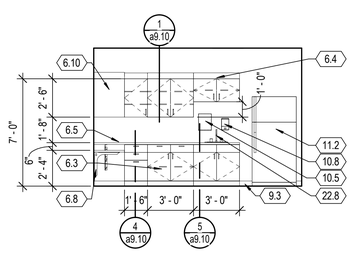
7 a7.6 **401 - clinic coordinators - west**
1/4" = 1'-0"



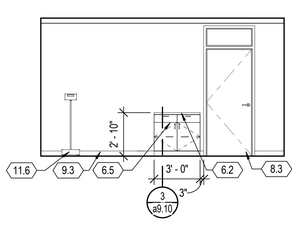
8 a7.6 **enlarged plan - 417 - med room**
1/4" = 1'-0"



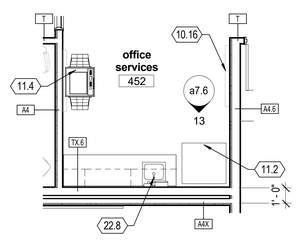
9 a7.6 **417 - med room - north**
1/4" = 1'-0"



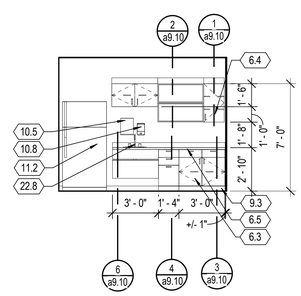
10 a7.6 **417 - med room - east**
1/4" = 1'-0"



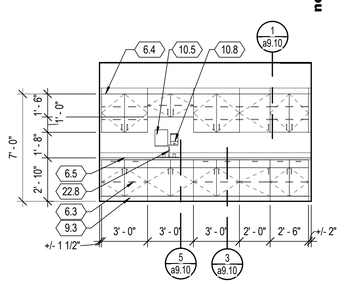
11 a7.6 **422 - north**
1/4" = 1'-0"



12 a7.6 **enlarged plan - 452 - office services**
1/4" = 1'-0"



13 a7.6 **452 - office services - south**
1/4" = 1'-0"



14 a7.6 **117 - large conference room - west**
1/4" = 1'-0"

general notes

1. REFER TO g1.3 FOR TYPICAL MOUNTING HEIGHTS
2. ALL DIMENSIONS ARE TO FINISH FACE OR CENTERLINE U.N.O.
3. USE EPOXY PAINT IN ALL RESTROOMS, KITCHEN AREAS OR OFFICE SERVICE.
4. KEYNOTES FOR ELEVATIONS ARE TYPICAL TO THIS SHEET.
5. ACCENT TILE PATTERN SHALL BE ON ALL CERAMIC TILE WALLS U.N.O. PROVIDE BLOCKING AT ALL WALL MOUNTED ITEMS. SEE FINISH PLANS FOR MORE INFO.
6. FURNITURE IS DASHED FOR CLARITY. FOR MORE INFORMATION SEE FURNITURE SHEETS.
7. DASHED LINES WITHIN RESTROOM FLOOR PLAN INDICATE ADA REQUIRED CLEARANCES FOR TURNING AND FIXTURES.

keynotes

5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
6.1	CUSTOM MILLWORK SEE INTERIOR ELEVATIONS FOR MORE INFORMATION
6.2	PLASTIC LAMINATE COUNTER TOP (4" BACKSPLASH AT WET AREAS). RADIUS ALL OUTSIDE CORNERS.
6.3	24" DEEP BASE CABINET. SEE SHEETS A9.10 & A9.11.
6.4	14" DEEP UPPER CABINET W/ ADJUSTABLE SHELVES. SEE SHEETS A9.10 & A9.11.
6.5	SOLID SURFACE COUNTERTOP WITH 4" BACKSPLASH. COORDINATE WITH FINISH PLANS. RADIUS ALL OUTSIDE CORNERS. SEE SHEETS A9.10 & A9.11.
6.8	COUNTERTOP SUPPORT. SEE SHEETS A9.10 & A9.11.
6.10	PLASTIC LAMINATE IN FILL PANEL. SEE SHEETS A9.10 & A9.11.
8.3	SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
8.10	SAFETY GLASS 6'-0" A.F.F.
8.11	1/2" TEMPERED GLASS WITH PASS THROUGH AND 3" DIAMETER HOLE OPENING. SEE SHEETS A9.10 & A9.11.
9.3	WALL BASE. SEE FINISH PLANS. SEE SHEET A9.1.
9.8	METAL FRAME & GYPSUM WALLBOARD PARTITION. SEE WALL TYPES SHEET A9.0.
10.5	PAPER TOWEL DISPENSER. PROVIDED BY VENDOR.
10.8	SOAP DISPENSER.
10.10	PRIVACY CURTAIN AND TRACK.
10.16	TACK BOARD OR WHITEBOARD, SEE FURNITURE PLANS.
11.2	REFRIGERATOR PROVIDED BY OWNER. PROVIDE ELECTRICAL AND WATER CONNECTION. COORDINATE WITH ELECTRICAL AND PLUMBING.
11.4	COPIER PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTIONS.
11.6	SCALE PROVIDED BY OWNER.
11.8	PRINTER PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.
11.17	WALL MOUNTED MEDICAL EQUIPMENT PROVIDED BY OWNER. COORDINATE LOCATIONS WITH OWNER. PROVIDE WOOD BLOCKING.
22.8	SINK, SEE PLUMBING.

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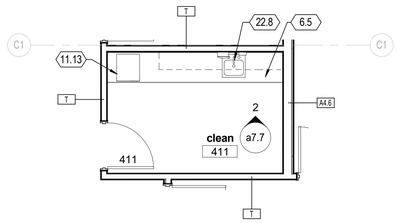
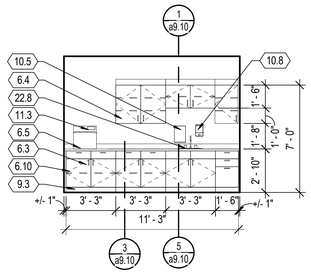
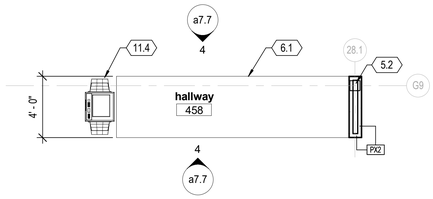


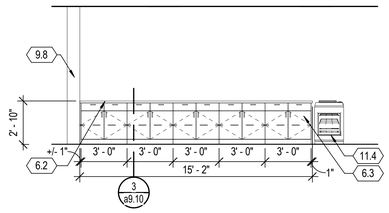
1 a7.7 **enlarged plan - 411 - clean**
1/4" = 1'-0"



2 a7.7 **411 - clean - north**
1/4" = 1'-0"

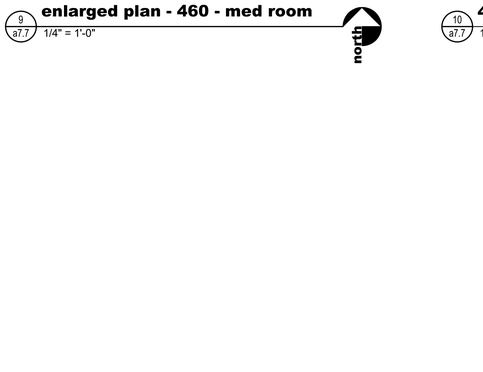


3 a7.7 **enlarged plan - 458 - hallway**
1/4" = 1'-0"



4 a7.7 **458 - hallway - south**
1/4" = 1'-0"

north



5 a7.7 **enlarged plan - 431 - reception**
1/4" = 1'-0"

6 a7.7 **431 - reception - south**
1/4" = 1'-0"

7 a7.7 **431 - reception - west**
1/4" = 1'-0"

8 a7.7 **431 - reception - east**
1/4" = 1'-0"

north

9 a7.7 **enlarged plan - 460 - med room**
1/4" = 1'-0"

10 a7.7 **460 - med room - north**
1/4" = 1'-0"

11 a7.7 **460 - med room - west**
1/4" = 1'-0"

12 a7.7 **enlarged plan - 415 - dark room**
1/4" = 1'-0"

13 a7.7 **415 - dark room - south**
1/4" = 1'-0"

14 a7.7 **415 - dark room - west**
1/4" = 1'-0"

north

general notes

1. REFER TO g1.3 FOR TYPICAL MOUNTING HEIGHTS
2. ALL DIMENSIONS ARE TO FINISH FACE OR CENTERLINE U.N.O.
3. USE EPOXY PAINT IN ALL RESTROOMS, KITCHEN AREAS OR OFFICE SERVICE.
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6. FURNITURE IS DASHED FOR CLARITY. FOR MORE INFORMATION SEE FURNITURE SHEETS.
7. DASHED LINES WITHIN RESTROOM FLOOR PLAN INDICATE ADA REQUIRED CLEARANCES FOR TURNING AND FIXTURES.

keynotes

5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
6.1	CUSTOM MILLWORK SEE INTERIOR ELEVATIONS FOR MORE INFORMATION
6.2	PLASTIC LAMINATE COUNTER TOP (4" BACKSPLASH AT WET AREAS), RADIUS ALL OUTSIDE CORNERS.
6.3	24" DEEP BASE CABINET. SEE SHEETS A9.10 & A9.11.
6.4	14" DEEP UPPER CABINET W/ ADJUSTABLE SHELVES. SEE SHEETS A9.10 & A9.11.
6.5	SOLID SURFACE COUNTERTOP WITH 4" BACKSPLASH. COORDINATE WITH FINISH PLANS. RADIUS ALL OUTSIDE CORNERS. SEE SHEETS A9.10 & A9.11.
6.8	COUNTERTOP SUPPORT. SEE SHEETS A9.10 & A9.11.
6.10	PLASTIC LAMINATE IN FILL PANEL. SEE SHEETS A9.10 & A9.11.
8.3	SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
8.10	SAFETY GLASS 6'-0" A.F.F.
8.11	1/2" TEMPERED GLASS WITH PASS THROUGH AND 3" DIAMETER HOLE OPENING. SEE SHEETS A9.10 & A9.11.
9.3	WALL BASE. SEE FINISH PLANS. SEE SHEET A9.1.
9.8	METAL FRAME & GYPSUM WALLBOARD PARTITION. SEE WALL TYPES SHEET A9.0.
10.5	PAPER TOWEL DISPENSER. PROVIDED BY VENDOR.
10.8	SOAP DISPENSER.
10.16	TACK BOARD OR WHITEBOARD, SEE FURNITURE PLANS.
11.2	REFRIGERATOR PROVIDED BY OWNER. PROVIDE ELECTRICAL AND WATER CONNECTION, COORDINATE WITH ELECTRICAL AND PLUMBING.
11.3	MEDICAL EQUIPMENT PROVIDED BY OWNER. PROVIDE DATA AND ELECTRICAL AS NEEDED.
11.4	COPIER PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTIONS.
11.13	PHARMACEUTICAL EQUIPMENT PROVIDED BY OWNER. PROVIDED ELECTRICAL AND DATA AS NEEDED.
21.7	FIRE EXTINGUISHER. SEE SHEET A9.1.
22.8	SINK, SEE PLUMBING.

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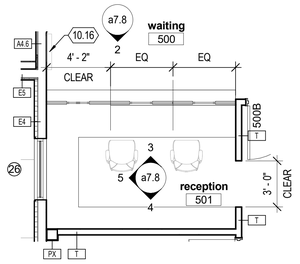
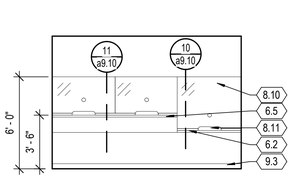
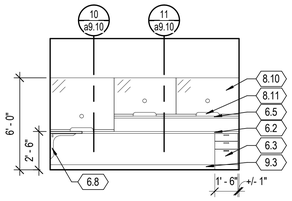


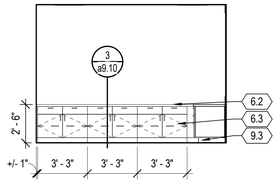
1 a7.8 **enlarged plan - 501 - reception**
1/4" = 1'-0"



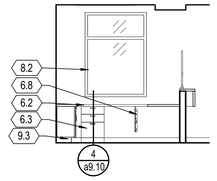
2 a7.8 **500 - waiting - south**
1/4" = 1'-0"



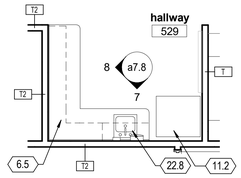
3 a7.8 **501 - reception - north**
1/4" = 1'-0"



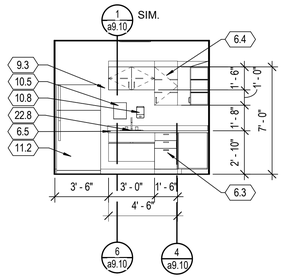
4 a7.8 **501 - reception - south**
1/4" = 1'-0"



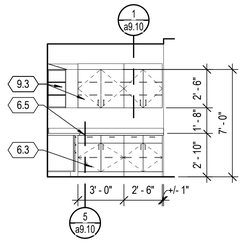
5 a7.8 **501 - reception - west**
1/4" = 1'-0"



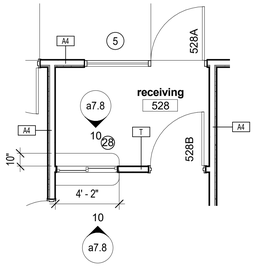
6 a7.8 **enlarged plan - 529 - hallway**
1/4" = 1'-0"



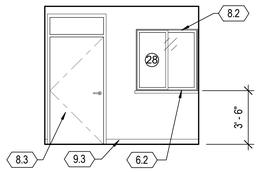
7 a7.8 **529 - hallway - south**
1/4" = 1'-0"



8 a7.8 **529 - hallway - west**
1/4" = 1'-0"

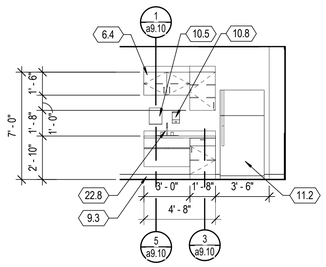


9 a7.8 **enlarged plan - 528 - receiving**
1/4" = 1'-0"

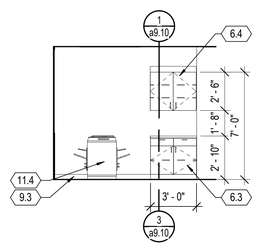


10 a7.8 **528 - receiving - south**
1/4" = 1'-0"

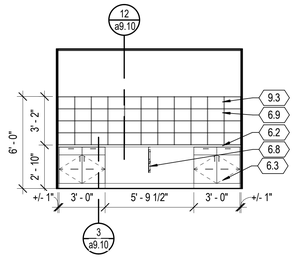
11 a7.8 **enlarged plan - 506 - office services**
1/4" = 1'-0"



12 a7.8 **506 - office services - east**
1/4" = 1'-0"

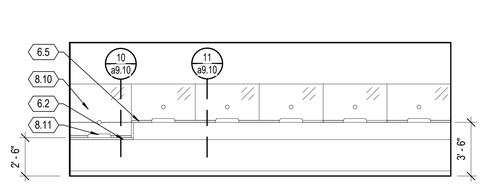


13 a7.8 **506 - office services - west**
1/4" = 1'-0"

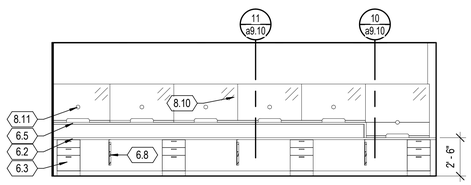


14 a7.8 **527 - mail - west**
1/4" = 1'-0"

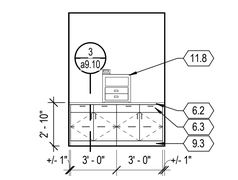
15 a7.8 **enlarged plan - 600, 601 - waiting, reception**
1/4" = 1'-0"



16 a7.8 **600 - waiting - south**
1/4" = 1'-0"



17 a7.8 **601 - reception - north**
1/4" = 1'-0"



18 a7.8 **601 - reception - south**
1/4" = 1'-0"

general notes

1. REFER TO g1.3 FOR TYPICAL MOUNTING HEIGHTS
2. ALL DIMENSIONS ARE TO FINISH FACE OR CENTERLINE U.N.O.
3. USE EPOXY PAINT IN ALL RESTROOMS, KITCHEN AREAS OR OFFICE SERVICE.
4. KEYNOTES FOR ELEVATIONS ARE TYPICAL TO THIS SHEET.
5. ACCENT TILE PATTERN SHALL BE ON ALL CERAMIC TILE WALLS U.N.O. PROVIDE BLOCKING AT ALL WALL MOUNTED ITEMS. SEE FINISH PLANS FOR MORE INFO.
6. FURNITURE IS DASHED FOR CLARITY. FOR MORE INFORMATION SEE FURNITURE SHEETS.
7. DASHED LINES WITHIN RESTROOM FLOOR PLAN INDICATE ADA REQUIRED CLEARANCES FOR TURNING AND FIXTURES.

keynotes

5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
6.2	PLASTIC LAMINATE COUNTER TOP (4" BACKSPLASH AT WET AREAS). RADIUS ALL OUTSIDE CORNERS.
6.3	24" DEEP BASE CABINET. SEE SHEETS A9.10 & A9.11.
6.4	14" DEEP UPPER CABINET W/ ADJUSTABLE SHELVES. SEE SHEETS A9.10 & A9.11.
6.5	SOLID SURFACE COUNTERTOP WITH 4" BACKSPLASH. COORDINATE WITH FINISH PLANS. RADIUS ALL OUTSIDE CORNERS. SEE SHEETS A9.10 & A9.11.
6.8	COUNTERTOP SUPPORT. SEE SHEETS A9.10 & A9.11.
6.9	PLASTIC LAMINATE MAILBOX MILLWORK. SEE SHEETS A9.10 & A9.11.
7.11	ROOF DRAIN NOZZLE. SEE ELEVATIONS. COORDINATE WITH PLUMBING FOR PRIMARY AND SECONDARY LOCATIONS.
8.2	HOLLOW METAL WINDOW FRAME WITH GLAZING. SEE WINDOW FRAME TYPES.
8.3	SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
8.10	SAFETY GLASS 6'-0" A.F.F.
8.11	1/2" TEMPERED GLASS WITH PASS THROUGH AND 3" DIAMETER HOLE OPENING. SEE SHEETS A9.10 & A9.11.
9.3	WALL BASE. SEE FINISH PLANS. SEE SHEET A9.1.
10.5	PAPER TOWEL DISPENSER. PROVIDED BY VENDOR.
10.8	SOAP DISPENSER.
10.16	TACK BOARD OR WHITEBOARD, SEE FURNITURE PLANS.
11.2	REFRIGERATOR PROVIDED BY OWNER. PROVIDE ELECTRICAL AND WATER CONNECTION, COORDINATE WITH ELECTRICAL AND PLUMBING.
11.4	COPIER PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTIONS.
11.8	PRINTER PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.
22.8	SINK, SEE PLUMBING.

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REGISTERED ARCHITECT
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KEVIN A. BARBER
ARIZONA U.S.A.

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

enlarged plans and interior elevations

a7.8

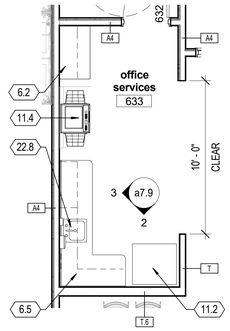
11/16/2018 2:35:50 PM C:\Active Revit Projects\1717 PYT Health Services Center II_Central File_cabrams.rvt

general notes

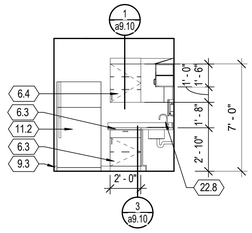
1. REFER TO g1.3 FOR TYPICAL MOUNTING HEIGHTS
2. ALL DIMENSIONS ARE TO FINISH FACE OR CENTERLINE U.N.O.
3. USE EPOXY PAINT IN ALL RESTROOMS, KITCHEN AREAS OR OFFICE SERVICE.
4. KEYNOTES FOR ELEVATIONS ARE TYPICAL TO THIS SHEET.
5. ACCENT TILE PATTERN SHALL BE ON ALL CERAMIC TILE WALLS U.N.O. PROVIDE BLOCKING AT ALL WALL MOUNTED ITEMS. SEE FINISH PLANS FOR MORE INFO.
6. FURNITURE IS DASHED FOR CLARITY. FOR MORE INFORMATION SEE FURNITURE SHEETS.
7. DASHED LINES WITHIN RESTROOM FLOOR PLAN INDICATE ADA REQUIRED CLEARANCES FOR TURNING AND FIXTURES.

keynotes

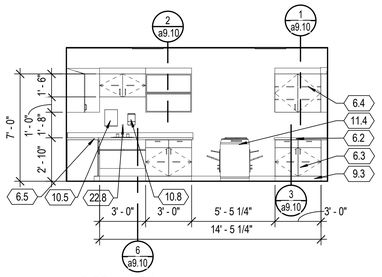
6.2	PLASTIC LAMINATE COUNTER TOP (4" BACKSPLASH AT WET AREAS). RADIUS ALL OUTSIDE CORNERS.
6.3	24" DEEP BASE CABINET. SEE SHEETS A9.10 & A9.11.
6.4	14" DEEP UPPER CABINET W/ ADJUSTABLE SHELVES. SEE SHEETS A9.10 & A9.11.
6.5	SOLID SURFACE COUNTERTOP WITH 4" BACKSPLASH. COORDINATE WITH FINISH PLANS. RADIUS ALL OUTSIDE CORNERS. SEE SHEETS A9.10 & A9.11.
9.3	WALL BASE. SEE FINISH PLANS. SEE SHEET A9.1.
10.5	PAPER TOWEL DISPENSER. PROVIDED BY VENDOR.
10.8	SOAP DISPENSER.
11.2	REFRIGERATOR PROVIDED BY OWNER. PROVIDE ELECTRICAL AND WATER CONNECTION, COORDINATE WITH ELECTRICAL AND PLUMBING.
11.3	MEDICAL EQUIPMENT PROVIDED BY OWNER. PROVIDE DATA AND ELECTRICAL AS NEEDED.
11.4	COPIER PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTIONS.
11.15	VENDING MACHINE, PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA AS REQUIRED.
22.8	SINK, SEE PLUMBING.



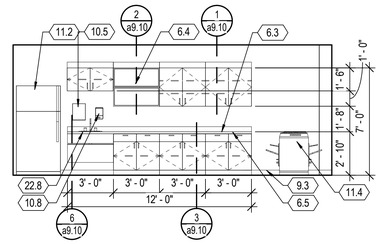
1 a7.9 **reference floor - 643 - office services**
1/4" = 1'-0"



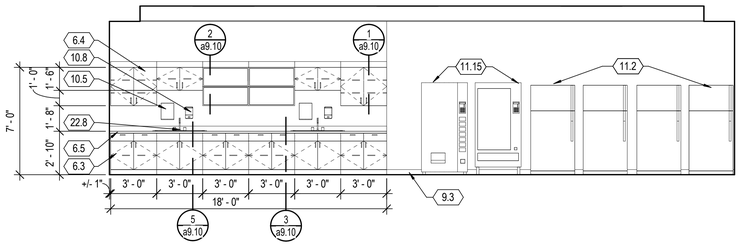
2 a7.9 **643 - office services - south**
1/4" = 1'-0"



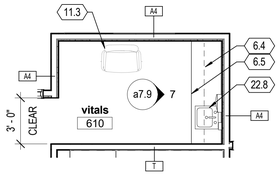
3 a7.9 **643 - office services - west**
1/4" = 1'-0"



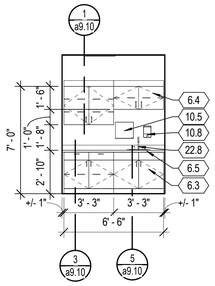
4 a7.9 **662 - office services - south**
1/4" = 1'-0"



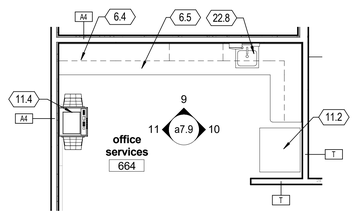
5 a7.9 **152 - employee lounge - east**
1/4" = 1'-0"



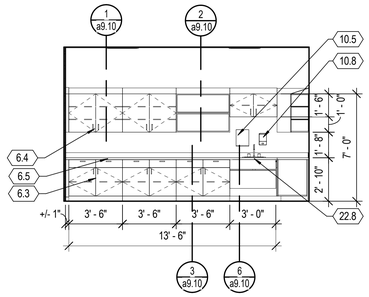
6 a7.9 **enlarged plan - 610 - vitals**
1/4" = 1'-0"



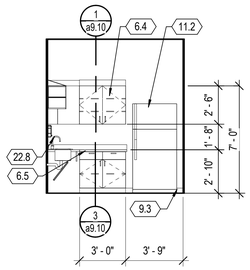
7 a7.9 **610 - vitals - east**
1/4" = 1'-0"



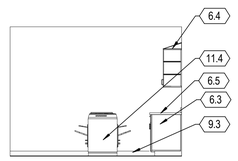
8 a7.9 **enlarged plan - 664 - office services**
1/4" = 1'-0"



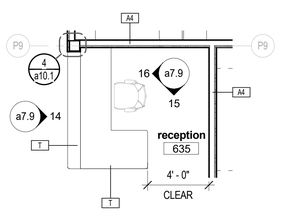
9 a7.9 **664 - office services - north**
1/4" = 1'-0"



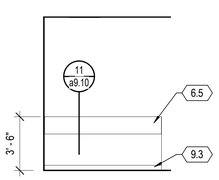
10 a7.9 **664 - office services - east**
1/4" = 1'-0"



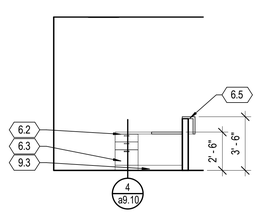
11 a7.9 **664 - office services - west**
1/4" = 1'-0"



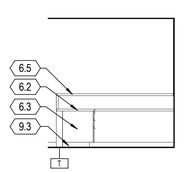
13 a7.9 **enlarged plan - 639 - reception**
1/4" = 1'-0"



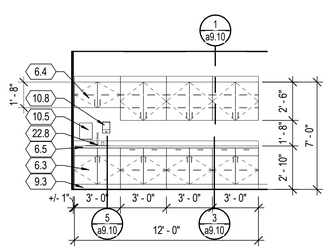
14 a7.9 **639 - reception - east**
1/4" = 1'-0"



15 a7.9 **639 - reception - south**
1/4" = 1'-0"



16 a7.9 **639 - reception - west**
1/4" = 1'-0"



17 a7.9 **654 - accu detox - south**
1/4" = 1'-0"

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job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

enlarged plans and interior elevations

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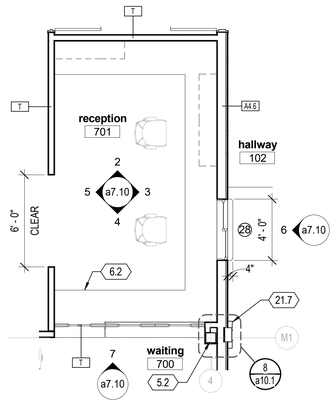
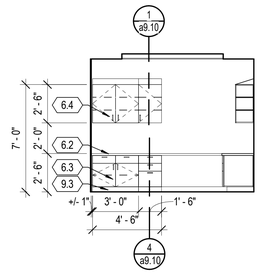
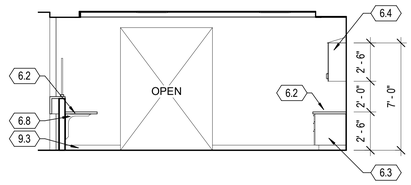


1 a7.10 **enlarged plan - 701 - reception**
1/4" = 1'-0"

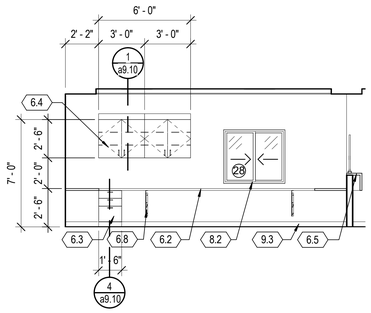
north



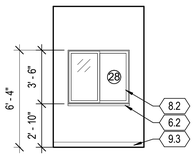
2 a7.10 **701 - reception - north**
1/4" = 1'-0"



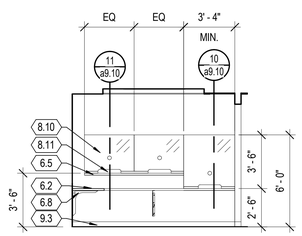
5 a7.10 **701 - reception - west**
1/4" = 1'-0"



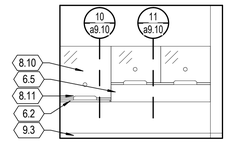
3 a7.10 **701 - reception - east**
1/4" = 1'-0"



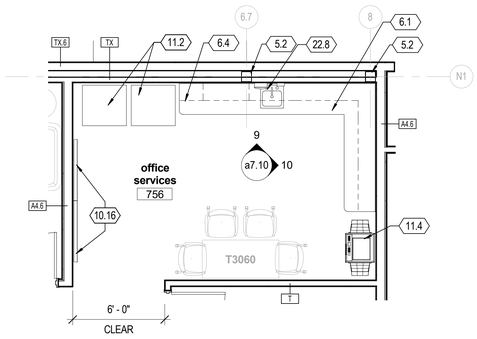
6 a7.10 **102 - hallway - west**
1/4" = 1'-0"



4 a7.10 **701 - reception - south**
1/4" = 1'-0"

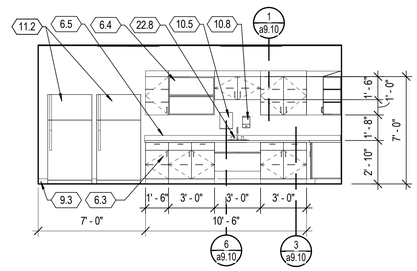


7 a7.10 **700 - waiting - north**
1/4" = 1'-0"

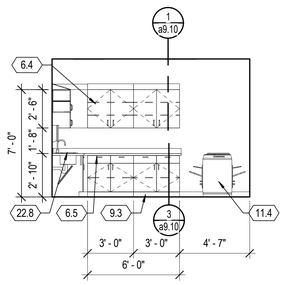


8 a7.10 **reference floor - 756 - office services**
1/4" = 1'-0"

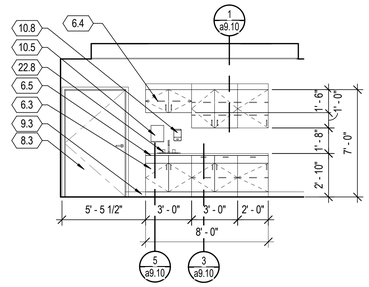
north



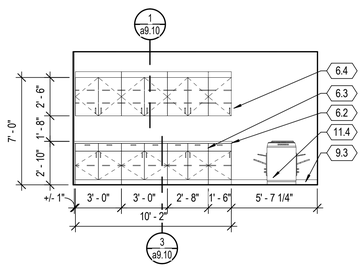
9 a7.10 **756 - office services - north**
1/4" = 1'-0"



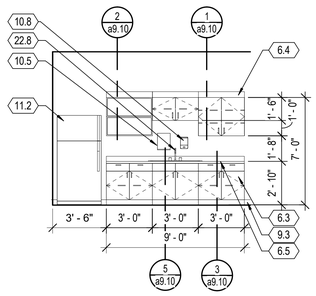
10 a7.10 **756 - office services - east**
1/4" = 1'-0"



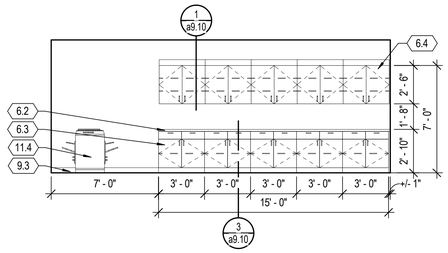
11 a7.10 **137 - large - east**
1/4" = 1'-0"



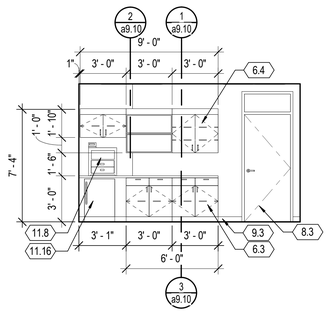
12 a7.10 **736 - office services - north**
1/4" = 1'-0"



13 a7.10 **773 - family meeting - north**
1/4" = 1'-0"



14 a7.10 **706 - hallway - south**
1/4" = 1'-0"



15 a7.10 **801 - office - north**
1/4" = 1'-0"

general notes

1. REFER TO g1.3 FOR TYPICAL MOUNTING HEIGHTS
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4. KEYNOTES FOR ELEVATIONS ARE TYPICAL TO THIS SHEET.
5. ACCENT TILE PATTERN SHALL BE ON ALL CERAMIC TILE WALLS U.N.O. PROVIDE BLOCKING AT ALL WALL MOUNTED ITEMS. SEE FINISH PLANS FOR MORE INFO.
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7. DASHED LINES WITHIN RESTROOM FLOOR PLAN INDICATE ADA REQUIRED CLEARANCES FOR TURNING AND FIXTURES.

keynotes

5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
6.1	CUSTOM MILLWORK SEE INTERIOR ELEVATIONS FOR MORE INFORMATION
6.2	PLASTIC LAMINATE COUNTER TOP (4" BACKSPLASH AT WET AREAS). RADIUS ALL OUTSIDE CORNERS.
6.3	24" DEEP BASE CABINET. SEE SHEETS A9.10 & A9.11.
6.4	14" DEEP UPPER CABINET W/ ADJUSTABLE SHELVES. SEE SHEETS A9.10 & A9.11.
6.5	SOLID SURFACE COUNTERTOP WITH 4" BACKSPLASH. COORDINATE WITH FINISH PLANS. RADIUS ALL OUTSIDE CORNERS. SEE SHEETS A9.10 & A9.11.
6.8	COUNTERTOP SUPPORT. SEE SHEETS A9.10 & A9.11.
8.2	HOLLOW METAL WINDOW FRAME WITH GLAZING. SEE WINDOW FRAME TYPES.
8.3	SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
8.10	SAFETY GLASS 6'-0" A.F.F.
8.11	1/2" TEMPERED GLASS WITH PASS THROUGH AND 3" DIAMETER HOLE OPENING. SEE SHEETS A9.10 & A9.11.
9.3	WALL BASE. SEE FINISH PLANS. SEE SHEET A9.1.
10.5	PAPER TOWEL DISPENSER. PROVIDED BY VENDOR.
10.8	SOAP DISPENSER.
10.16	TACK BOARD OR WHITEBOARD, SEE FURNITURE PLANS.
11.2	REFRIGERATOR PROVIDED BY OWNER. PROVIDE ELECTRICAL AND WATER CONNECTION, COORDINATE WITH ELECTRICAL AND PLUMBING.
11.4	COPIER PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTIONS.
11.8	PRINTER PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.
11.16	UNDERCOUNTER REFRIGERATOR PROVIDED BY OWNER. PROVIDE ELECTRICAL CONNECTION, COORDINATE WITH ELECTRICAL.
21.7	FIRE EXTINGUISHER. SEE SHEET A9.1.
22.8	SINK, SEE PLUMBING.

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ARIZONA U.S.A.

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

enlarged plans and interior elevations

a7.10

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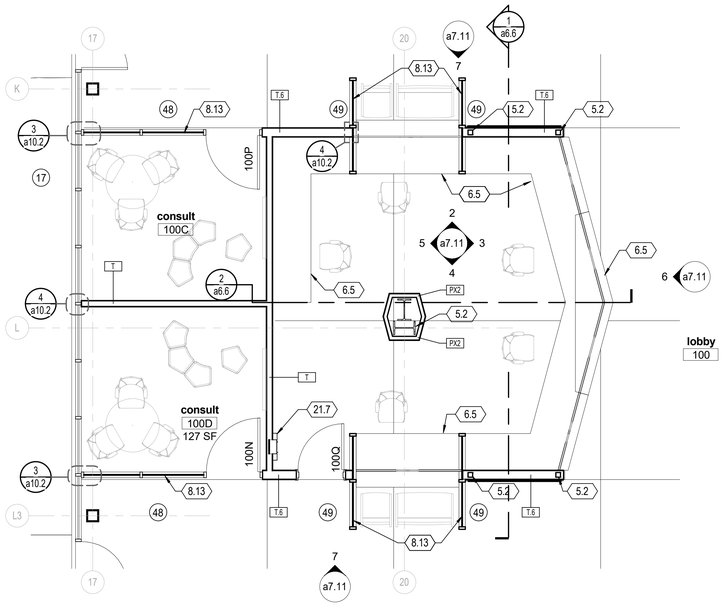
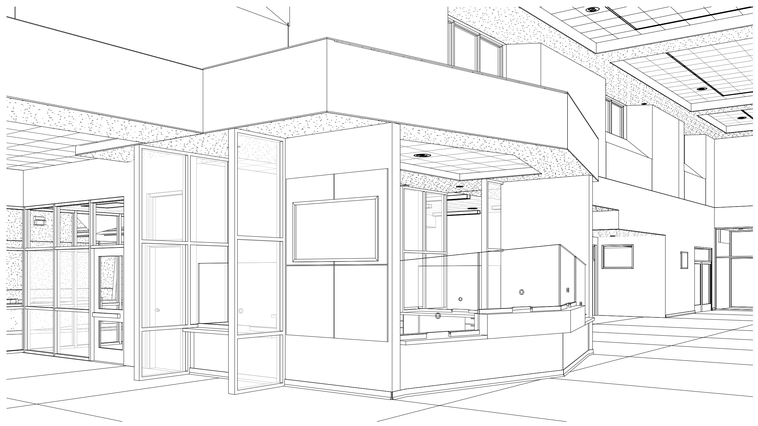
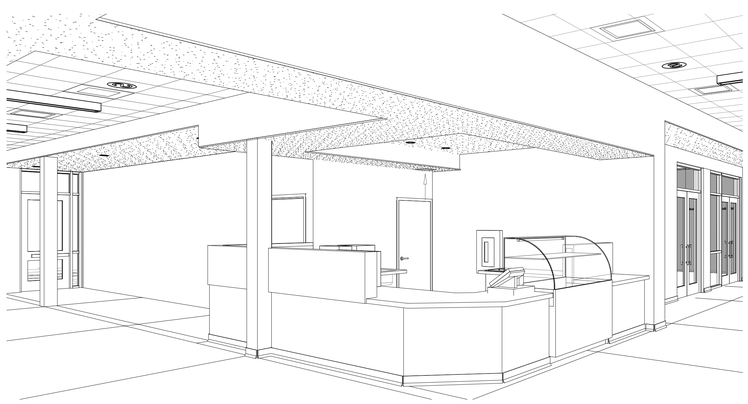


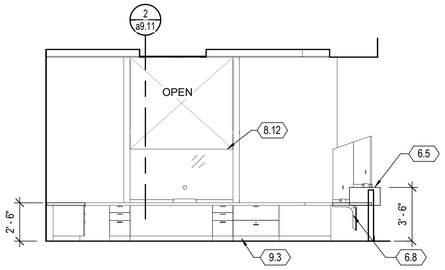
1 a7.11 **reference floor plan - 100 - lobby**
1/4" = 1'-0"



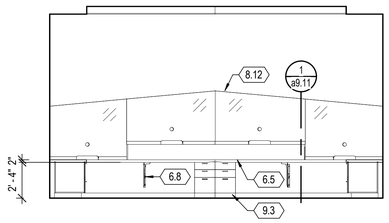
3D View of Lobby Desk



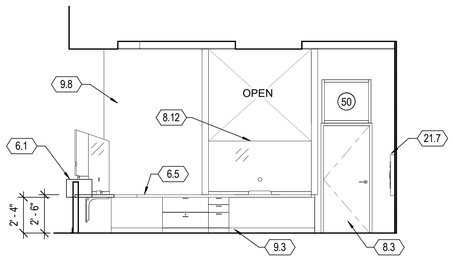
3D View of the cafe



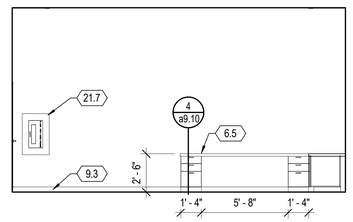
2 a7.11 **100 - lobby desk - north**
1/4" = 1'-0"



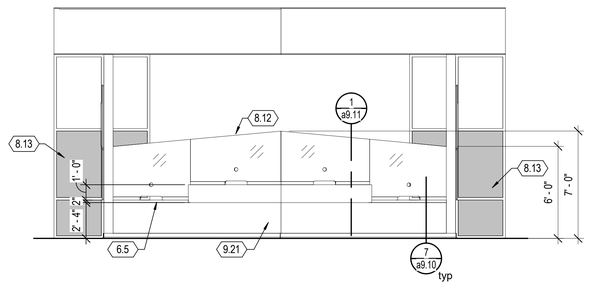
3 a7.11 **100 - lobby desk - east**
1/4" = 1'-0"



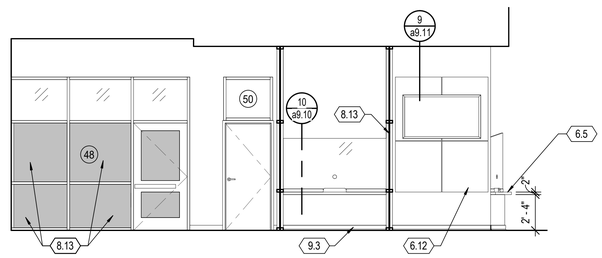
4 a7.11 **100 - lobby desk - south**
1/4" = 1'-0"



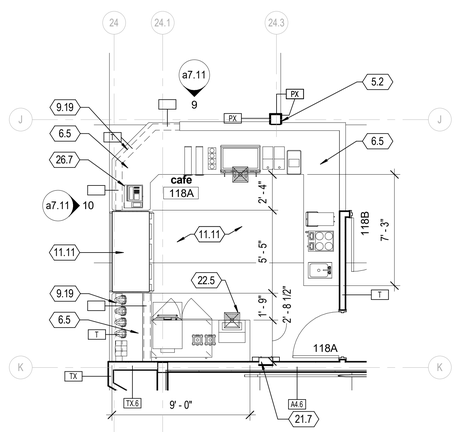
5 a7.11 **100 - lobby desk - west**
1/4" = 1'-0"



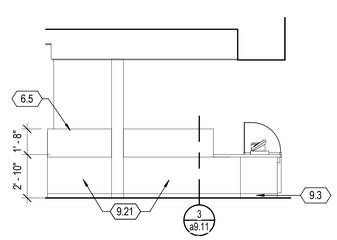
6 a7.11 **100 - lobby - west**
1/4" = 1'-0"



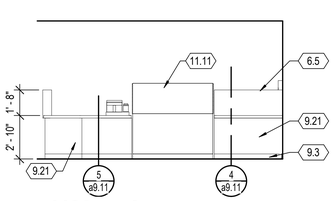
7 a7.11 **100 - lobby - north**
1/4" = 1'-0"



8 a7.11 **enlarged plan - 118A - cafe**
1/4" = 1'-0"



9 a7.11 **118A - cafe - south**
1/4" = 1'-0"



10 a7.11 **118A - cafe - east**
1/4" = 1'-0"

general notes

1. REFER TO g1.3 FOR TYPICAL MOUNTING HEIGHTS
2. ALL DIMENSIONS ARE TO FINISH FACE OR CENTERLINE U.N.O.
3. USE EPOXY PAINT IN ALL RESTROOMS, KITCHEN AREAS OR OFFICE SERVICE.
4. KEYNOTES FOR ELEVATIONS ARE TYPICAL TO THIS SHEET.
5. ACCENT TILE PATTERN SHALL BE ON ALL CERAMIC TILE WALLS U.N.O. PROVIDE BLOCKING AT ALL WALL MOUNTED ITEMS. SEE FINISH PLANS FOR MORE INFO.
6. FURNITURE IS DASHED FOR CLARITY. FOR MORE INFORMATION SEE FURNITURE SHEETS.
7. DASHED LINES WITHIN RESTROOM FLOOR PLAN INDICATE ADA REQUIRED CLEARANCES FOR TURNING AND FIXTURES.

keynotes

5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
6.1	CUSTOM MILLWORK SEE INTERIOR ELEVATIONS FOR MORE INFORMATION
6.5	SOLID SURFACE COUNTERTOP WITH 4" BACKSPLASH. COORDINATE WITH FINISH PLANS. RADIUS ALL OUTSIDE CORNERS. SEE SHEETS A9.10 & A9.11.
6.8	COUNTERTOP SUPPORT. SEE SHEETS A9.10 & A9.11.
6.12	PLASTIC LAMINATE PANELS WITH REVEALS.
8.3	SOLID CORE WOOD DOOR IN HOLLOW METAL FRAME. SEE DOOR SCHEDULE.
8.12	1/2" TEMPERED GLASS WITH POLISHED EDGE. SET IN ALUMINUM BASE.
8.13	DECORATIVE FILM IN SAFETY LAMINATED GLASS SECTION SET IN ALUMINUM STOREFRONT. SEE SHEETS A9.10 & A9.11.
9.3	WALL BASE. SEE FINISH PLANS. SEE SHEET A9.1.
9.8	METAL FRAME & GYPSUM WALLBOARD PARTITION. SEE WALL TYPES SHEET A9.0.
9.19	METAL FRAME & GYPSUM WALLBOARD PARTITION BELOW TOP. SEE MILLWORK DETAILS SEE SHEETS A9.10 & A9.11 AND WALL TYPES, SHEET A9.0.
9.21	DECORATIVE WALL COVERING IN CABINET FACE. COORDINATE WITH FINISH PLANS.
11.11	KITCHEN EQUIPMENT. SEE FOOD SERVICE SHEETS FOR MORE INFORMATION.
21.7	FIRE EXTINGUISHER. SEE SHEET A9.1.
22.5	FLOOR DRAIN, SEE PLUMBING. SLOPE FLOOR SLAB TO DRAIN.
26.7	POINT OF SALE PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA AS REQUIRED.

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enlarged plans and interior elevations - lobby

a7.11

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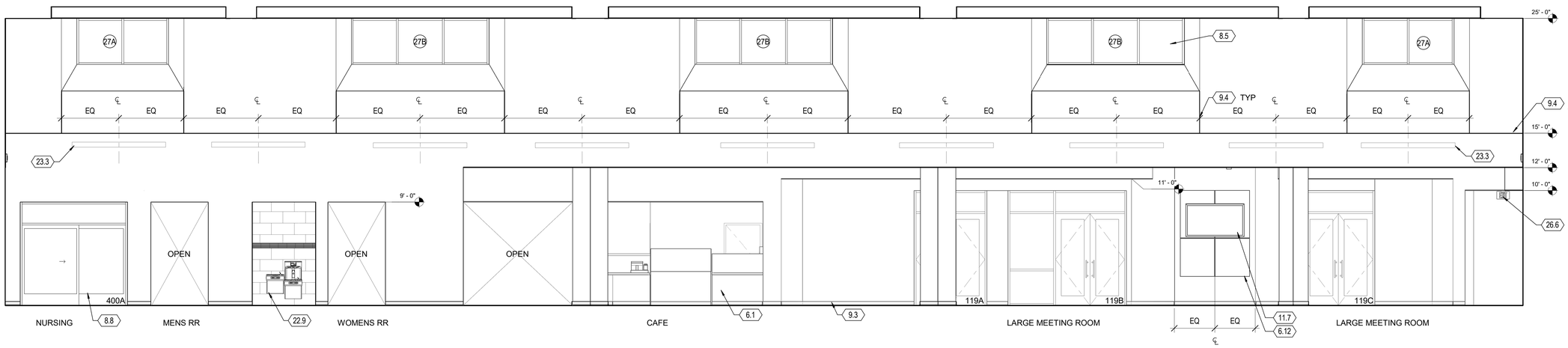
1 a7.12 **lobby elevation - east**

1/4" = 1'-0"



2 a7.12 **lobby elevation - west**

1/4" = 1'-0"

general notes

1. REFER TO g1.3 FOR TYPICAL MOUNTING HEIGHTS
2. ALL DIMENSIONS ARE TO FINISH FACE OR CENTERLINE U.N.O.
3. USE EPOXY PAINT IN ALL RESTROOMS, KITCHEN AREAS OR OFFICE SERVICE.
4. KEYNOTES FOR ELEVATIONS ARE TYPICAL TO THIS SHEET.
5. ACCENT TILE PATTERN SHALL BE ON ALL CERAMIC TILE WALLS U.N.O. PROVIDE BLOCKING AT ALL WALL MOUNTED ITEMS. SEE FINISH PLANS FOR MORE INFO.
6. FURNITURE IS DASHED FOR CLARITY. FOR MORE INFORMATION SEE FURNITURE SHEETS.
7. DASHED LINES WITHIN RESTROOM FLOOR PLAN INDICATE ADA REQUIRED CLEARANCES FOR TURNING AND FIXTURES.

keynotes

6.1	CUSTOM MILLWORK SEE INTERIOR ELEVATIONS FOR MORE INFORMATION
6.12	PLASTIC LAMINATE PANELS WITH REVEALS.
8.5	THERMALLY BROKEN ALUMINUM STOREFRONT SYSTEM - SEE DOOR AND WINDOW SCHEDULE. DOORS TO BE WIDE STILE. EXTERIOR GLAZING TO BE 1" INSULATED PPG Z75.
8.8	ALUMINUM SLIDER. SEE DOOR SCHEDULE.
8.11	1/2" TEMPERED GLASS WITH PASS THROUGH AND 3" DIAMETER HOLE OPENING. SEE SHEETS A9.10 & A9.11.
8.16	ALUMINUM FRAME WITH 1/4" GLASS AND 3-FORM GLASS
9.2	SUSPENDED ACOUSTICAL TILE CEILING SYSTEM. SEE SHEET A9.1.
9.3	WALL BASE. SEE FINISH PLANS. SEE SHEET A9.1.
9.4	GYPSUM WALLBOARD CONTROL JOINT
11.7	WALL MOUNTED TV SCREEN PROVIDED BY OWNER. PROVIDE ELECTRICAL AND DATA CONNECTION.
22.9	DRINKING FOUNTAIN, SEE PLUMBING.
23.3	MECHANICAL DEVICE - SEE MECHANICAL DRAWINGS.
26.6	EXIT SIGN. SEE ELECTRICAL DRAWINGS.

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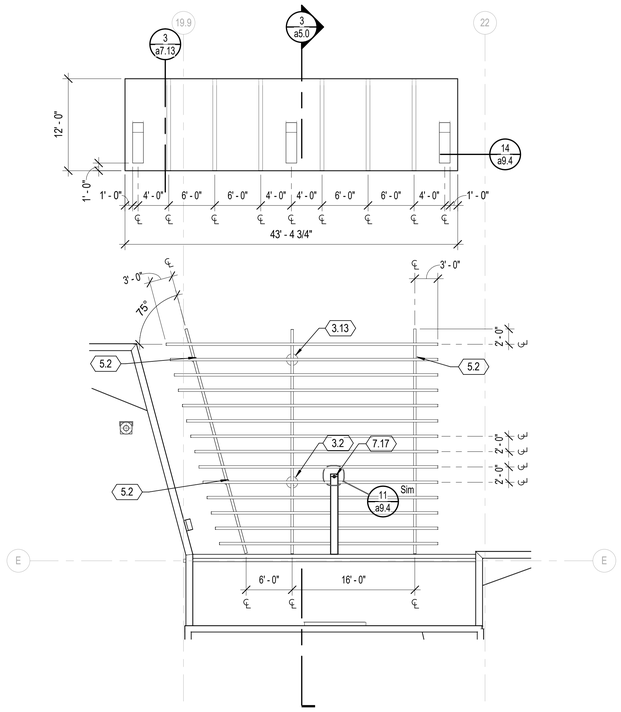
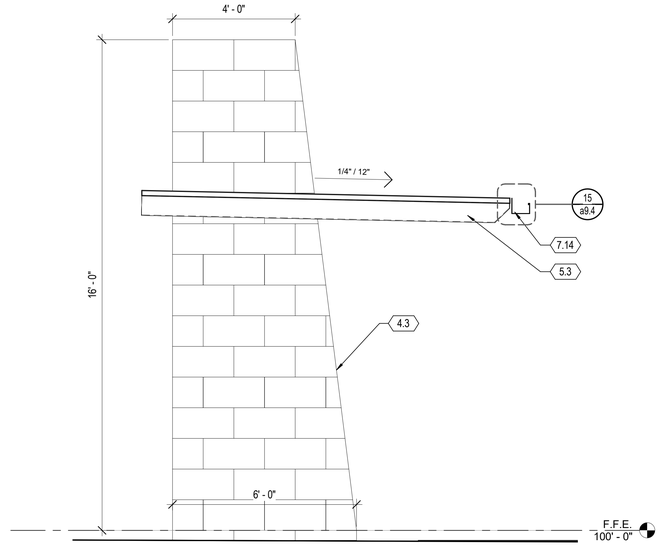
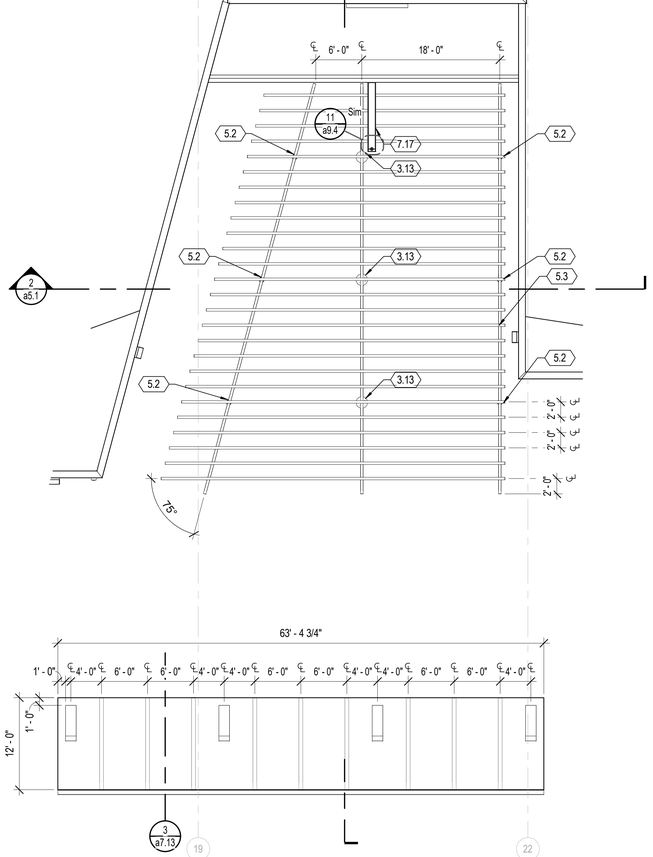


1 a7.13 **north entry canopy**
1/8" = 1'-0"



3 a7.13 **drop off canopy section**
1/2" = 1'-0"



2 a7.13 **southern entry canopy**
1/8" = 1'-0"

general notes

1. COORDINATE ALL WORK BETWEEN ARCHITECTURAL, STRUCTURAL, CIVIL, MECHANICAL, PLUMBING, COMMUNICATIONS AND ELECTRICAL DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE IMPLEMENTATION OF WORK.

keynotes

3.2	4" CONCRETE SIDEWALK ON COMPACTED SUBGRADE. SCORE AS INDICATED. SEE DETAILS 2 & 3 SHEET X1.6 FOR TYPICAL JOINT CONDITIONS.
3.13	CONCRETE COLUMN. SEE STRUCTURAL.
4.3	16" CMU SUPPORT PIERS WITH SANDSTONE TILE. SEE WALL TYPE SHEET A9.0.
5.2	STEEL COLUMN. SEE STRUCTURAL AND FRAMING DETAILS FOR MORE INFORMATION.
5.3	STEEL BEAM, SEE STRUCTURAL.
7.14	PREFINISHED METAL GUTTER. AT DROP-OFF CANOPIES, OPEN ON ENDS. INSTALL GUTTER FLAT AND LEVEL.
7.17	PRE-FINISHED GUTTER BOX. EXTEND TO PLANTER. FLAT BOTTOM, SLOPED INTERIOR PAN. BOX IS 12" WIDE. REFER TO ROOF PLAN(S) FOR LENGTH.

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enlarged plans and elevations - entry canopies

a7.13

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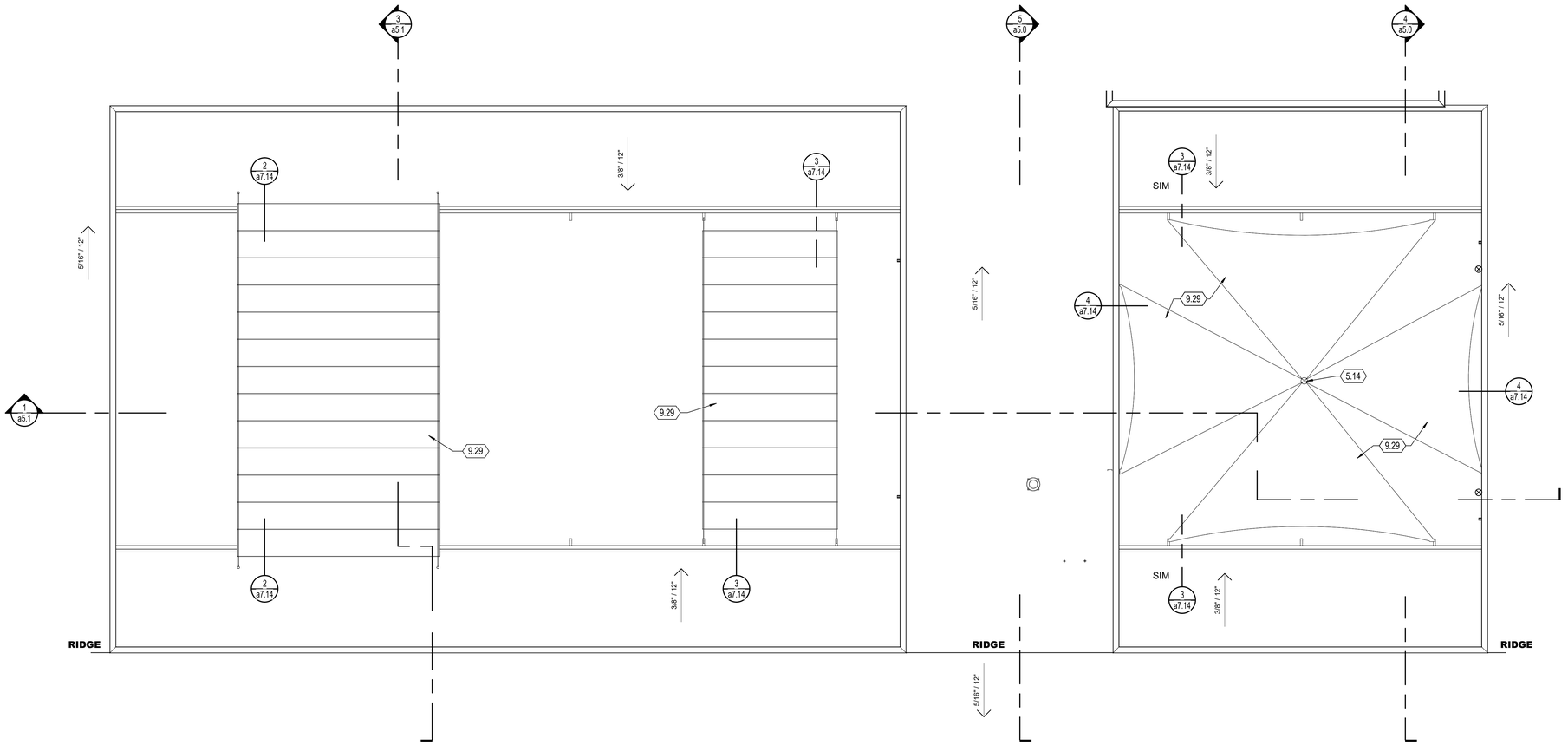
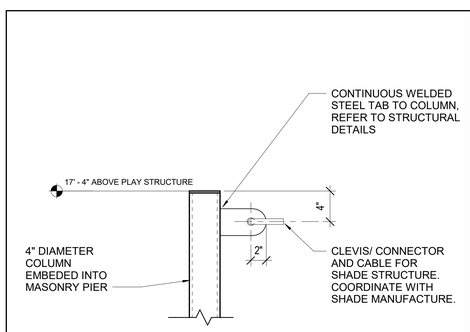


roof plan - shade canopies

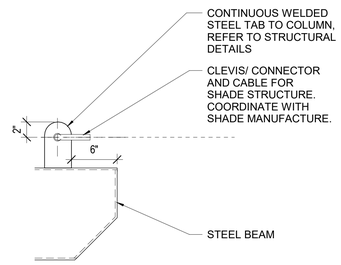
1 a7.14 — 1/8" = 1'-0"

north



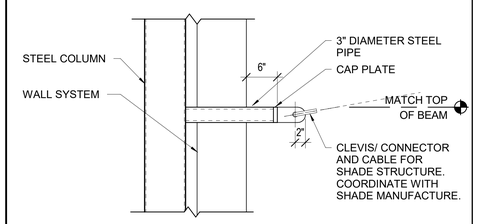
NOTE:
- COORDINATE WITH STRUCTURAL DETAILS FOR WELDING AND STRUCTURE SIZE
- PRIME AND PAINT EXPOSED STEEL, REFER TO SPECIFICATIONS

2 play shade connection
a7.14 — 1 1/2" = 1'-0" — (3 / a6.1)



NOTE:
- COORDINATE WITH STRUCTURAL DETAILS FOR WELDING AND STRUCTURE SIZE
- PRIME AND PAINT EXPOSED STEEL, REFER TO SPECIFICATIONS

3 dinning shade connection
a7.14 — 1 1/2" = 1'-0" — (1 /a7.14)



NOTE:
- COORDINATE WITH STRUCTURAL DETAILS FOR WELDING AND STRUCTURE SIZE
- PRIME AND PAINT EXPOSED STEEL, REFER TO SPECIFICATIONS

4 garden shade connection to column
a7.14 — 1" = 1'-0" — (1 / a5.1)

keynotes

5.14 STEEL COLUMN BY SHADE MANUFACTURE. COORDINATE WITH STRUCTURAL AND LANDSCAPE.

9.29 SHADE CANOPY BY MANUFACTURE. COORDINATE WITH STRUCTURAL AND LANDSCAPE.

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a7.14

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DOOR SCHEDULE - GENERAL

		DOOR				FRAME		DETAIL				
NUMBER	WIDTH	HEIGHT	THICKNESS	MATERIAL	TYPE	MATERIAL	TYPE	HEAD	JAMB	HARDWARE	SIGNAGE	COMMENTS
100A	16' - 0"	7' - 8"	1 3/4"	ALUM	J	ALUM	13	19/a9.8	19/a9.8	SL-02		2
100B	16' - 0"	7' - 8"	1 3/4"	ALUM	J	ALUM	13	19/a9.8	19/a9.8	SL-01		2
100C	4' - 0"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	13	19/a9.8	19/a9.8	AL-01	ENTRY	2
100D	16' - 0"	7' - 8"	1 3/4"	ALUM	J	ALUM	13	12/a9.9 sim	17/a9.9 sim	SL-01		2
100E	16' - 0"	7' - 8"	1 3/4"	ALUM	J	ALUM	13	12/a9.9 sim	17/a9.9 sim	SL-01		2
100F	4' - 0"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	13	12/a9.9 sim	17/a9.9 sim	AL-13	ENTRY	2
100J	4' - 0"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	13	5/a9.9	10/a9.9	AL-13	ENTRY	2
100M	4' - 0"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	13	19/a9.9	19/a9.9	AL-01	ENTRY	2
100N	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	34	12/a9.9	17/a9.9	AL-15	CONSULTATION ROOM	
100P	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	34	12/a9.9	17/a9.9	AL-15	CONSULTATION ROOM	
100Q	3' - 0"	7' - 0"	1 3/4"	HM	A	HM	1	2/a9.9	7/a9.9	208		
101	8' - 0"	8' - 0"	1 3/4"	ALUM	F	ALUM	46	2/a9.9	7/a9.9	223		2
103	8' - 0"	8' - 0"	1 3/4"	ALUM	F	ALUM	46	11/a9.9	16/a9.9	223		2
104	6' - 0"	7' - 0"	1 3/4"	ALUM	F	ALUM	14	13/a9.3	14/a9.3	AL-11		
104A	3' - 6"	8' - 0"	1 3/4"	ALUM/GL	E	ALUM	10	19/a9.8	19/a9.8	AL-07		
105	6' - 0"	7' - 0"	1 3/4"	ALUM	F	ALUM	14	13/a9.3	14/a9.3	AL-11		
105A	8' - 0"	8' - 0"	1 3/4"	ALUM	F	ALUM	46	11/a9.9	16/a9.9	AL-14		2
105B	8' - 0"	8' - 0"	1 3/4"	ALUM	F	ALUM	46	13/a9.3	14/a9.3	AL-08		
106B	6' - 0"	8' - 0"	1 3/4"	ALUM	F	ALUM	47	13/a9.3	14/a9.3	AL-14		2
107	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	14/a9.9 sim	19/a9.9 sim	200	CHAPEL	
110	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	204	FAMILY RESTROOM	1
111	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	2/a9.9	7/a9.9	216	JANITOR	
112	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	216		
113	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	9	3/a9.9	8/a9.9	201	CONFERENCE ROOM	1
114	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	216		1
115	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	221		2
116	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	4/a9.9	9/a9.9	201	CONFERENCE ROOM	1
117	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	4/a9.9	9/a9.9	201	CONFERENCE ROOM	1
118A	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	206		1
118B	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	221	FOOD SERVICES	1, 2
119A	6' - 0"	8' - 0"	1 3/4"	ALUM	F	ALUM	18A	4/a9.9	9/a9.9	AL-12		1
119B	6' - 0"	8' - 0"	1 3/4"	ALUM	F	ALUM	18B	4/a9.9	9/a9.9	AL-12		1
119C	6' - 0"	8' - 0"	1 3/4"	ALUM	F	ALUM	18A	4/a9.9	9/a9.9	AL-12		1
119D	3' - 6"	8' - 0"	1 3/4"	ALUM/GL	E	ALUM	19	19/a9.8	19/a9.8	AL-05		1
119E	3' - 6"	8' - 0"	1 3/4"	ALUM/GL	E	ALUM	11	19/a9.8	19/a9.8	AL-05		1
119F	6' - 0"	7' - 0"	1 3/4"	SCWD	B	HM	4	1/a9.9	6/a9.9	227	STORAGE	1
122	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	3/a9.9	8/a9.9	201	CONFERENCE ROOM	1
123	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	216	STORAGE	1, 2
124	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	221	IDF ROOM	1
126	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	3/a9.9	8/a9.9	201	CONFERENCE ROOM	1
127A	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	3/a9.9	8/a9.9	201	CONFERENCE ROOM	1
127B	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	4/a9.9	9/a9.9	216	AV ROOM	1
127C	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	11	19/a9.8	19/a9.8	AL-09		1
127D	4' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	2/a9.9	7/a9.9	217	STORAGE	
128	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	2	3/a9.9	8/a9.9	201	CONFERENCE ROOM	1
129	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	2	3/a9.9	8/a9.9	201	CONFERENCE ROOM	1
132	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	216		1
134	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	9	3/a9.9	8/a9.9	201	CONFERENCE ROOM	1
135	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	9	3/a9.9	8/a9.9	201	CONFERENCE ROOM	1
136	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	216	ELECTRICAL ROOM	1
137A	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	4/a9.9	9/a9.9	201	CONFERENCE ROOM	1
137B	3' - 6"	7' - 10"	1 3/4"	ALUM/GL	E	ALUM	11	9/a9.3	11/a9.3	AL-10		
137C	4' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	216	STORAGE	
138A	3' - 0"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	17	13/a9.3	14/a9.3	AL-03		
138B	3' - 0"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	17	13/a9.3	14/a9.3	AL-03		
139	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	216	AV ROOM	1
139A	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	15	13/a9.3	11/a9.3	AL-03		
139B	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	15	13/a9.3	14/a9.3	AL-03		
140	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	221	IDF ROOM	1
141	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	9	3/a9.9	8/a9.9	201	CONFERENCE ROOM	1
142	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	9	3/a9.9	8/a9.9	201	CONFERENCE ROOM	1
150	4' - 0"	7' - 0"	1 3/4"	HM	C	HM	1	2/a9.9	7/a9.9	216	MECHANICAL ROOM	
151	4' - 0"	7' - 0"	1 3/4"	HM	C	HM	1	2/a9.9	7/a9.9	216	MAINTENANCE STORAGE	
152A	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	2/a9.9	7/a9.9	213	EMPLOYEE LOUNGE	
152B	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	16	13/a9.3	14/a9.3	AL-09		
160	3' - 6"	7' - 0"	1 3/4"	HM	A	HM	1	9/a9.3	11/a9.3	104	FIRE RISER ROOM	
161	3' - 6"	7' - 0"	1 3/4"	HM	A	HM	1	9/a9.3	11/a9.3	104	PHONE SERVICE ROOM	

DOOR SCHEDULE ABBREVIATIONS

AL	ALUMINUM - ANODIZED
G1	1" INSULATED GLAZING
G2	1/4" GLAZING
HM	HOLLOW METAL - PAINTED
P	PAINT
SCWD	SOLID CORE WOOD
SG	SAFETY GLAZING

DOOR SCHEDULE & FRAME TYPE COMMENTS

1	ALL FRAMES IN METAL STUD WALLS TO BE FILLED WITH MINERAL WOOL.
2	CARD READER ADJACENT TO DOOR.
3	PROVIDE TEMPERED GLASS WITHIN 24" OF EACH SIDE OF DOORS AND WITHIN 18" OF FINISHED FLOOR IN COMPLIANCE WITH IBC 2406.4
4	ROOM SIGNAGE - SEE DETAILS 2/A9.7 & 3/A9.7. PROVIDE AT ALL DOORS U.N.O.
5	DOORBELL.

** REFER TO INTERIOR FINISH PLANS FOR ROOM FINISH INFORMATION

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REGISTERED ARCHITECT
37165
KEVIN A. BARBER
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1717

date
11.16.18

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Pascua Yaqui Tribe
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Tucson, AZ 85746

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DOOR SCHEDULE - SEWA U'USIM

	DOOR					FRAME		DETAIL				
NUMBER	WIDTH	HEIGHT	THICKNESS	MATERIAL	TYPE	MATERIAL	TYPE	HEAD	JAMB	HARDWARE	SIGNAGE	COMMENTS
200A	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	6	5/a9.9	10/a9.9	AL-16	SEWA U'USIM - PREVENTION HOUSE	1
200B	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	1/a9.9	6/a9.9	218		2
203	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	9	3/a9.9	8/a9.8	206	PRIVATE OFFICE	1
204	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	9	3/a9.9	8/a9.9	206	DIRECTOR OFFICE	1
206	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	9	1/a9.9	6/a9.9	206	PRIVATE OFFICE	1
207	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	9	1/a9.9	6/a9.9	206	PRIVATE OFFICE	
208	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	9	1/a9.9	6/a9.9	206	PRIVATE OFFICE	
211	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	PRIVATE OFFICE	
212	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	PRIVATE OFFICE	
214	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	PRIVATE OFFICE	
215	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	206	PROGRAM MANAGER	1
216	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	PRIVATE OFFICE	
217	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
218	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
219	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
220	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	1/a9.9	6/a9.9	225		
221	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	10/a9.9	206	SHARED OFFICE	
222	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	8/a9.9	206	SHARED OFFICE	
223	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
230A	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	1/a9.9	6/a9.9	220		
230B	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	5	5/a9.9	10/a9.9	AL-16	SEWA U'USIM - CIRCLES OF CARE	1, 2
233	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	206	PROGRAM MANAGER	1
234	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	PRIVATE OFFICE	
235	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	PRIVATE OFFICE	
236	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	PRIVATE OFFICE	
238	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	PRIVATE OFFICE	
239	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	PRIVATE OFFICE	
241	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	201	MULTI-PURPOSE ROOM	
242	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	11	13/a9.3	14/a9.3	AL-01		2
243	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
244	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
245	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
246	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
247	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
248	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	207	SHARED OFFICE	
249	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	9	1/a9.9	6/a9.9	214		
250	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	216	ELECTRICAL ROOM	
251	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	204	RESTROOM	1
253A	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	11	13/a9.3	14/a9.3	AL-06		
253B	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	A4/a9.9	A4/a9.9	225	CHILDCARE	
254	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	216	STORAGE	
255	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	204	RESTROOM	1
256A	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	202	FAMILY ROOM	1
256B	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	209	FAMILY ROOM	1
257A	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	202	FAMILY ROOM	1
257B	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	209	FAMILY ROOM	1
258	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	11	13/a9.3	14/a9.3	AL-01		
259	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	201	MULTI-PURPOSE ROOM	

DOOR SCHEDULE ABBREVIATIONS

AL	ALUMINUM - ANODIZED
G1	1" INSULATED GLAZING
G2	1/4" GLAZING
HM	HOLLOW METAL - PAINTED
P	PAINT
SCWD	SOLID CORE WOOD
SG	SAFETY GLAZING

DOOR SCHEDULE & FRAME TYPE COMMENTS

1	ALL FRAMES IN METAL STUD WALLS TO BE FILLED WITH MINERAL WOOL.
2	CARD READER ADJACENT TO DOOR.
3	PROVIDE TEMPERED GLASS WITHIN 24" OF EACH SIDE OF DOORS AND WITHIN 18" OF FINISHED FLOOR IN COMPLIANCE WITH IBC 2406.4
4	ROOM SIGNAGE - SEE DETAILS 2/A9.7 & 3/A9.7. PROVIDE AT ALL DOORS U.N.O.
5	DOORBELL.

** REFER TO INTERIOR FINISH PLANS FOR ROOM FINISH INFORMATION

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REGISTERED ARCHITECT
37165
KEVIN A. BARBER
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1717

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Pascua Yaqui Tribe
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Tucson, AZ 85746

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DOOR SCHEDULE - DIABETES + PHARMACY

DOOR						FRAME		DETAIL				
NUMBER	WIDTH	HEIGHT	THICKNESS	MATERIAL	TYPE	MATERIAL	TYPE	HEAD	JAMB	HARDWARE	SIGNAGE	COMMENTS
300A	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	11	13/a9.3	14/a9.3	AL-09		
300B	9' - 0"	7' - 0"	1 3/4"	ALUM	H	ALUM	13	9/a9.8	8/a9.8	SL-01		
300C	20' - 0"	9' - 8"	2"	ALUM	E	ALUM	42	10/a9.8	8 & 9/a.8	RU-01		
301A	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	222	COUNSEL	
301B	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	210	COUNSEL	
302	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	206	BREAK ROOM	1
303	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	206	STORAGE	
304	4' - 0"	7' - 0"	1 3/4"	HM	C	HM	1	9/a9.3	11/a9.3	103		4
305	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	213	PHARMACIST OFFICE	
306	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	203	RESTROOM	1
307A	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	213	PATIENT SPECIALIST	1
307B	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	222	PATIENT SPECIALIST	
310	3' - 3"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	10	4/a9.9	9/a9.9	AL-15		1
311	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	216	STORAGE	
312	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	207	MANAGER	
313	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	217	STORAGE	
314	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	OUTREACH	
315	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	DIETICIAN	
316	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	DIABETES OUTREACH EDUCATOR	
317	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	207	CONSULTATION ROOM	

DOOR SCHEDULE - NURSING

DOOR						FRAME		DETAIL				
NUMBER	WIDTH	HEIGHT	THICKNESS	MATERIAL	TYPE	MATERIAL	TYPE	HEAD	JAMB	HARDWARE	SIGNAGE	COMMENTS
400A	9' - 0"	7' - 0"	1 3/4"	ALUM	H	ALUM	13	9/a9.8	8/a9.8	SL-01		
400B	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	1/a9.9	6/a9.9	218		2
401	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	9	1/a9.9	6/a9.9	206	CLINIC COORDINATOR	
402	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	REFFERAL OFFICE	
403	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	216	SUPPLIES	
404	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	202	PROCEDURE ROOM	
405	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	202	PROCEDURE ROOM	
406	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	201	EXAM ROOM	
407	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	201	EXAM ROOM	
408	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	201	EXAM ROOM	
409A	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	212	BIOHAZARD	
409B	4' - 0"	7' - 0"	1 3/4"	HM	C	HM	1	9/a9.3	11/a9.3	105	BIOHAZARD	
410	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	211	DIRTY ROOM	
411	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	211	CLEAN ROOM	
412	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	201	EXAM ROOM	
413	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	201	EXAM ROOM	
414	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	201	EXAM ROOM	
415	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	205	DARK ROOM	
416	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	204	RESTROOM	1
417	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	221	MED ROOM	2
418A	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	211	SHARED OFFICE	
418B	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	211	SHARED OFFICE	
422	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	1/a9.9	6/a9.9	213	NURSING ADMINISTRATION	
430A	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	218	WAITING ROOM	2
430B	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	5	5/a9.9	10/a9.9	AL-16	NURSING	1
432	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	206	CARE PROVIDOR SUPERVISOR	1
433	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	206	DEPUTY DIRECTOR OF NURSING	1
434	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	206	DIRECTOR OF NURSING	1
435	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	ALTC PROGRAM MANAGER	
436	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
437	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
438	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
439	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
440	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
441	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
442	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	202	DIALYSIS	
444	4' - 0"	7' - 0"	1 3/4"	HM	C	HM	1	9/a9.3	11/a9.3	105		
445	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	216	STORAGE	
446	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	209	ACP	
447	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	209	ALTC	
448	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
449	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
451	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	209	CANCER	
453	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
454	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	204	RESTROOM	1
455	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	216	CLINIC + ALTC STORAGE	
456	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	209	EMERGENCY PREPARATION	
457	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	209	EMERGENCY PREPARATION	
459	5' - 0"	7' - 0"	1 3/4"	SCWD	B	HM	4	1/a9.9	6/a9.9	227	ELECTRICAL ROOM	
460	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	221	MED ROOM	2
461	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	204	RESTROOM	1

DOOR SCHEDULE ABBREVIATIONS

AL	ALUMINUM - ANODIZED
G1	1" INSULATED GLAZING
G2	1/4" GLAZING
HM	HOLLOW METAL - PAINTED
P	PAINT
SCWD	SOLID CORE WOOD
SG	SAFETY GLAZING

DOOR SCHEDULE & FRAME TYPE COMMENTS

1	ALL FRAMES IN METAL STUD WALLS TO BE FILLED WITH MINERAL WOOL.
2	CARD READER ADJACENT TO DOOR.
3	PROVIDE TEMPERED GLASS WITHIN 24" OF EACH SIDE OF DOORS AND WITHIN 18" OF FINISHED FLOOR IN COMPLIANCE WITH IBC 2406.4
4	ROOM SIGNAGE - SEE DETAILS 2/A9.7 & 3/A9.7. PROVIDE AT ALL DOORS U.N.O.
5	DOORBELL.

** REFER TO INTERIOR FINISH PLANS FOR ROOM FINISH INFORMATION

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REGISTERED ARCHITECT
37165
KEVIN A. BARBER
ARIZONA U.S.A.

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1717

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Pascua Yaqui Tribe
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Tucson, AZ 85746

schedules - Nursing + Clinics

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DOOR SCHEDULE - HEALTH BUDGET + MANAGED HEALTH/ BILLING

DOOR						FRAME		DETAIL				
NUMBER	WIDTH	HEIGHT	THICKNESS	MATERIAL	TYPE	MATERIAL	TYPE	HEAD	JAMB	HARDWARE	SIGNAGE	COMMENTS
500A	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	5	5/a9.9	10/a9.9	AL-17	HEALTH BUDGET + MANAGED HEALTH / BILLING	
500B	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	219		2
502	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	209	ID	
503	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
504	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	206	ADMINISTRATOR MHC	1
507A	3' - 0"	7' - 0"	1 3/4"	HM	C	HM	8	1/a9.9	6/a9.9	209	REVIEW SPECIALISTS	
507B	3' - 0"	7' - 0"	1 3/4"	HM	C	HM	8	1/a9.9	6/a9.9	209	REVIEW SPECIALISTS	
508	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	PRIVATE OFFICE	
509	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	PRIVATE OFFICE	
511	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	206	CONSULTATION ROOM	
512	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	216	FILE ROOM	
513	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	206	CONSULTATION ROOM	
514	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	216	FILE ROOM	
515	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	216	STORAGE	
516	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	213	BILLING STAFF	
517A	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	222		1
517B	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	11	13/a9.3	14/a9.3	AL-01		2
518	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	204	RESTROOM	1
519	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	213	BILLING STAFF	1
520	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	213	BILLING STAFF	1
521	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	206	SUPERVISOR BILLING	1
522	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	9	1/a9.9	6/a9.9	217		
523	3' - 0"	7' - 0"	1 3/4"	HM	A	HM	1	1/a9.9	6/a9.9	216	ELECTRICAL ROOM	
524	3' - 0"	7' - 0"	1 3/4"	HM	C	HM	8	1/a9.9	6/a9.9	206	TINA	
525	3' - 0"	7' - 0"	1 3/4"	HM	C	HM	8	1/a9.9	6/a9.9	206	RAQUEL	
526	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	221	MDF	2
527A	3' - 0"	7' - 0"	1 3/4"	HM	A	HM	1	3/a9.9	8/a9.9	216	MAIL ROOM	1
527B	3' - 0"	7' - 0"	1 3/4"	HM	A	HM	1	3/a9.9	8/a9.9	216	MAIL ROOM	1
528A	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	5	14/a9.9 sim	19/a9.9 sim	AL-19	RECEIVING ROOM	2
528B	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	214	RECEIVING ROOM	
530	3' - 0"	7' - 0"	1 3/4"	HM	C	HM	8	3/a9.9	8/a9.9	206	PRIVATE OFFICE	1
533	3' - 0"	7' - 0"	1 3/4"	HM	A	HM	1	1/a9.9	6/a9.9	216	FILE STORAGE	

DOOR SCHEDULE - WAREHOUSE

DOOR						FRAME		DETAIL				
NUMBER	WIDTH	HEIGHT	THICKNESS	MATERIAL	TYPE	MATERIAL	TYPE	HEAD	JAMB	HARDWARE	SIGNAGE	COMMENTS
800A	3' - 0"	7' - 0"	1 3/4"	HM	A	HM	9	9/a9.3	11/a9.3	106	WAREHOUSE	
800B	5' - 0"	7' - 0"	1 3/4"	HM	D	HM	4	9/a9.3	11/a9.3	108	WAREHOUSE	
800C	12' - 0"	12' - 0"	2"	ALUM	G	ALUM	42	10/a9.8	14/a9.8	RU-01		
801	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	206	OFFICE	1
802	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	204	RESTROOM	1
803	3' - 0"	7' - 0"	1 3/4"	HM	A	HM	1	9/a9.3	11/a9.3	107	FIRE RISER ROOM	
804	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	216	ELECTRICAL ROOM	1
809	3' - 0"	7' - 0"	1 3/4"	HM	A	HM	1	3/a9.9	8/a9.9	217	JANITOR	1

DOOR SCHEDULE ABBREVIATIONS

AL	ALUMINUM - ANODIZED
G1	1" INSULATED GLAZING
G2	1/4" GLAZING
HM	HOLLOW METAL - PAINTED
P	PAINT
SCWD	SOLID CORE WOOD
SG	SAFETY GLAZING

DOOR SCHEDULE & FRAME TYPE COMMENTS

1	ALL FRAMES IN METAL STUD WALLS TO BE FILLED WITH MINERAL WOOL.
2	CARD READER ADJACENT TO DOOR.
3	PROVIDE TEMPERED GLASS WITHIN 24" OF EACH SIDE OF DOORS AND WITHIN 18" OF FINISHED FLOOR IN COMPLIANCE WITH IBC 2406.4
4	ROOM SIGNAGE - SEE DETAILS 2/A9.7 & 3/A9.7. PROVIDE AT ALL DOORS U.N.O.
5	DOORBELL.

** REFER TO INTERIOR FINISH PLANS FOR ROOM FINISH INFORMATION

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REGISTERED ARCHITECT
CERTIFICATE NO.
37165
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I.S.T. LICENSED ARCHITECT
ARIZONA U.S.A.

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DOOR SCHEDULE - CENTERED SPIRITED

	DOOR					FRAME		DETAIL				
NUMBER	WIDTH	HEIGHT	THICKNESS	MATERIAL	TYPE	MATERIAL	TYPE	HEAD	JAMB	HARDWARE	SIGNAGE	COMMENTS
600	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	7	5/a9.9	10/a9.9	AL-16	CENTERED SPIRIT	1
602	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	BUSINESS MANAGER	
604	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	204	RESTROOM	1
605	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	206	SCREENER	1
607	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	203	RESTROOM	1
608	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	206	SCREENER	
609	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	3/a9.9	8/a9.9	218		
611	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	207	COMPER	
612	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	MANAGER	
613	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	HIM	
614	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	CAS	
615	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	BEHAVIORAL HEALTH THERAPIST	
616	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	216	STORAGE	
617	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	204	RESTROOM	1
619	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	BEHAVIORAL HEALTH THERAPIST	
620	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	BEHAVIORAL HEALTH THERAPIST	
621	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	217	STORAGE	
622	3' - 2"	7' - 10"	1 3/4"	ALUM/GL	E	ALUM	11	1/a9.9	6/a9.9	AL-02	HEALTH CLINICIAN	
623	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	CASE MANAGERS	
624	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	BEHAVIORAL HEALTH THERAPIST	
625	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	HEALTH CLINICIAN	
626	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	HEALTH CLINICIAN	
627	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	HEALTH CLINICIAN	
628	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	HEALTH CLINICIAN	
629	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	BEHAVIORAL HEALTH THERAPIST	
631	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	PATIENT BENEFIT	
632	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	204	RESTROOM	1
634A	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	11	13/a9.3	14/a9.3	AL-01		2
634B	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	9	3/a9.9	8/a9.9	213	CENTERED SPIRIT ADMINISTRATION	1
636	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	208	DIRECTOR	1
637	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	ADMINISTRATOR SUPPORT	
638	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	QUALITY SUPPORT	
639	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	216	STORAGE	
640	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	206	ASSOCIATE DIRECTOR	1
641	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	206	NETWORK COORDINATOR	1
642	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	206	TRAINING COORDINATOR	1
643	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	3/a9.9	8/a9.9	213		1
644	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	215	MEDICAL RECORDS	1
645	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	3/a9.9	206	NURSES	
646	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	3/a9.9	8/a9.9	218		1, 2
648	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	207	COMPER	
649	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	CRISIS	
650	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	209	COD	1
651	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	CRISIS	
652	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	TELE MED	
653	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	3/a9.9	206	PSYCHOLOGY	1
654	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	3/a9.9	202	ACCU DETOX	1
655	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	3/a9.9	221	MEDICAL DIRECTOR	1
656	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	11	19/a9.8 sim	19/a9.8 sim	AL-01		2
657	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	3/a9.9	206	SHARED OFFICE - BEHAVIORAL HEALTH THERAPIST	1
658	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	3/a9.9	206	MANAGER OFFICE	1
659	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	216	STORAGE	
660	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	203	RESTROOM	1
661	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SHARED OFFICE	
662	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	BEHAVIORAL HEALTH THERAPIST	
663	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	BEHAVIORAL HEALTH THERAPIST	
665	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	3/a9.9	8/a9.9	214	CENTERED SPIRIT	1
667	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	HEALTH CLINICIAN	
668	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	HEALTH CLINICIAN	
669	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	HEALTH CLINICIAN	
670	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	HEALTH CLINICIAN	
671	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	217	STORAGE	
673	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	HEALTH CLINICIAN	
674	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	HEALTH CLINICIAN	
675	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	HEALTH CLINICIAN	
676	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	HEALTH CLINICIAN	
677	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	11	9/a9.3	11/a9.3	AL-01		Exterior Door

DOOR SCHEDULE ABBREVIATIONS

AL	ALUMINUM - ANODIZED
G1	1" INSULATED GLAZING
G2	1/4" GLAZING
HM	HOLLOW METAL - PAINTED
P	PAINT
SCWD	SOLID CORE WOOD
SG	SAFETY GLAZING

DOOR SCHEDULE & FRAME TYPE COMMENTS

1	ALL FRAMES IN METAL STUD WALLS TO BE FILLED WITH MINERAL WOOL.
2	CARD READER ADJACENT TO DOOR.
3	PROVIDE TEMPERED GLASS WITHIN 24" OF EACH SIDE OF DOORS AND WITHIN 18" OF FINISHED FLOOR IN COMPLIANCE WITH IBC 2406.4
4	ROOM SIGNAGE - SEE DETAILS 2/A9.7 & 3/A9.7. PROVIDE AT ALL DOORS U.N.O.
5	DOORBELL.

** REFER TO INTERIOR FINISH PLANS FOR ROOM FINISH INFORMATION

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REGISTERED ARCHITECT
CERTIFICATE NO.
37165
KEVIN A.
BARBER
I'M A FILIPINO-AMERICAN
ARIZONA U.S.A.

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

schedules - Centered Spirit

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DOOR SCHEDULE - SOCIAL SERVICES

	DOOR					FRAME		DETAIL				
NUMBER	WIDTH	HEIGHT	THICKNESS	MATERIAL	TYPE	MATERIAL	TYPE	HEAD	JAMB	HARDWARE	SIGNAGE	COMMENTS
700A	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	5	5/a9.9	10/a9.9	AL-16	SOCIAL SERVICES	1
700B	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	5	1/a9.9	6/a9.9	AL-18		
700C	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	204	RESTROOM	1
702A	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	CPS SOCIAL WORKER ASSISTANT	
702B	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	4/a9.9	9/a9.9	206	CPS SOCIAL WORKER ASSISTANT	1
703A	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	ICWA SOCIAL WORK ASSISTANT	
703B	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	4/a9.9	9/a9.9	206	HEALTH CLINICIAN	1
704A	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	CPS SOCIAL WORKER ASSISTANT	
704B	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	4/a9.9	9/a9.9	206	CPS SOCIAL WORKER ASSISTANT	1
706A	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	4/a9.9	9/a9.9	224		1
706B	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	11	13/a9.3	14/a9.3	AL-01		
707	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	CPS SOCIAL WORKER ASSISTANT	
708	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	ADMINISTRATIVE SUPPORT TECHNICIAN	
709	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	ELIGIBILITY & CASE MANAGEMENT	
710	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	ELIGIBILITY & CASE MANAGEMENT	
712	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	FAMILY & CULTURE	
713	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	ADMINISTRATIVE SUPPORT TECHNICIAN	
714	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	ADMINISTRATIVE SUPPORT TECHNICIAN	
715	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	FAMILY ADVOCATE	
717	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SOCIAL WORKER 2 FAMILY ADVOCATE	
718	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	PROGRAM COORDINATOR	
719	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	TANF CASE MANAGER	
720	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	TANF CASE MANAGER	
721	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	TANF CASE MANAGER	
722	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	TANF CASE MANAGER	
723	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	ADULT SERVICES PROGRAM MANAGER	
724	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	CPS CASE MANAGER	
725	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	PROGRAM SPECIALIST	
726	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	CPS SUPERVISOR	
727	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	APPLICATION SUPPORT ANALYST	
728	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	CPS CASE MANAGER	
729	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	206	CHILD DEVELOPMENT STORAGE	
730	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	CPS CASE MANAGER	
731	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	CPS CASE MANAGER	
732	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	ADMINISTRATIVE SUPPORT TECHNICIAN	
733	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	PROGRAM MANAGER	
734	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	ADMINISTRATIVE SUPPORT TECHNICIAN	
735	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	SOCIAL SERVICES DIRECTOR	
737	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	ADMINISTRATIVE SUPPORT TECHNICIAN	
738	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	PROGRAM SPECIALIST	
739	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	TITLE IVE ELIGIBILITY WORKER	
740	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	TITLE IVE SPECIALIST	
741	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	204	CPS INVESTIGATOR	
742	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	INTERVIEW ROOM	
743	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	GUARDIANSHIP WORKER	
744	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	INTERVIEW ROOM	
745	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	CHILD CARE SUPERVISOR	
746	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	GUARDIANSHIP ADOPTION WORKER	
747	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	CHILD CARE ELIGIBILITY WORKER	
748	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	FOSTER CARE COORDINATOR	
751	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	WORKFORCE INSTRUCTOR	
752	3' - 0"	7' - 0"	1 3/4"	HM	A	HM	1	3/a9.9	8/a9.9	204	RESTROOM	1
753	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	204	RESTROOM	1
754	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	216	ELECTRICAL ROOM	1
755	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	3/a9.9	8/a9.9	206	FAMILY THERAPIST	1
758	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	216		
759	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	CPS INVESTIGATOR	
760	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	FAMILY PRESERVATION	
761	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	ICWA SOCIAL WORKER	
762	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	FAMILY SUPPORT SUPERVISOR	
763	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	ICWA SOCIAL WORKER	
764	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	3/a9.9	8/a9.9	204	RESTROOM	1
765	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	ICWA SUPERVISOR	
766	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	11	13/a9.3	14/a9.3	AL-01		
767	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	8	1/a9.9	6/a9.9	206	CPS INVESTIGATOR	
768A	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	4/a9.9	9/a9.9	221	CLASSROOM	1
768B	3' - 6"	7' - 10"	1 3/4"	ALUM/GL	E	ALUM	11	19/a9.8	19/a9.8	AL-10		
769	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	9	4/a9.9	9/a9.9	213	SOCIAL SERVICES	1
770	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	216	SUPPLIES	
771	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	216	ADULT FILE ROOM	
772	3' - 0"	7' - 0"	1 3/4"	SCWD	A	HM	1	1/a9.9	6/a9.9	221	IDF ROOM	
773A	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	8	4/a9.9	9/a9.9	209	FAMILY MEETING ROOM	1
773B	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	12	13/a9.3	14/a9.3	AL-09		
774A	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	8	4/a9.9	9/a9.9	209	FAMILY MEETING ROOM	1
774B	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	12	13/a9.3	14/a9.3	AL-09		
775A	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	8	4/a9.9	9/a9.9	209	FAMILY MEETING ROOM	1
775B	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	12	13/a9.3	14/a9.3	AL-09		
776A	3' - 6"	7' - 0"	1 3/4"	SCWD	A	HM	8	4/a9.9	9/a9.9	209	FAMILY MEETING ROOM	1
776B	3' - 6"	7' - 0"	1 3/4"	ALUM/GL	E	ALUM	12	13/a9.3	14/a9.3	AL-09		

DOOR SCHEDULE ABBREVIATIONS

AL	ALUMINUM - ANODIZED
G1	1" INSULATED GLAZING
G2	1/4" GLAZING
HM	HOLLOW METAL - PAINTED
P	PAINT
SCWD	SOLID CORE WOOD
SG	SAFETY GLAZING

DOOR SCHEDULE & FRAME TYPE COMMENTS

1	ALL FRAMES IN METAL STUD WALLS TO BE FILLED WITH MINERAL WOOL.
2	CARD READER ADJACENT TO DOOR.
3	PROVIDE TEMPERED GLASS WITHIN 24" OF EACH SIDE OF DOORS AND WITHIN 18" OF FINISHED FLOOR IN COMPLIANCE WITH IBC 2406.4
4	ROOM SIGNAGE - SEE DETAILS 2/A9.7 & 3/A9.7. PROVIDE AT ALL DOORS U.N.O.
5	DOORBELL.

** REFER TO INTERIOR FINISH PLANS FOR ROOM FINISH INFORMATION

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Tucson, AZ 85746

schedules - Social Services

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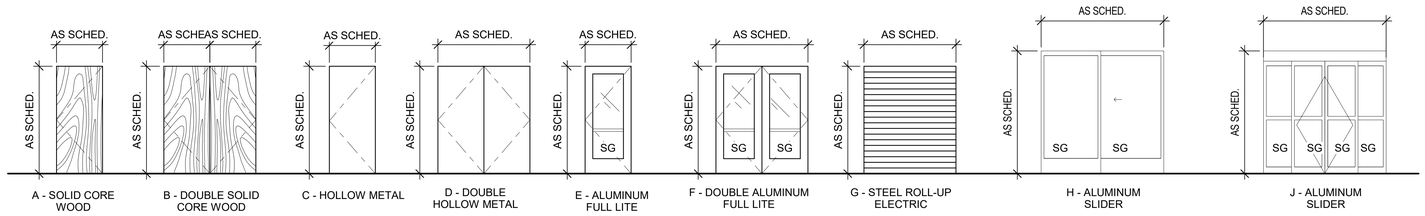
door types



A - SOLID CORE WOOD | B - DOUBLE SOLID CORE WOOD | C - HOLLOW METAL | D - DOUBLE HOLLOW METAL | E - ALUMINUM FULL LITE | F - DOUBLE ALUMINUM FULL LITE | G - STEEL ROLL-UP ELECTRIC | H - ALUMINUM SLIDER | J - ALUMINUM SLIDER

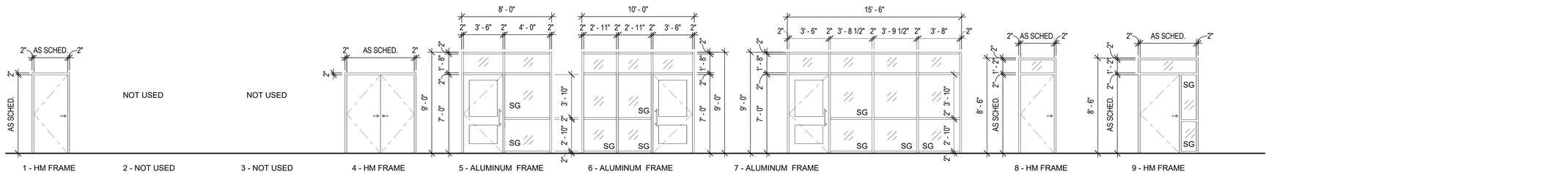
DOOR SCHEDULE & FRAME TYPE COMMENTS	
1	ALL FRAMES IN METAL STUD WALLS TO BE FILLED WITH MINERAL WOOL.
2	CARD READER ADJACENT TO DOOR.
3	PROVIDE TEMPERED GLASS WITHIN 24" OF EACH SIDE OF DOORS AND WITHIN 18" OF FINISHED FLOOR IN COMPLIANCE WITH IBC 2406.4
4	ROOM SIGNAGE - SEE DETAILS 2/A9.7 & 3/A9.7. PROVIDE AT ALL DOORS U.N.O.
5	DOORBELL.

DOOR SCHEDULE ABBREVIATIONS	
AL	ALUMINUM - ANODIZED
G1	1" INSULATED GLAZING
G2	1/4" GLAZING
HM	HOLLOW METAL - PAINTED
P	PAINT
SCWD	SOLID CORE WOOD
SG	SAFETY GLAZING

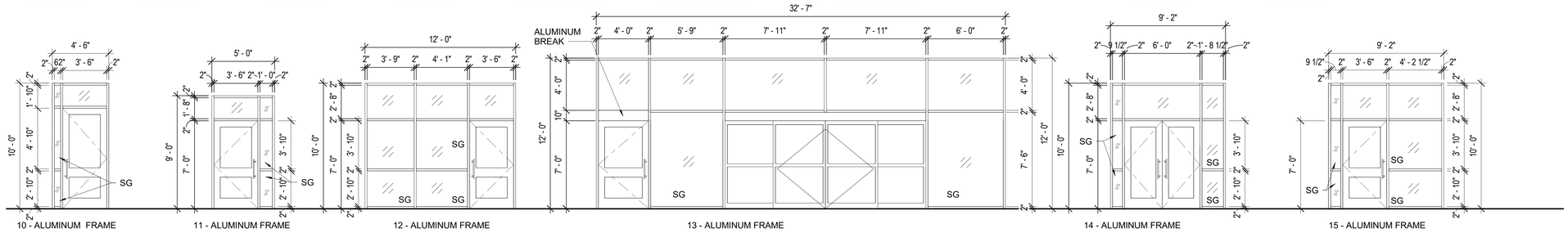
general notes

1. SAME FRAME TYPES ARE MIRRORED IMAGES OF THOSE SHOWN HERE. SEE FLOOR PLANS.

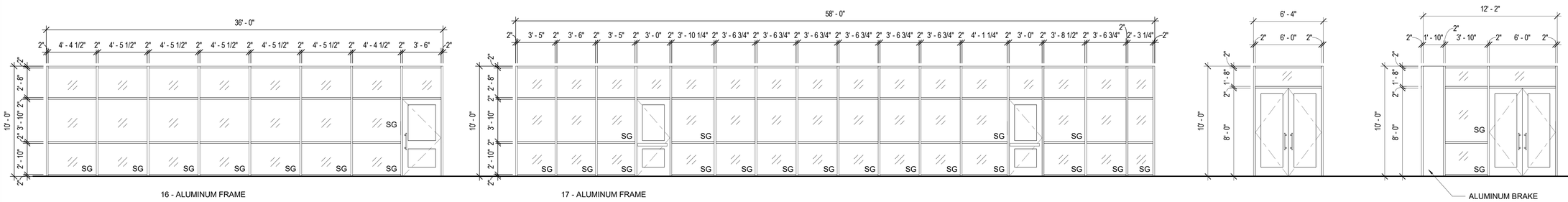
frame types



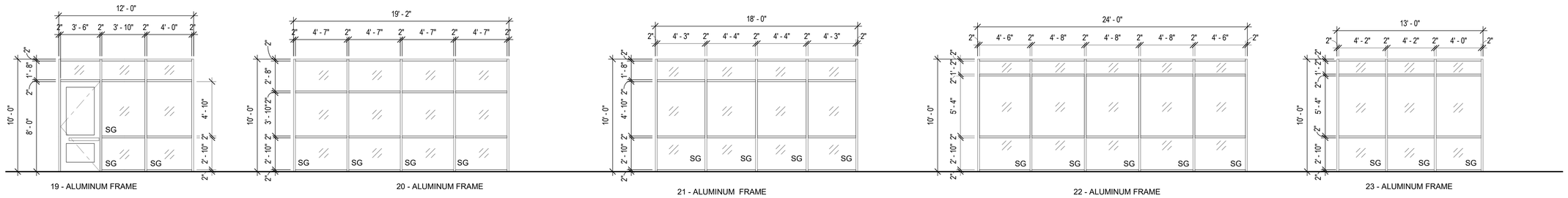
1 - HM FRAME | 2 - NOT USED | 3 - NOT USED | 4 - HM FRAME | 5 - ALUMINUM FRAME | 6 - ALUMINUM FRAME | 7 - ALUMINUM FRAME | 8 - HM FRAME | 9 - HM FRAME



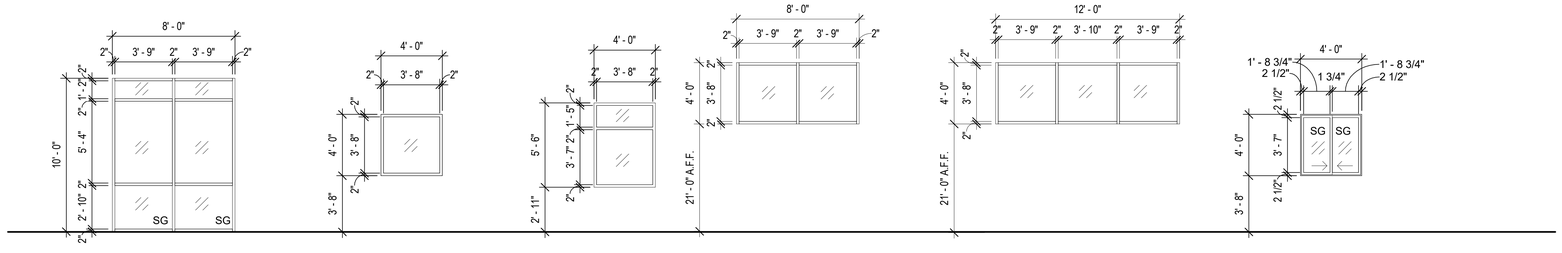
10 - ALUMINUM FRAME | 11 - ALUMINUM FRAME | 12 - ALUMINUM FRAME | 13 - ALUMINUM FRAME | 14 - ALUMINUM FRAME | 15 - ALUMINUM FRAME



16 - ALUMINUM FRAME | 17 - ALUMINUM FRAME | 18A - ALUMINUM FRAME | 18B - ALUMINUM FRAME



19 - ALUMINUM FRAME | 20 - ALUMINUM FRAME | 21 - ALUMINUM FRAME | 22 - ALUMINUM FRAME | 23 - ALUMINUM FRAME



24 - ALUMINUM FRAME | 25 - HM FRAME | 26 - ALUMINUM FRAME | 27A - ALUMINUM FRAME | 27B - ALUMINUM FRAME | 28 - HM FRAME SLIDING WINDOW

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Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

door and frame types

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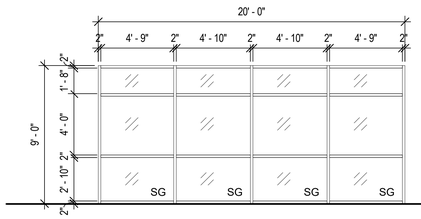
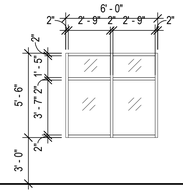
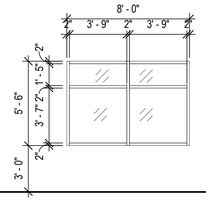
frame types



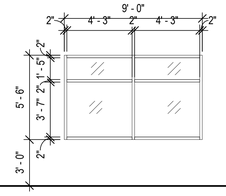
29 - ALUMINUM FRAME



30 - ALUMINUM FRAME



31 - ALUMINUM FRAME



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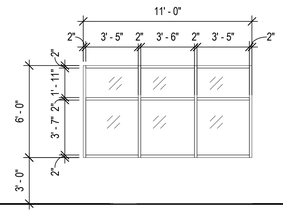

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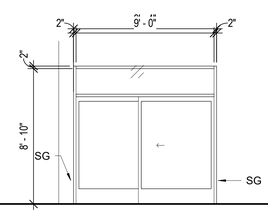
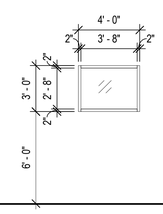


34 - ALUMINUM FRAME AT PHARMACY + CLINIC



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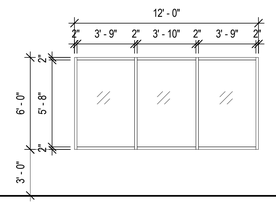

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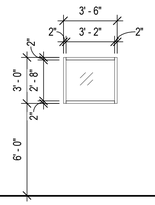
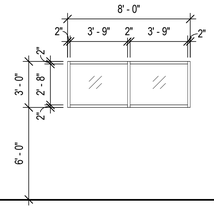


37 - ALUMINUM FRAME 3FORM



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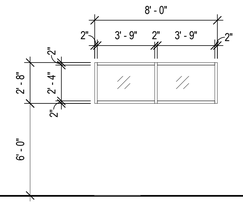

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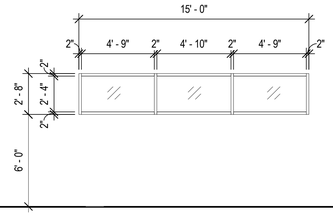

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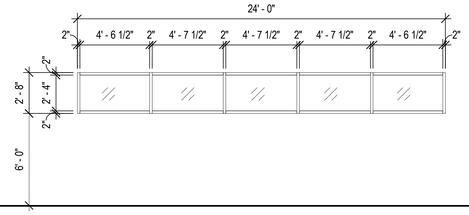

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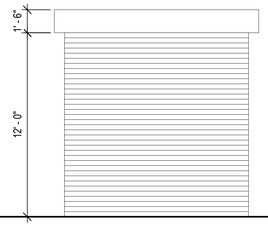
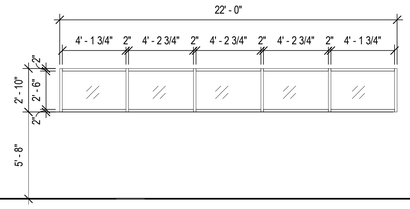


42 - ROLLING OVERHEAD DOOR

NOT USED

43 - NOT USED



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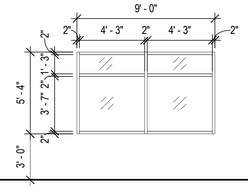

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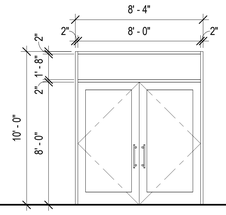

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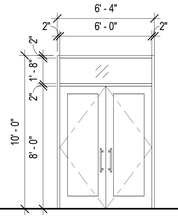

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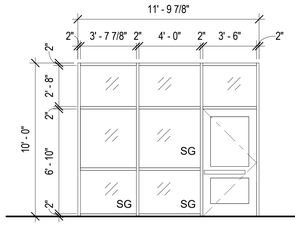
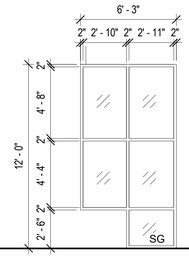
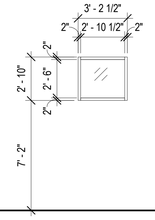


48 - ALUMINUM FRAME WITH 3 FORM PANELS



49 - ALUMINUM FRAME WITH 3 FORM PANELS



50 - ALUMINUM FRAME

general notes

1. SAME FRAME TYPES ARE MIRRORED IMAGES OF THOSE SHOWN HERE. SEE FLOOR PLANS.

DOOR SCHEDULE ABBREVIATIONS

AL	ALUMINUM - ANODIZED
G1	1" INSULATED GLAZING
G2	1/4" GLAZING
HM	HOLLOW METAL - PAINTED
P	PAINT
SCWD	SOLID CORE WOOD
SG	SAFETY GLAZING

DOOR SCHEDULE & FRAME TYPE COMMENTS

1	ALL FRAMES IN METAL STUD WALLS TO BE FILLED WITH MINERAL WOOL.
2	CARD READER ADJACENT TO DOOR.
3	PROVIDE TEMPERED GLASS WITHIN 24" OF EACH SIDE OF DOORS AND WITHIN 18" OF FINISHED FLOOR IN COMPLIANCE WITH IBC 2406.4
4	ROOM SIGNAGE - SEE DETAILS 2/A9.7 & 3/A9.7. PROVIDE AT ALL DOORS U.N.O.
5	DOORBELL.

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FAX (520) 326-1148
www.swaimaia.com

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CERTIFICATE NO.
37165
KEVIN A.
BARBER
ARIZONA U.S.A.

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

frame types

a8.7

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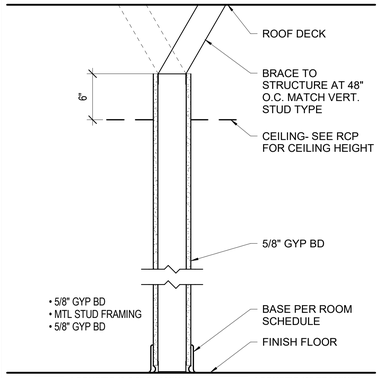


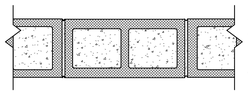
T **ACOUSTIC (3 5/8" FRAMING)**
NON RATED
THICKNESS: 4 7/8"
STC: N/A

T.6 **ACOUSTIC (6" FRAMING)**
NON RATED
THICKNESS: 7 1/4"
STC: N/A
BRACED: 48" O.C.

TX **ACOUSTIC (3 5/8" FRAMING)**
NON RATED
THICKNESS: 4 7/8"
STC: N/A

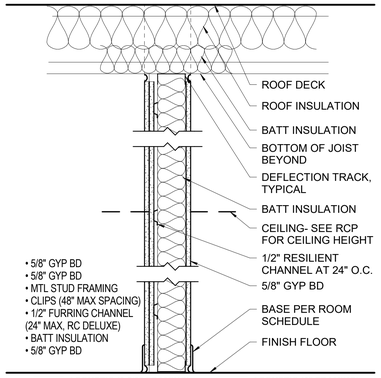
TX.6 **ACOUSTIC (6" FRAMING)**
NON RATED
THICKNESS: 7 1/4"
STC: N/A
BRACED: 48" O.C.

T2 **ACOUSTIC (3 5/8" FRAMING)**
NON RATED
THICKNESS: 4 7/8"
STC: N/A
ATTACH TO DECK



• 8" CMU WALL - SEE SPECIFICATIONS AND STRUCTURAL FOR REINFORCING AND ADDITIONAL INFORMATION

E1 **CMU**
THICKNESS: 7 5/8"

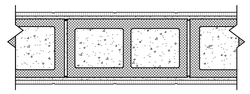


A4 **ACOUSTIC (3 5/8" FRAMING)**
NON RATED
THICKNESS: 6"
STC MIN.: 55

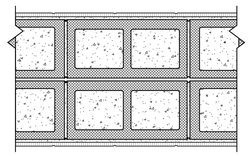
A4.6 **ACOUSTIC (6" FRAMING)**
NON RATED
THICKNESS: 8 3/8"
STC MIN.: 59

A4X **ACOUSTIC (3 5/8" FRAMING)**
NON RATED
THICKNESS: 5 3/8"
STC MIN.: 55

A4X.6 **ACOUSTIC (6" FRAMING)**
NON RATED
THICKNESS: 7 3/4"
STC MIN.: 59



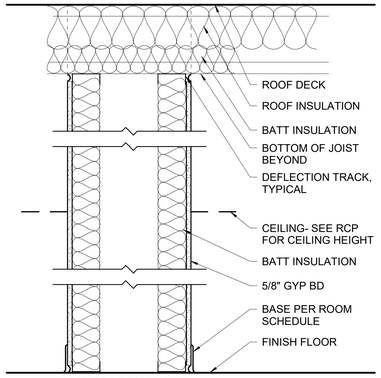
• THIN-SET STONE TILE
• 8" CMU WALL - SEE SPECIFICATIONS AND STRUCTURAL FOR REINFORCING AND ADDITIONAL INFORMATION
• THIN-SET STONE TILE



• THIN-SET STONE TILE
• (2) 8" CMU WALL - SEE SPECIFICATIONS AND STRUCTURAL FOR REINFORCING AND ADDITIONAL INFORMATION
• THIN-SET STONE TILE

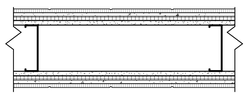
E2 **EXTERIOR TILE**
THICKNESS: 8 1/8"

E2.1 **EXTERIOR TILE**
THICKNESS: 1' - 4 3/4"



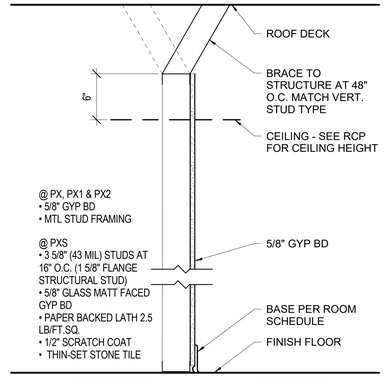
A5 **ACOUSTIC (3 5/8" FRAMING)**
NON RATED
THICKNESS: 1'-4" U.N.O.
STC MIN.: 56
BRACED: 48" O.C.

• 5/8" GYP BD
• BATT INSULATION
• (2) MTL STUD FRAMING
• BATT INSULATION
• 5/8" GYP BD



• THIN-SET STONE TILE
• 1/2" SCRATCH COAT
• PAPER BACKED LATH 2.5 LB/FT.SQ.
• FLUID APPLIED VAPOR BARRIER ON .65" RIGID INSULATION (R4.1)
• 5/8" GYP BD
• 6" (43 MIL) STUDS AT 24" O.C. (1 5/8" FLANGE STRUCTURAL STUD)
• FLUID APPLIED VAPOR BARRIER ON .65" RIGID INSULATION (R4.1)
• PAPER BACKED LATH 2.5 LB/FT.SQ.
• 1/2" SCRATCH COAT
• THIN-SET STONE TILE

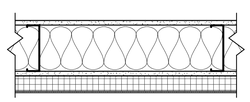
E3 **EXTERIOR TILE**
THICKNESS: 10 1/4"



PX **LAMINATED GWB**
THICKNESS: 5/8"

PX1 **1 5/8" FRAMING**
THICKNESS: 2 1/4"

PX2 **2 1/2" FRAMING**
THICKNESS: 3 1/8"

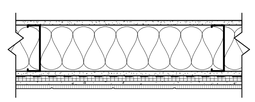


• 5/8" GYP BD
• 6" (43 MIL) STUDS AT 24" O.C. (1 5/8" FLANGE STRUCTURAL STUD)
• R19 FACED BATT INSULATION
• 5/8" GLASS MATT FACED GYP BD
• WATER RESISTIVE BARRIER
• EIFS W/ 2" INSULATION

E4 **EXTERIOR EIFS**
THICKNESS: 9 1/4"

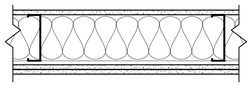
E4X **EXTERIOR EIFS**
THICKNESS: 8 5/8"

E4XF **EXTERIOR EIFS**
THICKNESS: 4 5/8"
FLAT STUDS



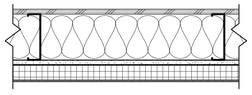
• 5/8" GYP BD
• 6" (43 MIL) STUDS AT 24" O.C. (1 5/8" FLANGE STRUCTURAL STUD)
• 5/8" GLASS MATT FACED GYP BD
• FLUID APPLIED VAPOR BARRIER
• .65" RIGID INSULATION (R4.1)
• PAPER BACKED LATH 2.5 LB/FT.SQ.
• 1/2" SCRATCH COAT
• THIN-SET STONE TILE

E5 **EXTERIOR TILE**
THICKNESS: 8 3/4"



• 5/8" GYP BD
• 6" (43 MIL) STUDS AT 24" O.C. (1 5/8" FLANGE STRUCTURAL STUD)
• CLIPS (48" MAX. SPACING) 1/2" FURRING CHANNEL (24" MAX. SPACING) (RC DELUXE)
• BATT INSULATION
• (2) 5/8" GYP BD

UP TO BOTTOM OF JOIST

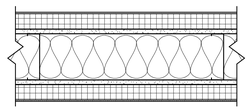


• 5/8" F.T. PLYWOOD
• 6" (43 MIL) STUDS AT 24" O.C. (1 5/8" FLANGE STRUCTURAL STUD)
• R19 FACED BATT INSULATION
• 5/8" GLASS MATT FACED GYP BD
• WATER RESISTIVE BARRIER
• EIFS W/ 2" INSULATION

ABOVE ROOF

E6 **EXTERIOR EIFS**
THICKNESS: 8 3/8" / 9 1/4"

E6X **EXTERIOR EIFS**
THICKNESS: 7 3/4" / 9 1/4"



• EIFS W/ 2" INSULATION
• WATER RESISTIVE BARRIER
• 5/8" GLASS MATT FACED GYP BD
• 6" (43 MIL) STUDS AT 24" O.C. (1 5/8" FLANGE STRUCTURAL STUD)
• R19 FACED BATT INSULATION
• 5/8" GLASS MATT FACED GYP BD
• WATER RESISTIVE BARRIER
• EIFS W/ 2" INSULATION

E7 **EXTERIOR EIFS**
THICKNESS: 12"

wall type notes

1. STAGGER GYPSUM BOARD JOINTS FROM ONE SIDE OF THE WALL TO THE OTHER.
2. ALLOW A 1/4" GAP ALONG ALL WALL PERIMETER EDGES, (@ FLOOR, CEILING & SIDES) AND COMPLETELY SEAL 1/4" GAP WITH ACOUSTIC SEALANT OR NON-HARDENING FLEXIBLE CAULK.
3. DO NOT 'SHORT-CIRCUIT' RESILIENT CHANNEL SUBSURFACE SUSPENSION MATERIALS WITH FASTENERS THRU DRYWALL AND INTO STUD. DO NOT 'SHORT-CIRCUIT' DRYWALL SHEET ISOLATION FROM STUDS AT SILL, HEAD OR SIDE JOINTS. MAINTAIN REQUIRED DRYWALL SHEET ISOLATION FROM STUD AT ALL POSSIBLE POINTS OF DRYWALL SHEET TO STUD CONTACT.
4. LIMIT NECESSARY WALL PENETRATIONS TO NO MORE THAN ONE PER STUD CAVITY. SEPARATE WALL PENETRATIONS AS FAR AS POSSIBLE FROM EACH OTHER. MAINTAIN A MINIMUM OF 24" SEPARATION FROM PENETRATIONS ON ONE SIDE OF A WALL TO PENETRATIONS ON THE OPPOSITE SIDE OF THE WALL.
5. SEAL ALL PENETRATIONS & OPENINGS IN JUNCTION BOXES WITH ACOUSTICAL SEALANT AND/OR PUTTY PADS.
6. PROVIDE EXTERIOR TYPE WEATHER-SEAL PADS UNDER ELECTRICAL OUTLET COVERS ON ALL ELECTRICAL OUTLETS ON BOTH SIDES OF SOUND RATED WALL.
7. FIBERGLASS BATTING TO BE EVENLY DISTRIBUTED THROUGHOUT WALL CAVITY, AVOID CLUMPING OR EMPTY AREAS IN WALL CAVITY.
8. SEAL ALL PENETRATIONS - DUCTWORK, CONDUIT, PIPING ETC. BOTH SIDES OF WALL WITH FLEXIBLE CAULK.
9. METAL FRAMING LISTED IS BASED ON PRODUCTS BY CLARK DIETRICH.
10. FULL HEIGHT PARTITIONS EXTEND TO BOTTOM OF TJI'S. SEE DETAIL ON SHEET A9.1.
11. TYPICAL EXTERIOR WALLS ARE 6" METAL FRAMING. REFER TO WALL SECTIONS AND STRUCTURAL DRAWINGS FOR GAUGE AND SPACING.
12. CONTRACTOR SHALL CONSULT MANUFACTURER'S LIMITING HEIGHT TABLES AND SHALL ADJUST GAUGE AS NECESSARY TO BE IN CONFORMANCE.

WALL STUD DESIGNATION

WALLS UP TO 13'-0"	WALLS UP TO 16'-0"	WALLS UP TO 20'-0"
326S125-27 @ 16" O.C.	326S125-33 @ 16" O.C.	326S125-54 @ 12" O.C.
600S125-27 @ 16" O.C.	600S125-27 @ 16" O.C.	600S125-27 @ 16" O.C.
800S125-43 @ 16" O.C.	800S125-43 @ 16" O.C.	800S125-43 @ 16" O.C.
1000S162-43 @ 16" O.C.	1000S162-43 @ 16" O.C.	1000S162-43 @ 16" O.C.

• INTERIOR PARTITON STUD FRAMING STUD DESIGNATION AND SPACING: GYP BD. BOTH SIDES FULL HEIGHT
• ALL BRACING TO BE 362S162 @ 4'-0" O.C.

WALL TYPE ABBREVIATIONS

1	1 HOUR RATED ASSEMBLY
2	2 HOUR RATED ASSEMBLY
.6	STUD SIZE (EX. .2 = 2 1/2" / .4 = 4" / .6 = 6")
A	ACOUSTIC
B	BARRIER
CH	CHASE
E	EXTERIOR
F	FURRING / FLAT STUD
H	HIGH IMPACT
P	PARTITION
S	SHAFT
SR	SMOKE RESISTANT
T	TYPICAL
V	VAPOR BARRIER
X	ONE-SIDED FINISH

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wall types

a9.0

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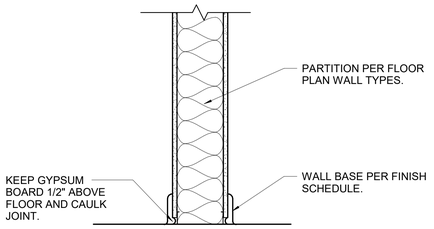
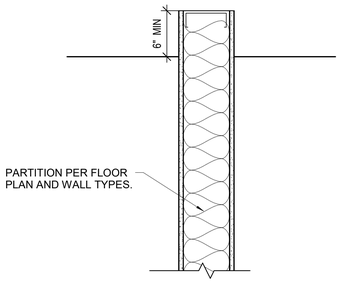
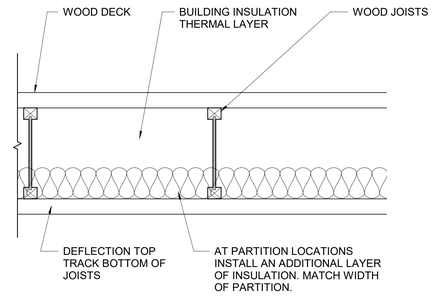


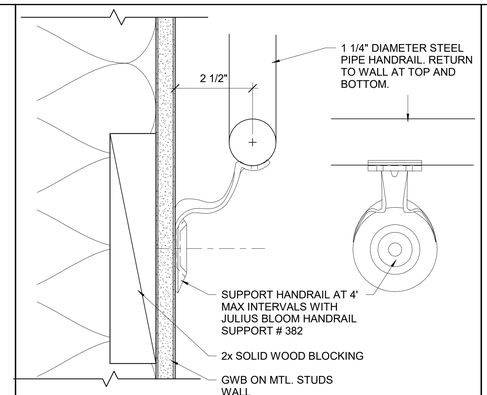
1 a9.1 — bottom of wall detail — 1 1/2" = 1'-0"



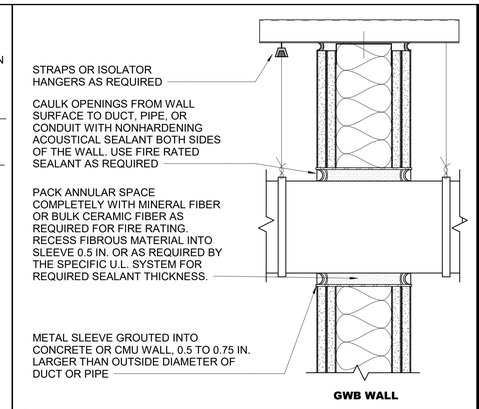
2 a9.1 — top of wall detail — 1 1/2" = 1'-0"



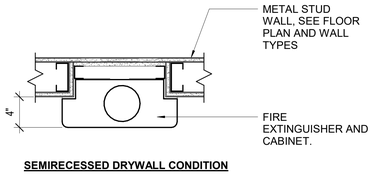
3 a9.1 — wall @ deck — 1 1/2" = 1'-0"



4 a9.1 — handrail @ framed wall — 6" = 1'-0" — (1/ a9.1)

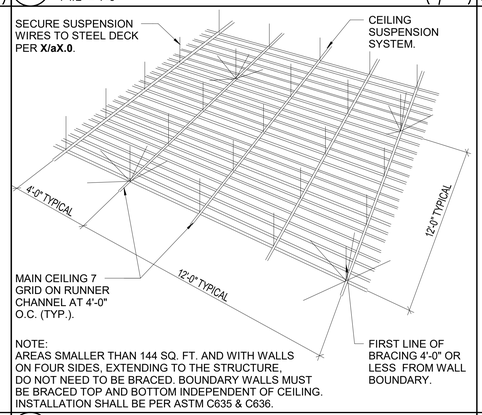


5 a9.1 — wall penetration — 3" = 1'-0"

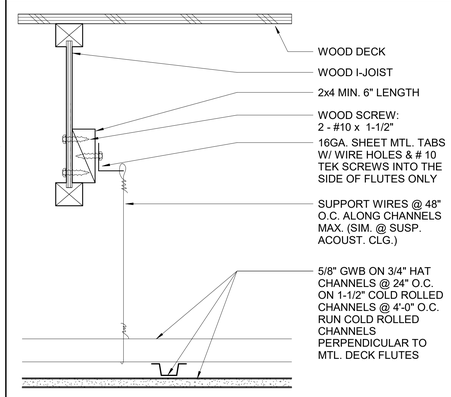


SEMIRECESSED DRYWALL CONDITION

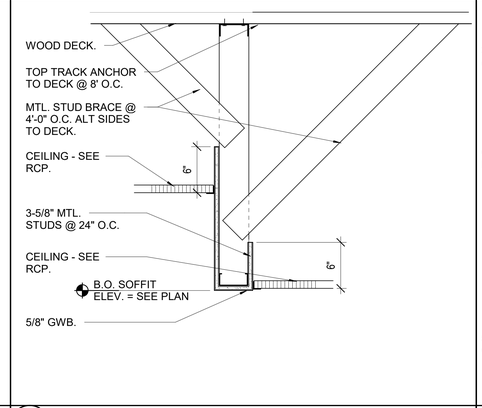
6 a9.1 — fire extinguisher cabinet detail — 1 1/2" = 1'-0"



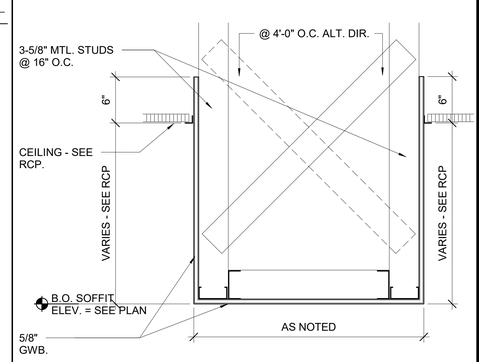
7 a9.1 — ceiling suspension system/ seismic bracing detail — 12" = 1'-0"



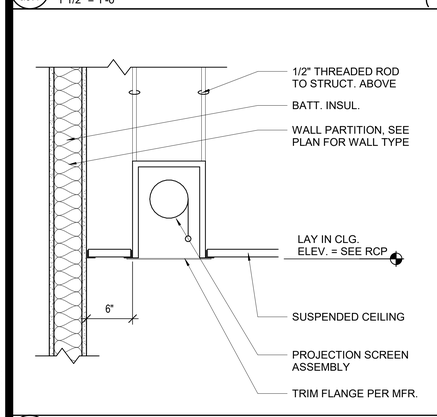
8 a9.1 — gwb ceiling suspension system (wood i-joist) — 3" = 1'-0"



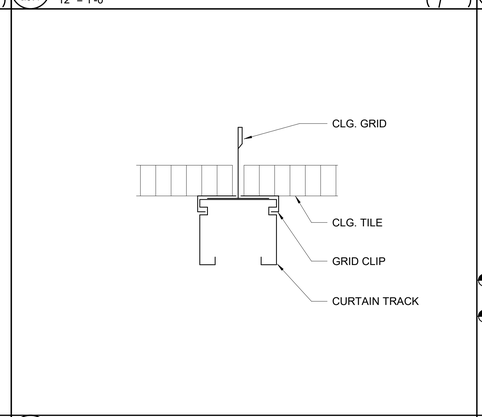
9 a9.1 — ceiling height transition — 1 1/2" = 1'-0" — (1/ a2.2)



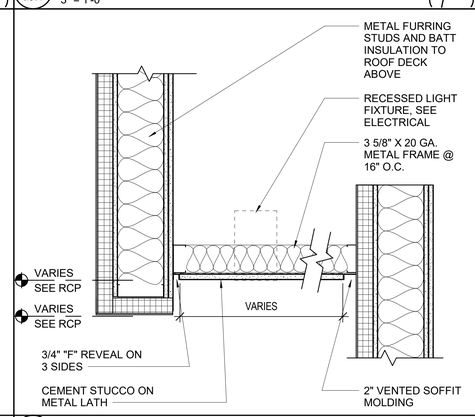
10 a9.1 — gwb soffit — 1 1/2" = 1'-0" — (2/a1.13)



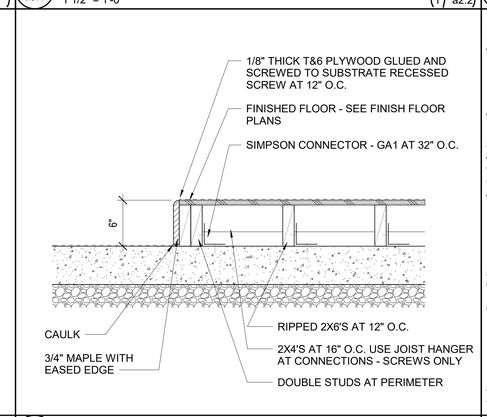
11 a9.1 — projection screen support — 1 1/2" = 1'-0" — (1/ a2.3)



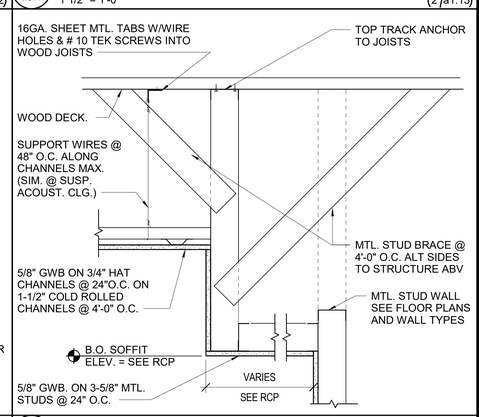
12 a9.1 — curtain track — 12" = 1'-0" — (2/ a7.6)



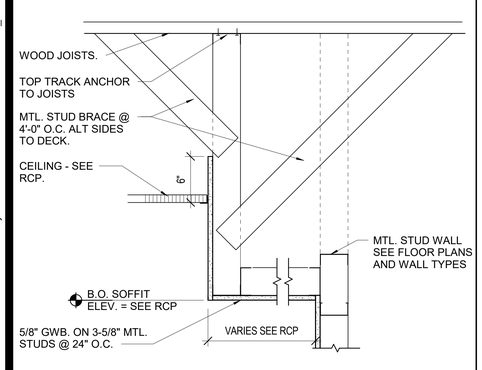
13 a9.1 — stucco ceiling between exterior walls — 1 1/2" = 1'-0" — (1/ a2.1)



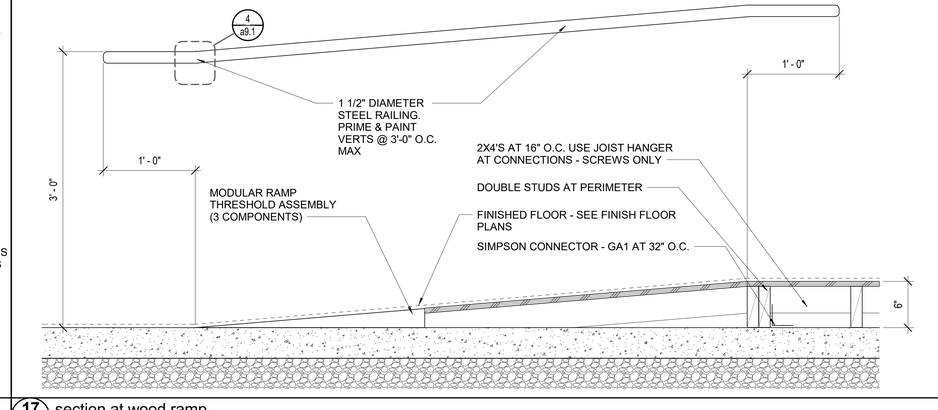
14 a9.1 — platform section — 1 1/2" = 1'-0" — (1/ a1.3)



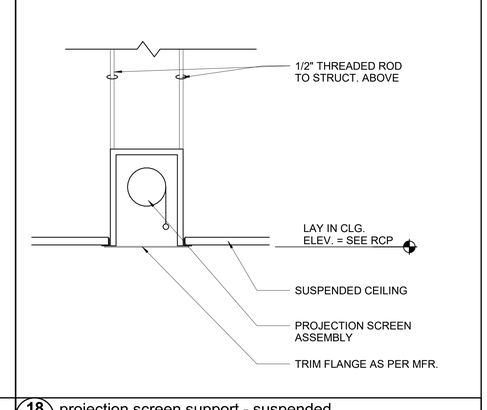
15 a9.1 — ceiling height transition - gwb — 1 1/2" = 1'-0" — (1/ a2.1)



16 a9.1 — ceiling height transition - act/ gwb — 1 1/2" = 1'-0" — (1/ a2.1)



17 a9.1 — section at wood ramp — 1 1/2" = 1'-0" — (1/ a1.3)



18 a9.1 — projection screen support - suspended — 1 1/2" = 1'-0" — (1/ a2.3)

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37165
KEVIN A. BARBER
ARIZONA U.S.A.

job
1717

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11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

details - wall and ceiling details

a9.1

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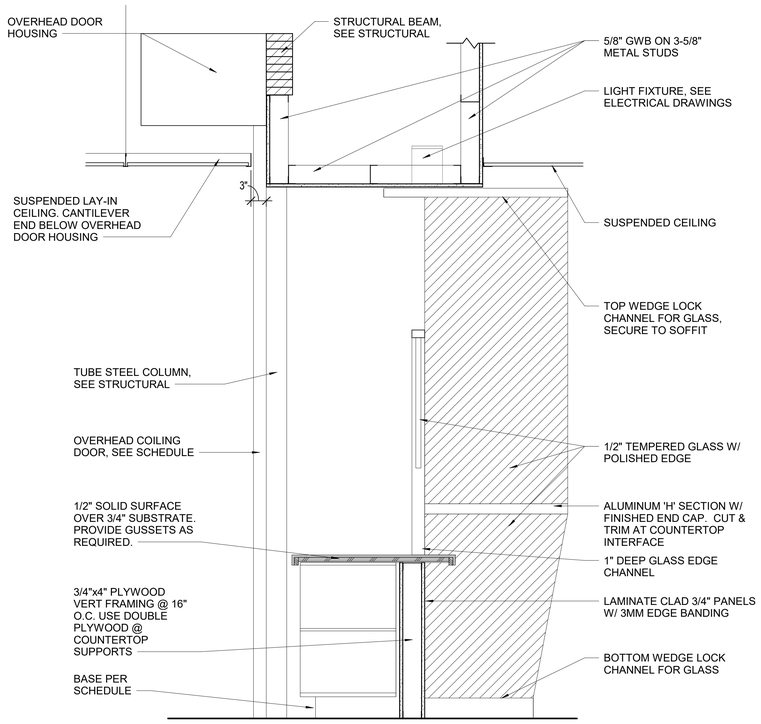
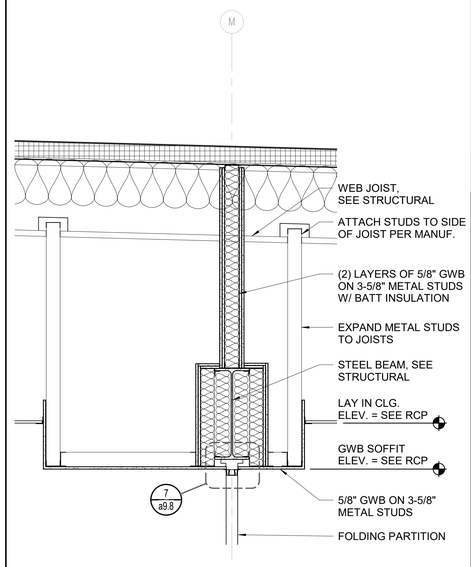
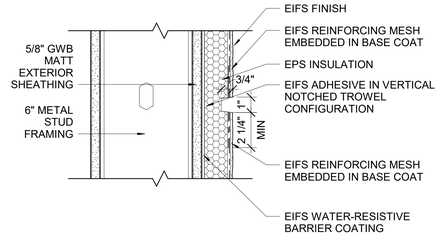


1 a9.2 — rolling grill door at pharmacy
1" = 1'-0" (1 / a7.5)

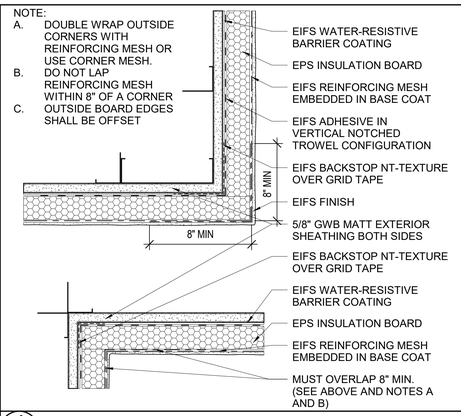


2 a9.2 — folding partition
3/4" = 1'-0" (1 / a2.3)

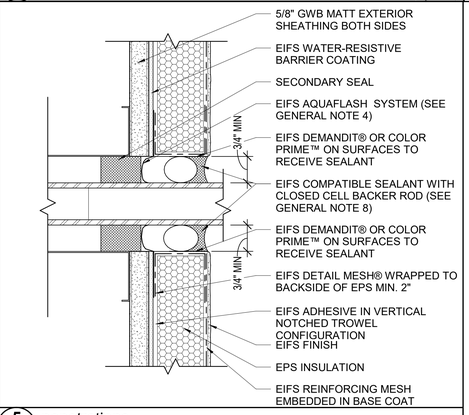


NOTE:
SLOPE BOTTOM EDGE OF HORIZONTAL REVEAL FOR POSITIVE DRAINAGE.

3 a9.2 — aesthetic reveals
3" = 1'-0" (/)



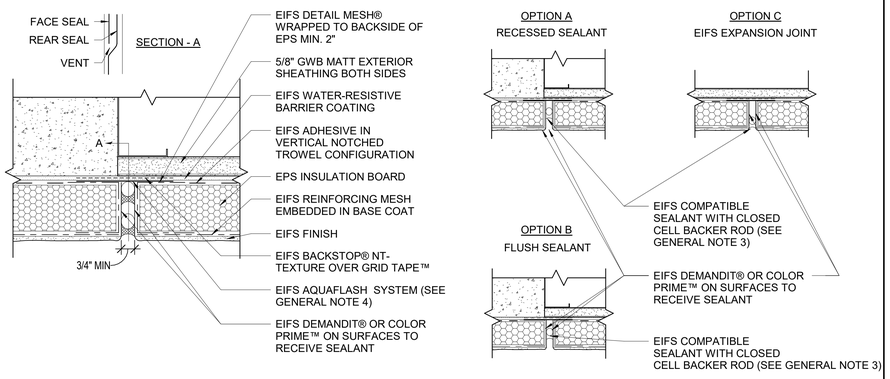
4 a9.2 — inside/outside corners
3" = 1'-0" (/)



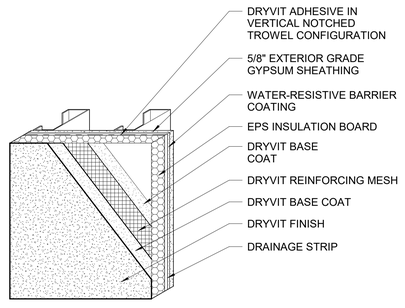
5 a9.2 — penetrations
6" = 1'-0" (/)

general notes

1. LAP ALL FLASHING AND WATER RESISTANT BARRIERS IN SINGLE FASHION.
2. SEALANT SHALL NOT BE IN DIRECT CONTACT WITH ASPHALTIC ADHESIVE ON DRYVIT FLASHING TAPE. COVER DRYVIT FLASHING TAPE LAPS WITH POLYETHYLENE TAPE OR BACKER ROD.
3. REFER TO STRUCTURAL SHEETS FOR ALL METAL FRAME LINTELS.
4. DETAILS ARE FROM DRYVIT STANDARD DETAILS AND MAY NOT DIRECTLY APPLY TO THIS PROJECT. REFER TO ASSOCIATED PROJECT DETAILS FOR ADDITIONAL INFORMATION.



6 a9.2 — verical expansion joint options
6" = 1'-0" (/)



NOTE: DRYVIT DRAINAGE TRACK CAN BE USED AT SYSTEM TERMINATION AT GRADE, REFER TO DETAIL 2 SHEET a9.4 FOR CONFIGURATION. DRYVIT DRAINAGE TRACK SHOULD ONLY BE USED AT GRADE LEVEL TERMINATIONS

7 a9.2 — outsulation plus MD system
12" = 1'-0" (/)

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revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

details - wall and ceiling details

a9.2

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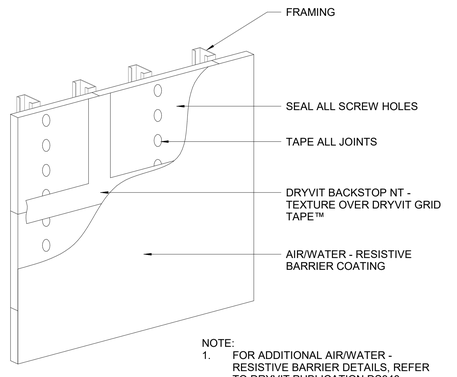
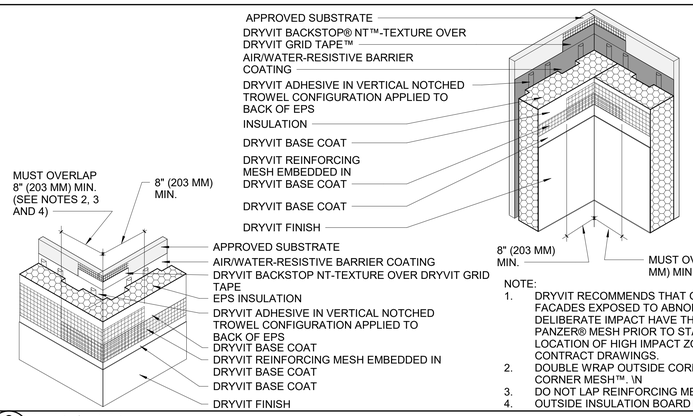
general notes

1. LAP ALL FLASHING AND WATER RESISTANT BARRIERS IN SINGLE FASHION.
2. SEALANT SHALL NOT BE IN DIRECT CONTACT WITH ASPHALTIC ADHESIVE ON DRYVIT FLASHING TAPE. COVER DRYVIT FLASHING TAPE LAPS WITH POLYETHYLENE TAPE OR BACKER ROD.
3. REFER TO STRUCTURAL SHEETS FOR ALL METAL FRAME LINTELS.
4. DETAILS ARE FROM DRYVIT STANDARD DETAILS AND MAY NOT DIRECTLY APPLY TO THIS PROJECT. REFER TO ASSOCIATED PROJECT DETAILS FOR ADDITIONAL INFORMATION.



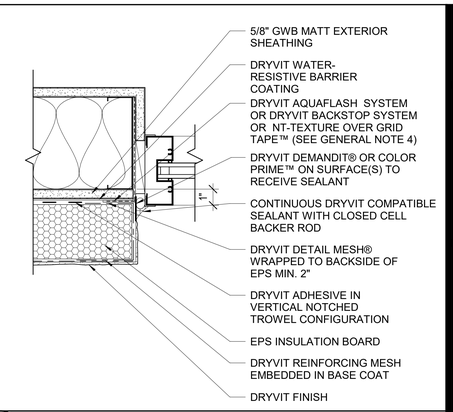
NOTE:
1. FOR ADDITIONAL AIR/WATER - RESISTIVE BARRIER DETAILS, REFER TO DRYVIT PUBLICATION DS840.

2 a9.3 awrb application
12" = 1'-0"

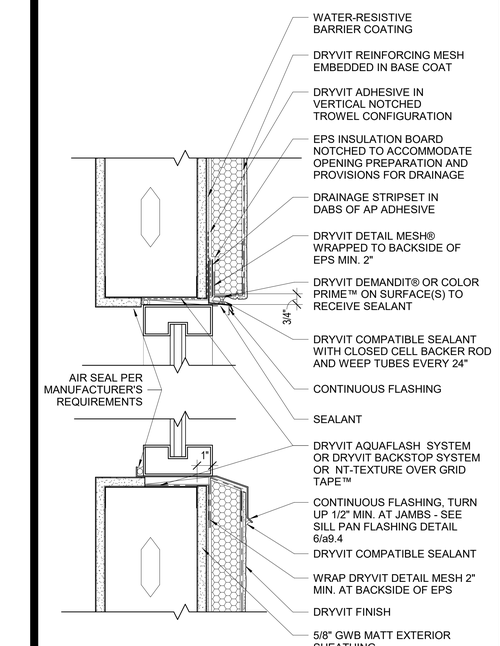


NOTE:
1. DRYVIT RECOMMENDS THAT GROUND FLOOR APPLICATIONS AND ALL FACADES EXPOSED TO ABNORMAL STRESS, HIGH TRAFFIC, OR DELIBERATE IMPACT HAVE THE BASE COAT REINFORCED WITH PANZER® MESH PRIOR TO STANDARD™ OR STANDARD PLUS™ MESH. LOCATION OF HIGH IMPACT ZONES SHOULD BE INDICATED ON CONTRACT DRAWINGS.
2. DOUBLE WRAP OUTSIDE CORNERS WITH REINFORCING MESH OR USE CORNER MESH™. \N
3. DO NOT LAP REINFORCING MESH WITHIN 8" (203 MM) OF A CORNER.
4. OUTSIDE INSULATION BOARD EDGES SHALL BE OFFSET.

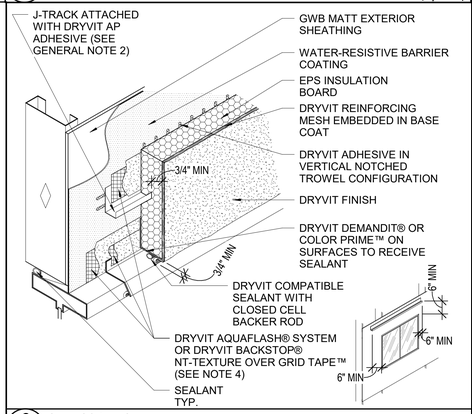
3 a9.3 inside/outside corners
12" = 1'-0"



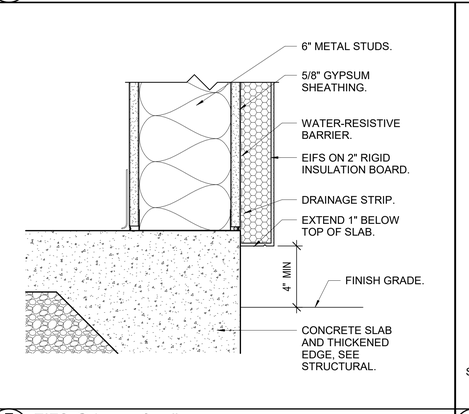
4 a9.3 jamb
3" = 1'-0"



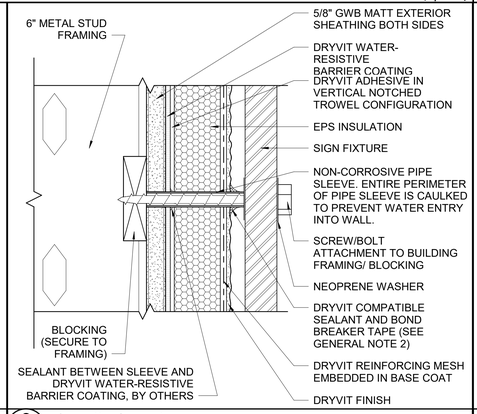
5 a9.3 head/sill - storefront window
3" = 1'-0"
(1 / a6.0)



6 a9.3 head j-track
1 1/2" = 1'-0"

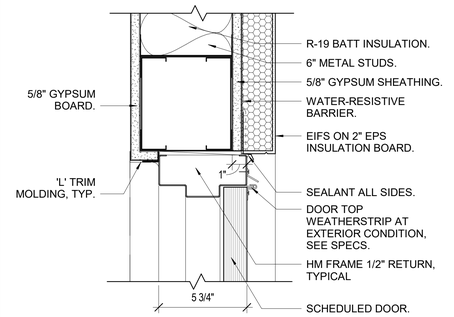


7 a9.3 EIFS @ base of wall
3" = 1'-0"
(2 / a6.0)

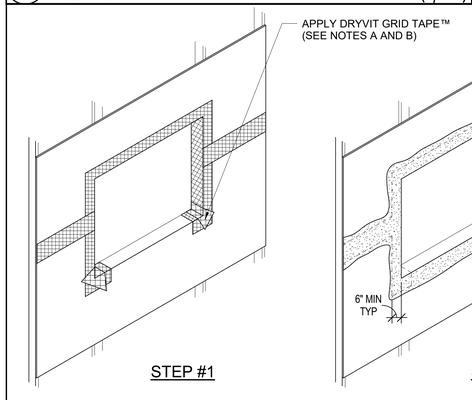


8 a9.3 sign attachment
6" = 1'-0"

NOTE:
REFER TO DETAILS ON THIS SHEET FOR TYPICAL FLASHING OF OPENINGS IN WALL.

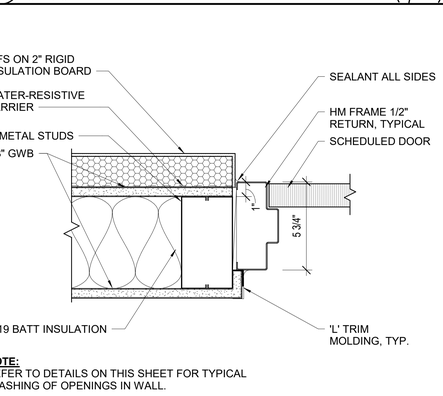


9 a9.3 E4 wall type - HM door head
3" = 1'-0"



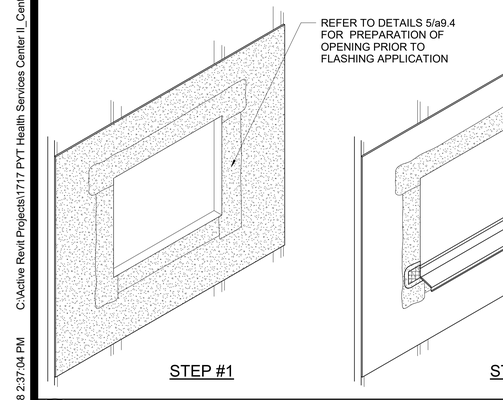
NOTE:
A. APPLY DRYVIT GRID TAPE ON CORNERS OF OPENING AND SHEATHING JOINTS.
B. TROWEL APPLY DRYVIT BACKSTOP NT-TEXTURE OVER THE DRYVIT GRID TAPE ALL THE WAY TO INSIDE FACE OF OPENING. ALL VOIDS MUST BE FILLED; MULTIPLE PASSES MAY BE REQUIRED. AS AN OPTION, DRYVIT GRID TAPE AND DRYVIT BACKSTOP NT-TEXTURE MAY ALSO BE APPLIED AT THE SILL PRIOR TO DRYVIT AQUAFLASH SYSTEM OR FLASHING TAPE APPLICATION.
C. INSTALL WINDOW UNIT AND ASSOCIATED FLASHING PER MANUFACTURER'S RECOMMENDATIONS, CODE REQUIREMENTS AND PROJECT DOCUMENTS.
D. REFER TO HEAD, SILL AND JAMB DETAILS FOR FLASHING INTEGRATION.

10 a9.3 opening preparation - backstop nt
1/2" = 1'-0"

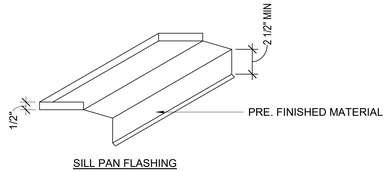


NOTE:
REFER TO DETAILS ON THIS SHEET FOR TYPICAL FLASHING OF OPENINGS IN WALL.

11 a9.3 E4 wall type - HM door jamb
3" = 1'-0"

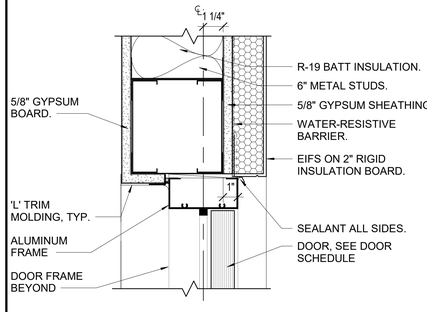


12 a9.3 opening flashing integration
1/2" = 1'-0"



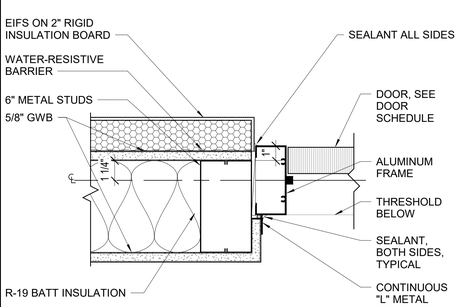
SILL PAN FLASHING DETAIL
N.T.S.

NOTE:
REFER TO DETAILS ON THIS SHEET FOR TYPICAL FLASHING OF OPENINGS IN WALL.



13 a9.3 E4 wall type - AL door head
3" = 1'-0"

NOTE:
REFER TO DETAILS ON THIS SHEET FOR TYPICAL FLASHING OF OPENINGS IN WALL.



14 a9.3 E4 wall type - AL door jamb
3" = 1'-0"

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job
1717

date
11.16.18

revisions

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details - EIFS system

a9.3

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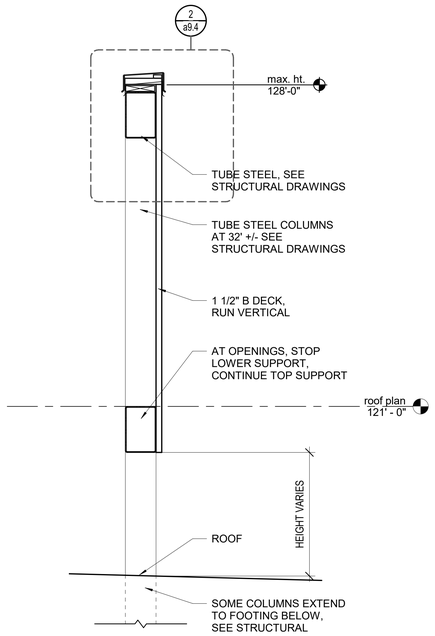
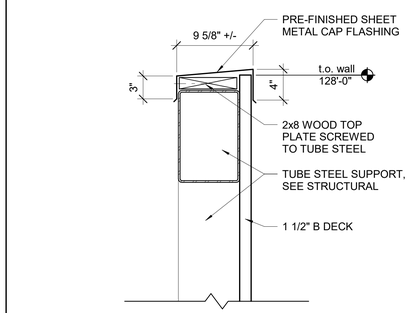
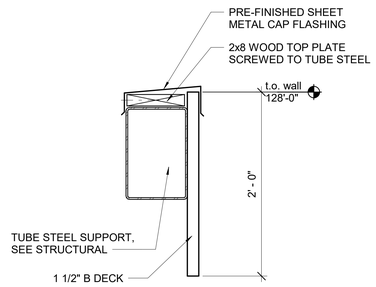


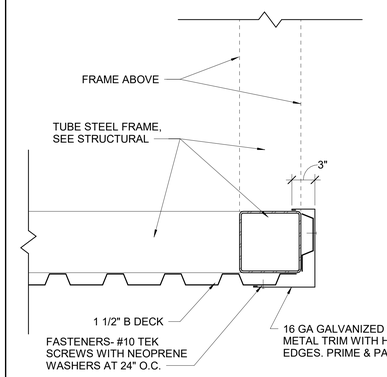
1 roof screen wall
a9.4 3/4" = 1'-0" (1 / a3.1)



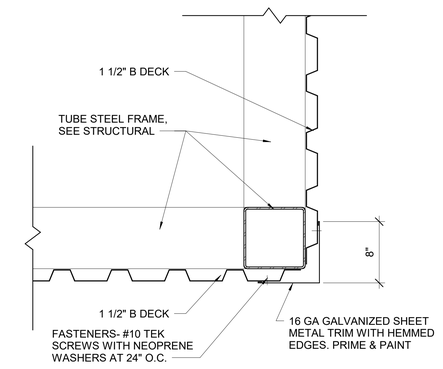
2 screen wall cap
a9.4 1 1/2" = 1'-0" (2 / a3.1)



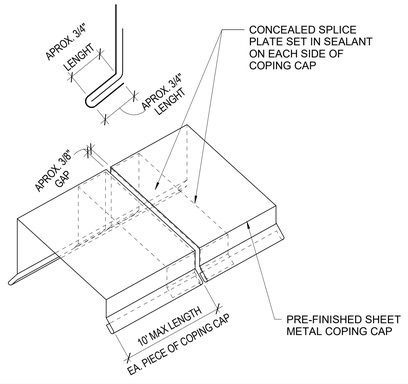
3 screen wall cap at opening
a9.4 1 1/2" = 1'-0" (2 / a3.1)



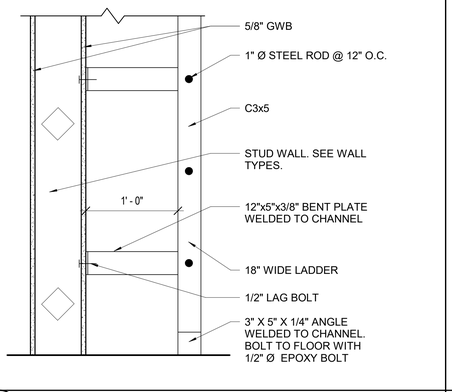
4 corner column at screen wall opening
a9.4 1 1/2" = 1'-0" (2 / a3.1)



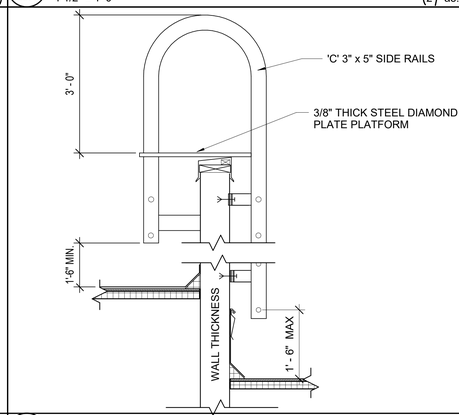
5 corner column at screen wall
a9.4 1 1/2" = 1'-0" (2 / a3.1)



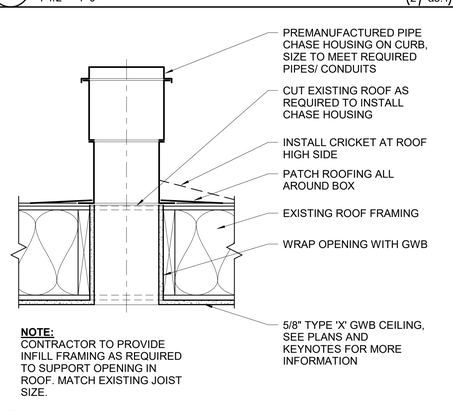
6 parapet cap splice
a9.4 6" = 1'-0" (/)



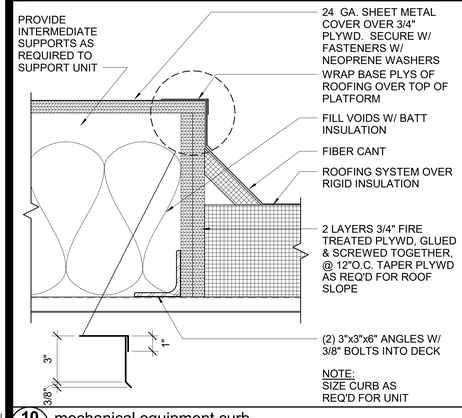
7 roof access ladder
a9.4 1 1/2" = 1'-0" (/)



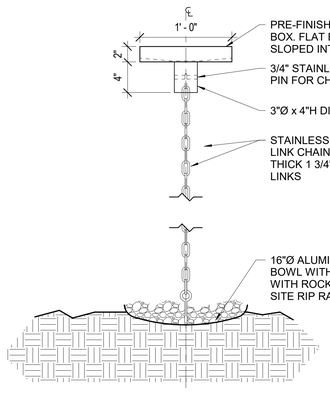
8 roof access ladder at parapet
a9.4 3/4" = 1'-0" (1 / a3.2)



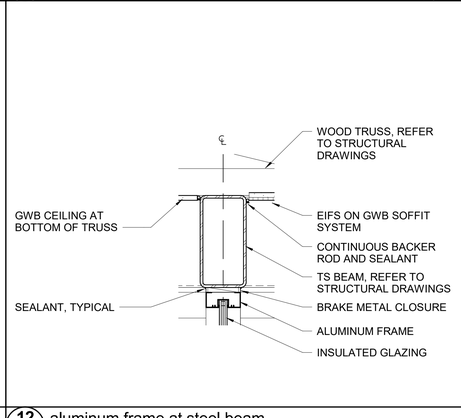
9 pipe chase housing
a9.4 1 1/2" = 1'-0" (/)



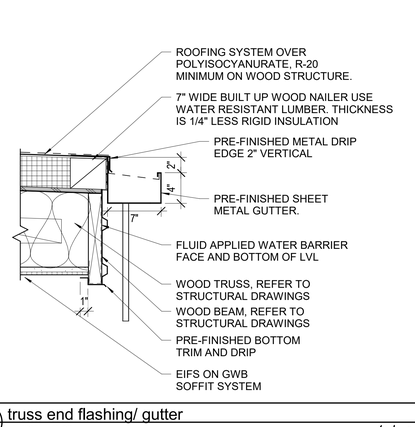
10 mechanical equipment curb
a9.4 3" = 1'-0" (/)



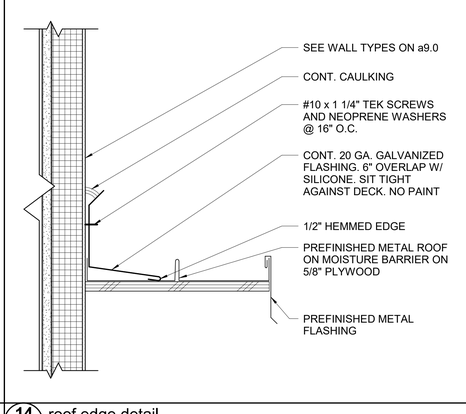
11 gutter rain chain/ basin
a9.4 1 1/2" = 1'-0" (1 / a4.3)



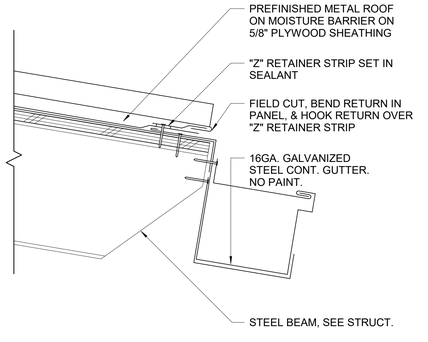
12 aluminum frame at steel beam
a9.4 1 1/2" = 1'-0" (3 / a6.1)



13 truss end flashing/ gutter
a9.4 1 1/2" = 1'-0" (1 / a6.0)



14 roof edge detail
a9.4 3" = 1'-0" (1 /a7.13)



15 gutter @ standing seam detail
a9.4 3" = 1'-0" (3 /a7.13)

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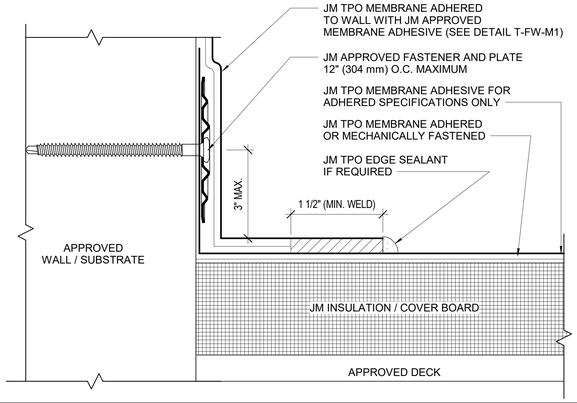
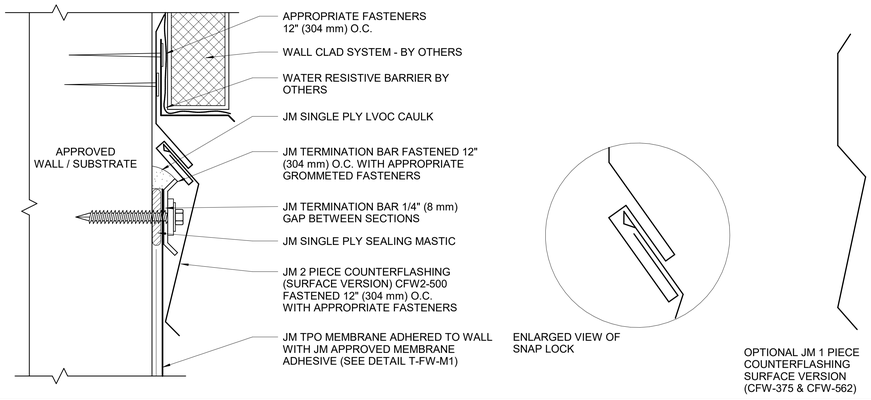
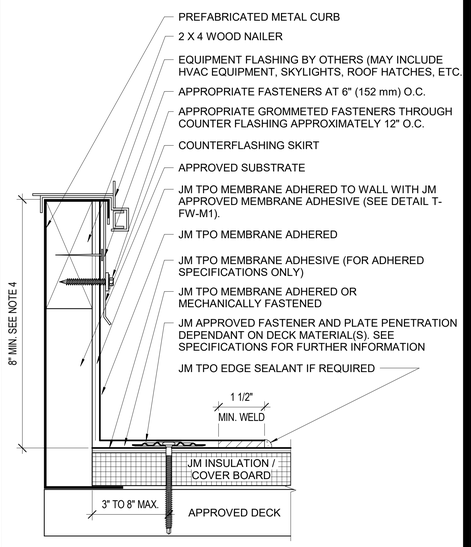


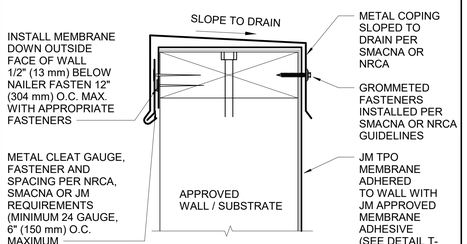
1 base tie-in (fastener & plate) on wall
a9.5 12" = 1'-0" (1 / a3.1)



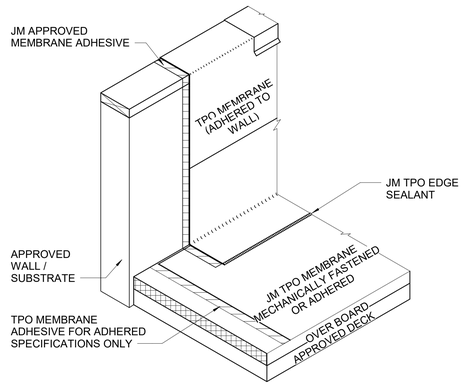
2 TPO intermediate termination below wall cladding
a9.5 12" = 1'-0" (1 / a3.2)



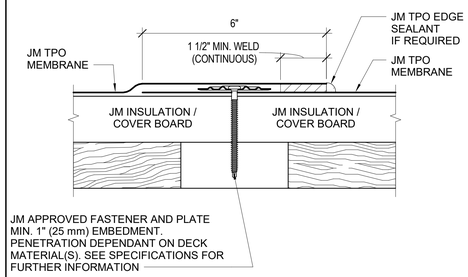
6 prefabricated metal curb base flashing
a9.5 6" = 1'-0" (1 / a3.1)



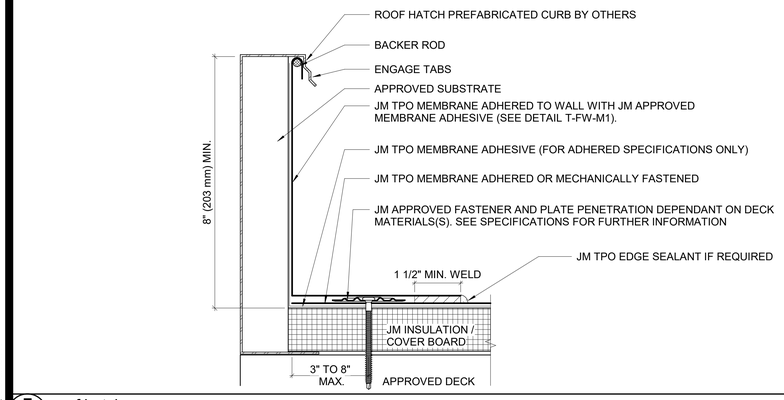
3 fabricated metal coping over adhered TPO
a9.5 6" = 1'-0" (1 / a3.1)



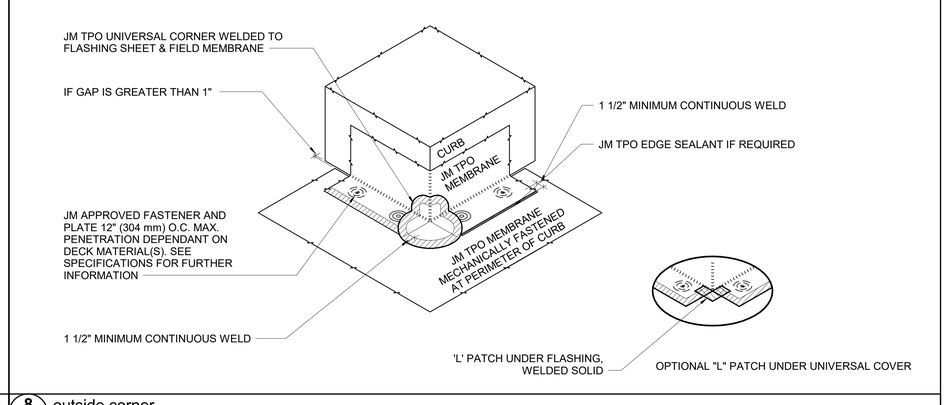
4 TPO base & wall flashing with coping isometric view
a9.5 6" = 1'-0" (/)



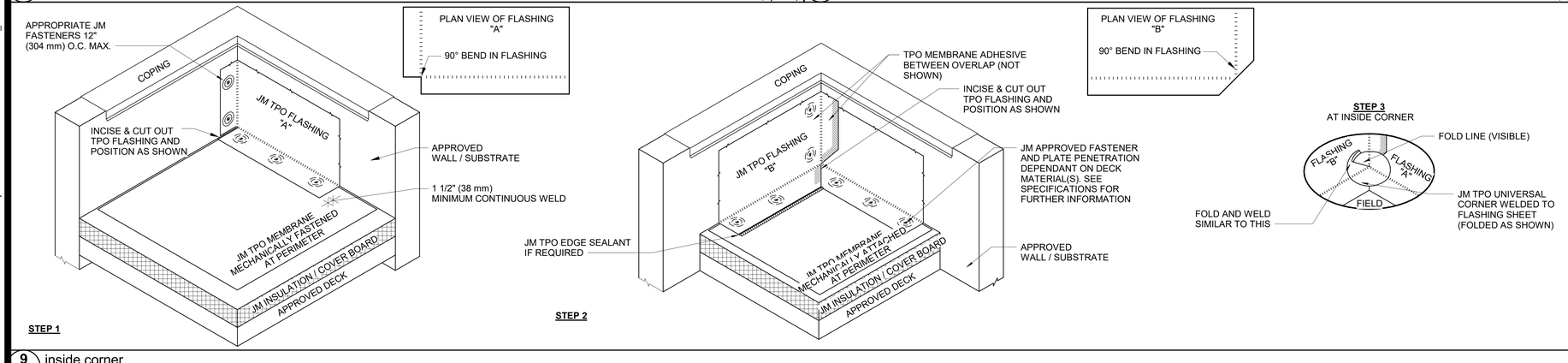
5 in lap fastening method-wood plank deck
a9.5 6" = 1'-0" (/)



7 roof hatch
a9.5 6" = 1'-0" (1 / a3.3)



8 outside corner
a9.5 6" = 1'-0" (/)



9 inside corner
a9.5 12" = 1'-0" (/)

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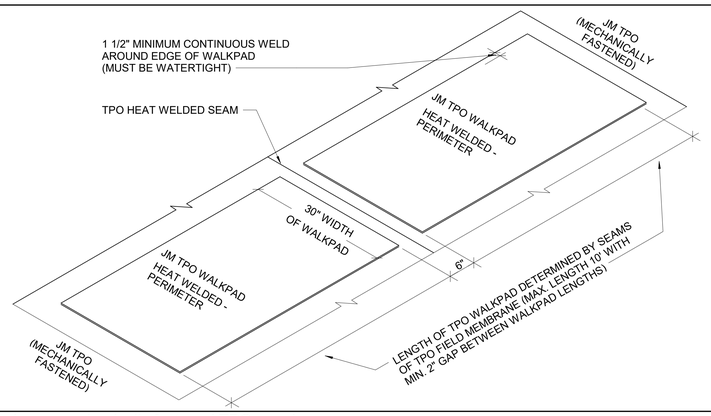
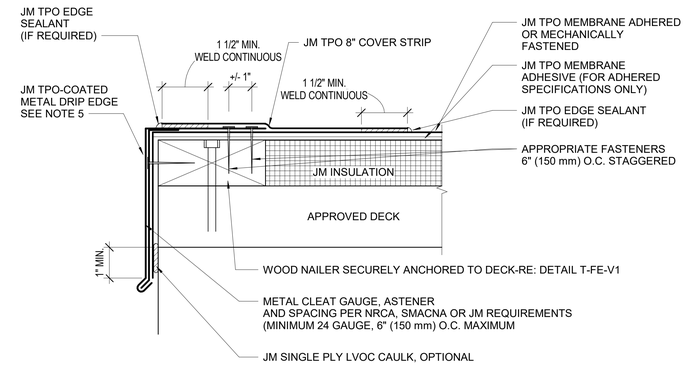
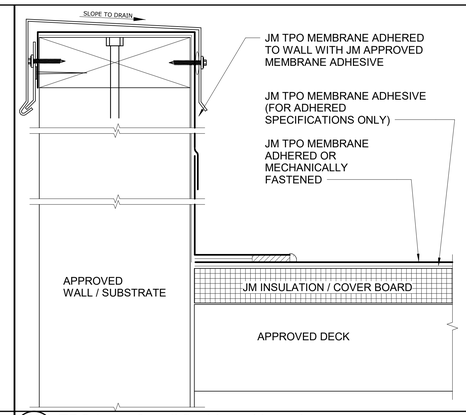


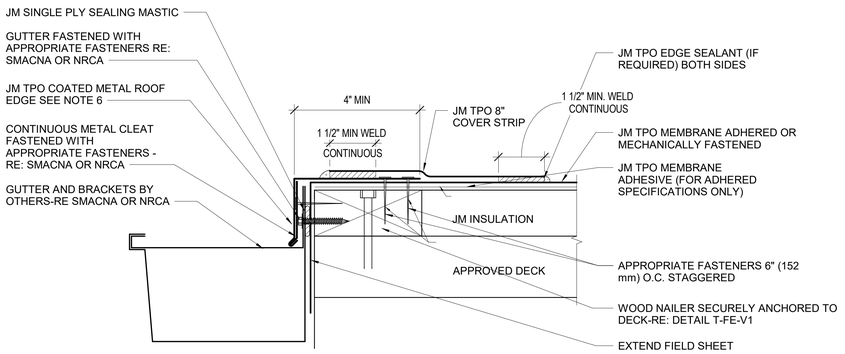
1 a9.6 — TPO walkpad over mechanically fastened TPO membrane
12" = 1'-0" (/)



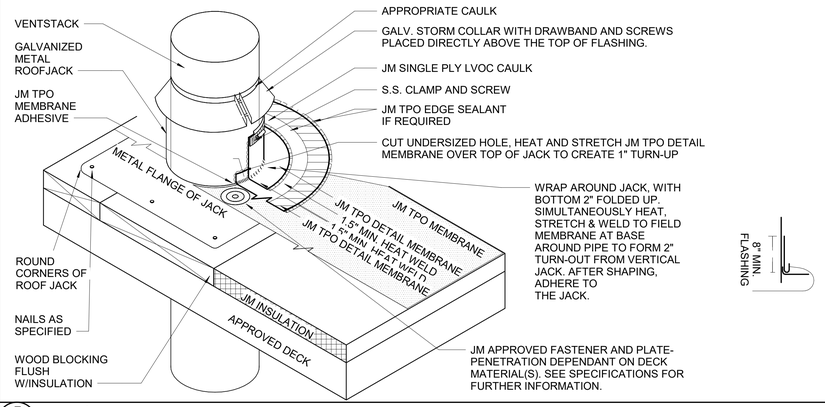
2 a9.6 — drip edge (TPO coated metal)
6" = 1'-0" (/)



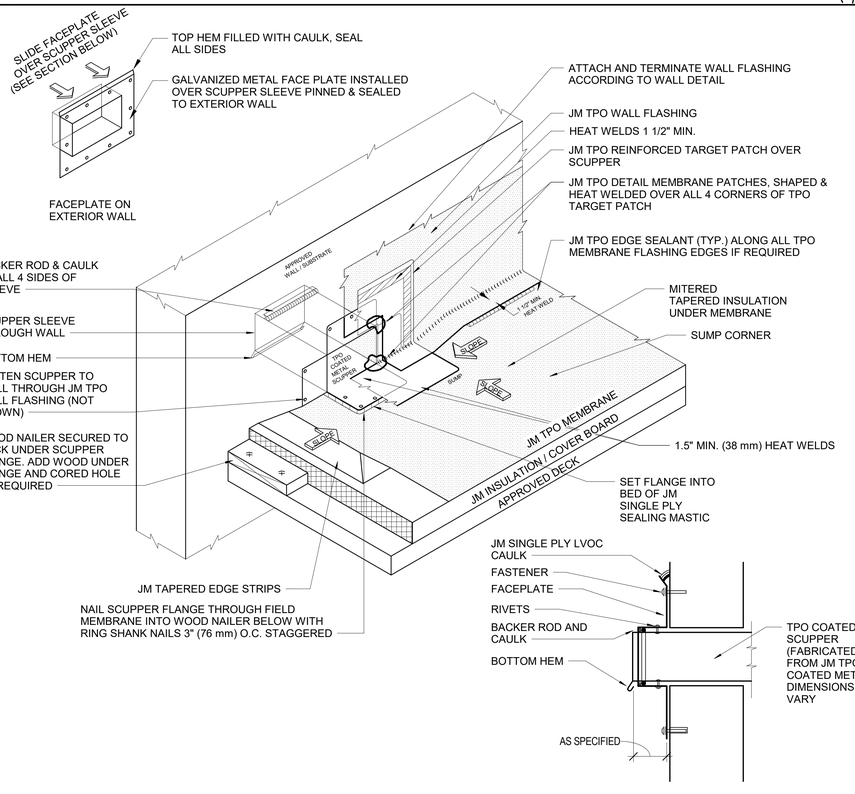
3 a9.6 — TPO base & wall flashing with coping
12" = 1'-0" (/)



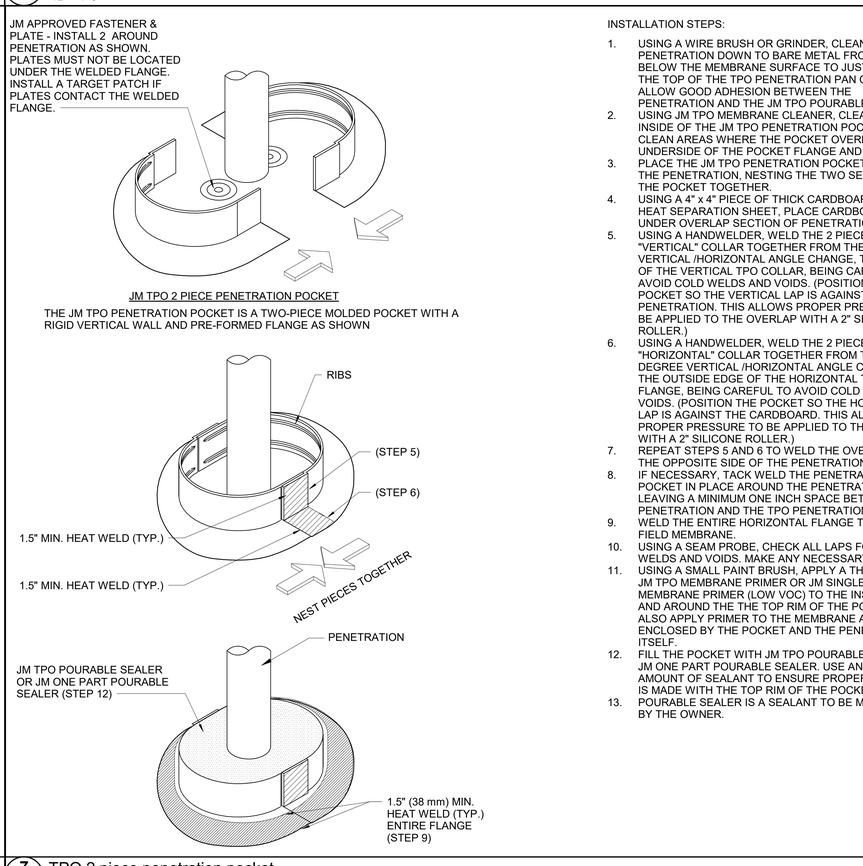
4 a9.6 — gutter & TPO coated metal edge
6" = 1'-0" (1 / a3.2)



5 a9.6 — vent pipe
12" = 1'-0" (/)



6 a9.6 — primary scupper with tapered insulation sump
12" = 1'-0" (/)



7 a9.6 — TPO 2 piece penetration pocket
12" = 1'-0" (/)

INSTALLATION STEPS:

1. USING A WIRE BRUSH OR GRINDER, CLEAN PENETRATION DOWN TO BARE METAL FROM JUST BELOW THE MEMBRANE SURFACE TO JUST ABOVE THE TOP OF THE TPO PENETRATION PAN COLLAR TO ALLOW GOOD ADHESION BETWEEN THE PENETRATION AND THE JM TPO POURABLE SEALER.
2. USING JM TPO MEMBRANE CLEANER, CLEAN THE INSIDE OF THE JM TPO PENETRATION POCKET. ALSO, CLEAN AREAS WHERE THE POCKET OVERLAPS THE UNDERSIDE OF THE POCKET FLANGE AND MEMBRANE.
3. PLACE THE JM TPO PENETRATION POCKET AROUND THE PENETRATION, NESTING THE TWO SECTIONS OF THE POCKET TOGETHER.
4. USING A 4" x 4" PIECE OF THICK CARDBOARD AS A HEAT SEPARATION SHEET, PLACE CARDBOARD UNDER OVERLAP SECTION OF PENETRATION PAN.
5. USING A HANDWELDER, WELD THE 2 PIECE "VERTICAL" COLLAR TOGETHER FROM THE 90 DEGREE VERTICAL /HORIZONTAL ANGLE CHANGE, TO THE TOP OF THE VERTICAL TPO COLLAR, BEING CAREFUL TO AVOID COLD WELDS AND VOIDS. (POSITION THE POCKET SO THE VERTICAL LAP IS AGAINST THE PENETRATION. THIS ALLOWS PROPER PRESSURE TO BE APPLIED TO THE OVERLAP WITH A 2" SILICONE ROLLER.)
6. USING A HANDWELDER, WELD THE 2 PIECE "HORIZONTAL" COLLAR TOGETHER FROM THE 90 DEGREE VERTICAL /HORIZONTAL ANGLE CHANGE, TO THE OUTSIDE EDGE OF THE HORIZONTAL TPO POCKET FLANGE, BEING CAREFUL TO AVOID COLD WELDS AND VOIDS. (POSITION THE POCKET SO THE HORIZONTAL LAP IS AGAINST THE CARDBOARD. THIS ALLOWS PROPER PRESSURE TO BE APPLIED TO THE OVERLAP WITH A 2" SILICONE ROLLER.)
7. REPEAT STEPS 5 AND 6 TO WELD THE OVERLAPS OF THE OPPOSITE SIDE OF THE PENETRATION PAN.
8. IF NECESSARY, TACK WELD THE PENETRATION POCKET IN PLACE AROUND THE PENETRATION, LEAVING A MINIMUM ONE INCH SPACE BETWEEN THE PENETRATION AND THE TPO PENETRATION COLLAR.
9. WELD THE ENTIRE HORIZONTAL FLANGE TO THE TPO FIELD MEMBRANE.
10. USING A SEAM PROBE, CHECK ALL LAPS FOR COLD WELDS AND VOIDS. MAKE ANY NECESSARY REPAIRS.
11. USING A SMALL PAINT BRUSH, APPLY A THIN COAT OF JM TPO MEMBRANE PRIMER OR JM SINGLE PLY MEMBRANE PRIMER (LOW VOC) TO THE INSIDE RIM AND AROUND THE THE TOP RIM OF THE POCKET. ALSO APPLY PRIMER TO THE MEMBRANE AREA ENCLOSED BY THE POCKET AND THE PENETRATION ITSELF.
12. FILL THE POCKET WITH JM TPO POURABLE SEALER OR JM ONE PART POURABLE SEALER. USE AN ADEQUATE AMOUNT OF SEALANT TO ENSURE PROPER CONTACT IS MADE WITH THE TOP RIM OF THE POCKET.
13. POURABLE SEALER IS A SEALANT TO BE MAINTAINED BY THE OWNER.

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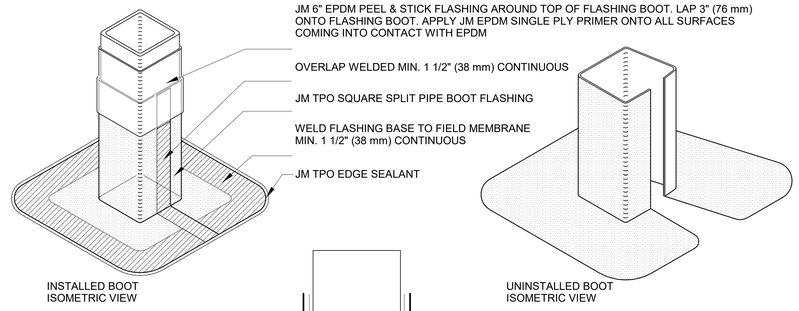
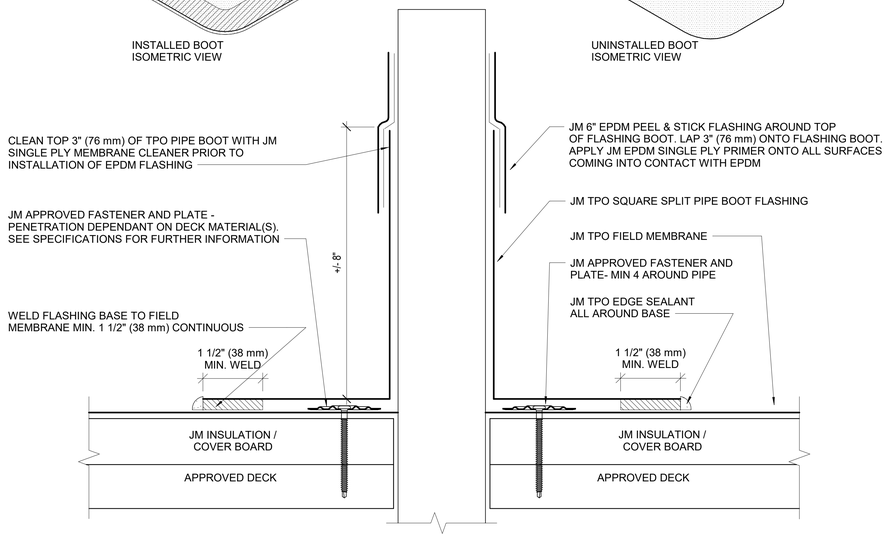
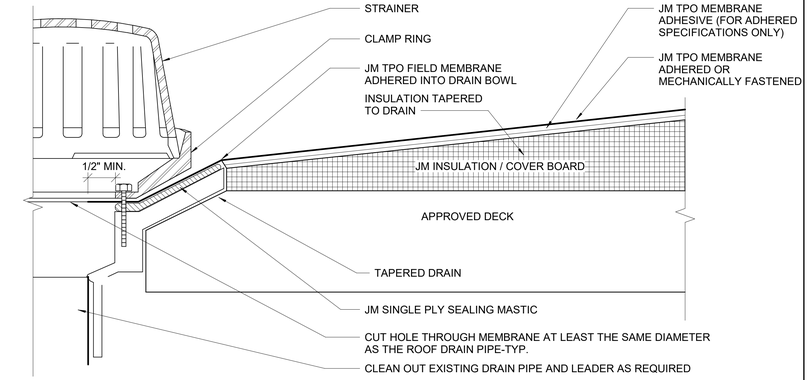
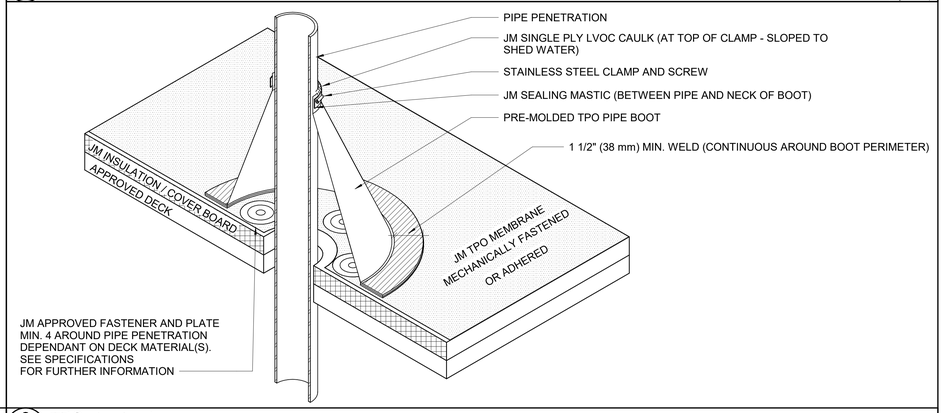




1 a9.7 — TPO split pipe boot
12" = 1'-0" (1 / a3.1)



2 a9.7 — primary drain sump
12" = 1'-0" (1 / a3.1)



3 a9.7 — TPO pipe boot
12" = 1'-0" (/)

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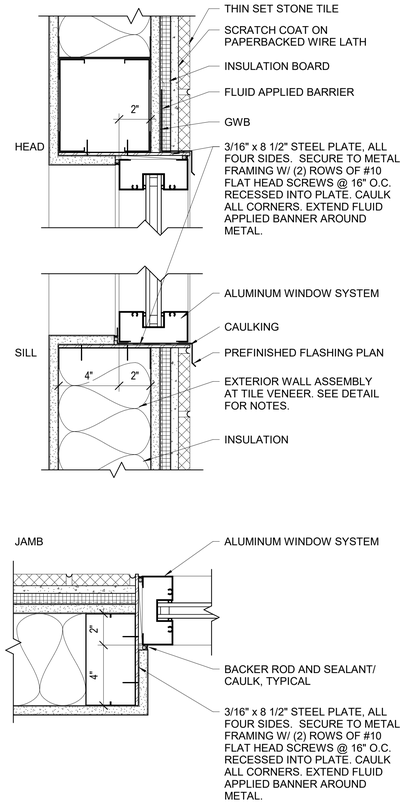
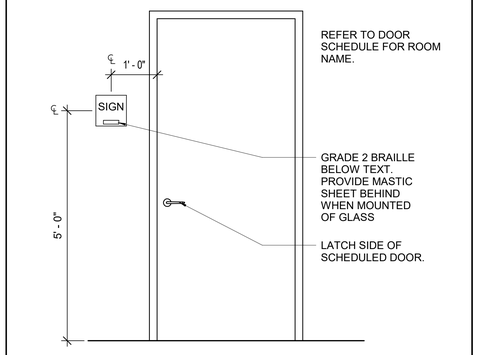
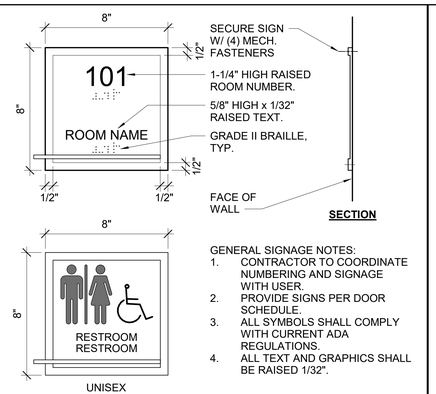


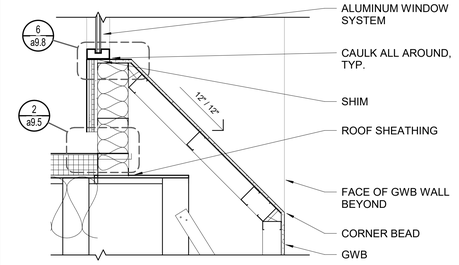
6 a9.8 — E5 wall type - AL window head, sill and jamb
3" = 1'-0" (1 / a6.1)



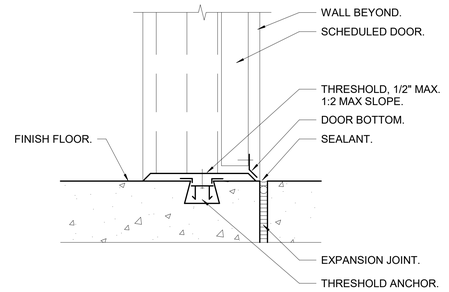
2 a9.8 — wall-mounted signage
3/4" = 1'-0" (/)



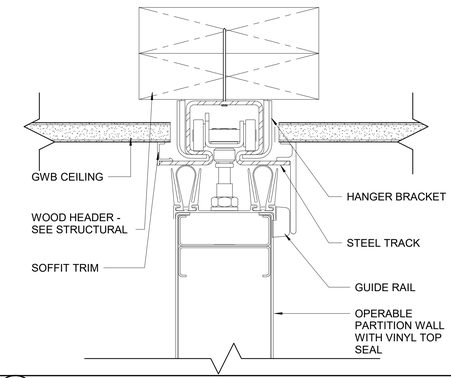
3 a9.8 — wall-mounted signage detail
3" = 1'-0" (/)



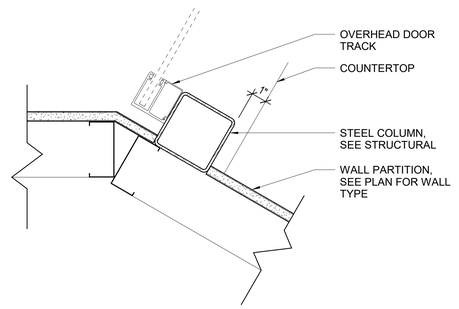
4 a9.8 — high bay window sill
1" = 1'-0" (1 / a2.4)



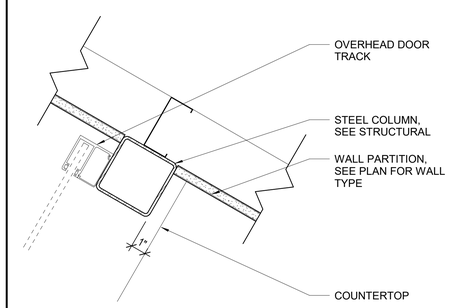
5 a9.8 — threshold
3" = 1'-0" (1 / a6.0)



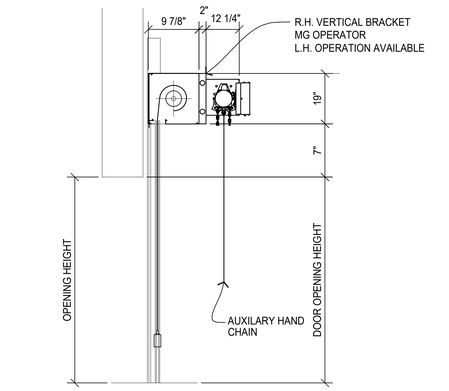
7 a9.8 — operable partition head
6" = 1'-0" (1 / a2.3)



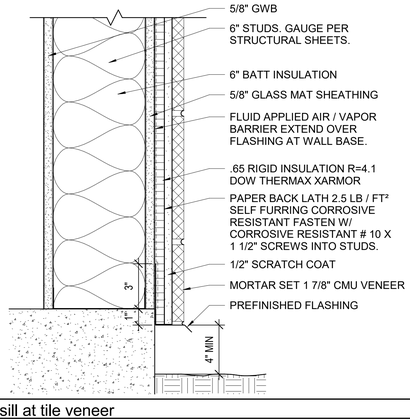
8 a9.8 — coiling grille jamb @ Pharmacy south
3" = 1'-0" (1 / a1.2)



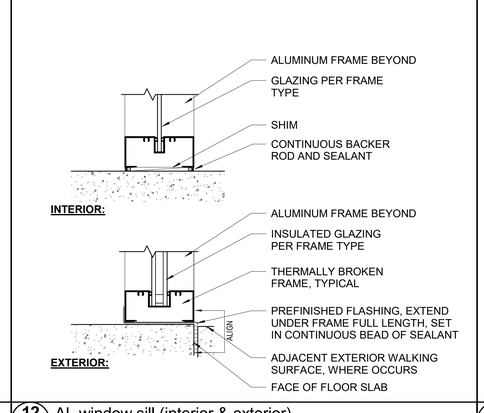
9 a9.8 — coiling grille jamb @ Pharmacy north
3" = 1'-0" (1 / a1.2)



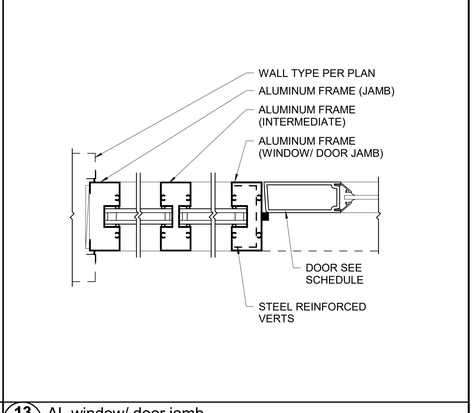
10 a9.8 — rolling grill door head
1" = 1'-0" (/)



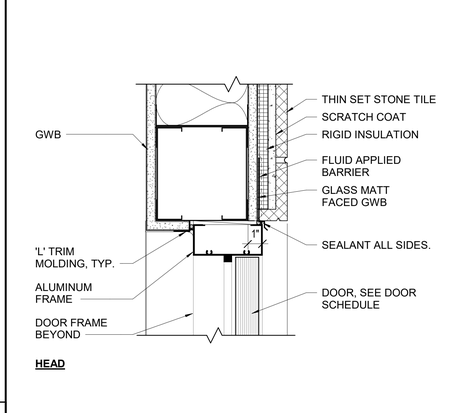
11 a9.8 — sill at tile veneer
3" = 1'-0" (/)



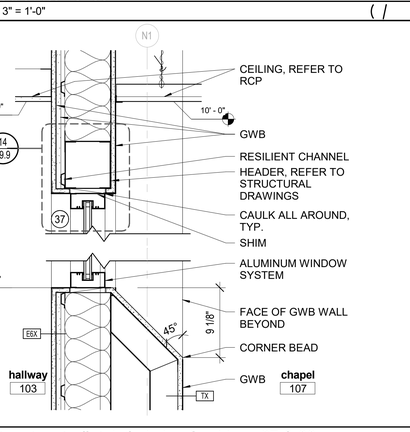
12 a9.8 — AL window sill (interior & exterior)
3" = 1'-0" (3 / a6.1)



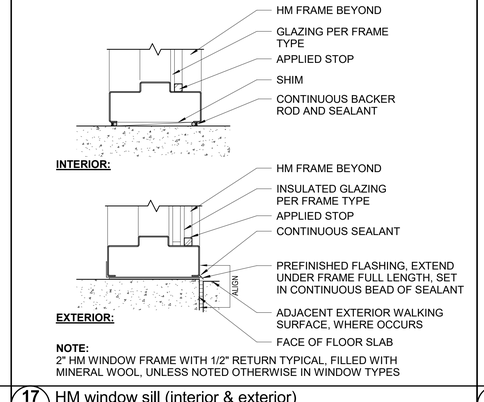
13 a9.8 — AL window/ door jamb
3" = 1'-0" (1 / a6.5)



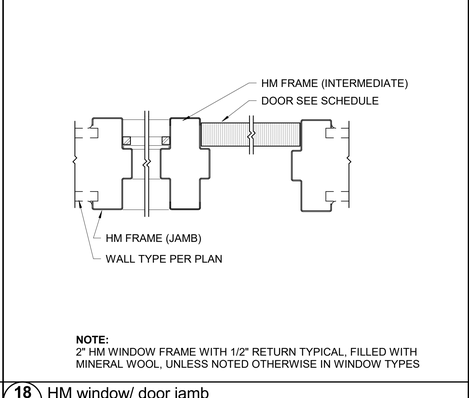
14 a9.8 — overhead coiling door jamb @ Warehouse
3" = 1'-0" (/)



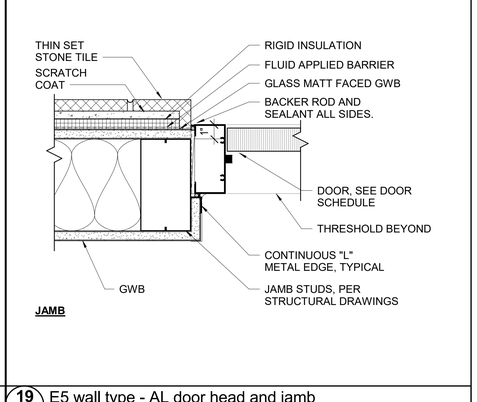
16 a9.8 — head and sill detail at storefront type 37 & 38
1 1/2" = 1'-0" (1 / a10.1)



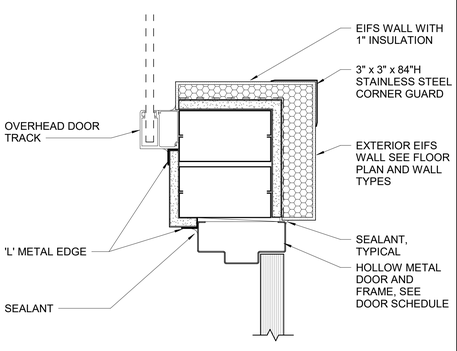
17 a9.8 — HM window sill (interior & exterior)
3" = 1'-0" (/)



18 a9.8 — HM window/ door jamb
3" = 1'-0" (/)



19 a9.8 — E5 wall type - AL door head and jamb
3" = 1'-0" (/)



20 a9.8 — overhead coiling door jamb @ Warehouse
3" = 1'-0" (/)

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FAX (520) 326-1148
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37165
KEVIN A. BARBER
ARIZONA U.S.A.

job
1717

date
11.16.18

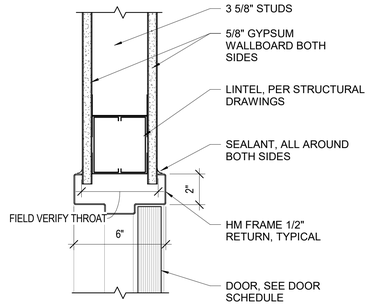
revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

details - doors and windows

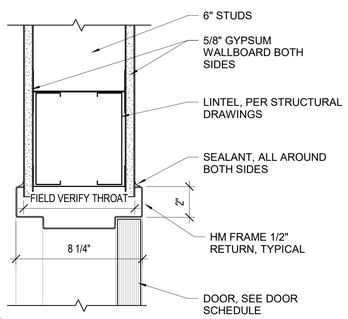
a9.8

11/16/2018 2:37:27 PM C:\Active Revit Projects\1717 PYT Health Services Center II_Central File_cabrams.rvt



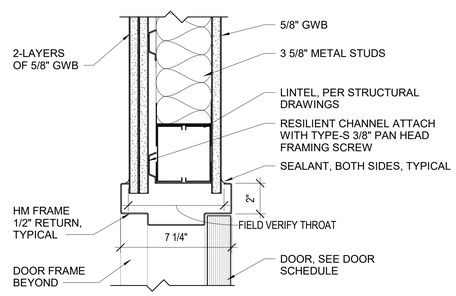
NOTE:
2" HM WINDOW FRAME WITH 1/2" RETURN TYPICAL, FILLED WITH MINERAL WOOL, UNLESS NOTED OTHERWISE IN WINDOW TYPES

1 a9.9 T wall type - HM door head
3" = 1'-0"



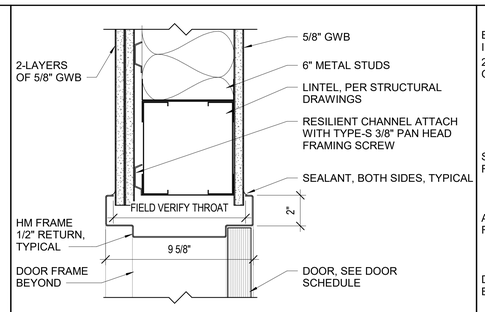
NOTE:
2" HM WINDOW FRAME WITH 1/2" RETURN TYPICAL, FILLED WITH MINERAL WOOL, UNLESS NOTED OTHERWISE IN WINDOW TYPES

2 a9.9 T.6 wall type - HM door head
3" = 1'-0"



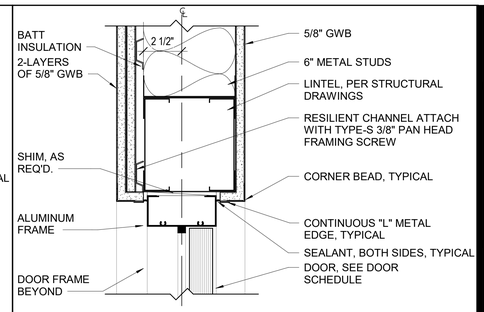
NOTE:
2" HM WINDOW FRAME WITH 1/2" RETURN TYPICAL, FILLED WITH MINERAL WOOL, UNLESS NOTED OTHERWISE IN WINDOW TYPES

3 a9.9 A4 wall type - HM door head
3" = 1'-0"

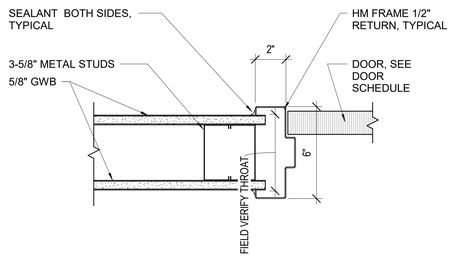


NOTE:
2" HM WINDOW FRAME WITH 1/2" RETURN TYPICAL, FILLED WITH MINERAL WOOL, UNLESS NOTED OTHERWISE IN WINDOW TYPES

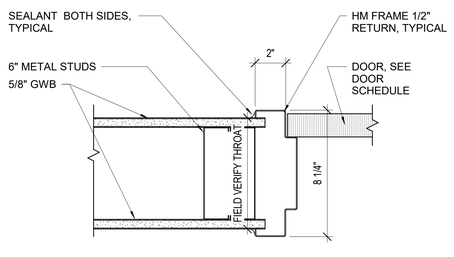
4 a9.9 A4.6 wall type - HM door head
3" = 1'-0"



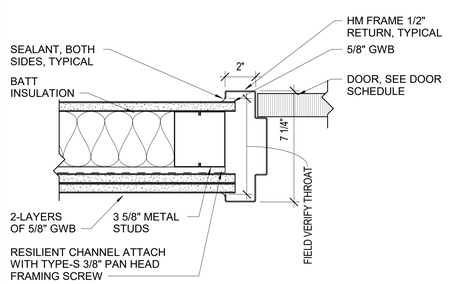
5 a9.9 A4.6 wall type - AL door head
3" = 1'-0"



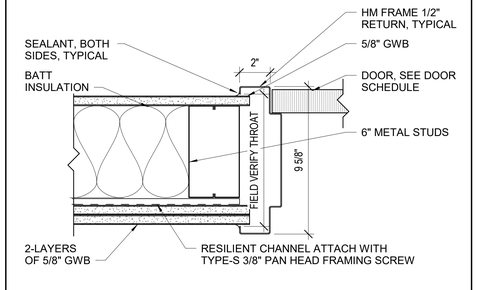
6 a9.9 T wall type - HM door jamb
3" = 1'-0"



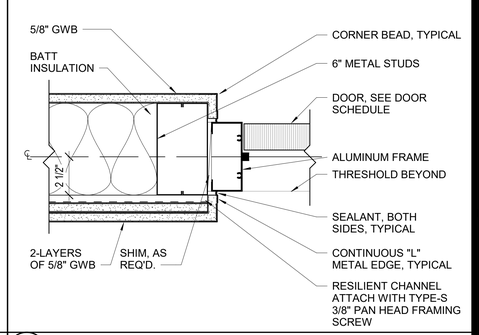
7 a9.9 T.6 wall type - HM door jamb
3" = 1'-0"



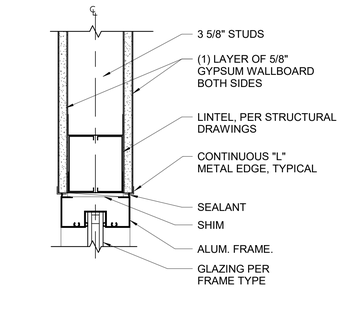
8 a9.9 A4 wall type - HM door jamb
3" = 1'-0"



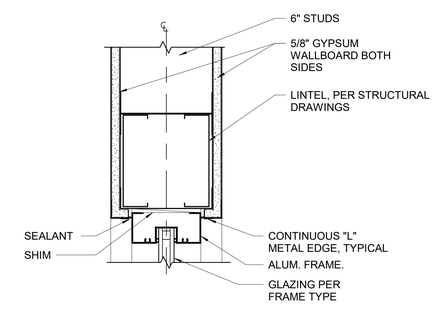
9 a9.9 A4.6 wall type - HM door jamb
3" = 1'-0"



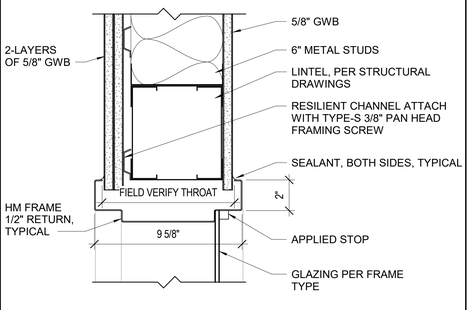
10 a9.9 A4.6 wall type - AL door jamb
3" = 1'-0"



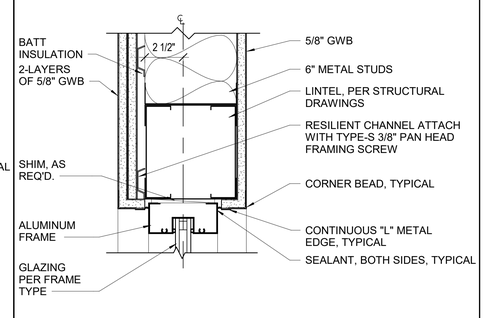
11 a9.9 T wall type - AL window head
3" = 1'-0"



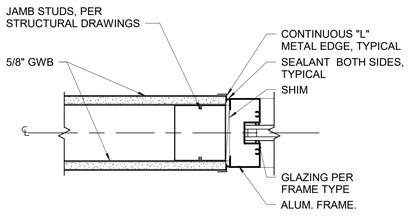
12 a9.9 T.6 wall type - AL window head
3" = 1'-0"



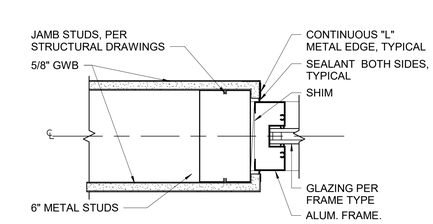
13 a9.9 A4.6 wall type - HM window head
3" = 1'-0"



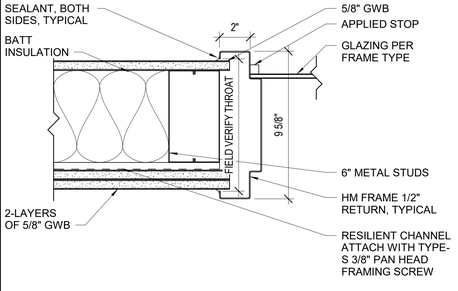
14 a9.9 A4.6 wall type - AL window head
3" = 1'-0"
(16 a9.8)



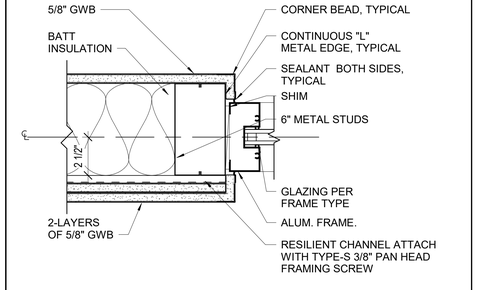
16 a9.9 T wall type - AL window jamb
3" = 1'-0"



17 a9.9 T.6 wall type - AL window jamb
3" = 1'-0"



18 a9.9 A4.6 wall type - HM window jamb
3" = 1'-0"



19 a9.9 A4.6 wall type - AL window jamb
3" = 1'-0"

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ARIZONA U.S.A.

job
1717

date
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revisions

Pascua Yaqui Tribe
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Tucson, AZ 85746

details - doors and windows

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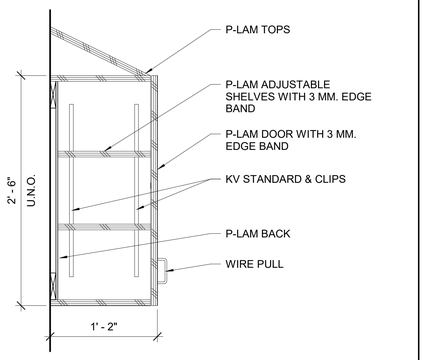
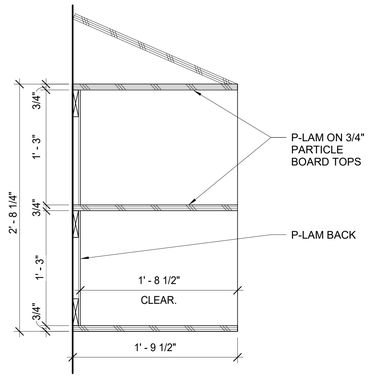
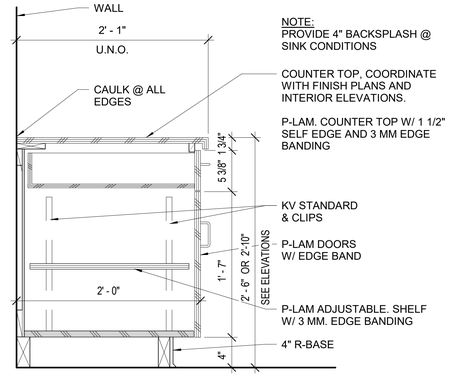


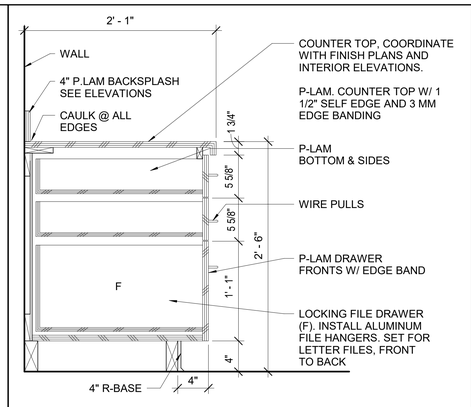
1 upper cabinet
a9.10 1 1/2" = 1'-0" (2 / a7.4)



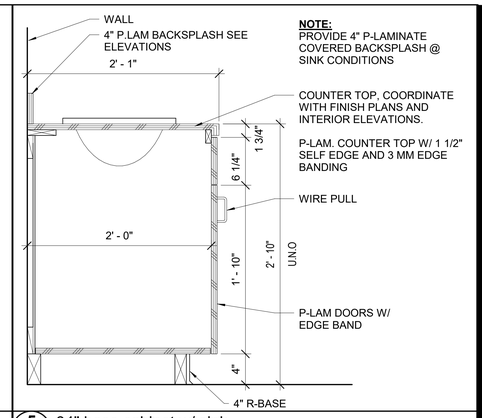
2 microwave shelf
a9.10 1 1/2" = 1'-0" (4 / a7.4)



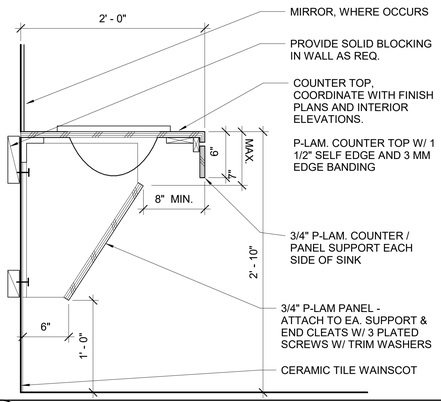
3 24" base cabinet w/ drawer
a9.10 1 1/2" = 1'-0" (2 / a7.4)



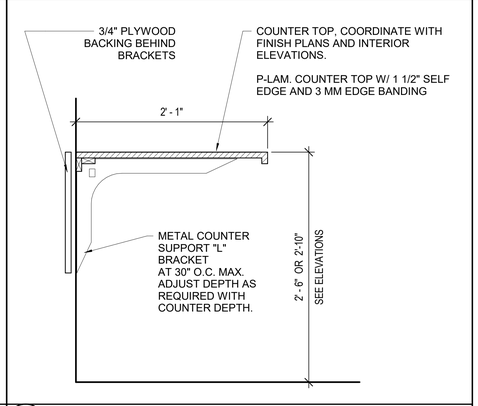
4 24" base cabinet w/ 3 drawer
a9.10 1 1/2" = 1'-0" (4 / a7.4)



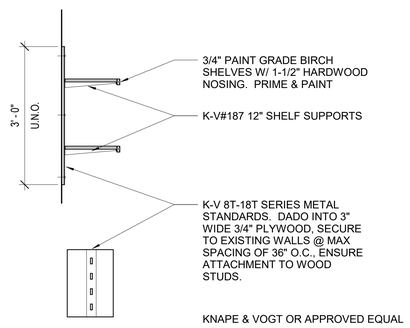
5 34" base cabinet w/ sink
a9.10 1 1/2" = 1'-0" (1 / a7.6)



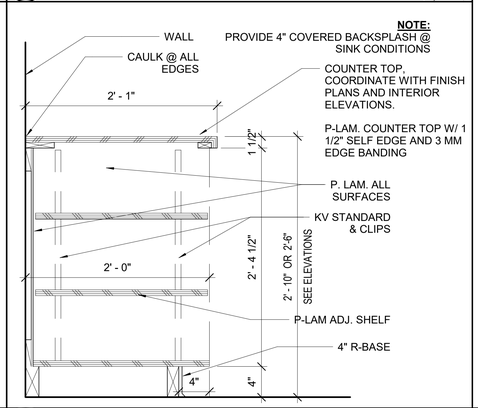
6 sinks @ countertop
a9.10 1 1/2" = 1'-0" (3 / a7.0)



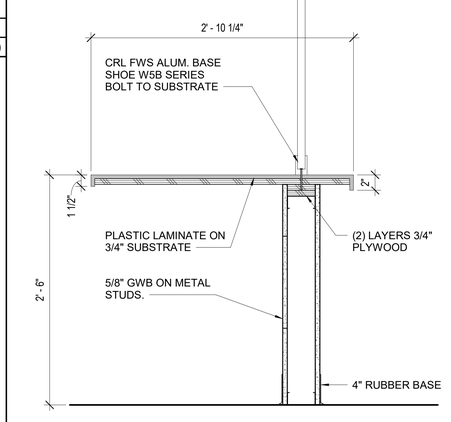
7 counter support detail
a9.10 1 1/2" = 1'-0" (1 / a7.4)



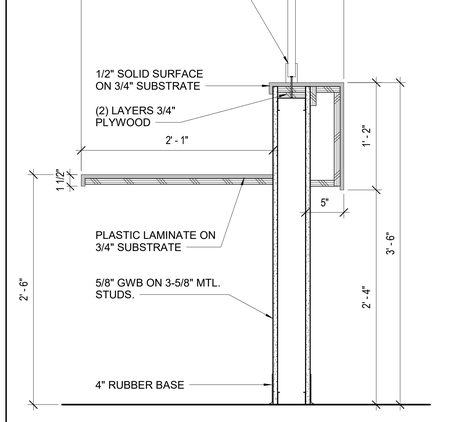
8 wood shelves
a9.10 3/4" = 1'-0" (7 / a7.5)



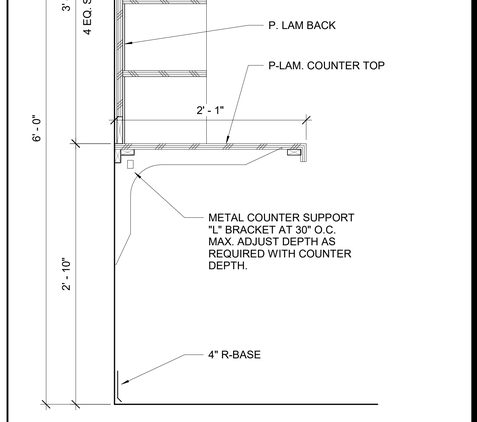
9 30" base cabinet w/ open shelves
a9.10 1 1/2" = 1'-0" (9 / a7.5)



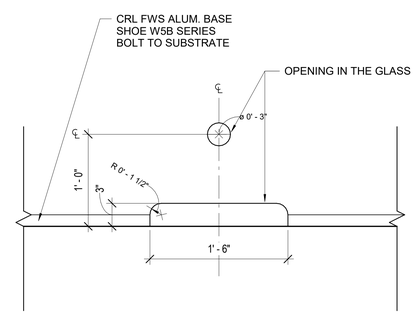
10 typical low counter at reception
a9.10 1 1/2" = 1'-0" (13 / a7.4)



11 typical high counter at reception
a9.10 1 1/2" = 1'-0" (10 / a7.4)



12 mail boxes
a9.10 1 1/2" = 1'-0" (14 / a7.8)



13 opening in safety glass
a9.10 1 1/2" = 1'-0" (/)

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37165
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ARIZONA U.S.A.

job
1717

date
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revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

details - millwork

a9.10

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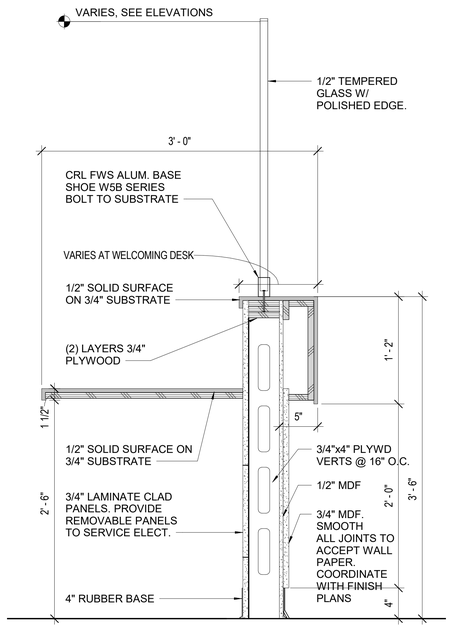
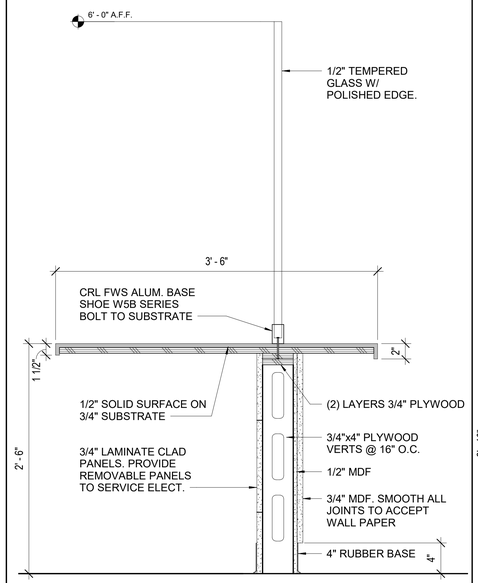
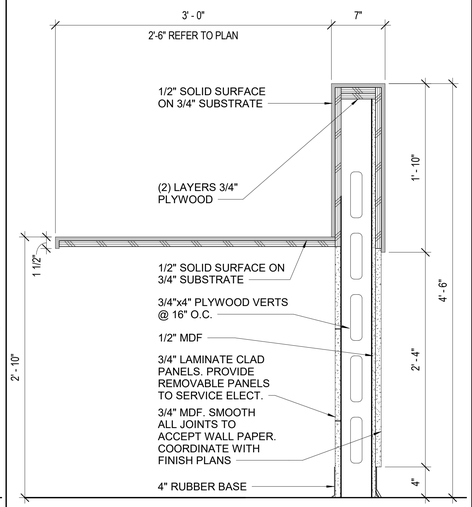


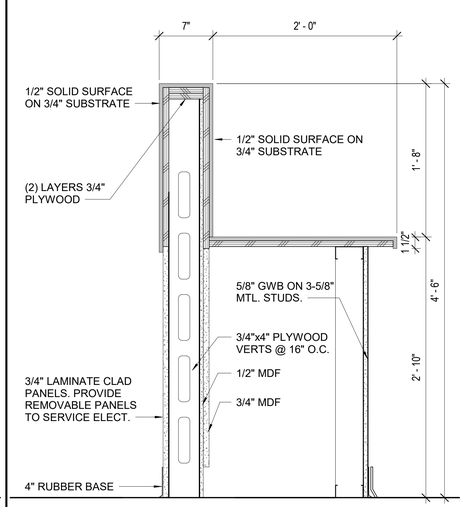
1 high counter at lobby
a9.11 1 1/2" = 1'-0" (3 / a7.11)



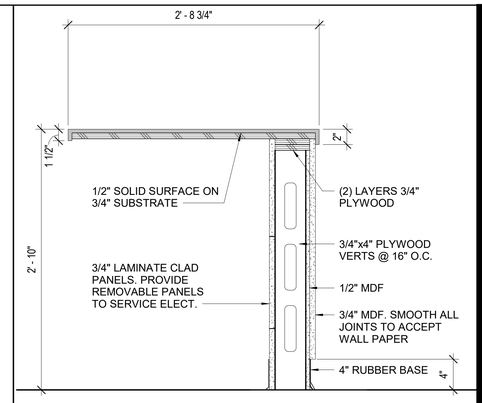
2 low counter at lobby
a9.11 1 1/2" = 1'-0" (2 / a7.11)



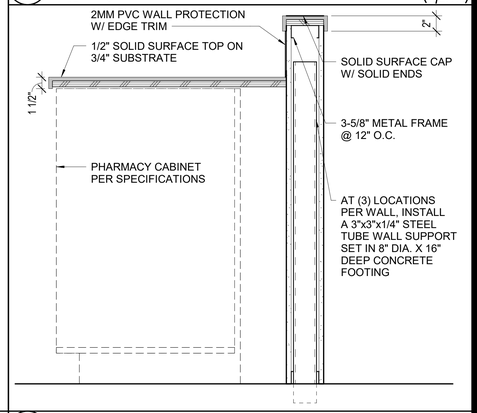
3 cafe detail 1
a9.11 1 1/2" = 1'-0" (9 / a7.11)



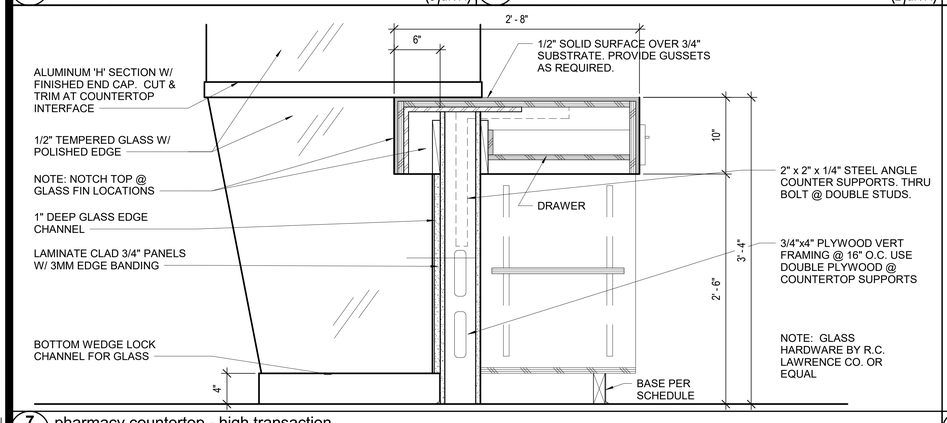
4 cafe detail 2
a9.11 1 1/2" = 1'-0" (10 / a7.11)



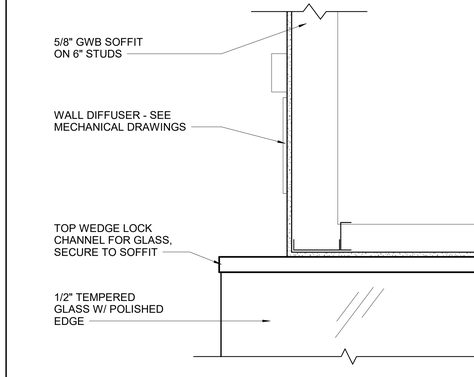
5 cafe detail 3
a9.11 1 1/2" = 1'-0" (10 / a7.11)



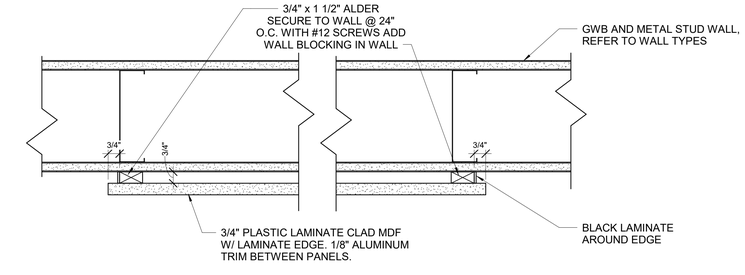
6 pharmacy work station
a9.11 1 1/2" = 1'-0" (6 / a7.5)



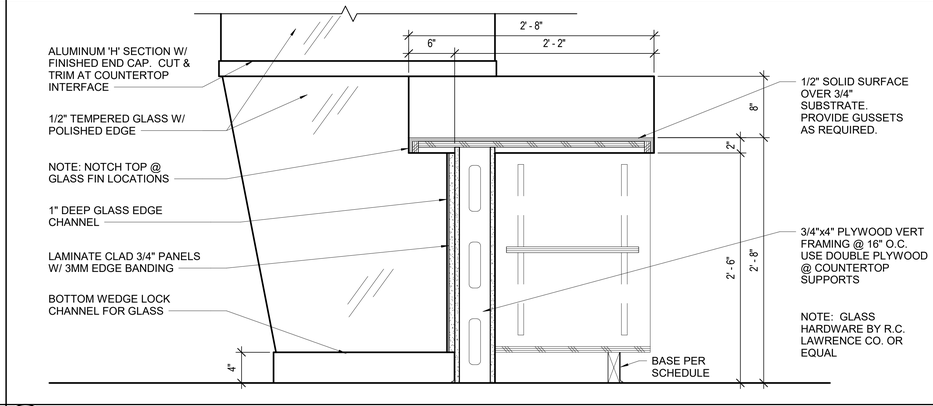
7 pharmacy countertop - high transaction
a9.11 1 1/2" = 1'-0" (2 / a7.5)



8 pharmacy glass partitions @ soffit
a9.11 1 1/2" = 1'-0" (1 / a2.2)



9 laminate panel detail
a9.11 3" = 1'-0" (8 / a7.5)



10 pharmacy countertop - low transaction
a9.11 1 1/2" = 1'-0" (2 / a7.5)

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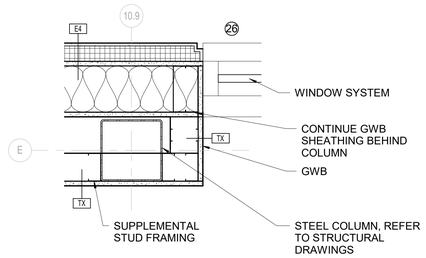
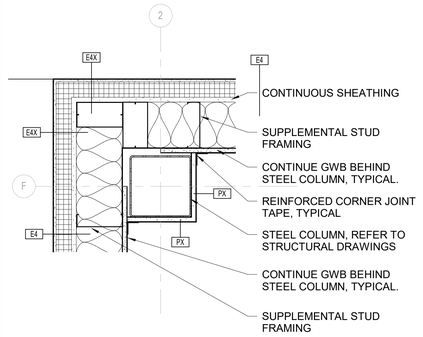
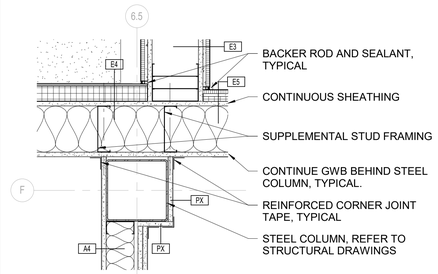


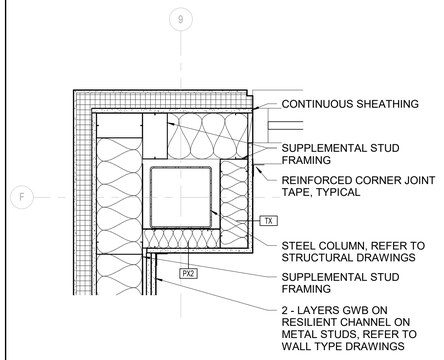
1 a10.0 column wrap at grid E, 10.9
1 1/2" = 1'-0" (1 / a1.1)



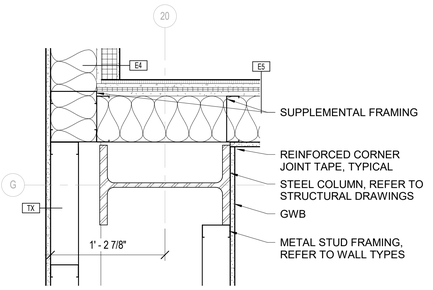
2 a10.0 column wrap at grid F, 2 (typical)
1 1/2" = 1'-0" (1 / a1.1)



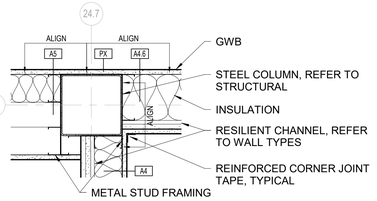
3 a10.0 column wrap at grid F, 6.5
1 1/2" = 1'-0" (1 / a1.1)



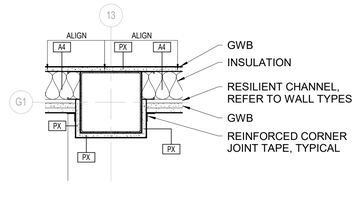
4 a10.0 column wrap at grid F, 9
1 1/2" = 1'-0" (1 / a1.1)



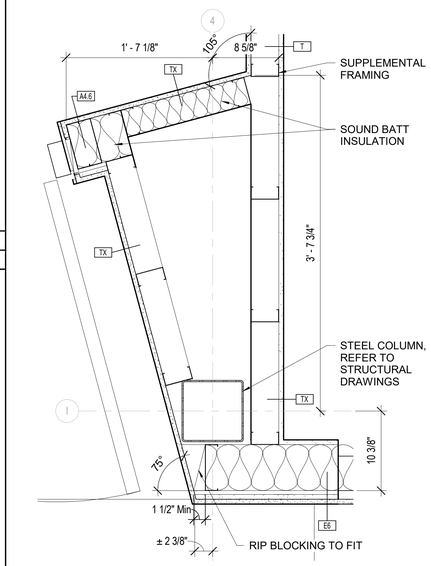
6 a10.0 column wrap at grid G, 20
1 1/2" = 1'-0" (1 / a7.5)



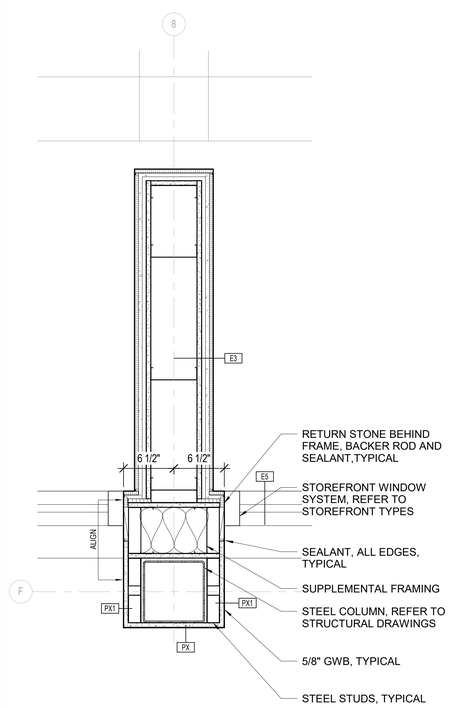
7 a10.0 column wrap at grid G, 24.7
1 1/2" = 1'-0" (1 / a1.2)



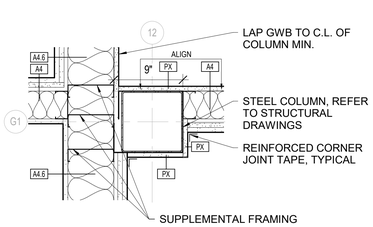
8 a10.0 column wrap at grid G1, 13
1 1/2" = 1'-0" (1 / a1.1)



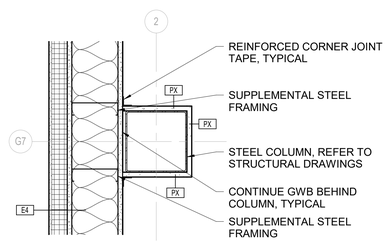
14 a10.0 column wrap at grid I, 4
1 1/2" = 1'-0" (1 / a1.1)



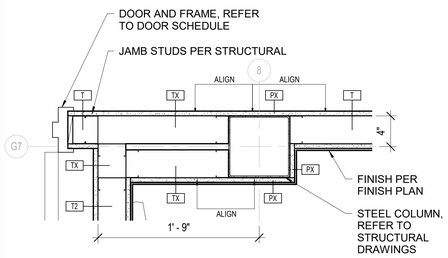
10 a10.0 column wrap at grid F, 8
1 1/2" = 1'-0" (1 / a1.1)



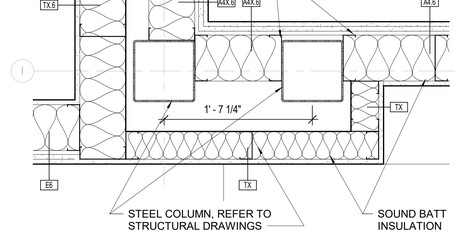
11 a10.0 column wrap at grid G1, 12
1 1/2" = 1'-0" (1 / a1.1)



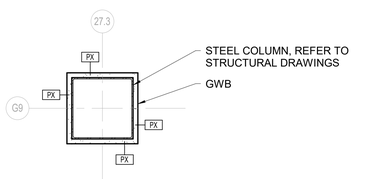
12 a10.0 column wrap at grid G7, 2
1 1/2" = 1'-0" (1 / a1.1)



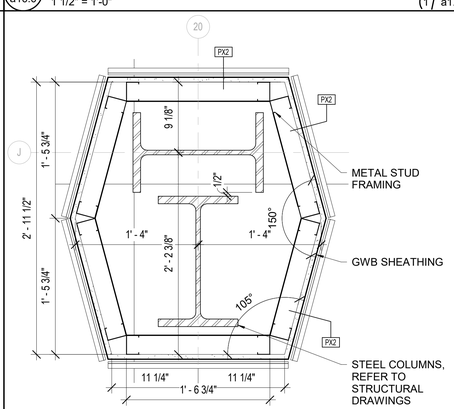
13 a10.0 column wrap at grid G7, 8
1 1/2" = 1'-0" (1 / a1.1)



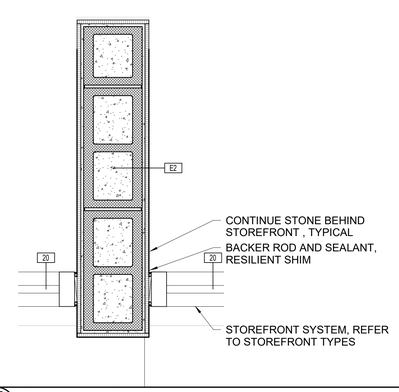
15 a10.0 column wrap at grid I, 12
1 1/2" = 1'-0" (1 / a1.1)



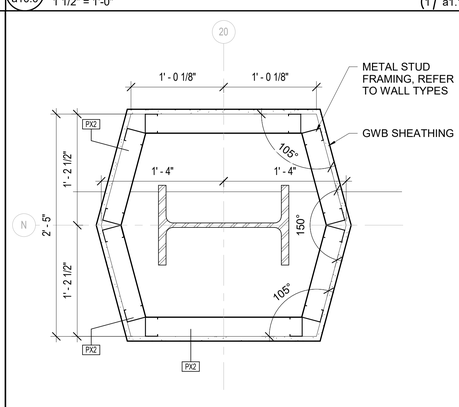
16 a10.0 column wrap at grid G9, 27.3
1 1/2" = 1'-0" (1 / a1.2)



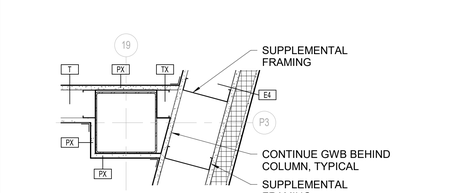
17 a10.0 column wrap at grid J, 20 (J,21 - L 20,21 similar)
1 1/2" = 1'-0" (1 / a1.2)



18 a10.0 column wrap at cmu
1 1/2" = 1'-0" (1 / a1.4)



19 a10.0 column wrap at grid N, 20 (N,21 similar)
1 1/2" = 1'-0" (1 / a1.3)



20 a10.0 column wrap at grid P3, 19
1 1/2" = 1'-0" (1 / a1.4)

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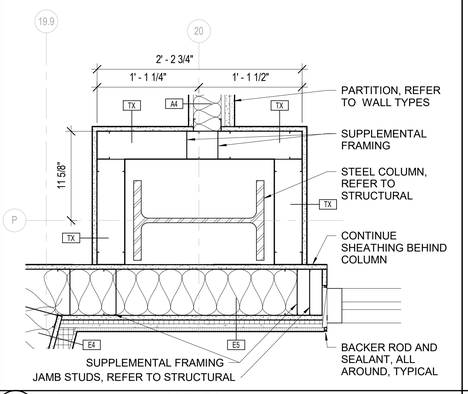
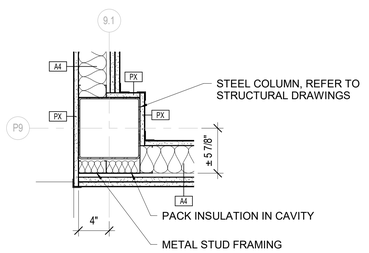
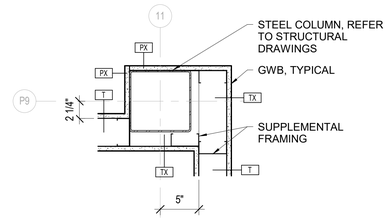


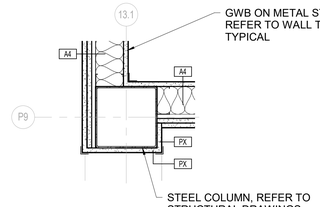
1 column wrap at grid P, 20
a10.1 1 1/2" = 1'-0" (1/ a1.4)



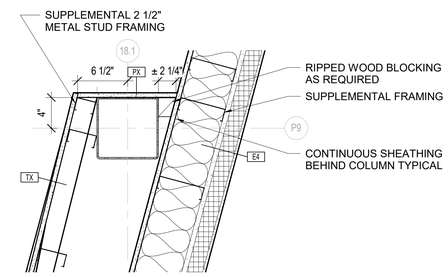
2 column wrap at grid P9, 9.1
a10.1 1 1/2" = 1'-0" (1/ a1.4)



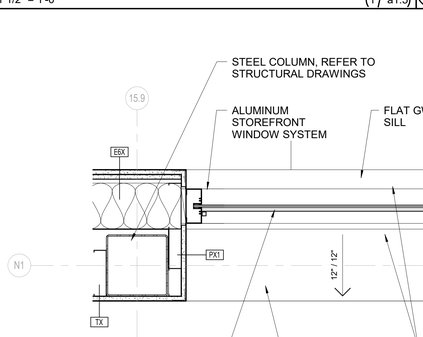
3 column wrap at grid P9, 11
a10.1 1 1/2" = 1'-0" (1/ a1.4)



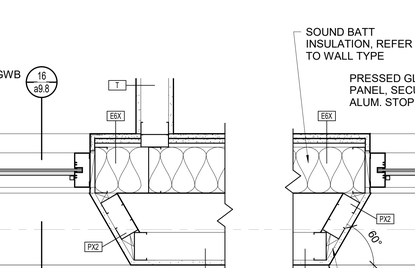
4 column wrap at grid P9,13.1
a10.1 1 1/2" = 1'-0" (1/ a7.9)



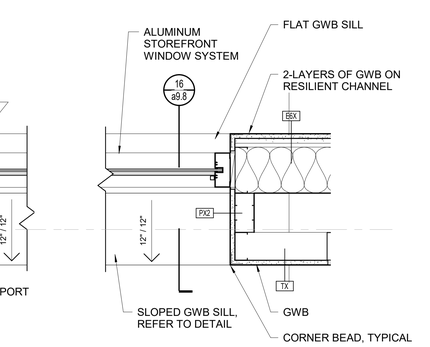
5 column wrap at grid P9, 18.1
a10.1 1 1/2" = 1'-0" (1/ a1.4)



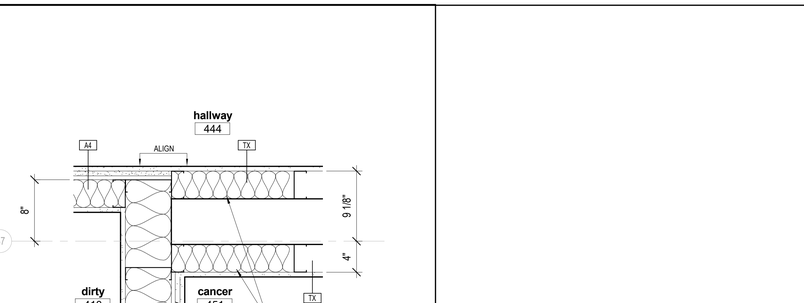
6 column wrap at grid L1, 24.1
a10.1 1 1/2" = 1'-0" (1/ a1.3)



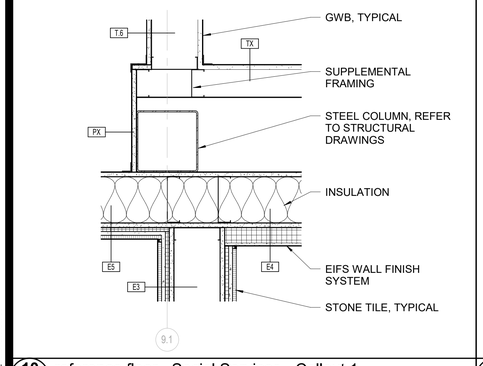
7 column wrap at grid J, 4
a10.1 1 1/2" = 1'-0" (1/ a1.5)



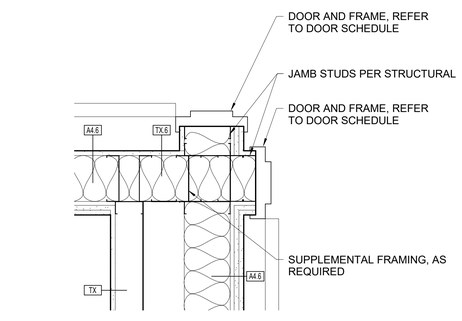
8 column wrap at grid M1, 4
a10.1 1 1/2" = 1'-0" (1/a7.10)



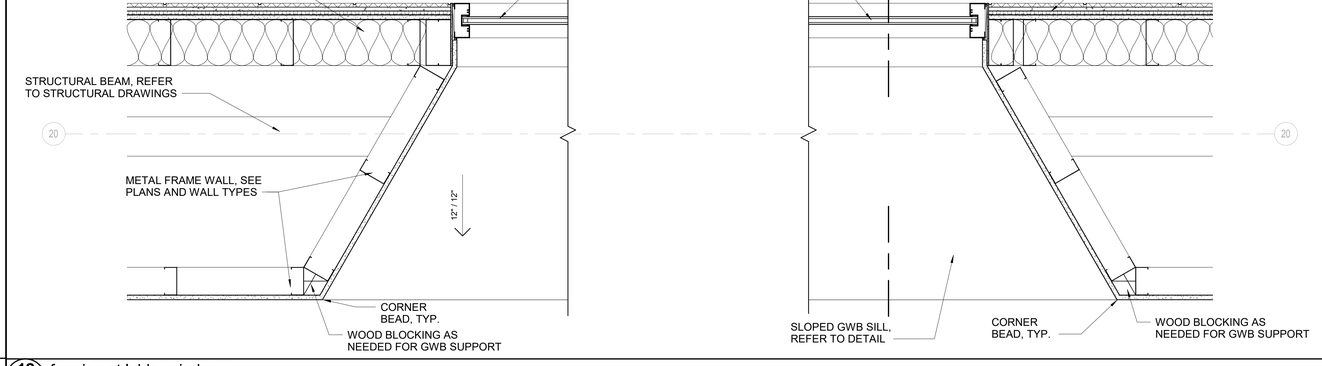
9 column wrap at grid wc, w4
a10.1 1 1/2" = 1'-0" (2/ a1.3)



10 reference floor - Social Services - Callout 1
a10.1 1 1/2" = 1'-0" (1/ a1.5)



11 Detail 2
a10.1 1 1/2" = 1'-0" (1/ a1.5)



12 framing at lobby windows
a10.1 1 1/2" = 1'-0" (1/a1.13)

13 framing at chapel 107
a10.1 1 1/2" = 1'-0" (1/ a1.4)

14 framing intersection at rooms 410, 444 & 451
a10.1 1 1/2" = 1'-0" (1/ a1.2)

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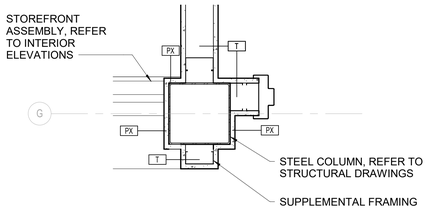
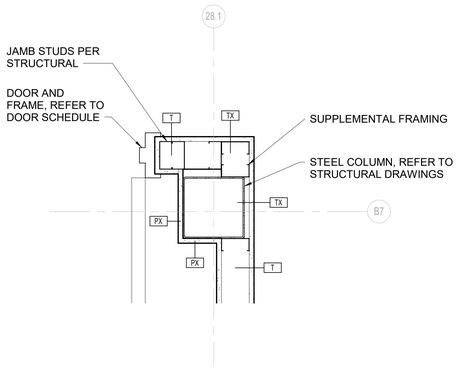


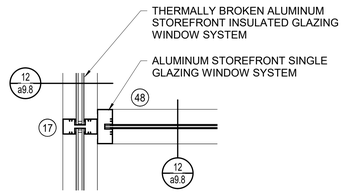
1 a10.2 — column wrap at along grid g at door 400B

1 1/2" = 1'-0" (1 / a1.2)



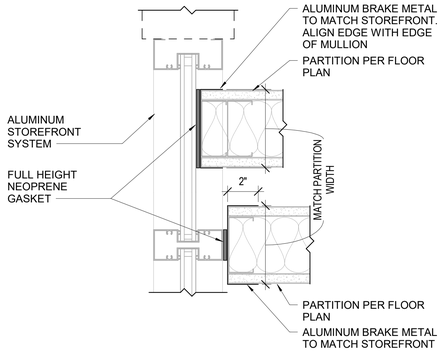
2 a10.2 — column wrap at grid B7, 28.1

1 1/2" = 1'-0" (1 / a1.2)



3 a10.2 — aluminum frame 'T" intersection

1 1/2" = 1'-0" (1 / a7.11)



4 a10.2 — gwb wall ending at storefront & glazing, typical

3" = 1'-0" (1 / a7.11)

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framing detials

a10.2

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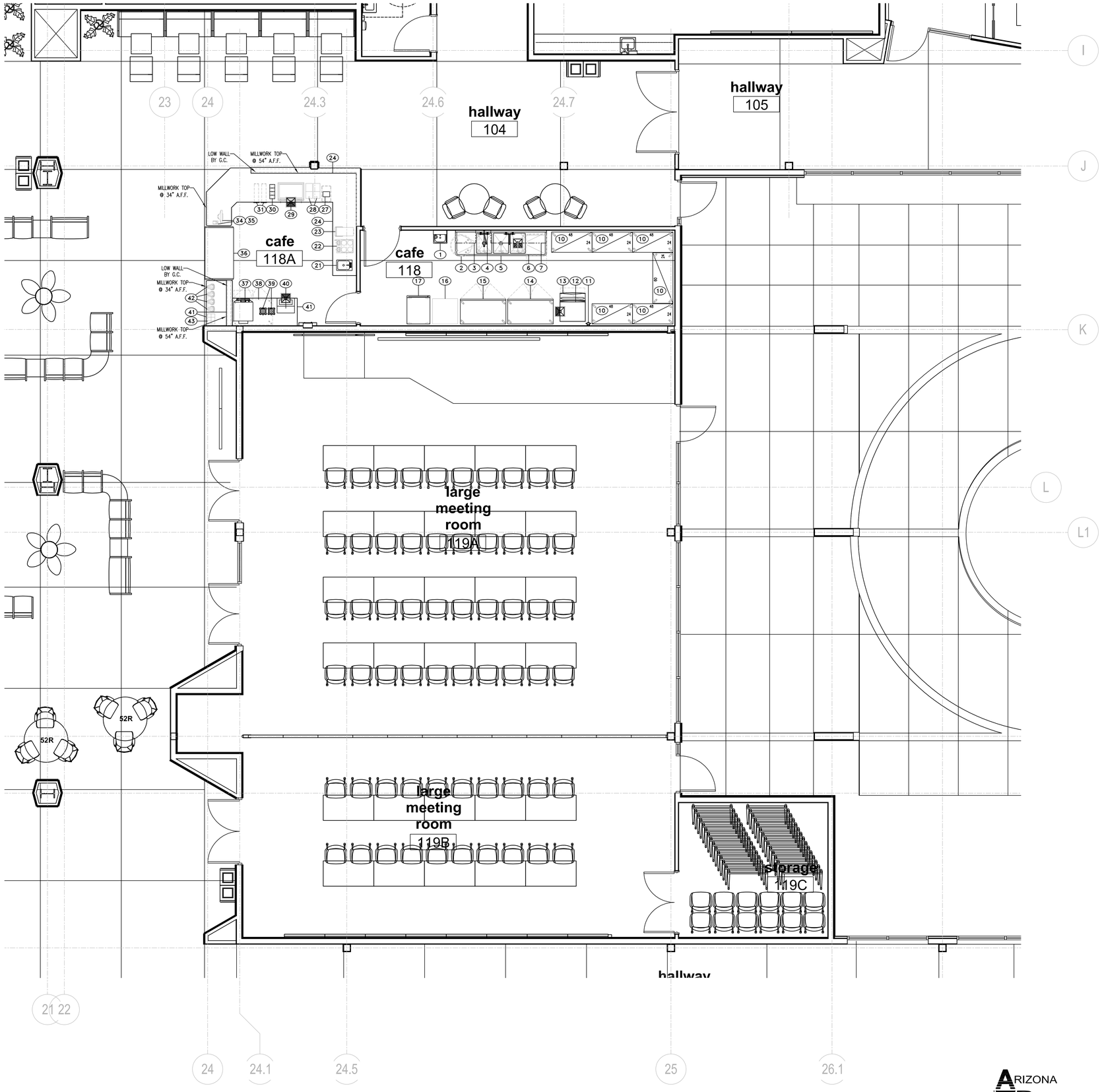


EQUIPMENT FLOOR PLAN

SCALE: 1/4" = 1'-0"

GENERAL NOTES:

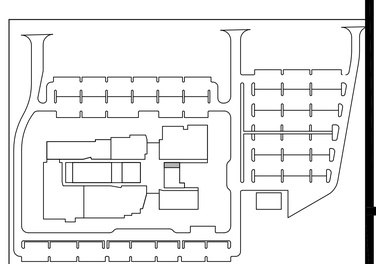
1. THESE PLANS ARE PROVIDED FOR THE PURPOSE OF INDICATING FOODSERVICE EQUIPMENT LOCATIONS AND REQUIREMENTS ONLY AND ARE NOT TO BE CONSTRUED BY THE GENERAL CONTRACTOR OR SUBCONTRACTOR AS TO RELIEVE THEM FROM THEIR RESPONSIBILITY OF COMPLYING WITH ALL APPLICABLE CODES. REFER TO ARCHITECTURAL DRAWINGS, MECHANICAL, AND ELECTRICAL DRAWINGS FOR BALANCE OF WORK NOT IN KITCHEN EQUIPMENT CONTRACT.
2. IT SHALL BE THE RESPONSIBILITY OF THE OWNER AND/OR HIS ASSIGNED COORDINATOR TO INSURE THAT THE FOODSERVICE EQUIPMENT CONTRACTOR RECEIVES COPIES OF ALL ADDENDUM AND CHANGES TO ARCHITECTURAL DOCUMENTS WHICH ARE MADE PRIOR TO AND DURING CONSTRUCTION.
3. GENERAL CONTRACTOR SHALL PROVIDE THE NECESSARY WALL BACKING FOR ALL WALL MOUNTED EQUIPMENT (SHELVING, POT RACKS, ETC.), AS INDICATED ON FOODSERVICE EQUIPMENT DRAWING.
4. WHERE REQUIRED BY LOCAL CODES, FLOORS SHALL BE SLOPED TO FLOOR DRAINS TO COMPLY WITH SAID CODES.
5. PLUMBING, ELECTRICAL, MECHANICAL, AND THE WORK OF ALL OTHER TRADES INVOLVED SHALL CONFORM TO PRESENT DAY CODES.
6. ALL EQUIPMENT TO BE N.S.F. APPROVED OR EQUIVALENT.
7. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO VERIFY AND COORDINATE WITH THE FOODSERVICE EQUIPMENT CONTRACTOR ANY DISCREPANCY OR OMISSION INCLUDING, BUT NOT LIMITED TO DIMENSIONAL LAYOUT ON THESE PLANS PRIOR TO START OF CONSTRUCTION. ALL TRANSACTIONS SHALL BE IN WRITIING.
8. FLOOR DEPRESSIONS & INSULATED FLOORS FOR WALK-INS ARE TO BE PROVIDED BY THE GENERAL CONTRACTOR AND AS DETAILED.
9. GENERAL CONTRACTOR TO PROVIDE FINISHED CURBS FOR WALK-IN REFRIGERATOR/FREEZER COMPRESSOR/CONDENSOR UNITS (VERIFY LOCATIONS). SLEEVES SHOULD BE PROVIDED THROUGH CURBS AND FINISHED BUILDING ROOF FOR REFRIGERATION LINE SETS. SLEEVES AND PENETRATIONS THROUGH ROOF OR BUILDING WALLS SHALL BE FURNISHED AND INSTALLED BY THE GENERAL CONTRACTOR. CONSULT WITH ARIZONA RESTAURANT SUPPLY, INC. FOR DIAMETER SIZE SLEEVE(S) REQUIRED. PENETRATIONS THROUGH FIRE RATED WALLS AND FIRE RATED CAULKING SEAL SHALL BE BY THE GENERAL CONTRACTOR.

HEALTH DEPARTMENT NOTES:

1. FOOD PREPARATION, DISHWASHING, STORAGE, AND RESTROOM AREAS TO HAVE:
   A) DURABLE, EASILY CLEANABLE, AND PROPER COVED BASE FLOORS.
   B) SMOOTH, NON-ABSORBENT, AND EASILY CLEANABLE LIGHT-COLORED WALLS AND CEILINGS.
2. ICE MACHINE BINS, CONDENSATE LINES, FOOD PREPARATION SINKS, DISHWASHERS, AND WATER/BEVERAGE DISPENSING SYSTEMS SHALL DRAIN INDIRECTLY INTO A FLOOR SINK.
3. OPERATOR TO OBTAIN FOOD CERTIFICATE PRIOR TO OPENING.
4. A HAND WASHING SINK SHALL BE PROVIDED IN THE FOOD PREPARATION AREA.
5. ENTIRE FACILITY TO BE IN CURRENT COMPLIANCE WITH ALL COUNTY HEALTH CODES.

EQUIPMENT LEGEND

- BUY OUT EQUIPMENT
- PROVIDED BY OTHERS
- FUTURE EQUIPMENT
- HIDDEN EQUIPMENT
- OVERHEAD EQUIPMENT



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Equipment Floor Plan

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SCHEDULE OF EQUIPMENT

ITEM	QUANTITY	PURCHASE	FABRICATE	MILLWORK	EXISTING	NIKEC	DESCRIPTION	MAKE	MODEL	REMARKS	ELECTRICAL			PLUMBING			MECHANICAL					
																		EXHAUST			SUPPLY	
											TAG	ROUGH–IN	LOAD & CONNECTION	TAG	ROUGH–IN	CONNECTION	TAG	DUCT	CFM	TAG	DUCT	CFM
1	1	X					HAND SINK	KROWNE	HS–7	W/ RIGHT SPLASH GUARD, SOAP & PAPER TOWEL DISPENSER				P1	1/2" H.W. & C.W. + 18"	1/2" H.W. & C.W.						
										WALL BACKING BY G.C.				W1	1–1/2" WASTE + 24"	1–1/2" W.						
2	1					X	WASTE RECEPTACLE	BY OWNER														
3	1		X				TUBULAR WALL SHELF	STAINLESS CONCEPTS	CUSTOM	WALL BACKING BY G.C.												
4	1	X					PRE–RINSE FAUCET	KROWNE	17–109WL	WALL BACKING BY G.C.				P4	1/2" C.W. + 18"	1/2" C.W.						
5	1		X				THREE COMPARTMENT SINK	STAINLESS CONCEPTS	CUSTOM	W/ FAUCET #14–812L & (3) LEVERWASTE #22–201				P5	1/2" H.W. & C.W. + 18"	1/2" H.W. & C.W.						
														W5	FLOOR SINK	(3) 2" I.W.						
6	1	X					UNDERCOUNTER DISH MACHINE	HOBART	LXeC–3		E6	120V 1PH JB + 12"	13.4 AMPS	P6	3/4" H.W. + 12"	3/4" H.W.						
														W6	FLOOR SINK (USE W5)	1–1/2" I.W.						
7	1		X				TUBULAR WALL SHELF	STAINLESS CONCEPTS	CUSTOM	WALL BACKING BY G.C.												
8	–						SPARE NUMBER															
9	–						SPARE NUMBER															
10	6	X					WIRE SHELF	OLYMPIC	EPOXY	W/ CASTERS												
11	1	X					WATER FILTER	MANITOWOC	AR–10000	WALL BACKING BY G.C.				P11	1/2" C.W. + 78"	3/8" C.W.						
12	1	X					ICE MACHINE	MANITOWOC	ID–0302A		E12	120V 1PH JB + 78"	10.8 AMPS	P12	1/2" C.W. (USE P11)	3/8" C.W.						
														W12	FLOOR SINK	1/2" I.W.						
13	1	X					ICE BIN	MANITOWOC	B–400					W13	FLOOR SINK (USE W12)	3/4" I.W.						
14	1	X					REACH–IN FREEZER	TRUE	T–49F	W/ CASTERS	E14	120V 1PH DR + 12"	12.5 AMPS									
15	1	X					REACH–IN REFRIGERATOR	TRUE	T–49	W/ CASTERS	E15	120V 1PH DR + 12"	5.8 AMPS									
16	1					X	POPCORN MACHINE	BY OWNER		W/ STAND IF REQUIRED–VERIFY UTILITY REQUIREMENTS	E16	VERIFY	VERIFY									
17	1	X					HOLDING CABINET	METRO	C539–CDC–U	W/ CASTERS	E17	120V 1PH DR + 12"	16.7 AMPS									
18	–						SPARE NUMBER															
19	–						SPARE NUMBER															
20	–						SPARE NUMBER															
21	1	X					DROP–IN HAND SINK	KROWNE	HS–1220	W/ SPLASH GUARDS–FAUCET INCLUDED–SOAP & PAPER				P21	1/2" H.W. & C.W. + 18"	1/2" H.W. & C.W.						
										TOWEL BY OWNER				W21	1–1/2" WASTE + 24"	1–1/2" W.						
22	1					X	COFFEE BREWER	BY OWNER		VERIFY UTILITY REQUIREMENTS–W/ INLINE FILTER BY VENDOR	E22	120/240V 1PH JB + 48"	30.0 AMPS	P22	1/2" C.W. + 48"	1/2" C.W.						
23	1					X	TEA BREWER	BY OWNER		VERIFY UTILITY REQUIREMENTS–W/ INLINE FILTER BY VENDOR	E23	120V 1PH DR + 48"	15.0 AMPS	P23	1/2" C.W. + 48"	1/2" C.W.						
24	1					X	SERVICE COUNTER/UPPER COUNTER	BY G.C.	MILLWORK	VERIFY HEIGHT & FINISH W/ ARCHITECT/G.C.												
25	–						SPARE NUMBER															
26	–						SPARE NUMBER															
27	1		X				COFFEE KNOCK BOX	STAINLESS CONCEPTS	CUSTOM	TRASH BIN BY OWNER												
28	2					X	COFFEE GRINDER	BY OWNER		VERIFY UTILITY REQUIREMENTS	E28	120V 1PH DR + 48"	9.4 AMPS									
29	1					X	ESPRESSO/CAPPUCINNO MACHINE	BY OWNER		VERIFY UTILITY REQUIREMENTS–W/ INLINE FILTER BY VENDOR	E29	208–240V 1PH SR + 48"	30.0 AMPS–NEMA L6–30P	P29	1/2" C.W. + 48"	1/2" C.W.						
														W29	FLOOR SINK	1–1/4" I.W.						
30	1					X	SYRUP RACK	BY OWNER														
31	2	X					CUP DISPENSER	DISPENSE–RITE	ADJ–2	VERIFY CUP SIZE W/ OWNER												
32	–						SPARE NUMBER															
33	–						SPARE NUMBER															
34	1					X	POS MONITOR	BY OWNER		VERIFY UTILITY/DATA REQUIREMENTS–DATA REQUIRED	E34	120V 1PH DR + 24"	20.0 AMPS–DEDICATED CIRC.									
35	1					X	POS PRINTER	BY OWNER		VERIFY UTILITY/DATA REQUIREMENTS–DATA REQUIRED	E35	120V 1PH DR + 24"	20.0 AMPS–DEDICATED CIRC.									
36	1	X					REFRIGERATED SELF–SERVICE CASE	STRUCTURAL CONCEPTS	HMBC5	W/ LOCKING SECURITY COVER	E36	120/230V 1PH SR + 10"	11.5 AMPS–NEMA 14–20P OR L14–20P									
37	1	X					MICROWAVE CONVECTION OVEN	MERRYCHEF	E4S	W/ PANINI PRESS	E37	208/240V 1PH SR + 48"	30.0 AMPS–NEMA 6–30P									
38	1	X					UNDERCOUNTER REFRIGERATOR	TRUE	TUC–48–ADA–HC	W/ CASTERS	E38	120V 1PH DR + 12"	3.0 AMPS									
39	2	X					BLENDER	HAMILTON BEACH	HBB250R		E39	120V 1PH DR + 48"	4.0 AMPS									
40	1	X					DROP–IN ICE BIN	DELFIELD	240					W40	FLOOR SINK	1" I.W.						
41	1					X	SERVICE COUNTER/UPPER COUNTER	BY G.C.	MILLWORK	VERIFY HEIGHT & FINISH W/ ARCHITECT/G.C.												
42	1					X	COFFEE AIRPOTS	BY OWNER	MILLWORK													
43	1					X	CONDIMENT CADDY	BY OWNER	MILLWORK													

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Equipment Schedule

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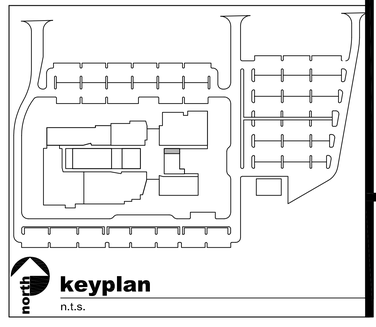

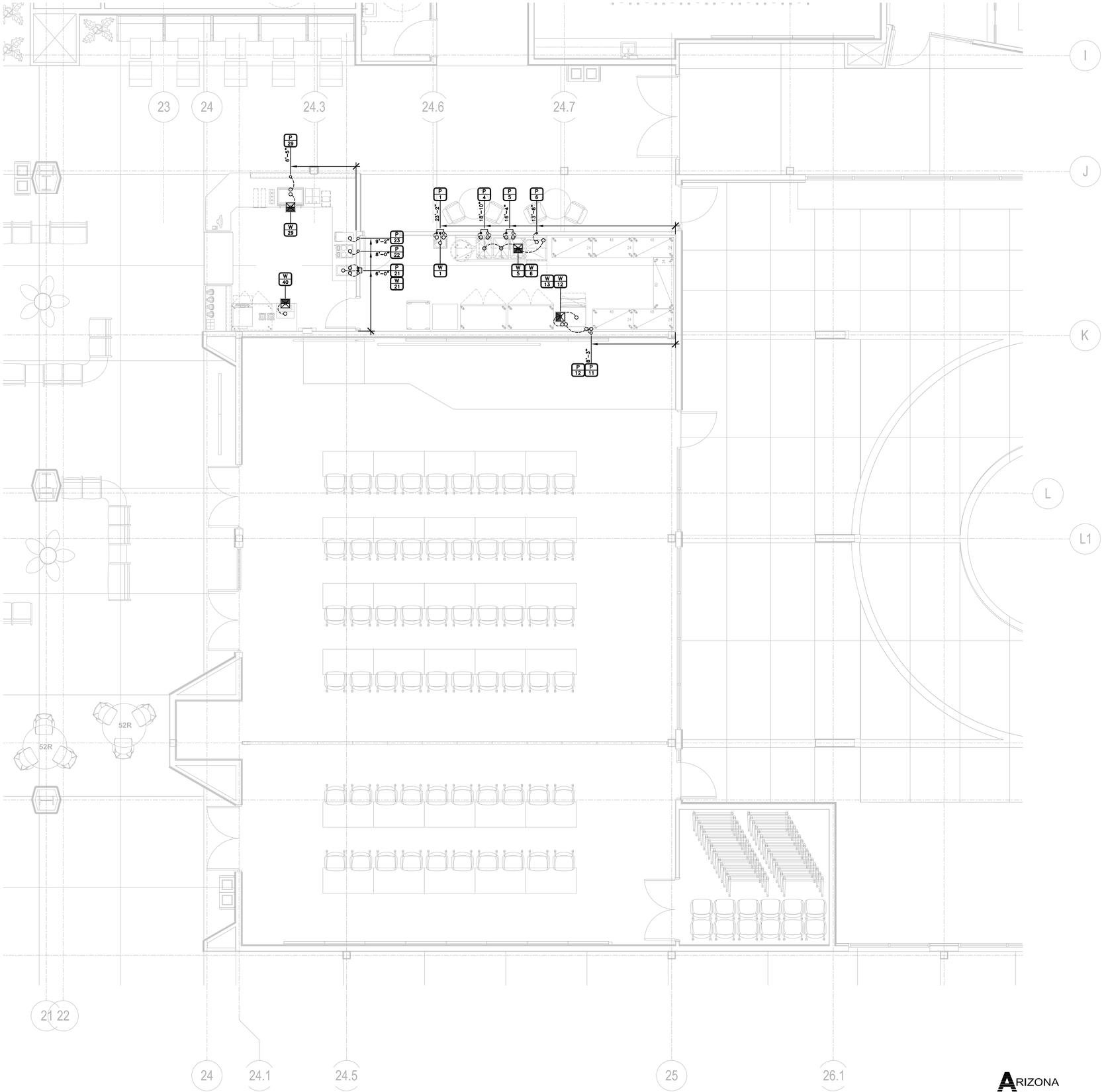

PLUMBING ROUGH-IN PLAN

SCALE: 1/4" = 1'-0"

PLUMBING NOTES:

1. THIS PLUMBING PLAN IS INTENDED TO INDICATE ROUGH-IN LOCATIONS FOR KITCHEN EQUIPMENT ONLY. REFER TO ARCHITECTURAL CONSTRUCTION DOCUMENTS FOR ADDITIONAL PLUMBING REQUIREMENTS.
2. ALL ROUGH-IN LOCATIONS SHOWN ARE APPROXIMATE AND SHALL BE THE RESPONSIBILITY OF THE PLUMBING CONTRACTOR FOR PROPER LOCATION.
3. THE PLUMBING CONTRACTOR IS RESPONSIBLE FOR ALL ROUGH-IN AND FINAL CONNECTIONS OF FOOD SERVICE EQUIPMENT UNLESS OTHERWISE NOTED.
4. IT IS THE RESPONSIBILITY OF THE PLUMBING CONTRACTOR TO INSTALL ALL FAUCETS, LEVER WASTES, DRAINS, AND SIMILAR ITEMS FURNISHED BY THE FOOD SERVICE EQUIPMENT CONTRACTOR.
5. FLOOR SINKS SHALL BE INSTALLED FLUSH WITH THE FINISHED FLOOR, UNLESS LOCAL CODES REQUIRE FLOOR SINK AT A DIFFERENT ELEVATION.
6. TOPS OF ALL ROUGH-INS STUBBED OUT FROM FLOOR ARE NOT TO EXCEED 5" ABOVE FINISHED FLOOR, UNLESS NOTED OTHERWISE ON THIS DRAWING.
7. PLUMBING CONTRACTOR TO PROVIDE GREASE TRAP FOR THREE COMPARTMENT SINK.
8. GAS PRESSURE REGULATOR(S) ON ALL FRONT MANIFOLD COOKING EQUIPMENT TO BE FURNISHED AND INSTALLED BY PLUMBING CONTRACTOR.
9. PLUMBER TO FURNISH AND INSTALL PRESSURE REDUCING VALVE TO OPERATE DISHWASHER AT 20 P.S.I. +/- 5 (flow pressure).
10. PLUMBING CONTRACTOR IS RESPONSIBLE FOR SUPPLYING AND INSTALLING ALL BACKFLOW PREVENTION DEVICES & DOUBLE CHECK VALVES TO BEVERAGE AND ICE MAKING EQUIPMENT, AS WELL AS, ANY OTHER FITTINGS OR DEVICES NOT SUPPLIED WITH THE EQUIPMENT WHICH WILL MAKE THE INSTALLATION COMPLETE, OPERATIONAL, AND IN COMPLIANCE WITH ALL APPLICABLE CODES.
11. PLUMBING CONTRACTOR TO INSTALL A MECHANICAL GAS SHUT-OFF VALVE FOR THE EXHAUST HOOD FIRE SUPPRESSION SYSTEM IN AN EASILY ACCESSIBLE AREA OF THE GAS LINE UPSTREAM OF THE COOKING EQUIPMENT.
12. PLUMBING CONTRACTOR IS RESPONSIBLE FOR SUPPLYING AND INSTALLING A DOUBLE CHECK VALVE ANTI-SIPHON DEVICE OR SIMILAR DEVICE (APPROVED BY LOCAL CODE) BETWEEN LINES AND CONNECTION TO ALL ICE MAKERS AND BEVERAGE MAKING EQUIPMENT.
13. ANY CONFLICTS WITH BUILDING CONDITIONS WHICH PREVENTS PLUMBING ROUGH-INS FROM BEING LOCATED AS SHOWN ON THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE KITCHEN EQUIPMENT CONTRACTOR. A RESOLUTION TO THE CONFLICT, IN WRITING, MUST BE MADE PRIOR TO ROUGHING IN SERVICES.
14. ALL DIMENSIONS SHOWN ARE FROM FINISHED WALL SURFACE TO ROUGH-IN CENTER-LINE, AND FROM CENTER-LINE TO CENTER-LINE.
15. ALL HEIGHTS GIVEN FOR ROUGH-INS ARE FROM FINISHED FLOOR SURFACE TO CENTER-LINE OF ROUGH-IN.
16. THE ROUGH-IN PLUMBING REQUIREMENTS SHOWN ON THIS DRAWING ARE FOR NEW AND RELOCATED EQUIPMENT ONLY. LOCATIONS OF ROUGH-INS ARE CONSIDERED TO BE IDEAL. HOWEVER, EXISTING PLUMBING SERVICES IN IMMEDIATE AREA ARE TO BE UTILIZED WHENEVER POSSIBLE. PLUMBING CONTRACTOR TO DETERMINE IF EXISTING SERVICES ARE ADEQUATE TO OPERATE EQUIPMENT SHOWN.

PLUMBING LEGEND

- COLD WATER AND CONNECTION
- HOT WATER AND CONNECTION
- DIRECT WASTE AND CONNECTION
- INDIRECT WASTE AND RUN TO FLOOR SINK
- FLOOR SINK
- FLOOR SINK WITH HALF GRATE
- FLOOR SINK WITH 3/4 GRATE
- FUNNEL DRAIN
- FIELD DRAIN
- GAS
- GAS CONNECTION
- CHILLED WATER (SUPPLY/RETURN)

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Plumbing Rough-In Plan

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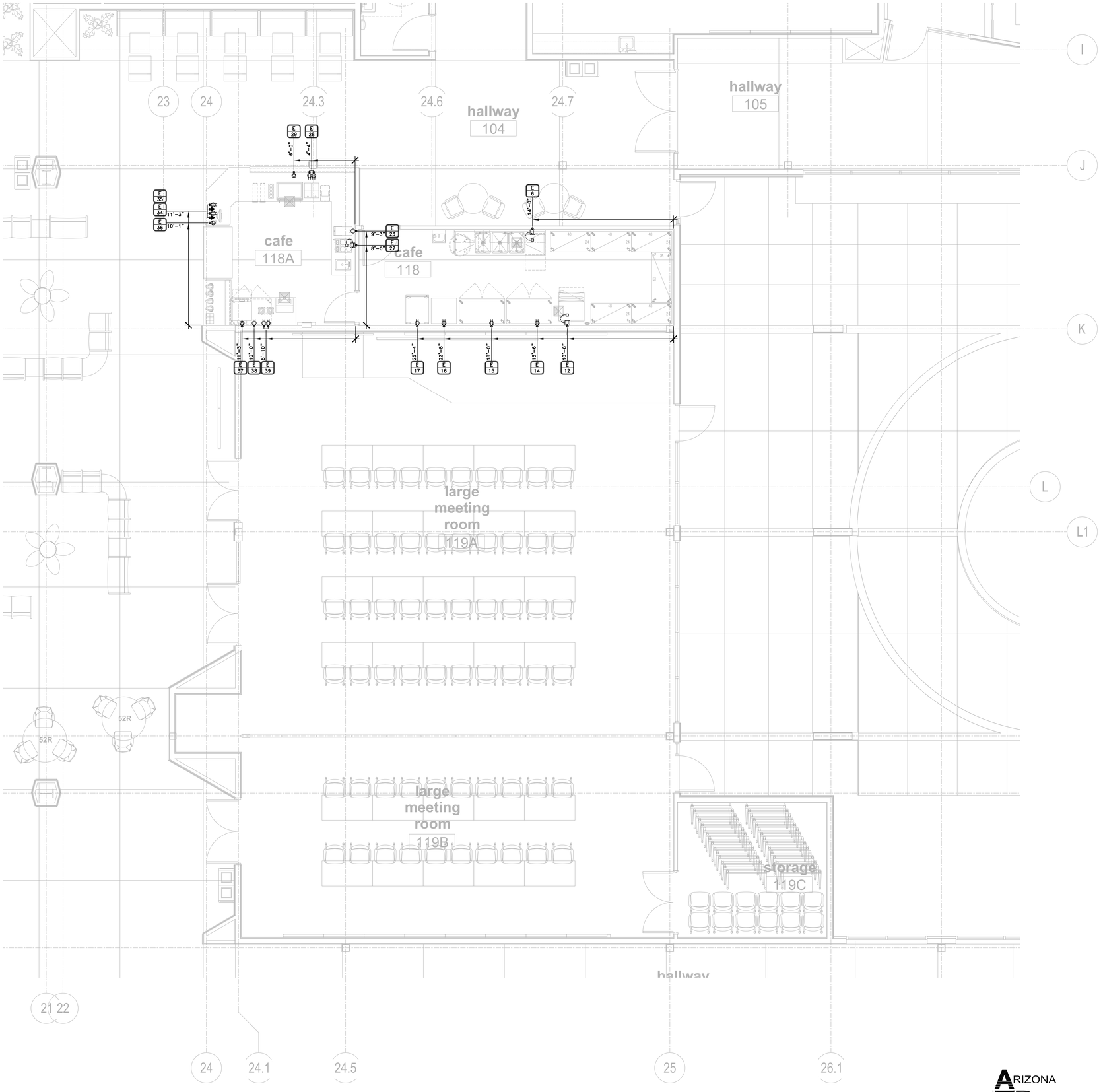

ELECTRICAL ROUGH-IN PLAN

SCALE: 1/4" = 1'-0"

ELECTRICAL NOTES:

1. THIS ELECTRICAL PLAN IS INTENDED TO INDICATE ROUGH-IN LOCATIONS FOR KITCHEN EQUIPMENT ONLY. REFER TO ARCHITECTURAL CONSTRUCTION DOCUMENTS FOR ADDITIONAL ELECTRICAL REQUIREMENTS.
2. ALL ROUGH-IN LOCATIONS SHOWN ARE APPROXIMATE AND SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR FOR PROPER LOCATION.
3. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL ROUGH-IN AND FINAL CONNECTIONS OF FOOD SERVICE EQUIPMENT UNLESS OTHERWISE NOTED.
4. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL ROOF MOUNTED JUNCTION BOXES AND OUTLETS AS SHOWN ON ELECTRICAL PLAN. ACTUAL LOCATIONS SHALL BE DETERMINED BY ELECTRICAL CONTRACTOR.
5. ELECTRICAL CONTRACTOR TO PROVIDE ALL ROUGH-IN AND FINAL CONNECTIONS TO LIGHTS, BLOWER FANS, COIL DEFROST, AND REMOTE COMPRESSORS TO WALK-IN UNITS, INCLUDING ALL CONTROL WIRING.
6. ELECTRICAL CONTRACTOR TO PROVIDE ALL ROUGH-IN AND FINAL CONNECTIONS TO LIGHT, EXHAUST BLOWERS, AND MAKE-UP AIR SYSTEMS TO EXHAUST HOOD. EXHAUST AND MAKE-UP AIR SYSTEMS TO BE INTERCONNECTED AND CONTROLLED BY A SINGLE SWITCH.
7. TOPS OF ALL ROUGH-INS STUBBED OUT FROM FLOOR ARE NOT TO EXCEED 5" ABOVE FINISHED FLOOR, UNLESS NOTED OTHERWISE ON THIS DRAWING.
8. ALL CORD AND PLUG REQUIREMENTS WHERE NEEDED, AND IF NOT SUPPLIED BY THE MANUFACTURER, SHALL BE FURNISHED BY THE ELECTRICAL CONTRACTOR.
9. ELECTRICAL CONTRACTOR TO PROVIDE FUSED DISCONNECT SWITCH AT ALL REMOTE CONDENSING UNITS AND MOUNT INSIDE WALK-IN BOX FOR BLOWER COIL UNITS.
10. ELECTRICAL CONTRACTOR TO PROVIDE FUSED DISCONNECT SWITCHES AT ALL EXHAUST BLOWER AND M.U.A. UNITS.
11. REMOTE CONDENSING UNITS ON BUILDING ROOF ARE TO BE LOCATED ON ARCHITECT'S AND MECHANICAL ENGINEER'S DRAWINGS, HOWEVER: THE RUN OF REFRIGERANT LINES FROM REMOTE CONDENSING UNITS TO CONNECTION POINTS ON EQUIPMENT SHOULD BE HELD TO A MINIMUM TO AVOID INCREASING THE SIZE OF THE CONDENSING UNITS.
12. ANY CONFLICTS THAT PREVENT ELECTRICAL ROUGH-INS FROM BEING LOCATED AS SHOWN ON THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE KITCHEN EQUIPMENT CONTRACTOR. A RESOLUTION TO THE CONFLICT, IN WRITING, MUST BE MADE PRIOR TO ROUGHING IN SERVICES.
13. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR SUPPLYING, AND INSTALLING ANY SWITCHES, DISCONNECTS, STARTERS, SHUNT TRIP BREAKERS, AS WELL AS, ANY OTHER COMPONENTS OR DEVICES NOT SUPPLIED WITH THE EQUIPMENT WHICH WILL MAKE THE INSTALLATION COMPLETE, OPERATIONAL, AND IN COMPLIANCE WITH ALL APPLICABLE CODES.
14. ALL DIMENSIONS SHOWN ARE FROM FINISHED WALL SURFACE TO ROUGH-IN CENTER-LINE, AND FROM CENTER-LINE TO CENTER-LINE.
15. ALL HEIGHTS GIVEN FOR ROUGH-INS ARE FROM FINISHED FLOOR SURFACE TO CENTER-LINE OF ROUGH-IN.
16. THE ROUGH-IN ELECTRICAL REQUIREMENTS SHOWN ON THIS DRAWING ARE FOR NEW AND RELOCATED EQUIPMENT ONLY. LOCATIONS OF ROUGH-INS ARE CONSIDERED TO BE IDEAL. HOWEVER, EXISTING ELECTRICAL SERVICES IN IMMEDIATE AREA ARE TO BE UTILIZED WHENEVER POSSIBLE. ELECTRICAL CONTRACTOR TO DETERMINE IF EXISTING SERVICES ARE ADEQUATE TO OPERATE EQUIPMENT SHOWN.
17. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO COVER IN THEIR SCOPE OF WORK ALL INFORMATION PROVIDED IN THE SPECIFICATION MANUALS.

ELECTRICAL LEGEND

- DUPLEX RECEPTACLE
- SINGLE RECEPTACLE
- JUNCTION BOX
- SR, 1 PHASE
- SR, 3 PHASE
- DATA LINE
- FLOOR RECEPTACLE (FLUSH MOUNT)
- SWITCH
- VAPOR PROOF LIGHT
- DCO (INSTALLED IN EQUIPMENT)
- SINGLE CONVENIENCE OUTLET (INSTALLED IN EQUIPMENT)
- JUNCTION BOX (INSTALLED IN EQUIPMENT)

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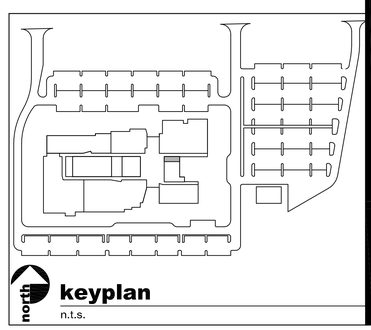

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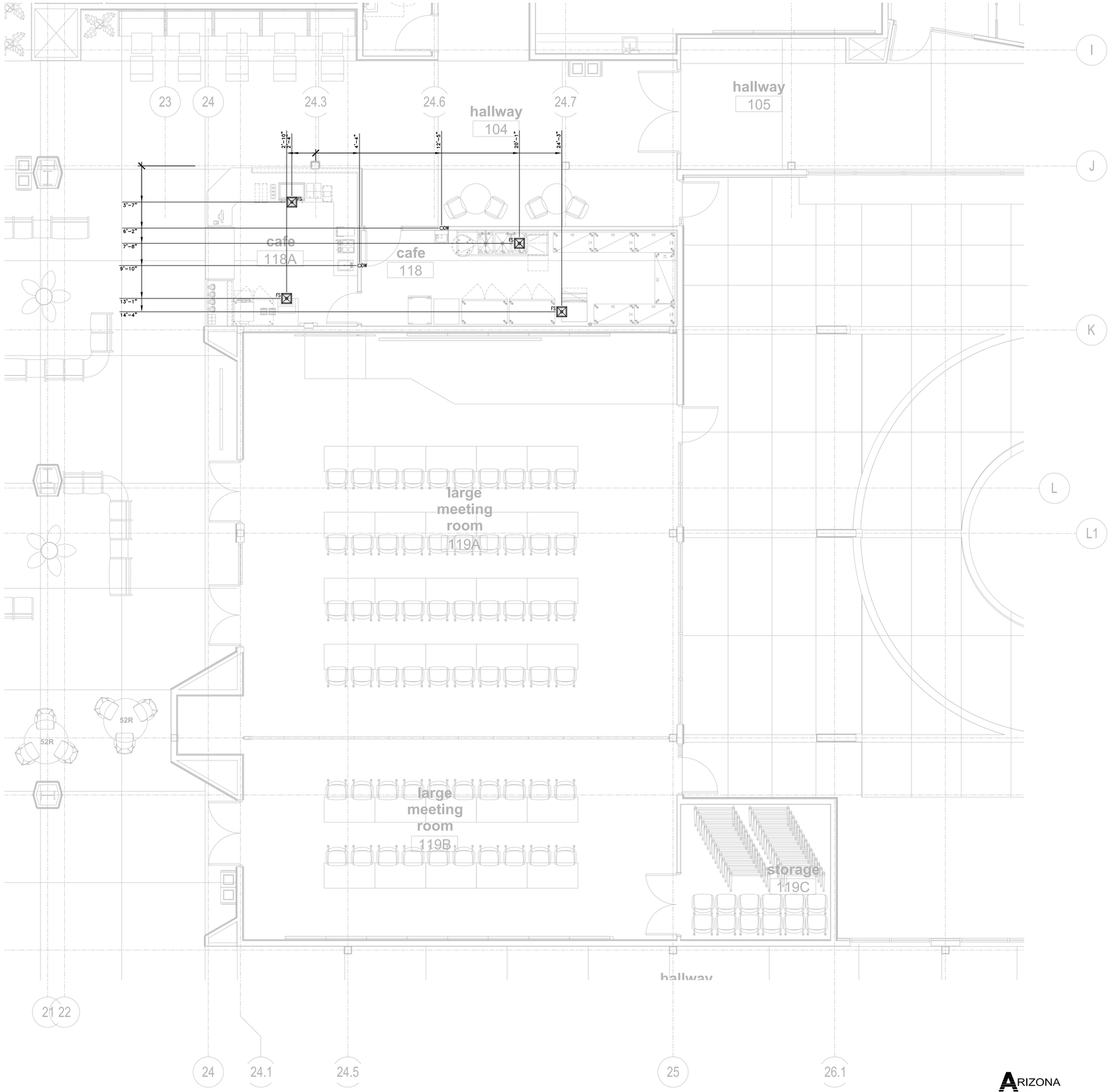


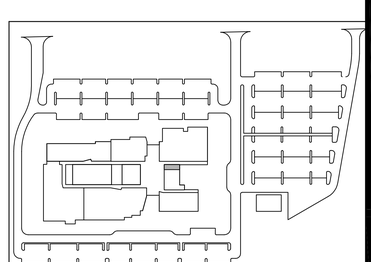
SPECIAL CONDITIONS PLAN

SCALE: 1/4" = 1'-0"

north

SPECIAL CONDITIONS LEGEND

- WALL BACKING
- FLOOR SINK
- STUB UP – DIRECT WASTE
- STUB UP – HOT/COLD WATER
- STUB UP – ELECTRICAL CONNECTION
- FUNNEL DRAIN
- FIELD DRAIN
- EXHAUST DUCT COLLAR
- MUA DUCT COLLAR
- WALK-IN FLOOR DEPRESSION
- FLOOR TROUGH DEPRESSION



north keyplan n.t.s.

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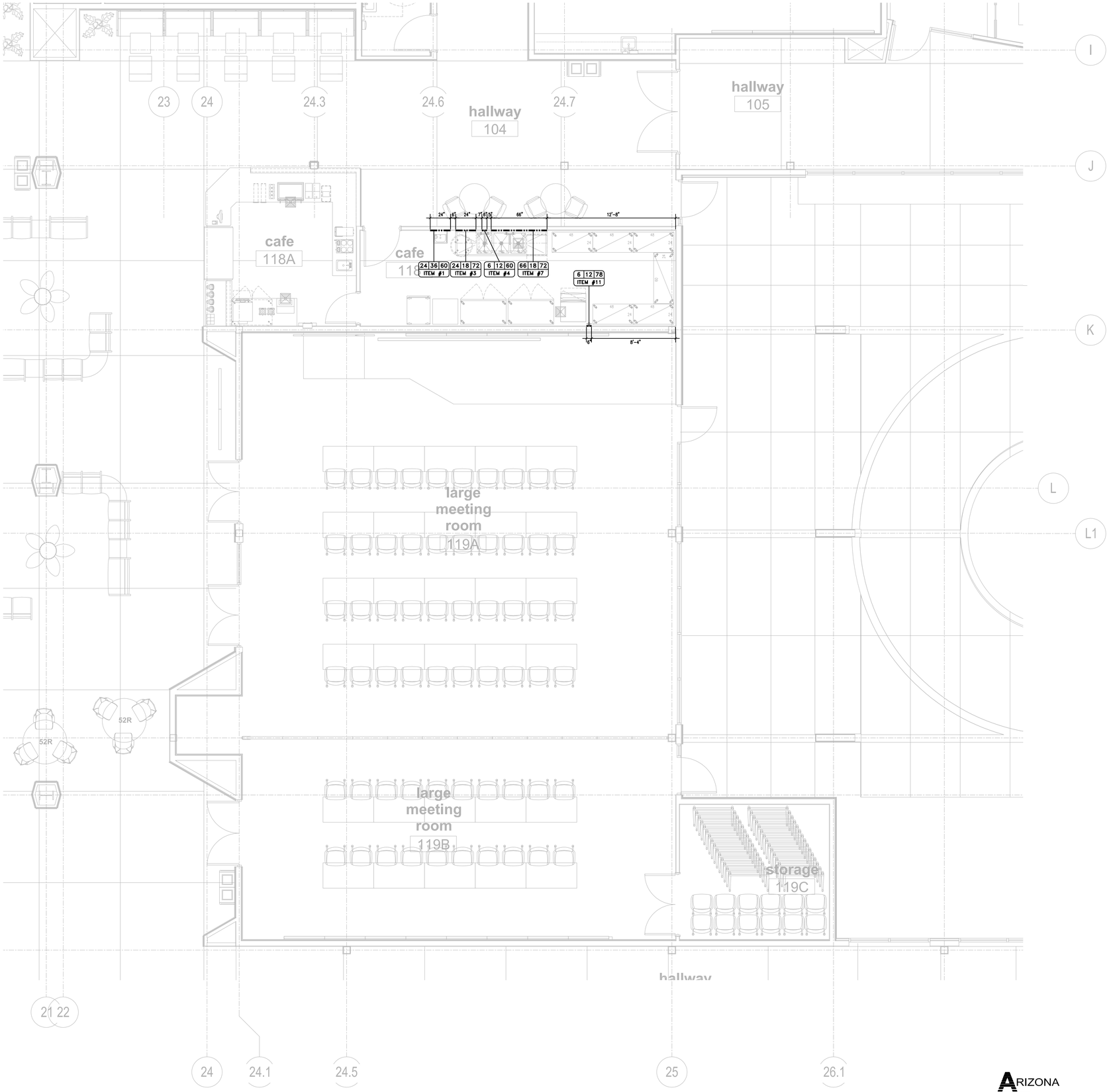
revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

Special Conditions Plan

FS5.0



SPECIAL CONDITIONS PLAN

SCALE: 1/4" = 1'-0"

SPECIAL CONDITIONS LEGEND

- WALL BACKING
- FLOOR SINK
- STUB UP – DIRECT WASTE
- STUB UP – HOT/COLD WATER
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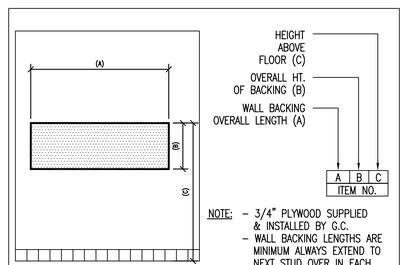
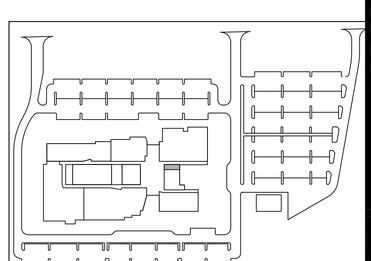


EQUIPMENT WALL BACKING DETAIL



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Special Conditions Plan

FS5.1

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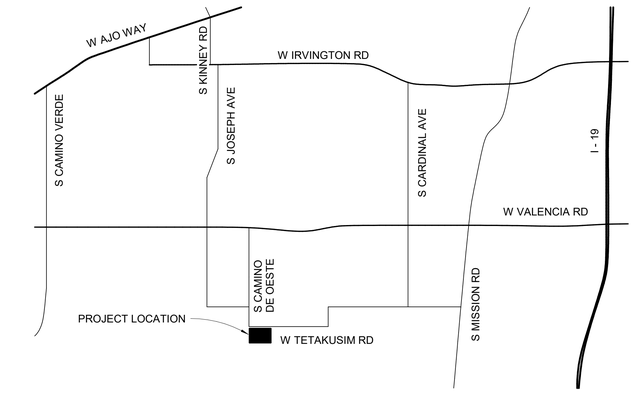
CONSTRUCTION DOCUMENTS



1 / g1.0 **location map**
not to scale

north

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* DRAWINGS PROVIDED FOR REFERENCE ONLY

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cover sheet

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11.16.18

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NOTE:
POTENTIAL AREA FOR BUILDING'S EXPANSION APPROX. ±8,000 SQ. FT.

NOTE:
POTENTIAL AREA FOR BUILDING'S EXPANSION APPROX. ±6,000 SQ. FT.

NOTE:
POTENTIAL AREA FOR BUILDING'S EXPANSION APPROX. ±7,000 SQ. FT.

FIRE RISER 2/fp1.1

ELECTRIC ALARM BELL

2" MAIN DRAIN

6" FP UG.

4/fp1.0 REMOTE FDC & BACKFLOW PREVENTER

6" FP UG. FOR CONT. SEE CIVIL DWGS

3/fp1.1 FIRE RISER

ELECTRIC ALARM BELL

2" MAIN DRAIN

4" FP UP FROM UG.

F.D.C.

4" FP MAIN UG. FOR CONT. SEE CIVIL DWGS

NOTE:
SEE CIVIL DRAWINGS FOR LOCATION AND SPECIFICATION OF THE FIRE PROTECTION BACKFLOW PREVENTER FOR THE WAREHOUSE.

1 fp1.0 fire protection floor plan
1" = 20'-0"

north

FP NOTE

1. LOCK BOX, (KNOX, SUPRA OR EQUIVALENT) COORDINATE WITH OWNER/ARCHITECT FOR SELECTION OF BOX TO SUIT NEED AND CONSTRUCTION TYPE. COORDINATE WITH FIRE DEPARTMENT FOR AN APPROVED LOCATION, REVIEW AND INSPECTION.
2. DETAIL IS DIAGRAMMATIC. SEE FIRE PROTECTION AND FIRE PROTECTION ENGINEERS DRAWINGS FOR ORIENTATION AND ROUTING.

FIRE PROTECTION GENERAL NOTES

1. DESIGN, FURNISH AND INSTALL A COMPLETE, FULLY AUTOMATIC WET PIPE SPRINKLER SYSTEM THROUGHOUT ALL AREAS OF NEW CONSTRUCTION AS INDICATED ON THE DRAWINGS. THE WORK SHALL BEGIN AT A POINT 5'-0" OUTSIDE THE EXTERIOR WALL OF THE BUILDING AS INDICATED IN THE DRAWINGS.
2. THE FIRE SPRINKLER SYSTEM SHALL INCLUDE ALL ITEMS OF A MINOR NATURE NECESSARY TO COMPLETE THE INSTALLATION. THE DESIGN OF THE SPRINKLER SYSTEM SHALL COMPLY WITH NFPA #13, 2010 EDITION, IBC, CHAPTER 9, 2012 EDITION (OR LATEST EDITIONS) AND THE REQUIREMENTS SPECIFIED HEREINAFTER.
3. BEFORE PREPARATION OF SHOP DRAWINGS, THE CONTRACTOR SHALL PERFORM A FLOW TEST AT THE SITE TO VERIFY THE WATER FLOW DATA LISTED IN THE DESIGN CRITERIA. ANY DISCREPANCY OBSERVED IN WATER PRESSURES SHALL BE REPORTED IMMEDIATELY TO THE ARCHITECT. PRIOR TO FABRICATION OF MATERIAL, SUBMIT ONE FULL SET OF SHOP DRAWINGS AND CALCULATIONS TO THE AUTHORITY HAVING JURISDICTION AND ONE ELECTRONIC COPY TO THE ARCHITECT. APPROVED SHOP DRAWINGS SHALL BE MAINTAINED AT THE CONSTRUCTION SITE.
4. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH ALL CODES, LAWS, RULES AND REGULATIONS OF ALL NATIONAL, STATE, COUNTY AND LOCAL AUTHORITIES HAVING JURISDICTION OVER THE PREMISES. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO THE STATE FIRE MARSHAL AND THE FIRE DEPARTMENT HAVING JURISDICTION, AND CARRIER OF THE BUILDING INSURANCE.
5. SECURE AND PAY FOR ALL PERMITS, INSPECTIONS AND CERTIFICATES REQUIRED BY THE FOREGOING AUTHORITIES.
6. IN AREAS WITH SUSPENDED, GYPSUM BOARD OR FINISHED CEILINGS, RECESSED PENDENT TYPE GLASS BULB SPRINKLER HEADS WITH SATIN CHROME FINISH INCLUDING (2) PIECE ADJUSTABLE ESCUTCHEONS WITH MATCHING FINISH SHALL BE PROVIDED. LOCATE HEADS 12" FROM A CEILING "T" ON 3 SIDES OR IN CENTER OF 2 x4 CEILING TILE. FINAL HEAD LAYOUT REQUIRES ARCHITECT'S APPROVAL.
7. COORDINATE CLOSELY WITH THE FIRE ALARM CONTRACTOR FOR ALL ALARM TIE-INS FOR A FULLY SUPERVISED SYSTEM.
8. PERFORM HYDROSTATIC TESTS AS REQUIRED BY NFPA-13 AND 24 UPON COMPLETION OF TESTING AND WHEN SATISFACTORY RESULTS HAVE BEEN OBTAINED, CERTIFY IN WRITING THAT ALL REQUIRED TESTS HAVE BEEN PERFORMED AND THAT APPROVAL OF THE SYSTEM HAS BEEN OBTAINED FROM THE AUTHORITIES HAVING JURISDICTION.

FIRE PROTECTION DESIGN CRITERIA

TYPE OF SYSTEM:
AUTOMATIC WET-PIPE FIRE SPRINKLER SYSTEM

OCCUPANCY CLASSIFICATION:	HAZARD CLASSIFICATION:
OFFICE/CLEAN-DIRTY/HALLWAY	LIGHT HAZARD
ELECTRICAL/IDF ROOM	ORDINARY HAZARD - GROUP I
JAN. ROOM/STORAGE	ORDINARY HAZARD - GROUP II

CONSTRUCTION STANDARDS:
NFPA 13, 2010 EDITION, 2012 INTERNATIONAL BUILDING CODE, CHAPTER 9 & 2012 INTERNATIONAL FIRE CODE.

FIRE PROTECTION CONTRACTOR SHALL PROVIDE A CERTIFIED COPY OF THE FIRE FLOW INFORMATION TO THE FIRE PROTECTION ENGINEER, ARCHITECT AND MECHANICAL ENGINEER. CONTRACTOR SHALL PAY FOR ALL FEES AND/OR PERMITS.

HYDRANT TEST DATA:

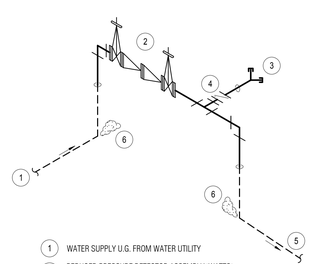
STATIC:	56	PSI
RESIDUAL:	52	PSI
FLOW:	2,000	GPM

SOURCE:
TUCSON FIRE DEPARTMENT

DESIGN DENSITY:

OFFICE/CLEAN-DIRTY/HALLWAY	0.10 GPM/SF FOR MOST REMOTE 1500 SF AREA
ELECTRICAL/IDF ROOM	0.15 GPM/SF FOR MOST REMOTE 1500 SF AREA
JAN. ROOM/STORAGE	0.20 GPM/SF FOR MOST REMOTE 1500 SF AREA

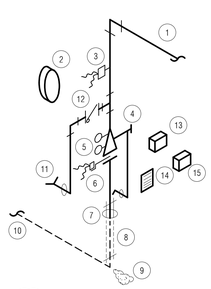
AUTHORITIES HAVING JURISDICTION:
TUCSON WATER COMPANY AND TUCSON FIRE DEPARTMENT



1. WATER SUPPLY U.G. FROM WATER UTILITY
2. REDUCED PRESSURE DETECTOR ASSEMBLY 'WATTS' MODEL #LF957RPDAOSY (OR EQUIVALENT - LOCKED).
3. 4" x 2 1/2" x 2 1/2" FIRE DEPT. CONN.
4. 4" CHECK VALVE
5. FP MAIN U.G. TO BUILDING
6. THRUST BLOCK PER NFPA 24

SEE FP NOTE #2

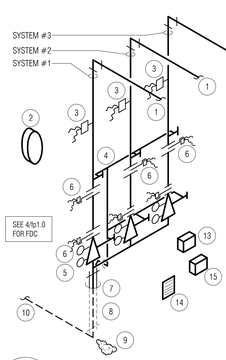
4 fp1.0 remote FDC connection detail
NTS



1. O.H. F.P. MAIN
2. EXTERIOR BELL, 120 VAC ELECTRIC BELL CONNECTED TO DEDICATED CIRCUIT W/ LOCKOUT BREAKER.
3. FLOW SWITCH
4. 2" DRAIN VALVE & MAIN DRAIN TO EXTERIOR
5. "SHOTGUN" CHECK VALVE w/ TRIM
6. INDICATING CONTROL VALVE w/ TAMPER SWITCH
7. FLANGE @ 6" A.F.F.
8. SPIGOT PIECE WITH TIE RODS PER NFPA 24
9. THRUST BLOCK PER NFPA 24
10. U.G. FIRE LINE
11. 4" x 2-1/2" x 2-1/2" F.D.C.
12. 4" CHECK VALVE
13. BOXED SPARE SPRINKLERS & WRENCH
14. HYDRAULIC CALC DATA INFO PLATE
15. LOCK BOX (SEE FP NOTE #1)

SEE FP NOTE #2

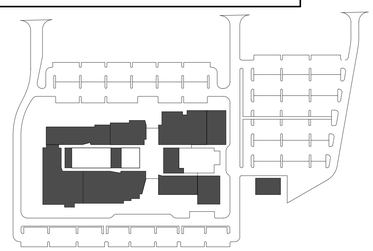
3 fp1.0 fire riser detail
NTS



1. O.H. F.P. MAIN
2. EXTERIOR BELL, 120 VAC ELECTRIC BELL CONNECTED TO DEDICATED CIRCUIT W/ LOCKOUT BREAKER.
3. FLOW SWITCH
4. 2" DRAIN VALVE & MAIN DRAIN TO EXTERIOR
5. "SHOTGUN" CHECK VALVE w/ TRIM
6. INDICATING CONTROL VALVE w/ TAMPER SWITCH
7. FLANGE @ 6" A.F.F.
8. SPIGOT PIECE WITH TIE RODS PER NFPA 24
9. THRUST BLOCK PER NFPA 24
10. U.G. FIRE LINE
11. NOT USED.
12. NOT USED
13. BOXED SPARE SPRINKLERS & WRENCH
14. HYDRAULIC CALC DATA INFO PLATE
15. LOCK BOX (SEE FP NOTE #1)

SEE FP NOTE #2

2 fp1.0 fire riser detail
NTS



north **keyplan**
n.t.s.

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

fire protection - overall

fp1.0

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MECHANICAL AND FIRE PROTECTION ENGINEERS, PLLC.
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TUCSON, ARIZONA, 85710
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www.adamsengrs.com

PROJECT No. 17069

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ARCHITECTS AIA

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TUCSON, ARIZONA 85710
OFFICE (520) 326-3700
FAX (520) 326-1148
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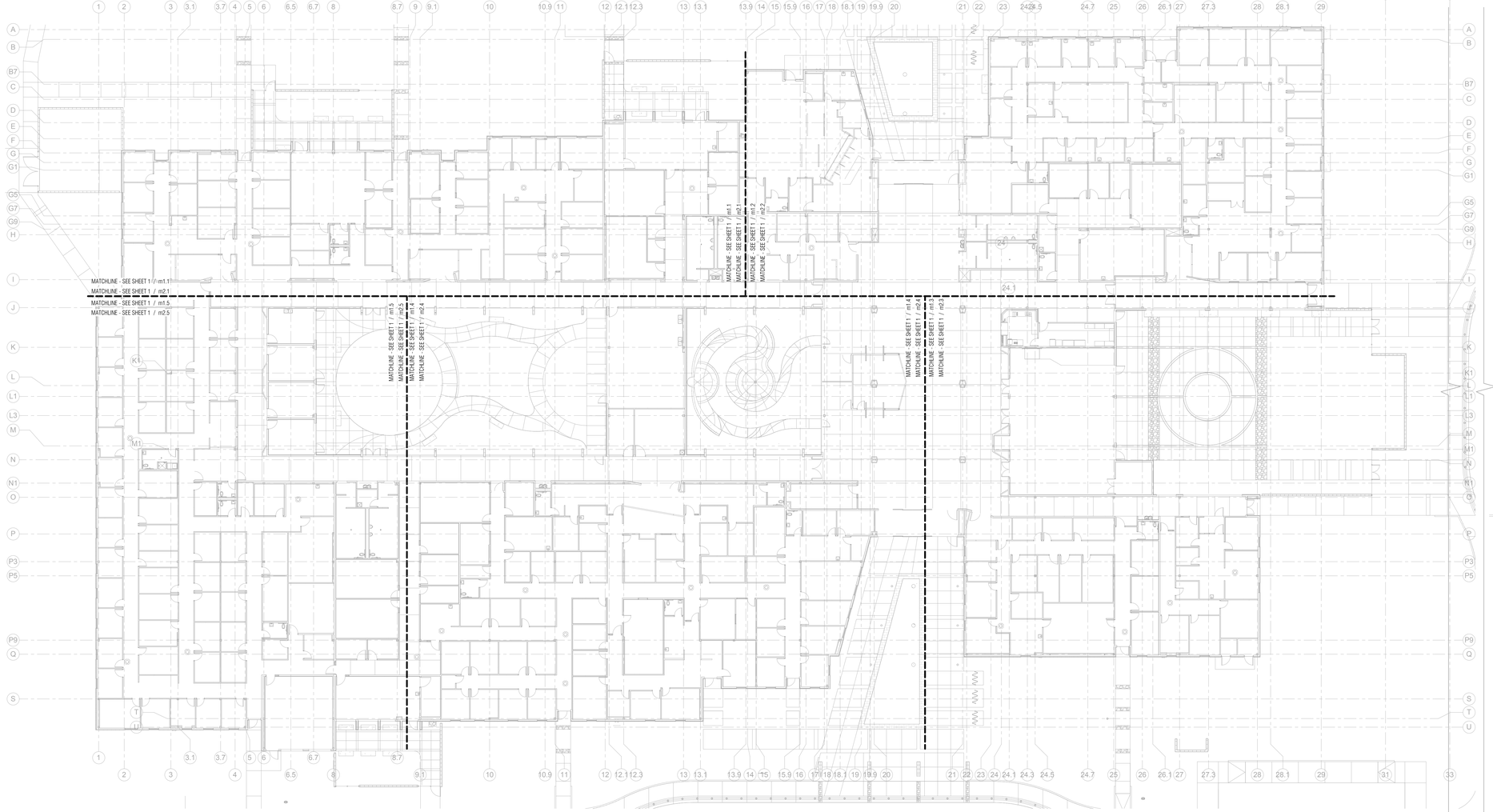
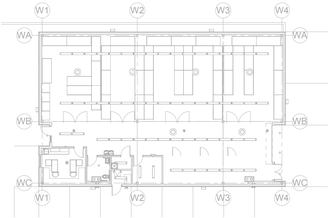
EXPIRES: 12-31-18

job
1717

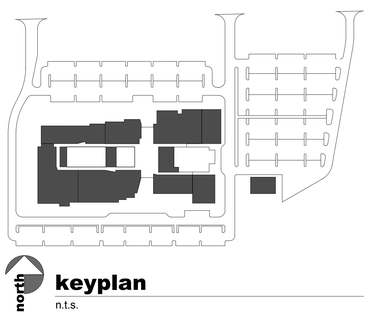
date
11.16.18

revisions





1 m1.0 mechanical floor plan - overall
1" = 20'-0"



keyplan
n.t.s.

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

mechanical floor plan - overall

m1.0

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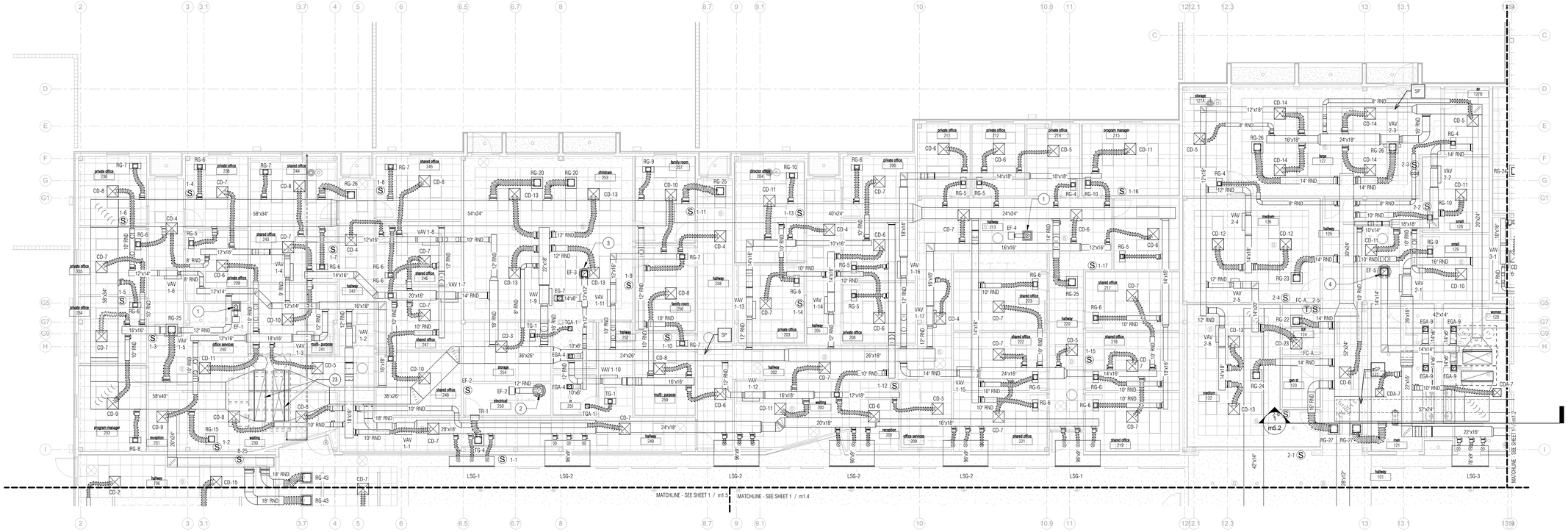


1 / m1.1 mechanical floor plan - Sewa U'usim
1/8" = 1'-0"

north

AIR DEVICE and FLEX DUCT SCHEDULE

CD-1	50 CFM, 6x6 (6" FLEX DUCT)	RG-1	50 CFM, 22x10 (6" FLEX DUCT)	EG-1	50 CFM, 22x10
CD-2	75 CFM, 6x6 (8" FLEX DUCT)	RG-2	75 CFM, 22x10 (8" FLEX DUCT)	EG-2	75 CFM, 22x10
CD-3	100 CFM 6x6 (8" FLEX DUCT)	RG-3	100 CFM, 22x10 (8" FLEX DUCT)	EG-3	100 CFM, 22x10
CD-4	125 CFM, 6x6 (8" FLEX DUCT)	RG-4	125 CFM, 22x10 (8" FLEX DUCT)	EG-4	125 CFM, 22x10
CD-5	150 CFM, 9x9 (8" FLEX DUCT)	RG-5	150 CFM, 22x10 (8" FLEX DUCT)	EG-5	150 CFM, 22x10
CD-6	175 CFM, 9x9 (10" FLEX DUCT)	RG-6	175 CFM, 22x10 (10" FLEX DUCT)	EG-6	175 CFM, 22x10
CD-7	200 CFM, 9x9 (10" FLEX DUCT)	RG-7	200 CFM, 22x10 (10" FLEX DUCT)	EG-7	200 CFM, ,22x10
CD-8	225 CFM, 9x9 (10" FLEX DUCT)	RG-8	225 CFM, 22x10 (10" FLEX DUCT)	EG-8	225 CFM, 22x10
CD-9	250 CFM, 9x9 (10" FLEX DUCT)	RG-9	250 CFM, 22x10 (10" FLEX DUCT)	EG-9	250 CFM, 22x10
CD-10	275 CFM, 12x12, (10" FLEX DUCT)	RG-10	275 CFM, 22x10 (10" FLEX DUCT)	EG-10	275 CFM, 22x10
CD-11	300 CFM, 12x12 (12" FLEX DUCT)	RG-11	300 CFM, 22x10 (12" FLEX DUCT)	EG-11	300 CFM, 22x10
CD-12	325 CFM, 12x12 (12" FLEX DUCT)	RG-12	325 CFM, 22x10 (12" FLEX DUCT)	EG-12	325 CFM, 22x10
CD-13	350 CFM, 12x12 (12" FLEX DUCT)	RG-13	350 CFM, 22x10 (12" FLEX DUCT)	EG-13	350 CFM, 22x10
CD-14	375 CFM, 12x12 (12" FLEX DUCT)	RG-14	375 CFM, 22x10 (12" FLEX DUCT)	EG-14	375 CFM, 22x10
CD-15	400 CFM, 12x12 (12" FLEX DUCT)	RG-15	400 CFM, 22x22 (12" FLEX DUCT)	EG-15	400 CFM, 22x22
CD-16	425 CFM, 12x12 (12" FLEX DUCT)	RG-16	425 CFM, 22x22 (12" FLEX DUCT)	EG-16	425 CFM, 22x22
CD-17	450 CFM, 12x12 (12" FLEX DUCT)	RG-17	450 CFM, 22x22 (12" FLEX DUCT)	EG-17	450 CFM, 22x22
CD-18	475 CFM, 15x15 (14" FLEX DUCT)	RG-18	475 CFM, 22x22 (12" FLEX DUCT)	EG-18	475 CFM, 22x22
CD-19	500 CFM, ,15x15 (14" FLEX DUCT)	RG-19	500 CFM, 22x22 (14" FLEX DUCT)	EG-19	500 CFM, 22x22
CD-20	525 CFM, 15x15 (14" FLEX DUCT)	RG-20	525 CFM, 22x22, (14" FLEX DUCT)		
CD-21	550 CFM, 15x15 (14" FLEX DUCT)	RG-21	550 CFM, 22x22 (14" FLEX DUCT)	EGA-1	50 CFM, 6x6
CD-22	575 CFM, 15x15 (14" FLEX DUCT)	RG-22	575 CFM, 22x22 (14" FLEX DUCT)	EGA-2	75 CFM, 8x8
CD-23	600 CFM, 15x15 (14" FLEX DUCT)	RG-23	600 CFM, 22x22 (14" FLEX DUCT)	EGA-3	100 CFM, 8x8
CD-24	625 CFM, 15x15 (14" FLEX DUCT)	RG-24	625 CFM, 22x22 (14" FLEX DUCT)	EGA-4	125 CFM, 8x8
CD-25	650 CFM, 15x15 (14" FLEX DUCT)	RG-25	650 CFM, 22x22 (14" FLEX DUCT)	EGA-5	150 CFM, 8x8
CD-26	675 CFM, 15x15 (14" FLEX DUCT)	RG-26	675 CFM, 22x22 (14" FLEX DUCT)	EGA-6	175 CFM, 10x10
CD-27	700 CFM, 18x18 (16" FLEX DUCT)	RG-27	700 CFM, 22x22 (16" FLEX DUCT)	EGA-7	200 CFM, 10x10
CD-28	725 CFM, 18x18 (16" FLEX DUCT)	RG-28	725 CFM, 22x22 (16" FLEX DUCT)	EGA-8	225 CFM, 10x10
CD-29	750 CFM, 18x18 (16" FLEX DUCT)	RG-29	750 CFM, 22x22 (16" FLEX DUCT)	EGA-9	250 CFM, 10x10
CD-30	775 CFM, 18x18 (16" FLEX DUCT)	RG-30	775 CFM, 22x22 (16" FLEX DUCT)	EGA-10	275 CFM, 10x10
CD-31	800 CFM, 18x18 (16" FLEX DUCT)	RG-31	800 CFM, 22x22 (16" FLEX DUCT)	EGA-11	300 CFM, 12x12
CD-32	825 CFM, 18x18 (16" FLEX DUCT)	RG-32	825 CFM, 22x22 (16" FLEX DUCT)	EGA-12	325 CFM, 12x12
CD-33	850 CFM, 18x18 (16" FLEX DUCT)	RG-33	850 CFM, 22x22 (16" FLEX DUCT)	EGA-13	350 CFM, 12x12
CD-34	875 CFM, 18x18 (16" FLEX DUCT)	RG-34	875 CFM, 22x22 (16" FLEX DUCT)	EGA-14	375 CFM, 12x12
CD-35	900 CFM, 18x18 (16" FLEX DUCT)	RG-35	900 CFM, 22x22 (16" FLEX DUCT)	EGA-15	400 CFM, 12x12
		RG-36	925 CFM, 22x22 (16" FLEX DUCT)	EGA-16	425 CFM, 12x12
CDA-1	50 CFM, 6x6 (6" FLEX DUCT)	RG-37	950 CFM, 22x22 (16" FLEX DUCT)	EGA-17	450 CFM, 12x12
CDA-2	75 CFM, 6x6 (8" FLEX DUCT)	RG-38	975 CFM, 22x22 (16" FLEX DUCT)	EGA-18	475 CFM, 12x12
CDA-3	100 CFM, 6x6 (8" FLEX DUCT)	RG-39	1000 CFM, 22x22 (16" FLEX DUCT)	EGA-19	500 CFM, 14x14
CDA-4	125 CFM, 6x6 (8" FLEX DUCT)	RG-40	1025 CFM, 22x22 (18" FLEX DUCT)	EGA-20	525 CFM, 14x14
CDA-5	150 CFM, 9x9 (8" FLEX DUCT)	RG-41	1050 CFM, 22x22 (18" FLEX DUCT)	EGA-21	550 CFM, 14x14
CDA-6	175 CFM, 9x9 (10" FLEX DUCT)	RG-42	1075 CFM, 22x22 (18" FLEX DUCT)	EGA-22	575 CFM, 14x14
CDA-7	200 CFM, 9x9 (10" FLEX DUCT)	RG-43	1100 CFM, 22x22 (18" FLEX DUCT)	EGA-23	600 CFM, 16x16
CDA-8	225 CFM, 9x9 (10" FLEX DUCT)				
CDA-9	250 CFM, 9x9 (10" FLEX DUCT)	RGA-1	50 CFM, 6x6 (6" FLEX DUCT)	ER-1	8x8, 50 CFM (NO FLEX DUCT)
CDA-10	275 CFM, 9x9 (10" FLEX DUCT)	RGA-2	75 CFM, 8x8 (8" FLEX DUCT)		
CDA-11	300 CFM, 12x12 (12" FLEX DUCT)	RGA-3	100 CFM, 8x8 (8" FLEX DUCT)	TG-1	22x10 (8" FLEX DUCT)
CDA-12	325 CFM, 12x12 (12" FLEX DUCT)	RGA-4	125 CFM, 8x8 (8" FLEX DUCT)	TG-2	22x10 (10" FLEX DUCT)
CDA-13	350 CFM, 12x12 (12" FLEX DUCT)	RG-A5	150 CFM, 8x8 (8" FLEX DUCT)	TG-3	22x22 (12" FLEX DUCT)
CDA-14	375 CFM, 12x12 (12" FLEX DUCT)	RGA-6	175 CFM, 10x10 (10" FLEX DUCT)	TG-4	22x22 (14" FLEX DUCT)
CDA-15	400 CFM, 12x12 (12" FLEX DUCT)	RGA-7	200 CFM, 10x10 (10" FLEX DUCT)		
CDA-16	425 CFM, 12x12 (12" FLEX DUCT)	RGA-8	225 CFM, 10x10 (10" FLEX DUCT)	TGA-1	8x8 (8" FLEX DUCT)
CDA-17	450 CFM, 12x12 (12" FLEX DUCT)	RGA-9	250 CFM, 10x10 (10" FLEX DUCT)	TGA-2	10x10 (10" FLEX DUCT)
CDA-18	475 CFM, 12x12 (12" FLEX DUCT)	RGA-10	275 CFM, 10x10 (10" FLEX DUCT)	TGA-3	12x12 (12" FLEX DUCT)
CDA-19	500 CFM, 15x15 (14" FLEX DUCT)	RGA-11	300 CFM, 12x12 (12" FLEX DUCT)		
CDA-20	525 CFM, 15x15 (14" FLEX DUCT)	RGA-12	325 CFM, 12x12 (12" FLEX DUCT)	TR-1	18x12 (14" FLEX DUCT)
CDA-21	550 CFM, 15x15 (14" FLEX DUCT)	RGA-13	350 CFM, 12x12 (12" FLEX DUCT)		
CDA-22	575 CFM, 15x15 (14" FLEX DUCT)	RGA-14	375 CFM, 12x12 (12" FLEX DUCT)		
CDA-23	600 CFM, 15x15 (14" FLEX DUCT)	RGA-15	400 CFM, 12x12 (12" FLEX DUCT)		
CDA-24	625 CFM, 15x15 (14" FLEX DUCT)	RGA-16	425 CFM, 12x12 (12" FLEX DUCT)		
CDA-25	650 CFM, 15x15 (14" FLEX DUCT)	RGA-17	450 CFM, 12x12 (12" FLEX DUCT)		
CDA-26	675 CFM, 15x15 (14" FLEX DUCT)	RGA-18	475 CFM, 12x12 (12" FLEX DUCT)		
CDA-27	700 CFM, 18x18 (16" FLEX DUCT)	RGA-19	500 CFM, 14x14 (14" FLEX DUCT)		
CDA-28	725 CFM, 18x18 (16" FLEX DUCT)	RGA-20	525 CFM, 14x14, (14" FLEX DUCT)		
CDA-29	750 CFM, 18x18 (16" FLEX DUCT)	RGA-21	550 CFM, 14x14 (14" FLEX DUCT)		
CDA-30	775 CFM, 18x18 (16" FLEX DUCT)	RGA-22	575 CFM, 14x14 (14" FLEX DUCT)		
CDA-31	800 CFM, 18x18 (16" FLEX DUCT)	RGA-23	600 CFM, 14x14 (14" FLEX DUCT)		
CDA-32	825 CFM, 18x18 (16" FLEX DUCT)	RGA-24	625 CFM, 14x14 (14" FLEX DUCT)		
CDA-33	850 CFM, 18x18 (16" FLEX DUCT)	RGA-25	650 CFM, 14x14 (14" FLEX DUCT)		
CDA-34	875 CFM, 18x18 (16" FLEX DUCT)	RGA-26	675 CFM, 14x14 (14" FLEX DUCT)		
CDA-35	900 CFM, 18x18 (16" FLEX DUCT)	RGA-27	700 CFM, 16x16 (16" FLEX DUCT)		
		RGA-28	725 CFM, 16x16 (16" FLEX DUCT)		
DL-1	500 CFM, 24x6 (NO FLEX DUCT)	RGA-29	750 CFM, 16x16 (16" FLEX DUCT)		
DL-2	350 CFM, 18x6 (NO FLEX DUCT)	RGA-30	775 CFM, 16x16 (16" FLEX DUCT)		
		RGA-31	800 CFM, 18x18 (16" FLEX DUCT)		
SR-1	800 CFM, 20x16 (NO FLEX DUCT)	RGA-32	825 CFM, 18x18 (16" FLEX DUCT)		
		RGA-33	850 CFM, 18x18(16" FLEX DUCT)		
LSG-1	8'-0" LONG x 3" TALL, 400 CFM (8" FLEX DUCT)	RGA-34	875 CFM, 18x18(16" FLEX DUCT)		
LSG-2	8'-0" LONG x 3" TALL, 425 CFM (8" FLEX DUCT)	RGA-35	900 CFM, 24x24 (18" FLEX DUCT)		
LSG-3	6'-0" LONG x 4" TALL, 650 CFM (8" FLEX DUCT)	RGA-36	925 CFM, 24x24 (18" FLEX DUCT)		
LSG-4	8'-0" LONG x 4" TALL, 750 CFM (10" FLEX DUCT)	RGA-37	950 CFM, 24x24 (18" FLEX DUCT)		
LSG-5	8'-0" LONG x 4" TALL, 725 CFM (10" FLEX DUCT)	RGA-38	975 CFM, 24x24 (18" FLEX DUCT)		
		RGA-39	1000 CFM, 24x24 (18"FLEX DUCT)		
		RGA-40	1025 CFM, 24x24 (18" FLEX DUCT)		
		RGA-41	1050 CFM, 24x24 (18" FLEX DUCT)		
		RGA-42	1075 CFM, 24x24 (18" FLEX DUCT)		
		RGA-43	1100 CFM, 24x24 (18" FLEX DUCT)		

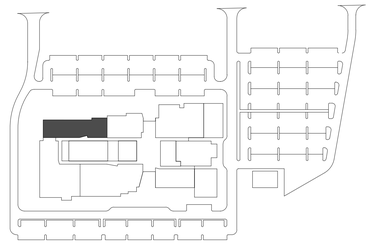
MECHANICAL LEGEND

CD	-	CEILING DIFFUSER - PRICE MODEL SCD, FRAME FOR T-BAR CEILING
CDA	-	CEILING DIFFUSER - PRICE MODEL SCD, OBD, FRAME FOR HARD CEILING
SR	-	SIDEWALL SUPPLY REGISTER - PRICE MODEL 520, OBD (DOUBLE DEFLECTION)
LSG	-	LINEAR SUPPLY GRILLE - PRICE MODEL LBMH, 15 DEGREE DEFLECTION
DL	-	DRUM LOUVER - PRICE MODEL HCD2
RG	-	RETURN GRILLE - PRICE MODEL 80, FRAME FOR T-BAR CEILING
RGA	-	RETURN GRILLE - PRICE MODEL 80, OBD, FRAME FOR HARD CEILING
TG	-	TRANSFER GRILLE - PRICE MODEL 80, FRAME FOR T-BAR CEILING
TGA	-	TRANSFER GRILLE - PRICE MODEL 80, FRAME FOR HARD CEILING
TR	-	SIDEWALL TRANSFER REGISTER - PRICE MODEL 530
EG	-	EXHAUST GRILLE - PRICE MODEL 80, FRAME FOR T-BAR CEILING
EGA	-	EXHAUST GRILLE - PRICE MODEL 80, OBD, FRAME FOR HARD CEILING
ER	-	SIDEWALL EXHAUST REGISTER - PRICE MODEL 530Z, OBD
S	-	ROOM TEMPERATURE SENSOR
T	-	THERMOSTAT
CO2	-	CARBON DIOXIDE SENSOR
SP	-	DUCT STATIC PRESSURE SENSOR

#	KEYNOTES:
1	8" ROUND EXHAUST DUCT THROUGH ROOF.
2	12" ROUND EXHAUST DUCT THROUGH ROOF.
3	12x12 EXHAUST DUCT THROUGH ROOF.
4	14x14 EXHAUST DUCT THROUGH ROOF.
23	SUPPLY AND RETURN DUCTS THROUGH ROOF - SAME SIZE AS UNIT OPENINGS. FIELD COORDINATE WITH STRUCTURAL MEMBERS. TRANSITION / OFFSET AS REQUIRED TO FIT WITHIN THE STRUCTURE. PROVIDE 18 GAUGE SHEET METAL FROM UNIT CONNECTION THROUGH TRANSITION TO SUPPLY AND RETURN TRUNK DUCTS.

GENERAL NOTES:

1. SEE ROOF PLAN (SHEET m3.1) FOR ROOFTOP AIR CONDITIONING UNIT NUMBERS.
2. FIELD COORDINATE WITH ARCHITECT EXACT LOCATION OF ROOM TEMPERATURE SENSORS, THERMOSTATS, AND CO2 SENSORS TO AVOID CONFLICT WITH FURNITURE, ART WORK, ETC. MOUNT SENSORS AT 48" ABOVE FINISHED FLOOR (CENTERLINE OF SENSOR).
3. PROVIDE BOWDEN CABLE DAMPER OPERATOR SYSTEM (OR EQUIVALENT) TO ACCESS BALANCE DAMPERS ABOVE THE HARD CEILINGS. NOTE: ALL AIR DEVICES TO HAVE A MANUAL BALANCE DAMPER IN THE BRANCH DUCT OR AT THE TRUNK DUCT TAKE-OFF.
4. FIELD COORDINATE AIR DEVICE LOCATIONS WITH ARCHITECTS REFLECTED CEILING PLAN AND ELECTRICAL LIGHTING PLAN. LIGHT FIXTURE LOCATIONS TAKE PRIORITY.
5. COORDINATE SUPPLY AND RETURN TRUNK DUCT ROUTING AND ELEVATIONS WITH GENERAL CONTRACTOR AND FIRE SPRINKLER CONTRACTOR PRIOR TO INSTALLATION OF FIRE SPRINKLER PIPING.
6. SEE m2.1 THROUGH m2..5 FOR CONDENSATE AND REFRIGERANT PIPING (SIZING AND ROUTING).



north keyplan
n.t.s.

REGISTERED PROFESSIONAL ENGINEER
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DAVID C. TYRRELL
ARIZONA U.S.A.
EXPIRES: 12-31-18

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

mechanical floor plan – Sewa U'usim

m1.1

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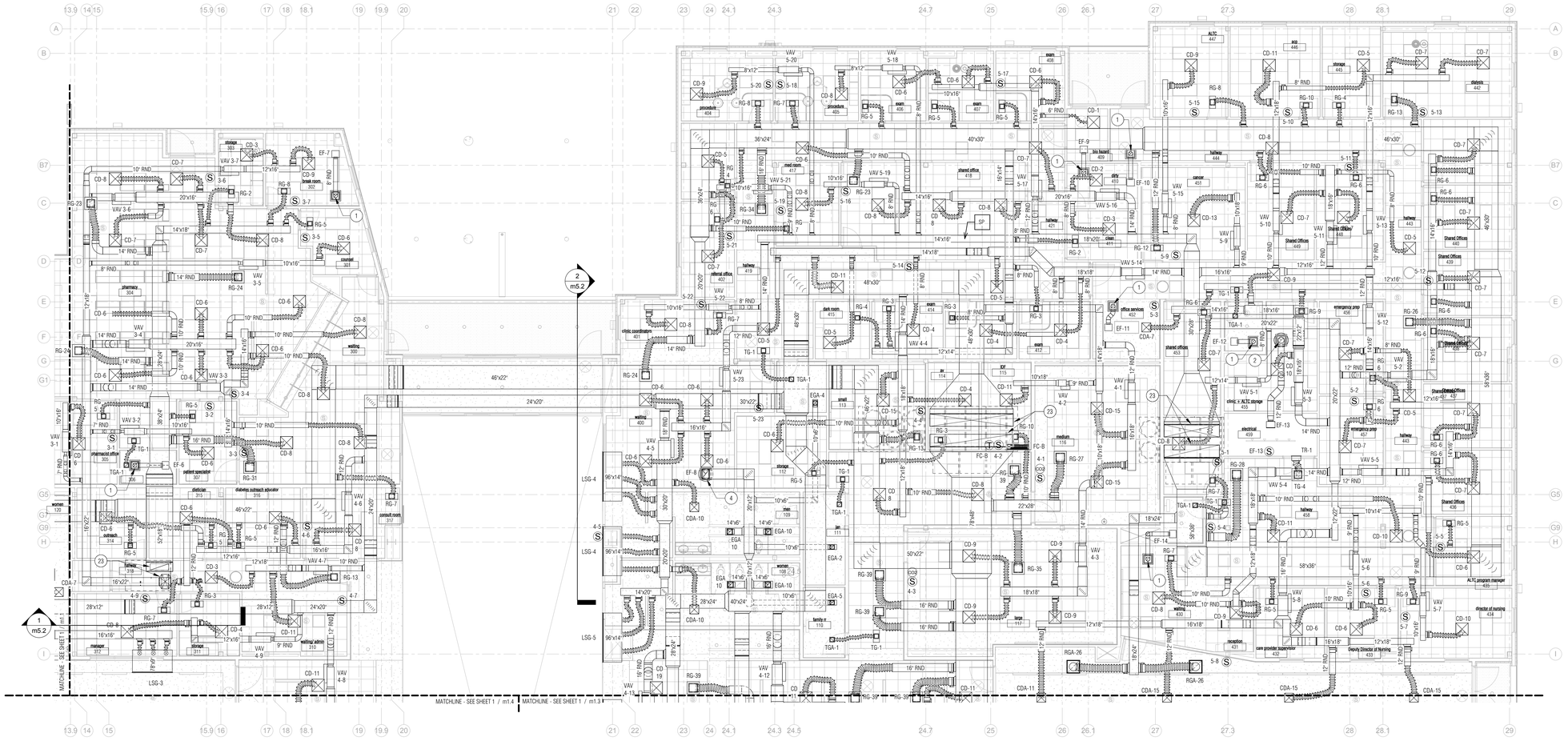
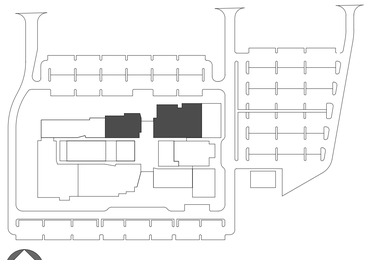


1 m5.2 mechanical floor plan - Nursing + Clinics
1/8" = 1'-0"

north

#	KEYNOTES:
1	8" ROUND EXHAUST DUCT THROUGH ROOF.
2	12" ROUND EXHAUST DUCT THROUGH ROOF.
4	14x14 EXHAUST DUCT THROUGH ROOF.
23	SUPPLY AND RETURN DUCTS THROUGH ROOF - SAME SIZE AS UNIT OPENINGS. FIELD COORDINATE WITH STRUCTURAL MEMBERS. TRANSITION / OFFSET AS REQUIRED TO FIT WITHIN THE STRUCTURE. PROVIDE 18 GAUGE SHEET METAL FROM UNIT CONNECTION THROUGH TRANSITION TO SUPPLY AND RETURN TRUNK DUCTS.



north **keyplan**
n.t.s.

Pascua Yaqui Tribe
Health Services Center II
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mechanical floor plan – Nursing
Clinics

m1.2

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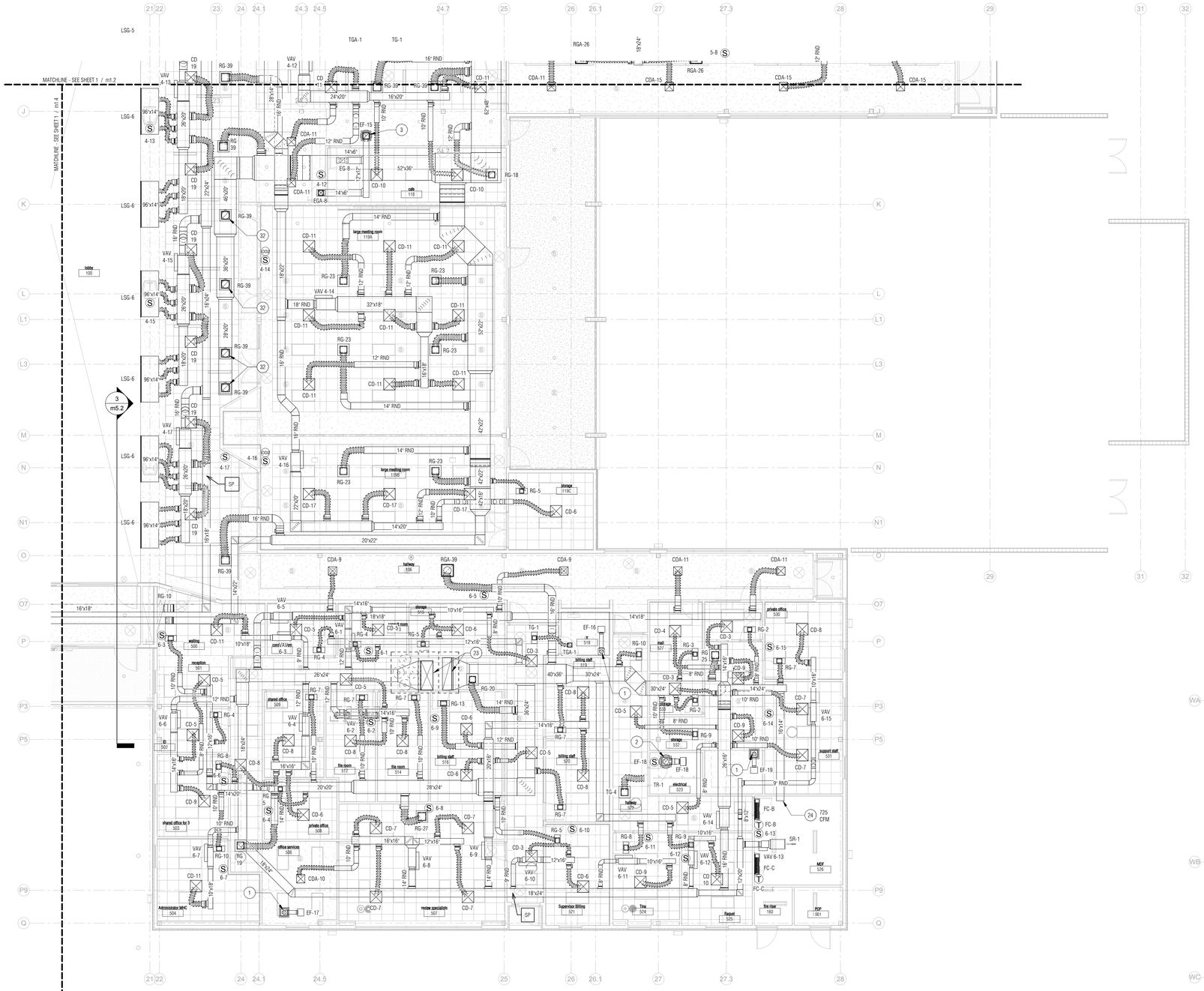
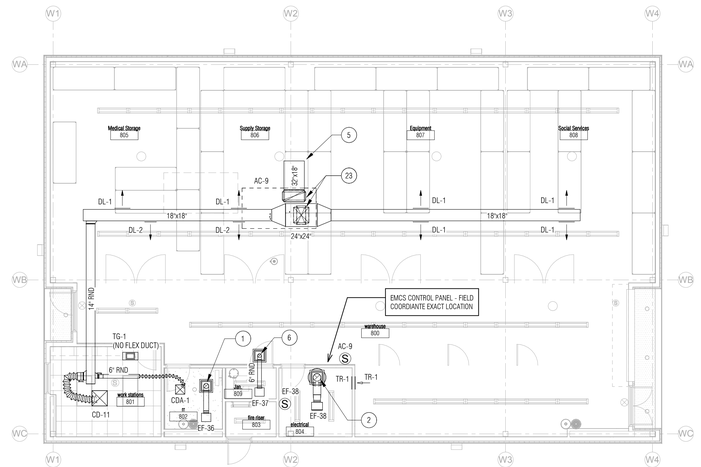


1 m1.3 mechanical floor plan - Health Budget + Managed Health / Billing

1/8" = 1'-0"

north

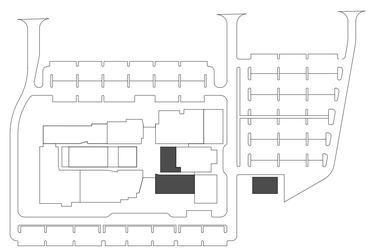


2 m1.3 mechanical floor plan - warehouse

1/8" = 1'-0"

north

#	KEYNOTES:
1	8" ROUND EXHAUST DUCT THROUGH ROOF.
2	12" ROUND EXHAUST DUCT THROUGH ROOF.
3	12x12 EXHAUST DUCT THROUGH ROOF.
5	OPEN END RETURN DUCT. PROVIDE BIRDSCREEN ON OPEN END OF DUCT. PROVIDE BALANCE DAMPER. BALANCE TO CFM SHOWN.
6	6" ROUND EXHAUST DUCT THROUGH ROOF.
23	SUPPLY AND RETURN DUCTS THROUGH ROOF - SAME SIZE AS UNIT OPENINGS. FIELD COORDINATE WITH STRUCTURAL MEMBERS. TRANSITION / OFFSET AS REQUIRED TO FIT WITHIN THE STRUCTURE. PROVIDE 18 GAUGE SHEET METAL FROM UNIT CONNECTION THROUGH TRANSITION TO SUPPLY AND RETURN TRUNK DUCTS.
24	16x14 RETURN AIR DUCT. COVER OPEN END OF DUCT WITH BIRDSCREEN. PROVIDE BALANCE DAMPER. BALANCE TO CFM SHOWN.
32	16" ROUND FLEX DUCT OFF BOTTOM OF TRUNK DUCT. PROVIDE BALANCE DAMPER.



keyplan

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Pascua Yaqui Tribe
Health Services Center II
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Tucson, AZ 85746

mechanical floor plan – Health Budget + Managed Health / Billing + Warehouse

m1.3

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Pascua Yaqui Tribe
Health Services Center II
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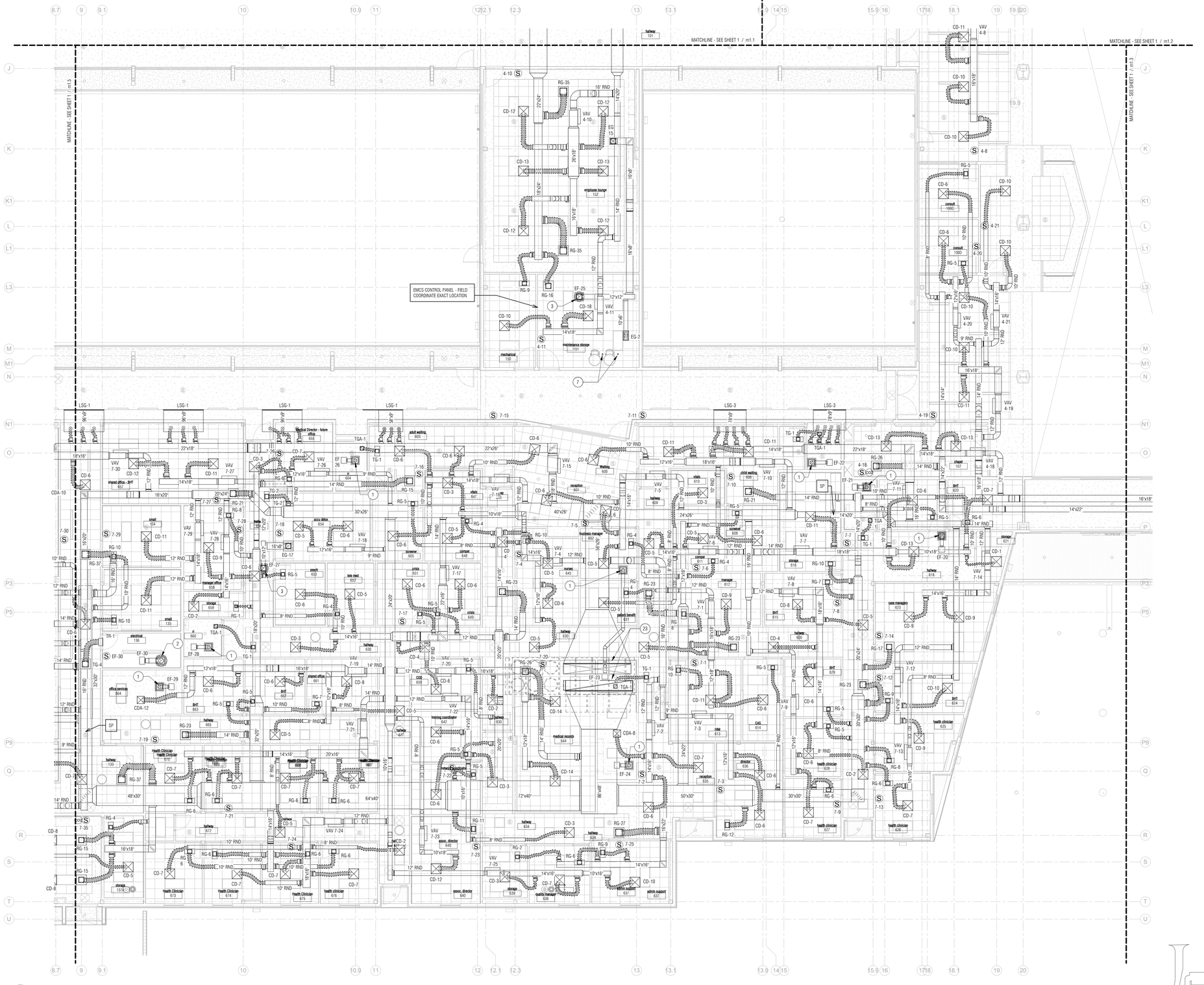
Tucson, AZ 85746

mechanical floor plan – Center Spirit

m1.4


MATCHLINE - SEE SHEET 1 / m1.1
MATCHLINE - SEE SHEET 1 / m1.2
MATCHLINE - SEE SHEET 1 / m1.5
EMCS CONTROL PANEL - FIELD COORDINATE EXACT LOCATION
hallway 101
employee lounge 152
maintenance storage 151
mechanical 150
waiting 609
child waiting 606
chapel 107
shared office - BHT 632
Medical Director - future office 633
adult waiting 603
recreation 607
business manager 602
shared office 661
manager office 608
manager 612
director 636
reception 635
case managers 623
training coordinator 642
medical records 644
quality manager 638
assoc. director 640
admin support 637
health clinician 625
health clinician 626
health clinician 627
health clinician 628
health clinician 629
Health Clinician 667
Health Clinician 668
Health Clinician 669
Health Clinician 670
Health Clinician 673
Health Clinician 674
Health Clinician 675
health clinician 676
Health Clinician 677
storage 137A
storage 609
storage 616
storage 621
storage 639
electrical 136
office services 664
small 134
small 135
hallway 133
hallway 665
hallway 672
hallway 677
hallway 630
hallway 634
hallway 639
hallway 680
hallway 618
hallway 625
bird 663
bird 662
bird 615
bird 619
bird 624
toilet med. 652
toilet 651
toilet 610
toilet 647
toilet 648
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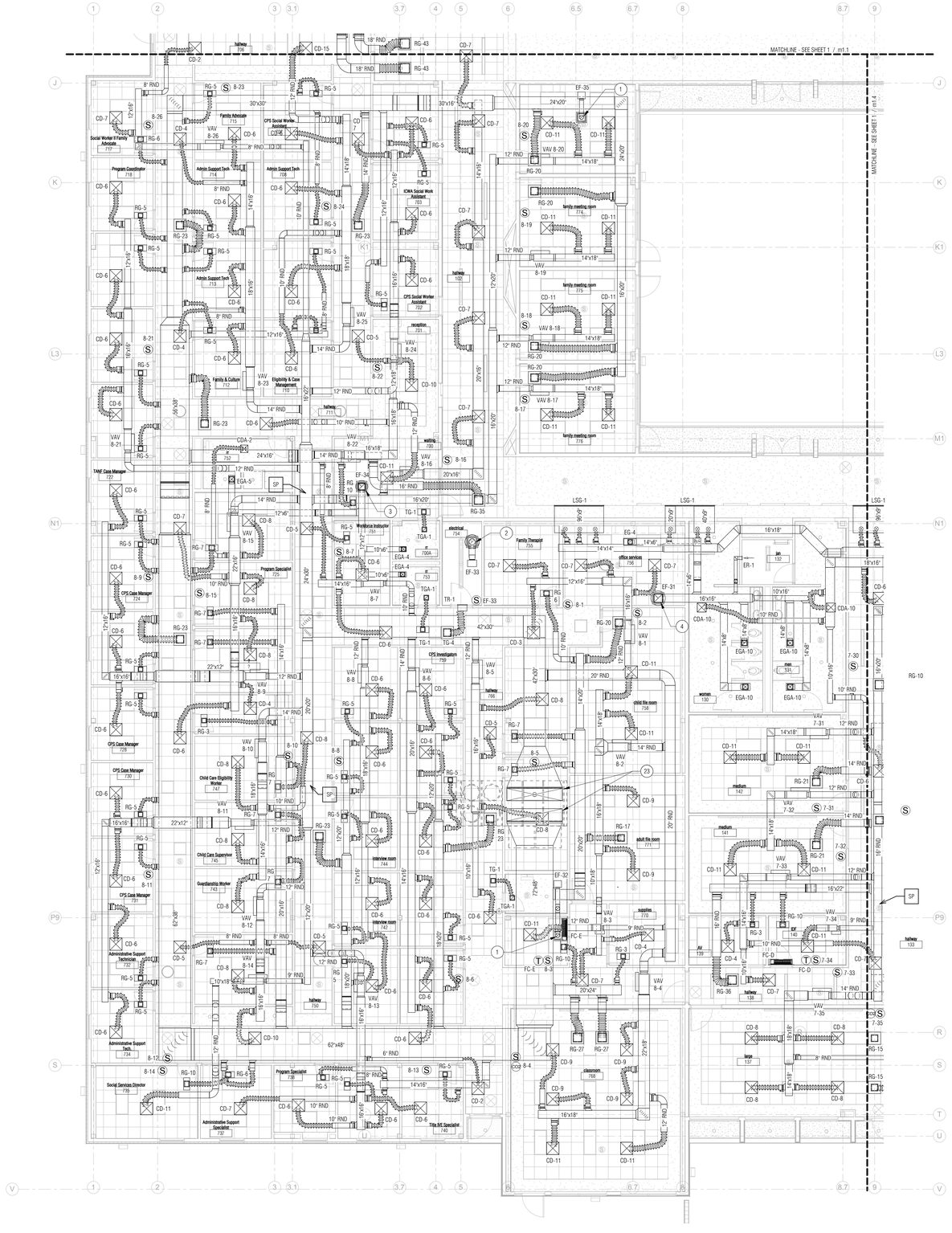
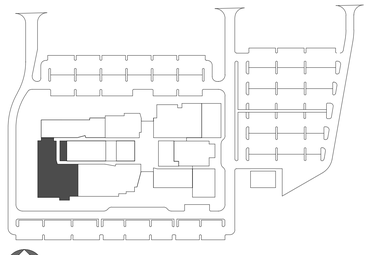


1 / m1.5 mechanical floor plan - Social Services

1/8" = 1'-0"

north

#	KEYNOTES:
1	8" ROUND EXHAUST DUCT THROUGH ROOF.
2	12" ROUND EXHAUST DUCT THROUGH ROOF.
3	12x12 EXHAUST DUCT THROUGH ROOF.
4	14x14 EXHAUST DUCT THROUGH ROOF.
23	SUPPLY AND RETURN DUCTS THROUGH ROOF - SAME SIZE AS UNIT OPENINGS. FIELD COORDINATE WITH STRUCTURAL MEMBERS. TRANSITION / OFFSET AS REQUIRED TO FIT WITHIN THE STRUCTURE. PROVIDE 18 GAUGE SHEET METAL FROM UNIT CONNECTION THROUGH TRANSITION TO SUPPLY AND RETURN TRUNK DUCTS.



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Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

mechanical floor plan – Social Services

m1.5

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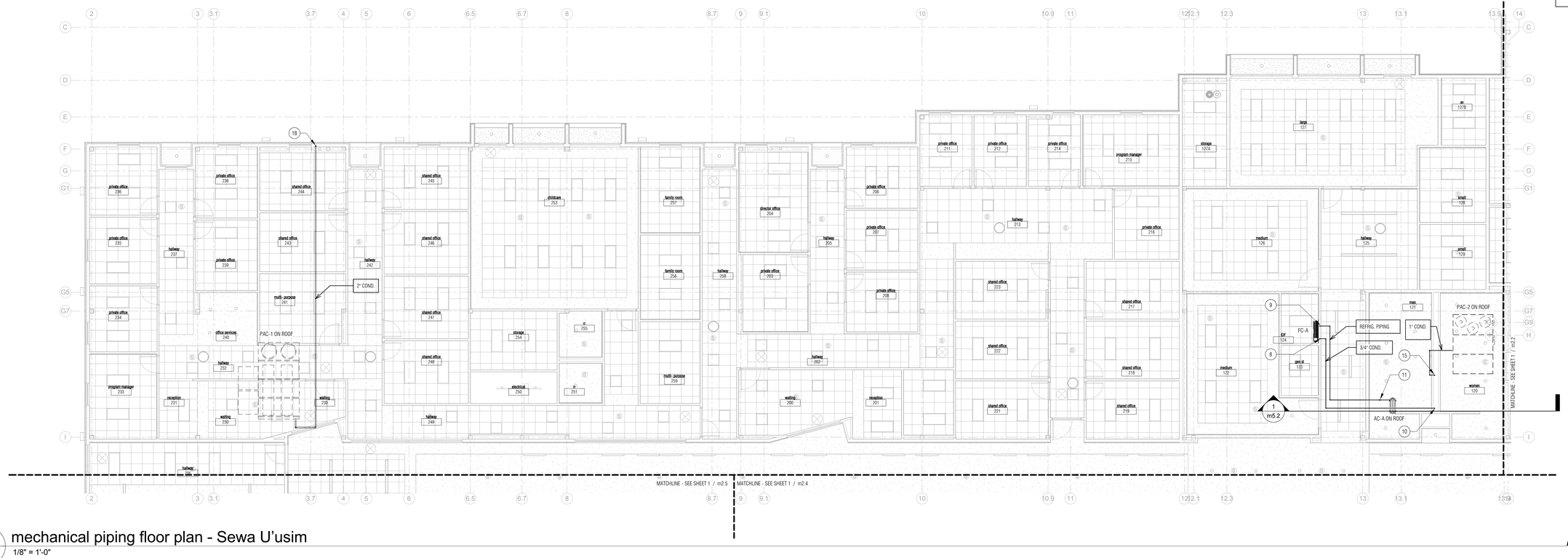
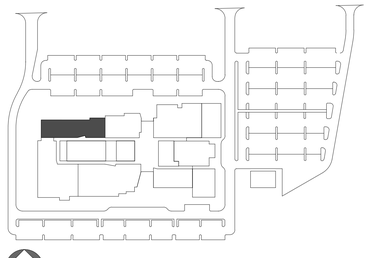


1 m2.1 mechanical piping floor plan - Sewa U'usim

1/8" = 1'-0"

north

#	KEYNOTES:
8	3/4" CONDENSATE PIPING (PUMPED) UP TO OVERHEAD.
9	REFRIGERANT PIPING OVERHEAD AND DOWN IN WALL TO DUCTLESS FAN COIL UNIT.
10	3/4" CONDENSATE PIPING OVERHEAD AND DOWN IN WALL TO LAVATORY TAILPIECE. FIELD COORDINATE WITH PLUMBING CONTRACTOR (FOR TAILPIECE ADAPTOR).
11	REFRIGERANT PIPING DOWN THROUGH ROOF FROM CONDENSING UNIT (AC).
15	1" CONDENSATE PIPING OVERHEAD AND DOWN IN WALL TO LAVATORY TAILPIECE. FIELD COORDINATE WITH PLUMBING CONTRACTOR (FOR TAILPIECE ADAPTOR).
18	2" CONDENSATE PIPING OVERHEAD AND DOWN IN WALL TO LANDSCAPE. COORDINATE EXACT LOCATION WITH ARCHITECT.



north **keyplan**

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mechanical piping floor plan - Sewa U'usim

m2.1

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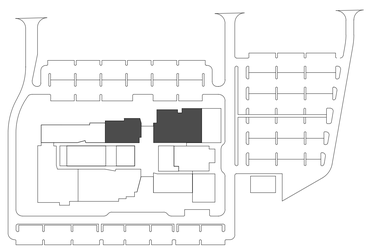
1 / m2.2 mechanical piping floor plan - Nursing + Clinics

1/8" = 1'-0"

north

#	KEYNOTES:
8	3/4" CONDENSATE PIPING (PUMPED) UP TO OVERHEAD.
9	REFRIGERANT PIPING OVERHEAD AND DOWN IN WALL TO DUCTLESS FAN COIL UNIT.
11	REFRIGERANT PIPING DOWN THROUGH ROOF FROM CONDENSING UNIT (AC).
12	3/4" CONDENSATE PIPING DOWN FROM PACKAGED AIR CONDITIONING UNIT (PAC) ON ROOF.
13	2" CONDENSATE PIPING DOWN FROM PACKAGED AIR CONDITIONING UNIT (PAC) ON ROOF.
16	3/4" CONDENSATE PIPING OVERHEAD AND DOWN IN WALL TO MOP SINK.
19	1-1/2" CONDENSATE PIPING DOWN FROM PACKAGED AIR CONDITIONING UNIT (PAC) ON ROOF.
26	2" CONDENSATE PIPING OVERHEAD AND DOWN IN WALL TO MOP SINK.



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mechanical piping floor plan - Nursing + Clinics

m2.2

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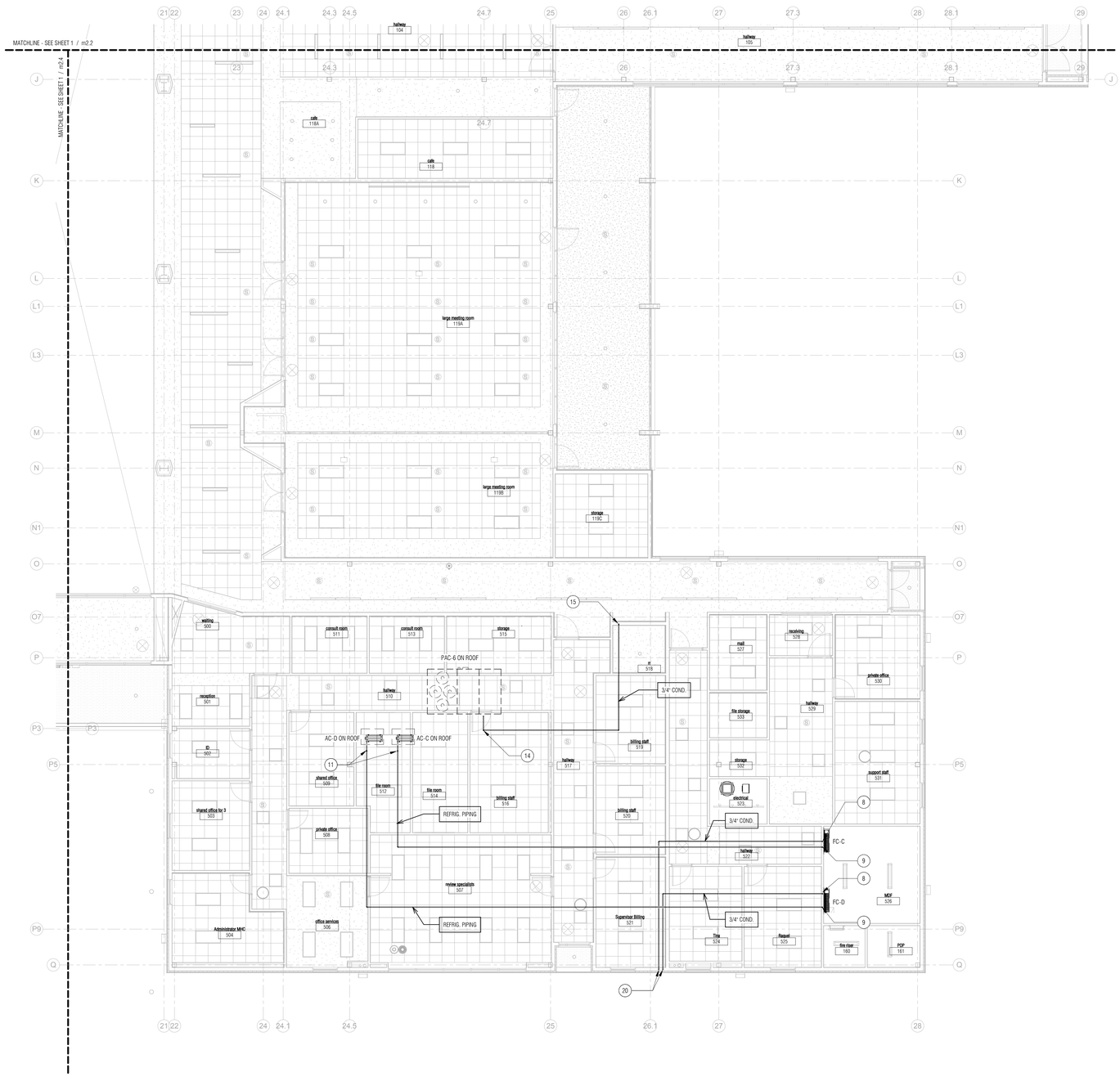
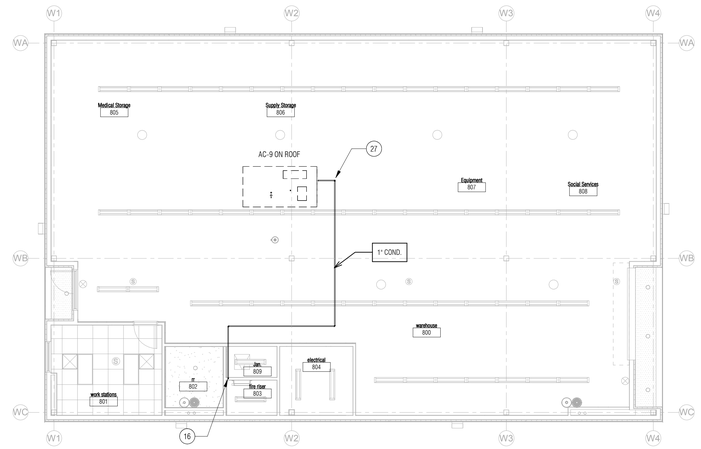


1 m2.3 mechanical piping floor plan - Health Budget + Managed Health / Billing

1/8" = 1'-0"

north

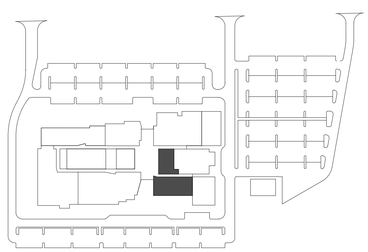


2 m2.3 mechanical piping floor plan - Warehouse

1/8" = 1'-0"

north

#	KEYNOTES:
8	3/4" CONDENSATE PIPING (PUMPED) UP TO OVERHEAD.
9	REFRIGERANT PIPING OVERHEAD AND DOWN IN WALL TO DUCTLESS FAN COIL UNIT.
11	REFRIGERANT PIPING DOWN THROUGH ROOF FROM CONDENSING UNIT (AC).
14	1" CONDENSATE PIPING DOWN FROM PACKAGED AIR CONDITIONING UNIT (PAC) ON ROOF.
15	1" CONDENSATE PIPING OVERHEAD AND DOWN IN WALL TO LAVATORY TAILPIECE. FIELD COORDINATE WITH PLUMBING CONTRACTOR (FOR TAILPIECE ADAPTOR).
16	3/4" CONDENSATE PIPING OVERHEAD AND DOWN IN WALL TO MOP SINK.
20	3/4" CONDENSATE PIPING OVERHEAD AND DOWN IN WALL TO LANDSCAPE. FIELD COORDINATE EXACT LOCATION WITH ARCHITECT.
27	1" CONDENSATE PIPING DOWN FROM AIR CONDITIONING UNIT (AC-9) ON ROOF.



north **keyplan**

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mechanical piping floor plan - Health Budget + Managed Health / Billing

m2.3

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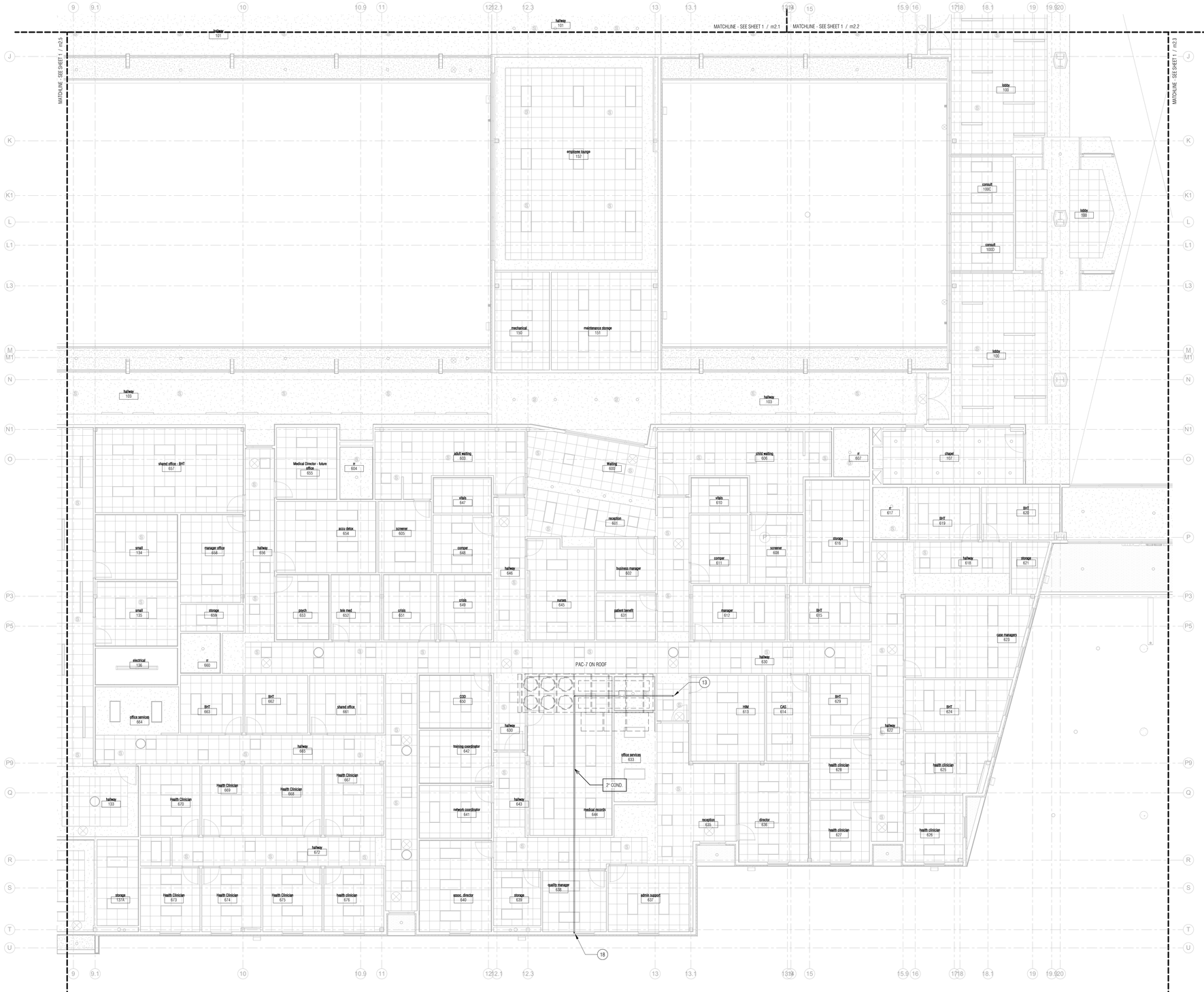
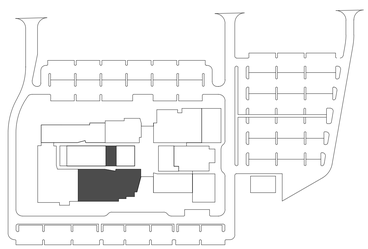


1 / m2.4 mechanical piping floor plan - Center Spirit

1/8" = 1'-0"

north

#	KEYNOTES:
13	2" CONDENSATE PIPING DOWN FROM PACKAGED AIR CONDITIONING UNIT (PAC) ON ROOF.
16	3/4" CONDENSATE PIPING OVERHEAD AND DOWN IN WALL TO MOP SINK.
18	2" CONDENSATE PIPING OVERHEAD AND DOWN IN WALL TO LANDSCAPE. COORDINATE EXACT LOCATION WITH ARCHITECT.



north **keyplan**

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mechanical piping floor plan - Center Spirit

m2.4

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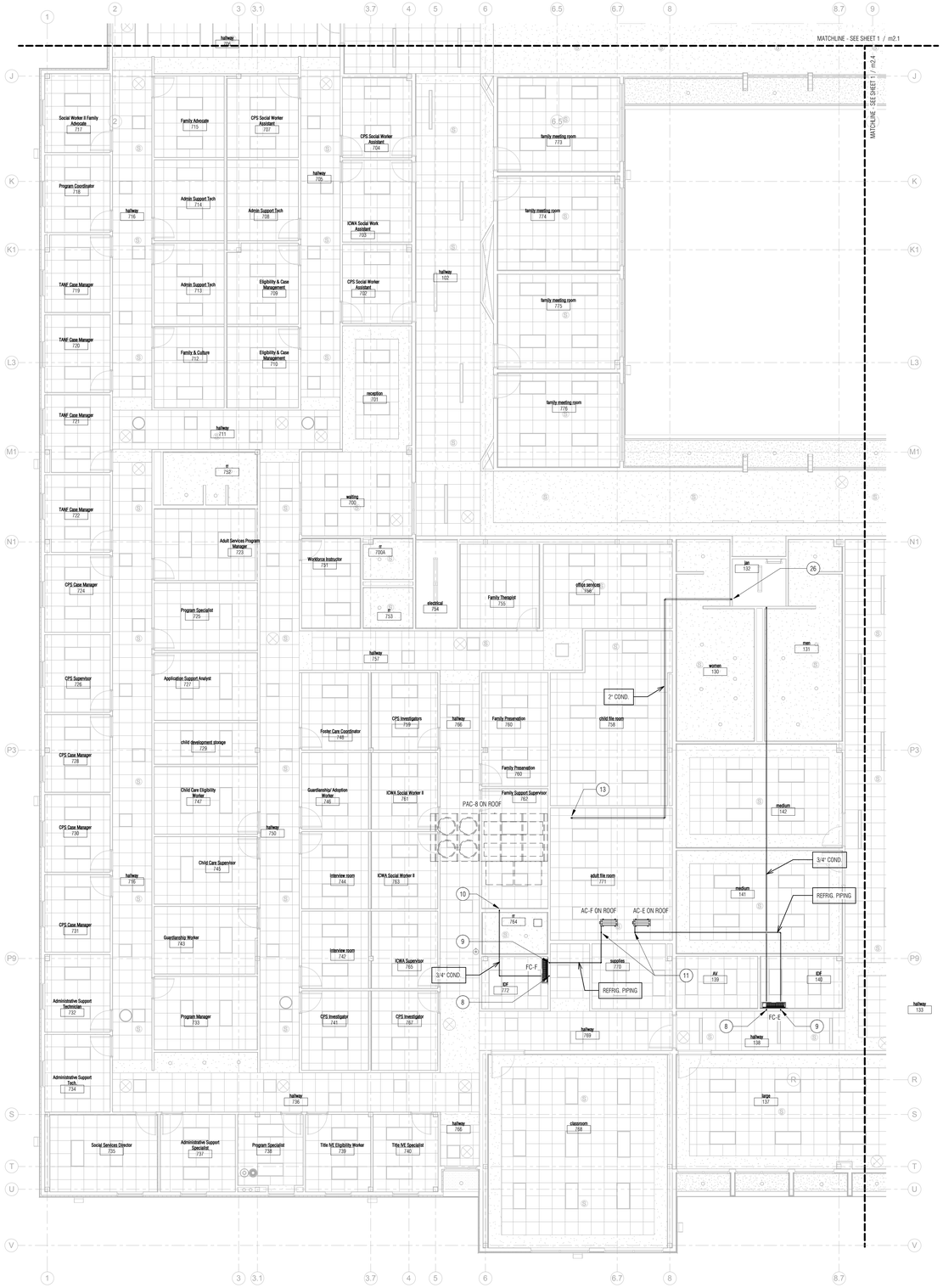
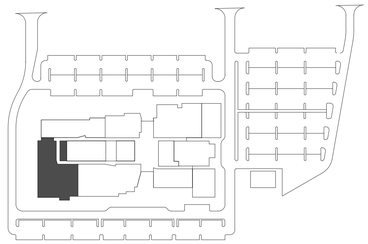


1 mechanical piping floor plan - Social Services
m2.5 1/8" = 1'-0"

north

#	KEYNOTES:
8	3/4" CONDENSATE PIPING (PUMPED) UP TO OVERHEAD.
9	REFRIGERANT PIPING OVERHEAD AND DOWN IN WALL TO DUCTLESS FAN COIL UNIT.
10	3/4" CONDENSATE PIPING OVERHEAD AND DOWN IN WALL TO LAVATORY TAILPIECE. FIELD COORDINATE WITH PLUMBING CONTRACTOR (FOR TAILPIECE ADAPTOR).
11	REFRIGERANT PIPING DOWN THROUGH ROOF FROM CONDENSING UNIT (AC).
13	2" CONDENSATE PIPING DOWN FROM PACKAGED AIR CONDITIONING UNIT (PAC) ON ROOF.
16	3/4" CONDENSATE PIPING OVERHEAD AND DOWN IN WALL TO MOP SINK.
26	2" CONDENSATE PIPING OVERHEAD AND DOWN IN WALL TO MOP SINK.



north **keyplan**
n.t.s.

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job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

mechanical piping floor plan - Social Services

m2.5

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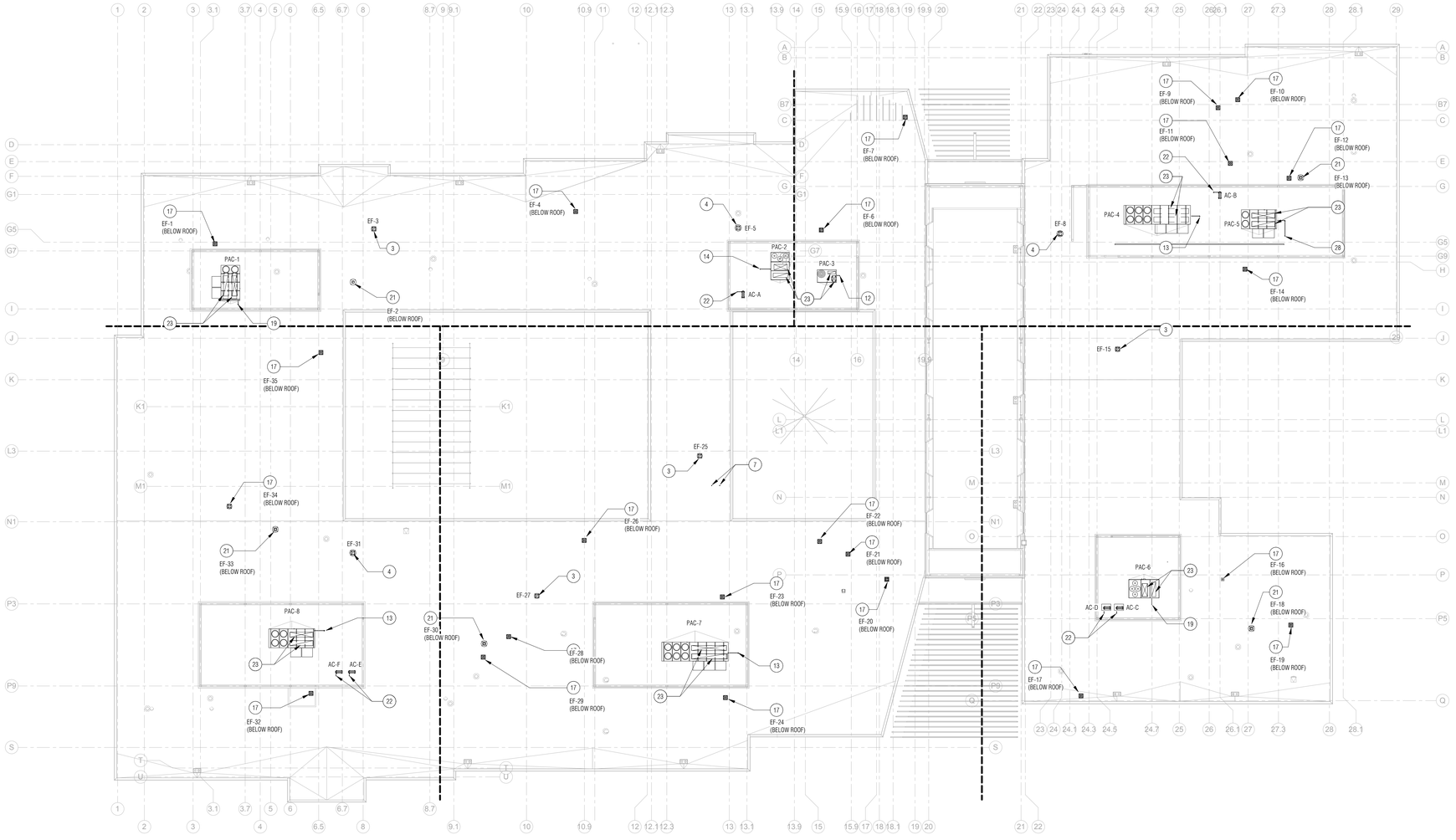
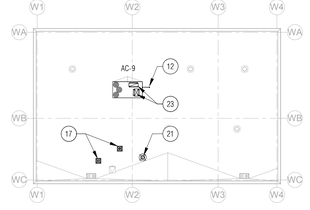


1 m3.1 mechanical roof plan
1" = 20'-0"

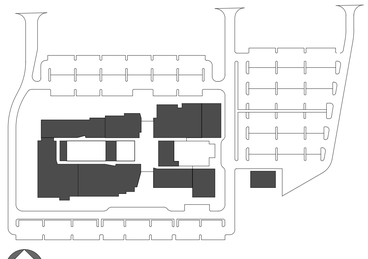
north



2 m3.1 mechanical roof plan - warehouse
1" = 20'-0"

north

#	KEYNOTES:
3	12x12 EXHAUST DUCT THROUGH ROOF.
4	14x14 EXHAUST DUCT THROUGH ROOF.
7	3" ROUND COMBINATION EXHAUST AND INTAKE VENT THROUGH ROOF FROM WATER HEATER (WH-1 AND WH-2). TERMINATE WITH FACTORY TERMINATION CAP. COORDIANTE WITH PLUMBING CONTRACTOR.
12	3/4" CONDENSATE PIPING DOWN FROM PACKAGED AIR CONDITIONING UNIT (PAC) ON ROOF.
13	2" CONDENSATE PIPING DOWN FROM PACKAGED AIR CONDITIONING UNIT (PAC) ON ROOF.
14	1" CONDENSATE PIPING DOWN FROM PACKAGED AIR CONDITIONING UNIT (PAC) ON ROOF.
17	8" ROUND EXHAUST DUCT THROUGH ROOF. PROVIDE FACTORY ROOF CAP.
21	12" ROUND EXHAUST DUCT THROUGH ROOF. PROVIDE FACTORY ROOF CAP.
22	REFRIGERANT PIPING DOWN THROUGH ROOF.
23	SUPPLY AND RETURN DUCTS THROUGH ROOF - SAME SIZE AS UNIT OPENINGS. FIELD COORDINATE WITH STRUCTURAL MEMBERS. TRANSITION / OFFSET AS REQUIRED TO FIT WITHIN THE STRUCTURE. PROVIDE 18 GAUGE SHEET METAL FROM UNIT CONNECTION THROUGH TRANSITION TO SUPPLY AND RETURN TRUNK DUCTS.
28	2" CONDENSATE PIPING DOWN THROUGH ROOF. OFFSET TO AVOID ELECTRICAL ROOM BELOW.



north keyplan
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mechanical roof plan

m3.1

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ROOFTOP PACKAGED VAV AIR CONDITIONING UNIT WITH GAS HEAT SCHEDULE

MARK	MANUFACTURER	MODEL	EER / IEER	AIR FLOW DATA			UNIT ELECTRICAL DATA						COOLING CAPACITY @ ARI (95/80/67)		HEATING MBH	UNIT WEIGHT (INCLUDES ROOF CURB)	REMARKS
				CFM @ 2,500 FT.	ESP (IN)	OUTSIDE AIR CFM MIN. / MAX. (ACTIVATION OF CO2 SENSOR)	VOLTAGE	COMPRESSOR QUANTITY / RLA	CONDENSER FAN MOTOR QUANTITY / FLA	EVAPORATOR FAN MOTOR HP / BHP	POWER EXHAUST QUANTITY / HP	MCA	MOCP	TOTAL MBH	SENSIBLE MBH	INPUT / OUTPUT		
PAC 1	CARRIER	48P3D35 35 TONS	9.8 / 11.6	14,000	SUPPLY: 1.5" RETURN: 1.5"	1,500	480/3/60	2 TOTAL A1 26.9 RLA B1 26.9 RLA	2 TOTAL AT 3.3 FLA EACH	20 HP	2 TOTAL 7.5 HP	116.2	125	369.46	280.60	1ST STAGE 244 / 197 2ND STAGE 325 / 263	7,200 LBS.	DUCT SMOKE DETECTOR REQUIRED IN THE RETURN DUCT (BY ELECTRICAL ENGINEER - SEE ELECTRICAL DRAWINGS)
PAC 2		48TCD16 15 TONS	10.8 / 12.4	6,000	SUPPLY: 1.0" RETURN: 0.5"	225 / 700		2 TOTAL COMP. 1 AT 12.2 RLA COMP. 2 AT 12.8 RLA	2 TOTAL AT 0.8 FLA EACH	3.5 BHP	N/A	39.0 (INCLUDES POWER EXHAUST)	40 (INCLUDES POWER EXHAUST)	159.2	118.64	1ST STAGE 144 / 18 2ND STAGE 180 / 146	2,200 LBS.	
PAC 3		48TCD12 10 TONS	11.1 / 12.8	4,000	SUPPLY: 1.0" RETURN: 0.5"	400		1 TOTAL AT 14.8 RLA	1 TOTAL AT 0.8 FLA	2.8 BHP	N/A	27.0 (INCLUDES POWER EXHAUST)	40 (MOCP)	106.53	82.89	1ST STAGE 131 / 87 2ND STAGE 159 / 106	1,500 LBS.	
PAC 4		48P3D60 60 TONS	9.8 / 12.4	24,000	SUPPLY: 2.0" RETURN: 1.0"	1,075 / 3,700		4 TOTAL A1 2 AT 23.1 RLA EACH B1 2 AT 23.1 RLA EACH	4 TOTAL AT 3.3 FLA EACH	25 HP	2 TOTAL 10 HP	170.1	200	622.30	467.36	1ST STAGE 488 / 390 2ND STAGE 650 / 520	10,200 LBS.	
PAC 5		48P3D30 30 TONS	9.9 / 12.1	12,000	SUPPLY: 2.0" RETURN: 1.5"	1300		2 TOTAL A1 23.1 RLA B1 23.1 RLA	2 TOTAL AT 3.3 FLA EACH	10 HP	2 TOTAL 5 HP	79.2	100	315.56	230.00	1ST STAGE 244 / 197 2ND STAGE 325 / 263	7,500 LBS.	
PAC 6		48TCD24 20 TONS	9.8 / 11.7	8,000	SUPPLY: 1.0" RETURN: 0.5"	800		2 TOTAL COMP. 1 AT 18.6 RLA COMP. 2 AT 14.7 RLA	2 TOTAL AT 0.9 FLA EACH	4.7 BHP	N/A	56.4 (INCLUDES POWER EXHAUST)	70 (INCLUDES POWER EXHAUST)	219.03	166.52	1ST STAGE 176 / 142 2ND STAGE 220 / 178	3,000 LBS.	
PAC 7		48P3D60 60 TONS	9.8 / 12.4	24,000	SUPPLY: 2.0" RETURN: 1.5"	1,075 / 2,500		4 TOTAL A1 2 AT 23.1 RLA EACH B1 2 AT 23.1 RLA EACH	4 TOTAL AT 3.3 FLA EACH	25 HP	2 TOTAL 10 HP	170.1	200	622.30	467.36	1ST STAGE 488 / 390 2ND STAGE 650 / 520	10,200 LBS.	
PAC 8		48P3D50 50 TONS	9.8 / 12.1	20,000	SUPPLY: 2.0" RETURN: 1.5"	1,050 / 2,200		4 TOTAL A1 2 AT 17.9 RLA EACH B1 2 AT 18.6 RLA EACH	4 TOTAL AT 3.3 FLA EACH	30 HP	2 TOTAL 10 HP	150.7	175	526.26	379.04	1ST STAGE 244 / 197 2ND STAGE 325 / 263	8,200 LBS.	

NOTES:

A. E.S.P. FOR SUPPLY FAN INCLUDES 0.5" FOR FILTER LOADING.

B. UNITS COMPLETE WITH THE FOLLOWING FACTORY OPTIONS: NON-FUSED DISCONNECT, SINGLE POINT POWER CONNECTION, VENTILATED VFD ENCLOSURES, 0-100% O/A ECONOMIZER WITH RETURN FAN, OUTSIDE AIR FLOW MEASURING STATION, VFD ON SUPPLY AND EXHAUST FANS, HIGH EFFICIENCY INVERTER DUTY FAN MOTORS, STAINLESS STEEL DRAIN PAN, HINGED ACCESS DOORS ON ALL SECTIONS, DOUBLE WALL CONSTRUCTION, HAIL GUARDS, 14" FACTORY ROOF CURB AND ANGLED FILTER RACK FOR 2" MERV 13 FILTERS. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

C. UNITS SHALL BE COMPLETE W/ THE FOLLOWING LOCAL LOOP FACTORY CONTROLS. COORDINATE WITH CONTROLS DRAWINGS:
1. CONTROL LEAVING AIR TEMPERATURE (STAGE COMPRESSORS, OPERATE OUTSIDE AIR, RETURN AIR AND EXHAUST AIR FANS DURING ECONOMIZER)
2. MAINTAIN SUPPLY DUCT STATIC PRESSURE SET POINT (SUPPLY FAN VFD CONTROL AS MEASURED BY FIELD INSTALLED STATIC PRESSURE SENSORS). SEE MECHANICAL FLOOR PLANS FOR LOCATIONS.
3. HIGH DUCT STATIC PRESSURE SWITCH AT UNIT DISCHARGE (HARDWIRE SUPPLY AND EXHAUST FAN SHUTDOWN)
4. EXHAUST FAN VFD CONTROL (TO MAINTAIN SLIGHTLY POSITIVE BUILDING PRESSURE WITH FIELD INSTALLED BUILDING PRESSURE SENSOR. SEE MECHANICAL FLOOR PLANS FOR INDOOR S.P. MEASUREMENT LOCATIONS. OUTDOOR S.P. MEASUREMENT SHALL BE LOCATED ON THE ROOF WITH AN OUTDOOR AIR STATIC PRESSURE PICK-UP PORT TO MITIGATE WIND EFFECTS
5. GRAVITY RELIEF DAMPER (TO MAINTAIN SLIGHTLY POSITIVE PRESSURE IN RETURN PLENUM)
6. COMPARATIVE ENTHALPY ECONOMIZER CONTROLS
7. MEASURE O/A FLOW AND MODULATE O/A AND R/A DAMPERS TO MAINTAIN O/A FLOW SETPOINT.

D. BACNET COMMUNICATION CARD (BACNET/IP) FOR THE FOLLOWING COMMUNICATION WITH THE EMCS. SEE CONTROLS DRAWINGS:
1. SOFTWARE POINTS TO THE UNIT FROM THE EMCS:
   - A. OCCUPIED / UNOCCUPIED
   - B. OUTSIDE AIRFLOW SET POINT
   - C. SUPPLY DUCT STATIC PRESSURE SET POINT
   - D. S/A TEMPERATURE SET POINT
   - E. BUILDING PRESSURE SET POINT
2. SOFTWARE POINTS FROM THE UNIT TO THE EMCS:
   - A. NO. OF ACTIVE COOLING STAGES
   - B. SUPPLY AIR, RETURN AIR, OUTDOOR AIR AND MIXED AIR TEMPERATURE READOUT
   - C. ECONOMIZER STATUS
   - D. SUPPLY AND EXHAUST FAN SPEEDS
   - E. DUCT STATIC PRESSURE READOUT
   - F. BUILDING PRESSURE READOUT
   - G. ALL ALARM POINTS

E. PROVIDE START-UP SERVICES BY A FACTORY AUTHORIZED REPRESENTATIVE. IN ADDITION TO TYPICAL FACTORY START-UP DOCUMENTATION, START-UP REPORT SHALL INCLUDE DOCUMENTED SETPOINTS OF ALL ADJUSTABLE PARAMETERS IN THE A/C UNIT CONTROL PANELS AND VFD'S, REGARDLESS OF WHETHER OR NOT THE PARAMETERS ARE LEFT AT THE FACTORY DEFAULT SETTINGS. SUBMIT FACTORY START-UP REPORT TO COMMISSIONING PROVIDER.

F. BID SHALL INCLUDE TIME FOR FACTORY AUTHORIZED REPRESENTATIVE TO PROVIDE TRAINING INSTRUCTIONS AND BE PRESENT DURING FUNCTIONAL PERFORMANCE TESTING - SEE SECTION 23 74 00.

ROOFTOP PACKAGED GAS / ELECTRIC AIR CONDITIONING UNIT SCHEDULE

MARK	MANUFACTURER	MODEL	MIN. EER	CFM	ESP	OUTSIDE AIR CFM	COOLING BTUH AT ARI (95 /80/67) TOTAL / SENS.	HEATING MBH 1ST STAGE INPUT / OUTPUT 2ND STAGE INPUT / OUTPUT	TE %	UNIT ELECTRICAL DATA						UNIT WEIGHT (INCLUDES ROOF CURB)	REMARKS
										VOLTAGE	COMPRESSOR QUANTITY / RLA	OFM QUANTITY / FLA	IFM FLA	MCA	FUSE SIZE		
AC 9	CARRIER	48HCD012 10 TONS	11.5	4,000	0.5"	400	124,900 / 93,500	120 / 96 150 / 120	82	480/3/60	2 AT 7.7 EACH	2 AT 3.1 EACH	3.8	28.0 (INCLUDES POWER EXHAUST)	30 (INCLUDES POWER EXHAUST)	1,800 LBS.	DUCT SMOKE DETECTOR REQUIRED IN THE RETURN DUCT (BY ELECTRICAL ENGINEER - SEE ELECTRICAL DRAWINGS)

NOTE: UNIT COMPLETE WITH NON-FUSED DISCONNECT, FACTORY ECONOMIZER AND POWER EXHAUST, HAIL GUARD, 14" FACTORY ROOF CURB.

DUCTLESS SPLIT SYSTEM AIR CONDITIONING UNIT SCHEDULE

OUTDOOR UNIT MARK	INDOOR UNIT MARK	OUTDOOR UNIT MANUFACTURER	INDOOR UNIT MANUFACTURER	OUTDOOR UNIT MARK	INDOOR UNIT MARK	SEER	CFM HI / MED / LOW	COOLING CAPACITY BTUH (RATED)	UNIT ELECTRICAL DATA					OUTDOOR UNIT WEIGHT	INDOOR UNIT WEIGHT	REMARKS
									VOLTAGE	OUTDOOR UNIT COMP. RLA	OUTDOOR UNIT MCA	OUTDOOR UNIT MOCP	INDOOR UNIT (POWERED FROM OUTDOOR UNIT)			
AC A	FC A	CARRIER	CARRIER	38MHRC24A-3 2 TONS	40MHHC24-3 2 TONS	17.5	600 / 500 / 425	24,000	208/1/60	11.0	16.0	25	0.60 FLA	125 LBS.	45 LBS.	SERVES IDF ROOM 124
AC B	FC B			38MHRC24A-3 2 TONS	40MHHC24-3 2 TONS	17.5	600 / 500 / 425	24,000	208/1/60	11.0	16.0	25	0.60 FLA	125 LBS.	45 LBS.	SERVES IDF ROOM 115
AC C	FC C			38MAQB36R-3 3 TONS	40MAQB36B-3 3 TONS	16.0	780 / 620 / 520	36,000	208/1/60	17.0	25	35	0.23 FLA	175 LBS.	50 LBS.	SERVES MDF ROOM 536
AC D	FC D			38MAQB36R-3 3 TONS	40MAQB36B-3 3 TONS	16.0	780 / 620 / 520	36,000	208/1/60	17.0	25	35	0.23 FLA	175 LBS.	50 LBS.	SERVES MDF ROOM 536
AC E	FC E			38MHRC24A-3 2 TONS	40MHHC24-3 2 TONS	17.5	600 / 500 / 425	24,000	208/1/60	11.0	16.0	25	0.60 FLA	125 LBS.	45 LBS.	SERVES IDF ROOM 140
AC F	FC F			38MHRC24A-3 2 TONS	40MHHC24-3 2 TONS	17.5	600 / 500 / 425	24,000	208/1/60	11.0	16.0	25	0.60 FLA	125 LBS.	45 LBS.	SERVES IDF ROOM 772

NOTE: UNITS COMPLETE WITH LOW AMBIENT CONTROL, WIRED REMOTE CONTROLLER. COORDINATE MAXIMUM REFRIGERANT PIPING LENGTHS WITH MANUFACTURER PRIOR TO INSTALLATION.
PROVIDE LITTLE GIANT CONDENSATE PUMP (115/1/60)

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VAV BOX SCHEDULE (PAC-1: SEWA U'USIM)

MARK	MANUFACTURER	MODEL	SIZE	MAX. AIR PD	CFM			ELECTRIC HEATER				REMARKS
					COOLING	MINIMUM	HEATING	VOLTAGE	KW	MCA	MOCP	
VAV 1-1	PRICE	SDV	14	0.50"	2500	550	15	480/3/60	20	30.1	35	
VAV 1-2			10		850	200	525	480/3/60	5	7.5	15	
VAV 1-3			10		875	200	525	480/3/60	5	7.5	15	
VAV 1-4			7		325	75	200	208/3/60	2	6.9	15	
VAV 1-5			9		650	150	400	480/3/60	4	6.0	15	
VAV 1-6			6		225	50	175	208/3/60	2	6.9	15	
VAV 1-7			12		1150	250	700	480/3/60	7	10.5'	15	
VAV 1-8			9		575	150	350	480/3/60	4	6.0	15	
VAV 1-9			14		1500	350	900	480/3/60	9	13.5	15	
VAV 1-10			9		625	150	400	480/3/60	4	6.0	15	
VAV 1-11			8		400	100	250	208/3/60	3	4.5	15	
VAV 1-12			10		825	200	500	480/3/60	5	7.5	15	
VAV 1-13			9		625	150	400	480/3/60	4	6.0	15	
VAV 1-14			9		550	125	325	480/3/60	4	6.0	15	
VAV 1-15			12		1350	300	825	480/3/60	9	13.5	15	
VAV 1-16			10		800	200	500	480/3/60	5	7.5	15	
VAV 1-17			9		650	150	400	480/3/60	4	6.0	15	

NOTES: COMPLETE WITH FUSED DISCONNECT SWITCH AND CONTROLS TRANSFORMER. PROVIDE SOLID STATE DIGITAL RELAYS AND ASSOCIATED CONTROLLER AS REQUIRED FOR PROPORTIONAL ELECTRIC HEAT CONTROL WITH 0-10 VDC OR 4-20 MA SIGNAL FROM EMCS

VAV BOX SCHEDULE (PAC-2: CONFERENCE CENTER)

MARK	MANUFACTURER	MODEL	SIZE	MAX. AIR PD	CFM			ELECTRIC HEATER				REMARKS
					COOLING	MINIMUM	HEATING	VOLTAGE	KW	MCA	MOCP	
VAV 2-1	PRICE	SDV	14	0.50"	1700	375	1025	480/3/60	13	19.5	20	
VAV 2-2			12		1050	250	650	480/3/60	7	10.5	15	
VAV 2-3			14		1800	400	1100	480/3/60	12	18.0	20	
VAV 2-4			9		650	150	400	480/3/60	4	6.0	15	
VAV 2-5			9		600	150	N/A	120/1/60	N/A	N/A	N/A	PROVIDE 120 V. FOR CONTROL POWER
VAV 2-6			10		700	175	425	480/3/60	5	7.5	15	

NOTES: COMPLETE WITH FUSED DISCONNECT SWITCH AND CONTROLS TRANSFORMER. PROVIDE SOLID STATE DIGITAL RELAYS AND ASSOCIATED CONTROLLER AS REQUIRED FOR PROPORTIONAL ELECTRIC HEAT CONTROL WITH 0-10 VDC OR 4-20 MA SIGNAL FROM EMCS

VAV BOX SCHEDULE (PAC-3: PHARMACY)

MARK	MANUFACTURER	MODEL	SIZE	MAX. AIR PD	CFM			ELECTRIC HEATER				REMARKS
					COOLING	MINIMUM	HEATING	VOLTAGE	KW	MCA	MOCP	
VAV 3-1	PRICE	SDV	5	0.50"	175	50	125	208/3/60	2	6.9	15	
VAV 3-2			5		175	50	125	208/3/60	2	6.9	15	
VAV 3-3			12		900	200	550	480/3/60	6	9.0	15	
VAV 3-4			12		1050	250	650	480/3/60	7	10.5	15	
VAV 3-5			5		175	50	125	208/3/60	2	6.9	15	
VAV 3-6			12		1050	250	650	480/3/60	7	10.5	15	
VAV 3-7			7		375	100	225	480/3/60	3	4.5	15	

NOTES: COMPLETE WITH FUSED DISCONNECT SWITCH AND CONTROLS TRANSFORMER. PROVIDE SOLID STATE DIGITAL RELAYS AND ASSOCIATED CONTROLLER AS REQUIRED FOR PROPORTIONAL ELECTRIC HEAT CONTROL WITH 0-10 VDC OR 4-20 MA SIGNAL FROM EMCS

VAV BOX SCHEDULE (AC-4: MAIN LOBBY / COMMON AREA)

MARK	MANUFACTURER	MODEL	SIZE	MAX. AIR PD	CFM			ELECTRIC HEATER				REMARKS
					COOLING	MINIMUM	HEATING	VOLTAGE	KW	MCA	MOCP	
VAV 4-1	PRICE	SDV	10	0.50"	800	200	500	480/3/60	5	7.5	15	
VAV 4-2			7		300	75	N/A	120/1/60	N/A	N/A	N/A	PROVIDE 120 V. FOR CONTROL POWER
VAV 4-3			12		1000	225	600	480/3/60	7	10.5	15	
VAV 4-4			12		1150	275	700	480/3/60	7	10.5	15	
VAV 4-5			16		2725	600	1650	480/3/60	20	30.1	35	
VAV 4-6			10		750	175	450	480/3/60	5	7.5	15	
VAV 4-7			8		450	100	275	480/3/60	3.5	5.3	15	
VAV 4-8			10		850	200	325	480/3/60	5	7.5	15	
VAV 4-9			7		350	100	200	480/3/60	3	4.5	15	
VAV 4-10			14		2000	450	1200	480/3/60	12	18.0	20	
VAV 4-11			10		750	175	450	480/3/60	5	7.5	15	
VAV 4-12			14		1750	400	1050	480/3/60	12	18.0	20	
VAV 4-13			16		2350	525	1425	480/3/60	20	30.1	35	
VAV 4-14			16		2600	575	1575	480/3/60	20	30.1	35	
VAV 4-15			16		2350	525	1425	480/3/60	20	30.1	35	
VAV 4-16			14		1525	350	925	480/3/60	9.5	13.5	15	
VAV 4-17			16		2350	525	1425	480/3/60	20	30.1	35	
VAV 4-18			10		700	175	425	480/3/60	5	7.5	15	
VAV 4-19			10		850	200	525	480/3/60	5	7.5	15	
VAV 4-20			7		350	100	200	480/3/60	3	4.5	15	
VAV 4-21			9		600	150	375	480/3/60	4	6.0	15	

NOTES: COMPLETE WITH FUSED DISCONNECT SWITCH AND CONTROLS TRANSFORMER. PROVIDE SOLID STATE DIGITAL RELAYS AND ASSOCIATED CONTROLLER AS REQUIRED FOR PROPORTIONAL ELECTRIC HEAT CONTROL WITH 0-10 VDC OR 4-20 MA SIGNAL FROM EMCS

VAV BOX SCHEDULE (PAC-5: NURSING + CLINICS)

MARK	MANUFACTURER	MODEL	SIZE	MAX. AIR PD	CFM			ELECTRIC HEATER				REMARKS
					COOLING	MINIMUM	HEATING	VOLTAGE	KW	MCA	MOCP	
VAV 5-1	PRICE	SDV	6	0.50"	225	50	175	208/3/60	2	6.9	15	PROVIDE 120 V. FOR CONTROL POWER
VAV 5-1			10		800	200	500	480/3/60	5	7.5	15	
VAV 5-3			12		925	225	550	480/3/60	6	9.0	15	
VAV 5-4			12		1050	250	650	480/3/60	7	10.5	15	
VAV 5-5			9		575	150	350	480/3/60	4	6.0	15	
VAV 5-6			7		350	100	200	480/3/60	3	4.5	15	
VAV 5-7			7		275	75	175	208/3/60	2	6.9	15	
VAV 5-8			14		1500	350	900	480/3/60	9	13.5	20	
VAV 5-9			7		350	100	200	480/3/60	3	4.5	15	
VAV 5-10			8		450	100	275	480/3/60	3.5	5.3	15	
VAV 5-11			10		775	175	475	480/3/60	5	7.5	15	
VAV 5-12			9		550	125	325	480/3/60	4	6.0	15	
VAV 5-13			8		400	100	250	480/3/60	3	4.5	15	
VAV 5-14			12		1100	250	675	480/3/60	7	10.5	15	
VAV 5-15			6		250	75	175	208/3/60	2	6.9	15	
VAV 5-16			12		1200	275	725	480/3/60	7	10.5	15	
VAV 5-17			9		575	150	350	480/3/60	4	6.0	15	
VAV 5-18			6		225	50	175	208/3/60	2	6.9	15	
VAV 5-19			6		225	50	175	208/3/60	2	6.9	15	
VAV 5-20			6		250	75	175	208/3/60	2	6.9	15	
VAV 5-21			7		250	100	200	480/3/60	3	4.5	15	
VAV 5-22			6		225	50	175	208/3/60	2	6.9	15	
VAV 5-23			10		700	175	425	480/3/60	5	7.5	15	

NOTES: COMPLETE WITH FUSED DISCONNECT SWITCH AND CONTROLS TRANSFORMER. PROVIDE SOLID STATE DIGITAL RELAYS AND ASSOCIATED CONTROLLER AS REQUIRED FOR PROPORTIONAL ELECTRIC HEAT CONTROL WITH 0-10 VDC OR 4-20 MA SIGNAL FROM EMCS

VAV BOX SCHEDULE (PAC-6: HEALTH BUDGET / BILLING)

MARK	MANUFACTURER	MODEL	SIZE	MAX. AIR PD	CFM			ELECTRIC HEATER				REMARKS
					COOLING	MINIMUM	HEATING	VOLTAGE	KW	MCA	MOCP	
VAV 6-1	PRICE	SDV	9	0.50"	575	150	350	480/3/60	4	6.0	15	
VAV 6-2			9		600	150	375	480/3/60	4	6.0	15	
VAV 6-3			7		300	75	200	208/3/60	2	6.9	15	
VAV 6-4			9		625	150	400	480/3/60	4	6.0	15	
VAV 6-5			12		1100	250	675	480/3/60	7	10.5	15	
VAV 6-6			9		550	125	325	480/3/60	4	6.0	15	
VAV 6-7			7		300	75	200	208/3/60	2	6.9	15	
VAV 6-8			12		1075	250	650	480/3/60	7	10.5	15	
VAV 6-9			12		950	225	575	480/3/60	6	9.0	15	
VAV 6-10			7		375	100	225	480/3/60	3	4.5	15	
VAV 6-11			6		250	75	175	208/3/60	2	6.9	15	
VAV 6-12			6		275	75	200	208/3/60	2	2.9	15	
VAV 6-13			12		800	200	N/A	120/1/60	N/A	N/A	N/A	PROVIDE 120 V. FOR CONTROL POWER
VAV 6-14			14		1525	350	925	480/3/60	9	13.5	15	
VAV 6-15			6		225	20	175	208/3/60	2	6.9	15	

NOTES: COMPLETE WITH FUSED DISCONNECT SWITCH AND CONTROLS TRANSFORMER. PROVIDE SOLID STATE DIGITAL RELAYS AND ASSOCIATED CONTROLLER AS REQUIRED FOR PROPORTIONAL ELECTRIC HEAT CONTROL WITH 0-10 VDC OR 4-20 MA SIGNAL FROM EMCS

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EXPIRES: 12-31-18

job **1717**

date **11.16.18**

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

mechanical equipment schedules

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EXHAUST FAN SCHEDULE

MARK	MANUFACTURER	TYPE	MODEL	CFM	ESP	MAX. RPM	MAX. SONES	UNIT ELECTRICAL DATA			UNIT WEIGHT	AREA SERVED	REMARKS
								VOLTAGE	WATTS	HP			
EF-1	COOK	CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0	115/1/60	27	N/A	30 LBS.	OFFICE SERVICES 240 SEWA UUSIM (SHEET M1.1)	FAN TO BE CONTROLLED BY WALL SWITCH - SEE ELECTRICAL DRAWINGS
EF-2		IN-LINE DIRECT DRIVE	GN 642	550	0.125"	1500	4.5		186	N/A	40 LBS.	ELECTRICAL ROOM 250 SEWA UUSIM (SHEET M1.1)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-3		ROOFTOP CENTRIFUGAL BELT DRIVE	ACE-B 80	450	0.375"	1400	8.2		N/A	1/4	100 LBS.	CHILD CARE 253 RESTROOMS 251 & 255 SEWA UUSIM (SHEET M1.1)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-4		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	HALLWAY 213 SEWA UUSIM (SHEET M1.1)	FAN TO BE CONTROLLED BY WALL SWITCH - SEE ELECTRICAL DRAWINGS
EF-5		ROOFTOP CENTRIFUGAL BELT DRIVE	ACE-B 120	1000	0.375"	1250	8.3		N/A	1/4	100 LBS.	RESTROOMS 120 & 121 SEWA UUSIM (SHEET M1.1)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-6		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	RESTROOM 306 PHARMACY (SHEET M1.2)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-7		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	BREAKROOM 302 PHARMACY (SHEET M1.2)	FAN TO BE CONTROLLED BY WALL SWITCH - SEE ELECTRICAL DRAWINGS
EF-8		ROOFTOP CENTRIFUGAL BELT DRIVE	ACE-B 135	1450	0.375"	1410	10.6		N/A	1/4	100 LBS.	RESTROOMS 108 & 109 MAIN ENTRY LOBBY (SHEET M1.2)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-9		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	BIO HAZARD ROOM 409 NURSING + CLINICS (SHEET M1.2)	FAN TO RUN CONTINUOUSLY - SEE CONTROLS DRAWINGS
EF-10		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	DIRTY ROOM 410 NURSING + CLINICS (SHEET M1.2)	FAN TO RUN CONTINUOUSLY - SEE CONTROLS DRAWINGS
EF-11		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	OFFICE SERVICES 452 NURSING + CLINICS (SHEET M1.2)	FAN TO BE CONTROLLED BY WALL SWITCH - SEE ELECTRICAL DRAWINGS
EF-12		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	RESTROOM 454 NURSING + CLINICS (SHEET M1.2)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-13		IN-LINE DIRECT DRIVE	GN 642	550	0.125"	1500	4.5		186	N/A	40 LBS.	ELECTRICAL ROOM 459 NURSING + CLINIC (SHEET M1.2)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-14		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	RESTROOM 461 NURSING + CLINICS (SHEET M1.2)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-15		ROOFTOP CENTRIFUGAL BELT DRIVE	ACE-B 80	450	0.375"	1400	7.0		N/A	1/4	100 LBS.	CAFE 118 & 118A MAIN ENTRY LOBBY (SHEET M1.3)	FAN TO BE CONTROLLED BY WALL SWITCH - SEE ELECTRICAL DRAWINGS
EF-16		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	RESTROOM 518 HEALTH BUDGET + BILLING (SHEET M1.3)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-17		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	OFFICE SERVICES 506 HEALTH BUDGET + BILLING (SHEET M1.3)	FAN TO BE CONTROLLED BY WALL SWITCH - SEE ELECTRICAL DRAWINGS
EF-18		IN-LINE DIRECT DRIVE	GN 642	500	0.125"	1500	4.5		186	N/A	40 LBS.	ELECTRICAL ROOM 523 HEALTH BUDGET + BILLING (SHEET M1.3)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-19		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	HALLWAY 529 HEALTH BUDGET + BILLING (SHEET M1.3)	FAN TO BE CONTROLLED BY WALL SWITCH - SEE ELECTRICAL DRAWINGS
EF-20		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	HALLWAY 618 CENTER SPIRIT (SHEET M1.4)	FAN TO BE CONTROLLED BY WALL SWITCH - SEE ELECTRICAL DRAWINGS
EF-21		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	RESTROOM 617 CENTER SPIRIT (SHEET M1.4)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-22		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	RESTROOM 607 CENTER SPIRIT (SHEET M1.4)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-23		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	RESTROOM 632 CENTER SPIRIT (SHEET M1.4)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-24		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	OFFICE SERVICES 633 CENTER SPIRIT (SHEET M1.4)	FAN TO BE CONTROLLED BY WALL SWITCH - SEE ELECTRICAL DRAWINGS
EF-25		ROOFTOP CENTRIFUGAL BELT DRIVE	ACE-B 80	475	0.25"	1400	7.0		N/A	1/4	100 LBS.	EMPLOYEE LOUNGE 152 MAINTENANCE STORAGE 151 (SHEET M1.4)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-26		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	RESTROOM 604 CENTER SPIRIT (SHEET M1.4)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-27		ROOFTOP CENTRIFUGAL BELT DRIVE	ACE-B 80	450	0.25"	1400	7.0		N/A	1/4	100 LBS.	ACCU DETOX 654 CENTER SPIRIT (SHEET M1.4)	FAN TO RUN CONTINUOUSLY - SEE CONTROLS DRAWINGS
EF-28		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	RESTROOM 660 CENTER SPIRIT (SHEET M1.4)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-29		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	OFFICE SERVICES 664 CENTER SPIRIT (SHEET M1.4)	FAN TO BE CONTROLLED BY WALL SWITCH - SEE ELECTRICAL DRAWINGS
EF-30		IN-LINE DIRECT DRIVE	GN 642	500	0.125"	1500	4.5		186	N/A	40 LBS.	ELECTRICAL ROOM 136 CENTER SPIRIT (SHEET M1.4)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-31		ROOFTOP CENTRIFUGAL BELT DRIVE	ACE-B 120	1275	0.325"	1420	10.6		N/A	1/4	100 LBS.	RESTROOMS 130 & 131 SOCIAL SERVICES (SHEET M1.5)	FAN TO RUN CONTINUOUSLY - SEE CONTROLS DRAWINGS
EF-32		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	RESTROOM 764 SOCIAL SERVICES (SHEET M1.5)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-33		IN-LINE DIRECT DRIVE	GN 642	550	0.125"	1500	4.5		186	N/A	40 LBS.	ELECTRICAL ROOM 764 SOCIAL SERVICES (SHEET M1.5)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-34		ROOFTOP CENTRIFUGAL BELT DRIVE	ACE-B 80	425	0.375"	1400	7.0		N/A	1/4	100 LBS.	RESTROOMS 700A, 725 & 753 SOCIAL SERVICES (SHEET M1.5)	FAN TO RUN CONTINUOUSLY - SEE CONTROLS DRAWINGS
EF-35		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	FAMILY MEETING ROOM 773 SOCIAL SERVICES (SHEET M1.5)	FAN TO BE CONTROLLED BY WALL SWITCH - SEE ELECTRICAL DRAWINGS
EF-36		CEILING MOUNTED DIRECT DRIVE	GC 242	125	0.125"	1480	2.0		27	N/A	30 LBS.	RESTROOM 802 WAREHOUSE (SHEET M1.3)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-37		CEILING MOUNTED DIRECT DRIVE	128	50	0.125"	750	0.9		29	N/A	20 LBS.	JANITORS ROOM 809 WAREHOUSE (SHEET M1.3)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS
EF-38	↓	IN-LINE DIRECT DRIVE	GN 642	550	0.125"	1500	4.5	↓	186	N/A	40 LBS.	ELECTRICAL ROOM 804 WAREHOUSE (SHEET M1.3)	FAN TO BE CONTROLLED BY EMCS - SEE CONTROLS DRAWINGS

VAV BOX SCHEDULE (PAC-7: CENTER SPIRIT)

MARK	MANUFACTURER	MODEL	SIZE	MAX. AIR PD	CFM			ELECTRIC HEATER				REMARKS
					COOLING	MINIMUM	HEATING	VOLTAGE	KW	MCA	MOP	
VAV-T-1	TITUS	DESV	10	0.50"	875	200	525	480/3/60	5	7.5	15	
VAV-T-2			9		600	150	375	480/3/60	4	6.0	15	
VAV-T-3			7		350	100	200	480/3/60	3	4.5	15	
VAV-T-4			10		850	200	525	480/3/60	5	7.5	15	
VAV-T-5			8		500	125	300	480/3/60	4	6.0	15	
VAV-T-6			9		550	125	325	480/3/60	4	6.0	15	
VAV-T-7			12		1075	250	650	480/3/60	7	10.5	15	
VAV-T-8			10		850	200	525	480/3/60	5	7.5	15	
VAV-T-9			6		275	75	200	208/3/60	2	6.9	15	
VAV-T-10			10		850	200	525	480/3/60	5	7.5	15	
VAV-T-11			14		1300	300	800	480/3/60	9	13.5	15	
VAV-T-12			9		525	125	325	480/3/60	4	6.0	15	
VAV-T-13			6		200	50	150	208/3/60	2	6.9	15	
VAV-T-14			9		500	125	300	480/3/60	4	6.0	15	
VAV-T-15			16		2400	550	1450	480/3/60	20	30.1	35	
VAV-T-16			10		700	175	425	480/3/60	5	7.5	15	
VAV-T-17			12		1075	250	650	480/3/60	7	10.5	15	
VAV-T-18			7		325	75	200	208/3/60	2	6.9	15	
VAV-T-19			12		1200	275	725	480/3/60	7	10.5	15	
VAV-T-20			10		825	200	500	480/3/60	5	7.5	15	
VAV-T-21			12		950	225	575	480/3/60	6	9.0	15	
VAV-T-22			9		550	125	325	480/3/60	4	6.0	15	
VAV-T-23			7		325	75	200	208/3/60	2	6.9	15	
VAV-T-24			10		875	200	525	480/3/60	5	7.5	15	
VAV-T-25			9		525	150	350	480/3/60	4	6.0	15	
VAV-T-26			6		275	75	200	208/3/60	2	6.9	15	
VAV-T-27			9		625	150	400	480/3/60	4	6.0	15	
VAV-T-28			9		500	125	300	480/3/60	4	6.0	15	
VAV-T-29			9		600	150	375	480/3/60	4	6.0	15	
VAV-T-30			12		900	200	550	480/3/60	6	9.0	15	
VAV-T-31			9		600	150	375	480/3/60	4	6.0	15	
VAV-T-32			9		600	150	375	480/3/60	4	6.0	15	
VAV-T-33			9		525	125	325	480/3/60	4	6.0	15	
VAV-T-34			7		300	75	N/A	120/1/60	N/A	N/A	N/A	PROVIDE 120 V. FOR CONTROL POWER
VAV-T-35	↓	↓	12	↓	1050	250	650	480/3/60	7	10.0	15	

NOTES: COMPLETE WITH FUSED DISCONNECT SWITCH AND CONTROLS TRANSFORMER. PROVIDE SOLID STATE DIGITAL RELAYS AND ASSOCIATED CONTROLLER AS REQUIRED FOR PROPORTIONAL ELECTRIC HEAT CONTROL WITH 0-10 VDC OR 4-20 MA SIGNAL FROM EMCS

VAV BOX SCHEDULE (PAC-8 SOCIAL SERVICES)

MARK	MANUFACTURER	MODEL	SIZE	MAX. AIR PD	CFM			ELECTRIC HEATER				REMARKS
					COOLING	MINIMUM	HEATING	VOLTAGE	KW	MCA	MOP	
VAV-8-1	TITUS	DESV	10	0.50"	700	175	425	480/3/60	5	7.5	15	
VAV-8-2			12		1425	325	875	480/3/60	10	13.5	15	
VAV-8-3			7		300	75	N/A	120/1/60	N/A	N/A	N/A	PROVIDE 120 V. FOR CONTROL POWER
VAV-8-4			14		1600	375	975	480/3/60	9	13.5	15	
VAV-8-5			10		775	175	475	480/3/60	5	7.5	15	
VAV-8-6			12		1050	250	650	480/3/60	7	10.5	15	
VAV-8-7			8		450	100	275	480/3/60	3.5	5.3	15	
VAV-8-8			10		875	200	525	480/3/60	5	7.5	15	
VAV-8-9			10		700	175	425	480/3/60	5	7.5	15	
VAV-8-10			12		900	200	550	480/3/60	6	9.0	15	
VAV-8-11			10		700	175	425	480/3/60	5	7.5	15	
VAV-8-12			12		800	200	500	480/3/60	5	7.5	15	
VAV-8-13			10		775	175	475	480/3/60	5	7.5	15	
VAV-8-14			7		300	75	200	208/3/60	2	6.9	15	
VAV-8-15			12		1150	200	700	480/3/60	7	10.5	15	
VAV-8-16			12		1000	225	600	480/3/60	7	10.5	15	
VAV-8-17			9		600	150	375	480/3/60	4	6.0	15	
VAV-8-18			9		600	150	375	480/3/60	4	6.0	15	
VAV-8-19			9		600	150	375	480/3/60	4	6.0	15	
VAV-8-20			9		600	150	375	480/3/60	4	6.0	15	
VAV-8-21			10		700	175	425	480/3/60	5	7.5	15	
VAV-8-22			12		950	225	575	480/3/60	6	9.0	15	
VAV-8-23			12		950	225	575	480/3/60	6	9.0	15	
VAV-8-24			10		725	175	450	480/3/60	5	7.5	15	
VAV-8-25			12		1100	250	675	480/3/60	7	10.5	15	
VAV-8-26	↓	↓	6	↓	275	75	200	208/3/60	2	6.9	15	

NOTES: COMPLETE WITH FUSED DISCONNECT SWITCH AND CONTROLS TRANSFORMER. PROVIDE SOLID STATE DIGITAL RELAYS AND ASSOCIATED CONTROLLER AS REQUIRED FOR PROPORTIONAL ELECTRIC HEAT CONTROL WITH 0-10 VDC OR 4-20 MA SIGNAL FROM EMCS

Registered Professional Engineer
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DAVID C. TYRRELL
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EXPIRES: 12-31-18

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revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

mechanical equipment schedules

m4.3

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PROJECT No. 17069

OUTSIDE AIR CALCULATION: PAC-1

SPACE	OCCUPANCY CATAGORY	PEOPLE OUTDOOR AIR RATE, Rp (CFM / PERSON)	PEOPLE, Pz	AREA OUTDOOR AIR RATE, Ra (CFM / SQ. FT.)	SQ. FT., Az	BREATHING ZONE OUTDOOR AIRFLOW, Vbz (CFM) (Vbz = Rp Pz + Ra Az)	AIR DISTRIBUTION EFFECTIVENESS, Ez	ZONE OUTDOOR AIRFLOW, Voz (CFM) (Voz = Vbz / Ez)	MIN. S/A, Vpz (CFM)	OUTDOOR AIR FRACTION, Zp (Zp = Voz / Vpz)	MAX. Zp	SYSTEM POPULATION Ps	OCCUPANT DIVERSITY, D (D = Ps / (SUM) Pz	UNCORRECTED OUTDOOR AIR INTAKE, Vou (CFM) (Vou = D (SUM) Rp Pz + Ra Az)	SYSTEM VENT. EFFICIENCY, Ev	OUTDOOR AIR INTAKE REQUIRED , Vot (CFM) (Vot = Vou / Ev)	DESIGN OUTDOOR AIR (CFM) PROVIDED
OFFICE AREAS	OFFICE BUILDINGS: OFFICE SPACE	5	24	0.06	4,635	399	0.8	499	6,225	0.8	0.29	93	1.0	1,147	0.8	1,434	1,500
WAITING / RECEPTIONS AREAS	OFFICE BUILDINGS: RECEPTION AREAS	5	14	0.06	445	97	0.8	121	750	0.16							
GROUP ROOMS	GENERAL: CONFERENCE / MEETING	5	36	0.06	670	220	0.8	275	1,025	0.27							
CHILD CARE	EDUCATIONAL FACILITIES: DAYCARE (THROUGH AGE 4)	10	19	0.18	755	326	0.8	408	1,400	0.29							
STORAGE	GENERAL: STORAGE ROOMS	N/A	N/A	0.12	165	20	0.8	25	100	0.25							
HALLWAY	GENERAL: CORRIDORS	N/A	N/A	0.06	4,120	247	0.8	309	5,025	0.06							

OUTSIDE AIR CALCULATION: PAC-2

SPACE	OCCUPANCY CATAGORY	PEOPLE OUTDOOR AIR RATE, Rp (CFM / PERSON)	PEOPLE, Pz	AREA OUTDOOR AIR RATE, Ra (CFM / SQ. FT.)	SQ. FT., Az	BREATHING ZONE OUTDOOR AIRFLOW, Vbz (CFM) (Vbz = Rp Pz + Ra Az)	AIR DISTRIBUTION EFFECTIVENESS, Ez	ZONE OUTDOOR AIRFLOW, Voz (CFM) (Voz = Vbz / Ez)	MIN. S/A, Vpz (CFM)	OUTDOOR AIR FRACTION, Zp (Zp = Voz / Vpz)	MAX. Zp	SYSTEM POPULATION Ps	OCCUPANT DIVERSITY, D (D = Ps / (SUM) Pz	UNCORRECTED OUTDOOR AIR INTAKE, Vou (CFM) (Vou = D (SUM) Rp Pz + Ra Az)	SYSTEM VENT. EFFICIENCY, Ev	OUTDOOR AIR INTAKE REQUIRED , Vot (CFM) (Vot = Vou / Ev)	DESIGN OUTDOOR AIR (CFM) REQUIRED / PROVIDED MIN. / MAX *
CONFERENCE ROOMS	GENERAL: CONFERENCE / MEETING	5	82	0.06	1,625	508	0.8	635	3,425	0.19	0.19	82	1.0	617	0.9	686	225 / 700 *
STORAGE	GENERAL: STORAGE ROOMS	N/A	N/A	0.12	165	29	0.8	36	300	0.12							
HALLWAY	GENERAL: CORRIDORS	N/A	N/A	0.06	1,340	80	0.8	100	1,625	0.06							

* UPON ACTIVATION OF CO2 SENSOR

OUTSIDE AIR CALCULATION: PAC-3

SPACE	OCCUPANCY CATAGORY	PEOPLE OUTDOOR AIR RATE, Rp (CFM / PERSON)	PEOPLE, Pz	AREA OUTDOOR AIR RATE, Ra (CFM / SQ. FT.)	SQ. FT., Az	BREATHING ZONE OUTDOOR AIRFLOW, Vbz (CFM) (Vbz = Rp Pz + Ra Az)	AIR DISTRIBUTION EFFECTIVENESS, Ez	ZONE OUTDOOR AIRFLOW, Voz (CFM) (Voz = Vbz / Ez)	MIN. S/A, Vpz (CFM)	OUTDOOR AIR FRACTION, Zp (Zp = Voz / Vpz)	MAX. Zp	SYSTEM POPULATION Ps	OCCUPANT DIVERSITY, D (D = Ps / (SUM) Pz	UNCORRECTED OUTDOOR AIR INTAKE, Vou (CFM) (Vou = D (SUM) Rp Pz + Ra Az)	SYSTEM VENT. EFFICIENCY, Ev	OUTDOOR AIR INTAKE REQUIRED , Vot (CFM) (Vot = Vou / Ev)	DESIGN OUTDOOR AIR (CFM) PROVIDED
OFFICE AREAS	OFFICE BUILDINGS: OFFICE SPACE	5	10	0.06	1,905	164	0.8	205	2,050	0.10	0.17	31	1.0	323	0.9	359	400
WAITING	OFFICE BUILDINGS: RECEPTION AREAS	5	17	0.06	565	119	0.8	149	900	0.17							
BREAK ROOM	GENERAL: BREAK ROOMS	5	4	0.06	160	30	0.8	38	250	0.15							
STORAGE	GENERAL: STORAGE ROOMS	N/A	N/A	0.12	85	10	0.8	13	100	0.13							

OUTSIDE AIR CALCULATION: PAC-4

SPACE	OCCUPANCY CATAGORY	PEOPLE OUTDOOR AIR RATE, Rp (CFM / PERSON)	PEOPLE, Pz	AREA OUTDOOR AIR RATE, Ra (CFM / SQ. FT.)	SQ. FT., Az	BREATHING ZONE OUTDOOR AIRFLOW, Vbz (CFM) (Vbz = Rp Pz + Ra Az)	AIR DISTRIBUTION EFFECTIVENESS, Ez	ZONE OUTDOOR AIRFLOW, Voz (CFM) (Voz = Vbz / Ez)	MIN. S/A, Vpz (CFM)	OUTDOOR AIR FRACTION, Zp (Zp = Voz / Vpz)	MAX. Zp	SYSTEM POPULATION Ps	OCCUPANT DIVERSITY, D (D = Ps / (SUM) Pz	UNCORRECTED OUTDOOR AIR INTAKE, Vou (CFM) (Vou = D (SUM) Rp Pz + Ra Az)	SYSTEM VENT. EFFICIENCY, Ev	OUTDOOR AIR INTAKE REQUIRED , Vot (CFM) (Vot = Vou / Ev)	DESIGN OUTDOOR AIR (CFM) REQUIRED / PROVIDED MIN. / MAX *
OFFICE AREAS	OFFICE BUILDINGS: OFFICE SPACE	5	9	0.06	1605	141	0.8	176	2050	0.09	0.32	378	1.0	2951	0.8	3,689	1,075 / 3,700 *
WAITING / LOBBY AREAS	OFFICE BUILDINGS: RECEPTION AREAS	5	126	0.06	4180	881	0.8	1101	8250	0.13							
MEETING ROOMS	GENERAL: CONFERENCE / MEETING	5	169	0.06	3370	1047	0.8	1309	6250	0.21							
CHAPEL	PUBLIC ASSEMBLY SPACES: PLACES OF RELIGIOUS WORSHIP	5	33	0.06	270	181	0.8	226	700	.032							
BREAK ROOM AND CAFE	GENERAL: BREAK ROOMS	5	41	0.06	1640	303	0.8	379	3150	0.12							
STORAGE	GENERAL: STORAGE ROOMS	N/A	N/A	0.12	870	104	0.8	130	600	0.22							
HALLWAY	GENERAL: CORRIDORS	N/A	N/A	0.06	4880	293	0.8	366	4025	0.09							

* UPON ACTIVATION OF CO2 SENSOR

OUTSIDE AIR CALCULATION: PAC-5

SPACE	OCCUPANCY CATAGORY	PEOPLE OUTDOOR AIR RATE, Rp (CFM / PERSON)	PEOPLE, Pz	AREA OUTDOOR AIR RATE, Ra (CFM / SQ. FT.)	SQ. FT., Az	BREATHING ZONE OUTDOOR AIRFLOW, Vbz (CFM) (Vbz = Rp Pz + Ra Az)	AIR DISTRIBUTION EFFECTIVENESS, Ez	ZONE OUTDOOR AIRFLOW, Voz (CFM) (Voz = Vbz / Ez)	MIN. S/A, Vpz (CFM)	OUTDOOR AIR FRACTION, Zp (Zp = Voz / Vpz)	MAX. Zp	SYSTEM POPULATION Ps	OCCUPANT DIVERSITY, D (D = Ps / (SUM) Pz	UNCORRECTED OUTDOOR AIR INTAKE, Vou (CFM) (Vou = D (SUM) Rp Pz + Ra Az)	SYSTEM VENT. EFFICIENCY, Ev	OUTDOOR AIR INTAKE REQUIRED , Vot (CFM) (Vot = Vou / Ev)	DESIGN OUTDOOR AIR (CFM) PROVIDED
OFFICE AREAS	OFFICE BUILDINGS: OFFICE SPACE	5	26	0.06	5,200	442	0.8	553	6,925	0.08	0.29	51	1.0	976	0.8	1,220	1,300
WAITING AREAS	OFFICE BUILDINGS: RECEPTION AREAS	5	19	0.06	605	131	0.8	164	925	0.18							
PROCEDURE ROOMS	HOSPITALS, NURSING and CONVALESCENT HOMES: MEDICAL PROCEDURE ROOMS	15	6	0.06	310	109	0.8	136	475	0.29							
STORAGE	GENERAL: STORAGE ROOMS	N/A	N/A	0.12	645	77	0.8	96	750	0.13							
HALLWAY	GENERAL: CORRIDORS	N/A	N/A	0.06	3,605	216	0.8	270	4,000	0.07							

OUTSIDE AIR CALCULATION: PAC-6

SPACE	OCCUPANCY CATAGORY	PEOPLE OUTDOOR AIR RATE, Rp (CFM / PERSON)	PEOPLE, Pz	AREA OUTDOOR AIR RATE, Ra (CFM / SQ. FT.)	SQ. FT., Az	BREATHING ZONE OUTDOOR AIRFLOW, Vbz (CFM) (Vbz = Rp Pz + Ra Az)	AIR DISTRIBUTION EFFECTIVENESS, Ez	ZONE OUTDOOR AIRFLOW, Voz (CFM) (Voz = Vbz / Ez)	MIN. S/A, Vpz (CFM)	OUTDOOR AIR FRACTION, Zp (Zp = Voz / Vpz)	MAX. Zp	SYSTEM POPULATION Ps	OCCUPANT DIVERSITY, D (D = Ps / (SUM) Pz	UNCORRECTED OUTDOOR AIR INTAKE, Vou (CFM) (Vou = D (SUM) Rp Pz + Ra Az)	SYSTEM VENT. EFFICIENCY, Ev	OUTDOOR AIR INTAKE REQUIRED , Vot (CFM) (Vot = Vou / Ev)	DESIGN OUTDOOR AIR (CFM) PROVIDED
OFFICE AREAS	OFFICE BUILDINGS: OFFICE SPACE	5	17	0.06	3315	284	0.8	355	4475	0.8	0.17	23	1.0	498	0.9	554	800
WAITING	OFFICE BUILDINGS: RECEPTION AREAS	5	6	0.06	180	41	0.8	51	300	0.17							
STORAGE	GENERAL: STORAGE ROOMS	N/A	N/A	0.12	655	79	0.8	99	850	0.12							
HALLWAY	GENERAL: CORRIDORS	N/A	N/A	0.06	1570	94	0.8	118	0.8	0.05							

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SIGNED 11/16/18
ARIZONA U.S.A.
EXPIRES: 12-31-18

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Tucson, AZ 85746

outside air calculations

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OUTSIDE AIR CALCULATION: PAC-7

SPACE	OCCUPANCY CATAGORY	PEOPLE OUTDOOR AIR RATE, Rp (CFM / PERSON)	PEOPLE, Pz	AREA OUTDOOR AIR RATE, Ra (CFM / SQ. FT.)	SQ. FT., Az	BREATHING ZONE OUTDOOR AIRFLOW, Vbz (CFM) (Vbz = Rp Pz + Ra Az)	AIR DISTRIBUTION EFFECTIVENESS, Ez	ZONE OUTDOOR AIRFLOW, Voz (CFM) (Voz = Vbz / Ez)	MIN. S/A, Vpz (CFM)	OUTDOOR AIR FRACTION, Zp (Zp = Voz / Vpz)	MAX. Zp	SYSTEM POPULATION Ps	OCCUPANT DIVERSITY, D (D = Ps / (SUM) Pz	UNCORRECTED OUTDOOR AIR INTAKE, Vou (CFM) (Vou = D (SUM) Rp Pz + Ra Az)	SYSTEM VENT. EFFICIENCY, Ev	OUTDOOR AIR INTAKE REQUIRED , Vot (CFM) (Vot = Vou / Ev)	DESIGN OUTDOOR AIR (CFM) REQUIRED / PROVIDED MIN. / MAX *
OFFICE AREAS	OFFICE BUILDINGS: OFFICE SPACE	5	43	0.06	8,435	721	0.8	901	11,475	0.8	0.8	164	1.0	1,982	0.8	2,478	1,075 / 2,500 *
WAITING AREAS	OFFICE BUILDINGS: RECEPTION AREAS	5	31	0.06	1,010	216	0.8	270	1,625	0.17							
MEETING ROOMS	GENERAL: CONFERENCE / MEETING	5	90	0.06	1,790	557	0.8	696	2,700	0.26							
STORAGE	GENERAL: STORAGE ROOMS	N/A	N/A	0.12	700	84	0.8	105	800	0.13							
HALLWAY	GENERAL: CORRIDORS	N/A	N/A	0.06	6,725	404	0.8	505	7,075	0.07							

* UPON ACTIVATION OF CO2 SENSOR

OUTSIDE AIR CALCULATION: PAC-8

SPACE	OCCUPANCY CATAGORY	PEOPLE OUTDOOR AIR RATE, Rp (CFM / PERSON)	PEOPLE, Pz	AREA OUTDOOR AIR RATE, Ra (CFM / SQ. FT.)	SQ. FT., Az	BREATHING ZONE OUTDOOR AIRFLOW, Vbz (CFM) (Vbz = Rp Pz + Ra Az)	AIR DISTRIBUTION EFFECTIVENESS, Ez	ZONE OUTDOOR AIRFLOW, Voz (CFM) (Voz = Vbz / Ez)	MIN. S/A, Vpz (CFM)	OUTDOOR AIR FRACTION, Zp (Zp = Voz / Vpz)	MAX. Zp	SYSTEM POPULATION Ps	OCCUPANT DIVERSITY, D (D = Ps / (SUM) Pz	UNCORRECTED OUTDOOR AIR INTAKE, Vou (CFM) (Vou = D (SUM) Rp Pz + Ra Az)	SYSTEM VENT. EFFICIENCY, Ev	OUTDOOR AIR INTAKE REQUIRED , Vot (CFM) (Vot = Vou / Ev)	DESIGN OUTDOOR AIR (CFM) REQUIRED / PROVIDED MIN. / MAX *
OFFICE AREAS	OFFICE BUILDINGS: OFFICE SPACE	5	35	0.06	6930	591	0.8	739	9675	0.8	0.26	118	1.0	1,728	0.8	2,160	1,050 / 2,200 *
WAITING AREAS	OFFICE BUILDINGS: RECEPTION AREAS	5	7	0.06	220	48	0.8	60	300	0.20							
MEETING ROOMS	GENERAL: CONFERENCE / MEETING	5	54	0.06	1080	335	0.8	419	2400	0.17							
CLASSROOM	EDUCATIONAL FACILITIES: CLASSROOM (AGE 9 +)	10	22	0.18	610	330	0.8	413	1600	0.26							
STORAGE	GENERAL: STORAGE ROOMS	N/A	N/A	0.12	1055	127	0.8	519	1350	0.12							
HALLWAY	GENERAL: CORRIDORS	N/A	N/A	0.06	4970	298	0.8	373	4850	0.8							

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OUTSIDE AIR CALCULATION: AC-9

SPACE	OCCUPANCY CATAGORY	PEOPLE OUTDOOR AIR RATE, Rp (CFM / PERSON)	PEOPLE, Pz	AREA OUTDOOR AIR RATE, Ra (CFM / SQ. FT.)	SQ. FT., Az	BREATHING ZONE OUTDOOR AIRFLOW, Vbz (CFM) (Vbz = Rp Pz + Ra Az)	AIR DISTRIBUTION EFFECTIVENESS, Ez	ZONE OUTDOOR AIRFLOW, Voz (CFM) (Voz = Vbz / Ez)	MIN. S/A, Vpz (CFM)	OUTDOOR AIR FRACTION, Zp (Zp = Voz / Vpz)	MAX. Zp	SYSTEM POPULATION Ps	OCCUPANT DIVERSITY, D (D = Ps / (SUM) Pz	UNCORRECTED OUTDOOR AIR INTAKE, Vou (CFM) (Vou = D (SUM) Rp Pz + Ra Az)	SYSTEM VENT. EFFICIENCY, Ev	OUTDOOR AIR INTAKE REQUIRED , Vot (CFM) (Vot = Vou / Ev)	DESIGN OUTDOOR AIR (CFM) PROVIDED
OFFICE	OFFICE BUILDINGS: OFFICE SPACE	5	1	0.06	175	16	0.8	20	250	0.8	0.8	1	1.0	217	1.0	217	400
WAREHOUSE	MISCELLANEOUS SPACES: WAREHOUSE	N/A	N/A	0.06	3350	201	0.8	251	3700	0.07							

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outside air calculations

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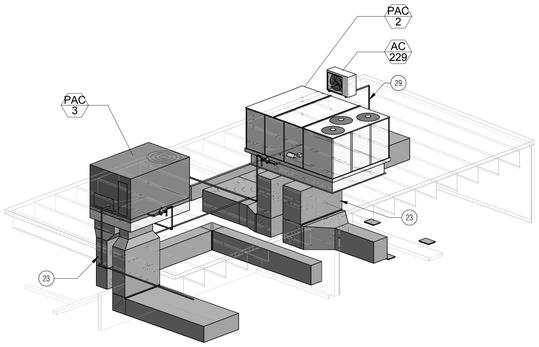
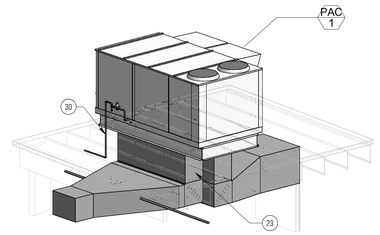
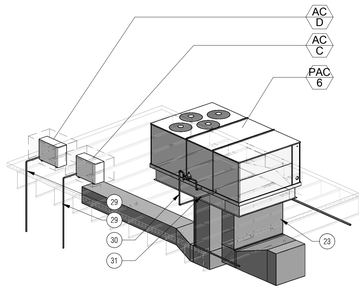


2 m5.1 mechanical isometric - PAC 2 & 3 (Conference Center & Pharmacy)

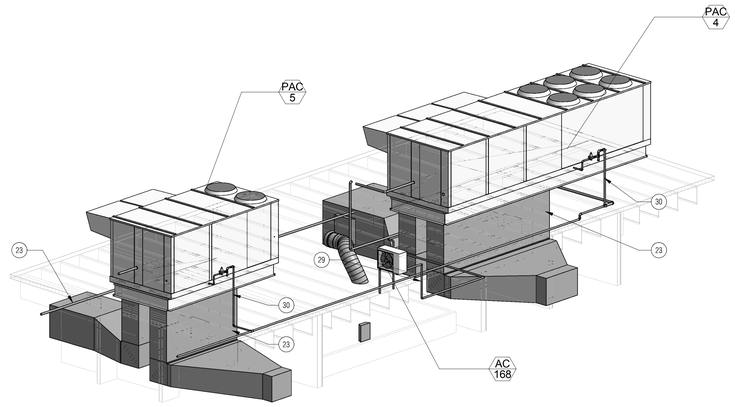


1 m5.1 mechanical isometric - PAC 1 (Sewa U' usim)

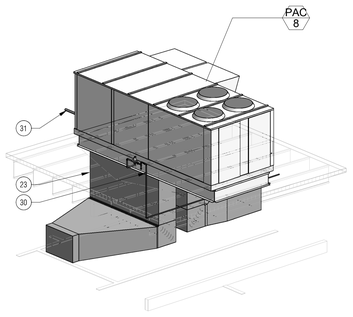
#	KEYNOTES:
23	SUPPLY AND RETURN DUCTS THROUGH ROOF - SAME SIZE AS UNIT OPENINGS. FIELD COORDINATE WITH STRUCTURAL MEMBERS. TRANSITION / OFFSET AS REQUIRED TO FIT WITHIN THE STRUCTURE. PROVIDE 18 GAUGE SHEET METAL FROM UNIT CONNECTION THROUGH TRANSITION TO SUPPLY AND RETURN TRUNK DUCTS.
29	REFRIGERANTING PIPING DOWN THROUGH ROOF. SEE MANUFRACTURE SPECIFICATIONS FOR SIZE.
30	GAS PIPING DOWN THROUGH ROOF. SEE PLUMBING DRAWINGS FOR SIZE.
31	CONDENSATE PIPING DOWN THROUGH ROOF



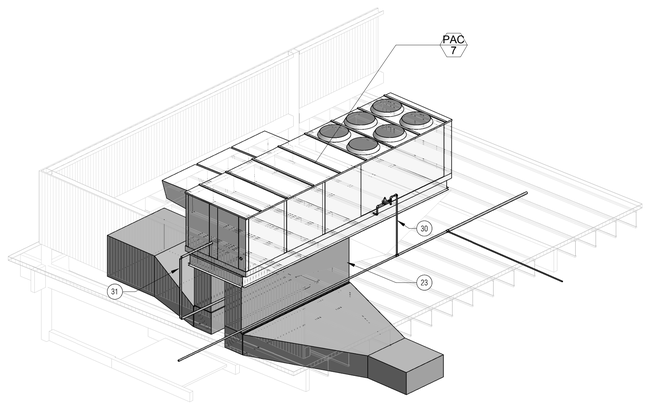
4 m5.1 mechanical isometric - PAC 6 (Finance)



3 m5.1 mechanical isometric - PAC 4 & 5 (Nurisng & Clinics)



6 m5.1 mechanical isometric - PAC 8 (Soical Services)



5 m5.1 mechanical isometric - PAC 7 (Center Spirit)

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mechanical isometrics

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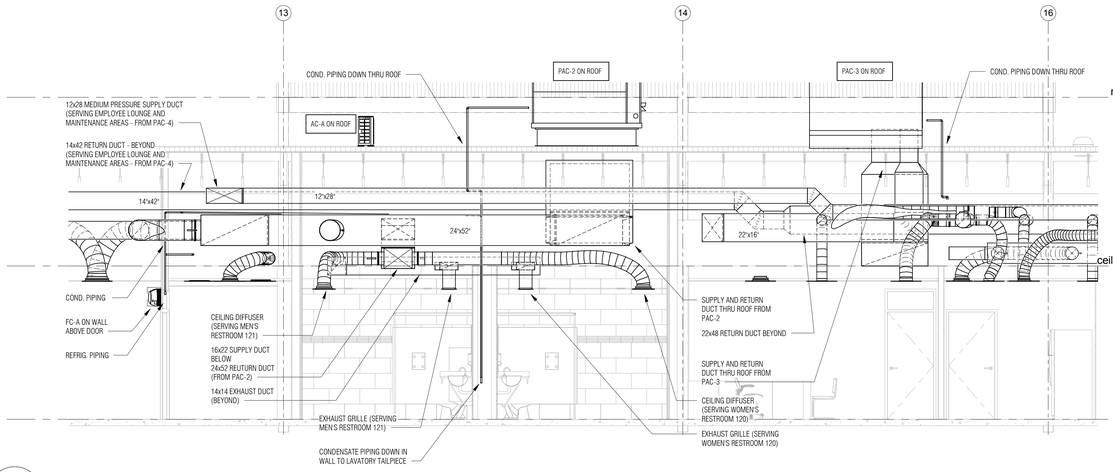
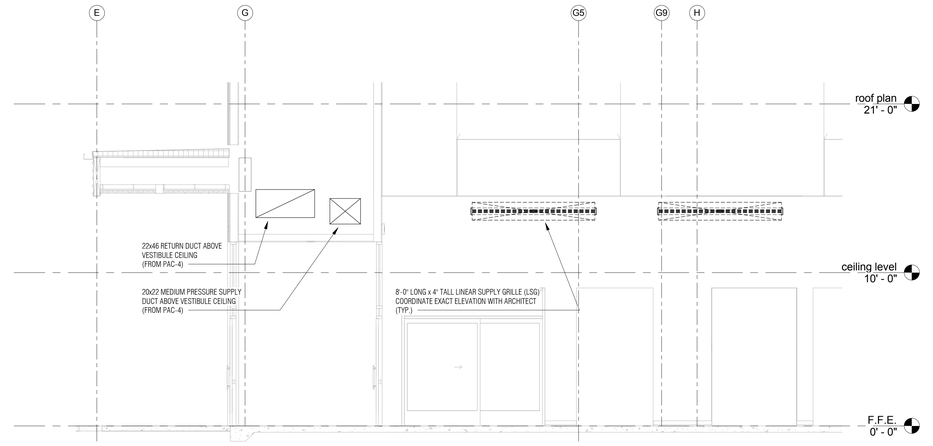


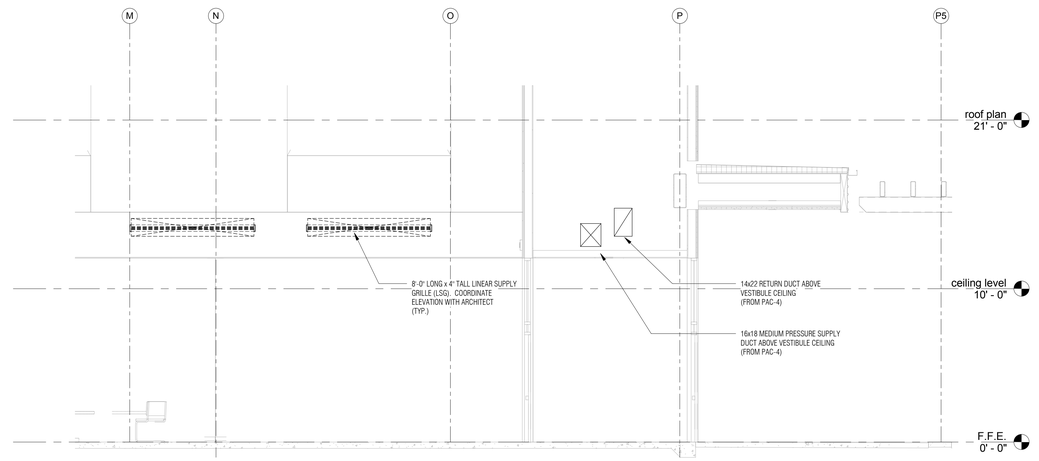
1 m5.2 **mechanical section**

1/4" = 1'-0"



2 m5.2 **mechanical elevation main lobby north**

1/4" = 1'-0"



3 m5.2 **mechanical elevation main lobby south**

1/4" = 1'-0"

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mechanical section and elevation views

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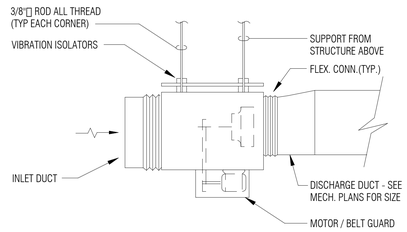
EXPIRES: 12-31-18

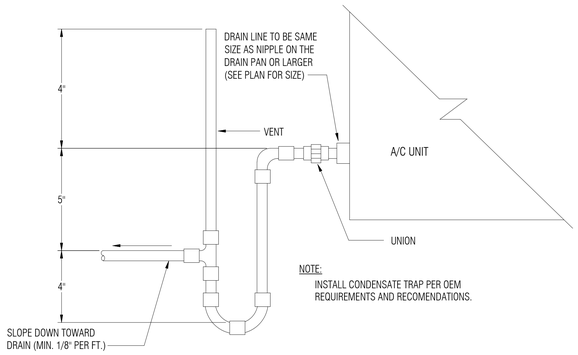
job
1717

date
11.16.18

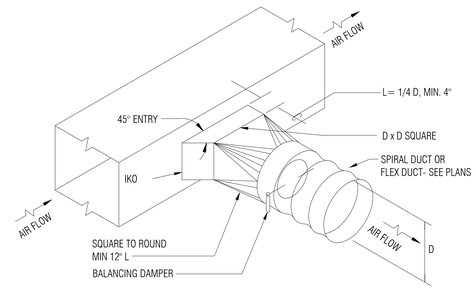
revisions



13 m5.3 inline exhaust fan detail
n.t.s.

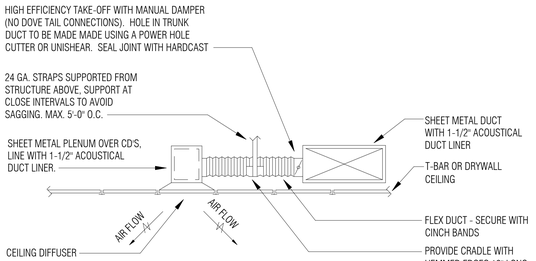


9 m5.3 condensate p-trap detail
n.t.s. (pac-1, 2, 4, 5, 6, 7, and 8)

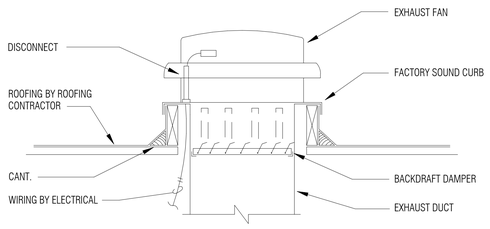


TYP. ROUND DUCT TAKE-OFF DETAIL

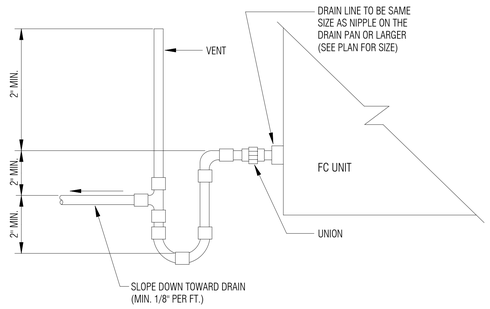
5 m5.3 typical round duct take-off detail - downstream of vav box
n.t.s. (low pressure)



1 m5.3 ceiling diffuser with flex duct detail - lined ductwork
n.t.s. (return similar)

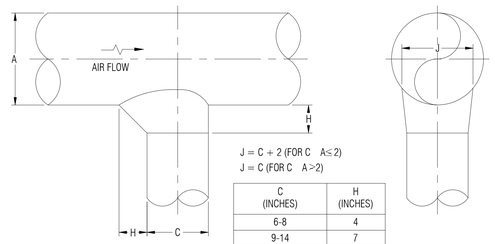


14 m5.3 rooftop exhaust fan detail
n.t.s.



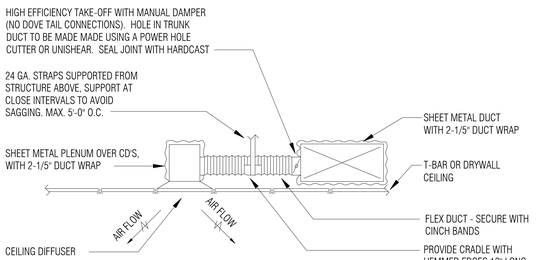
10 m5.3 condensate p-trap detail
n.t.s. (pac-3, ac-9, fc-a through fc-f)

NOTES:
- TAKE-OFF'S FOR MEDIUM PRESSURE DUCTWORK SHALL BE McGILL 'LO-LOSS' OR EQUIVALENT HIGH-EFFICIENCY TAKE-OFF'S.
- TAKE-OFF'S ARE SIMILAR FOR FLAT OVAL DUCT.

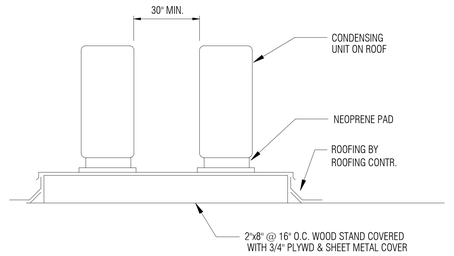


C (INCHES)	H (INCHES)
6-8	4
9-14	7
16-26	10
28 OR LARGER	13

6 m5.3 typical round high efficiency take-off detail - upstream of vav box
n.t.s. (medium pressure)

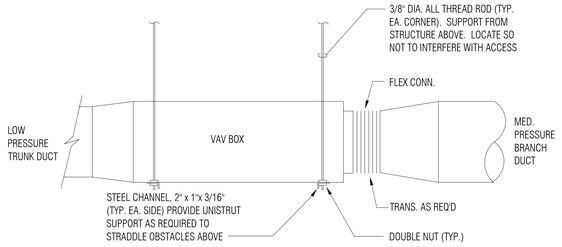


2 m5.3 ceiling diffuser with flex duct detail - wrapped ductwork
n.t.s. (return similar)

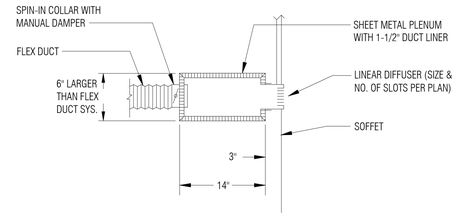


NOTE: UNITS MAY BE INSTALL ON INDIVIAUAL PLATFORM - CONTRACTOR'S OPTION

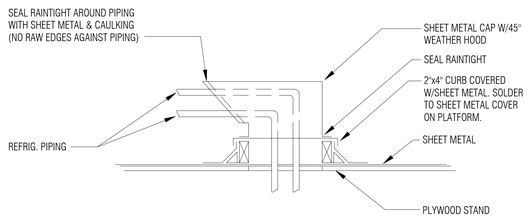
11 m5.3 rooftop condensing unit detail
n.t.s. (ac-a through ac-f)



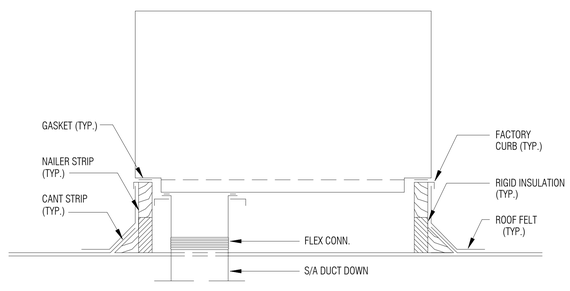
7 m5.3 vav box hanging detail
n.t.s.



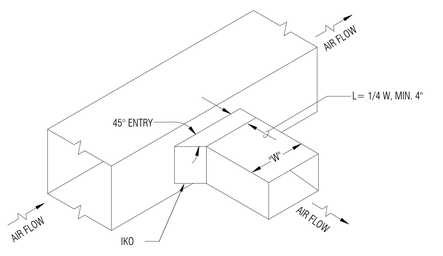
3 m5.3 linear diffuser with flex duct detail
n.t.s.



12 m5.3 piping weather hood detail
n.t.s.



8 m5.3 rooftop air conditioning unit detail
n.t.s. (pac units & ac-9)



4 m5.3 typical rectangular duct take-off detail - downstream of vav box
n.t.s. (low pressure)

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

mechanical details

m5.3

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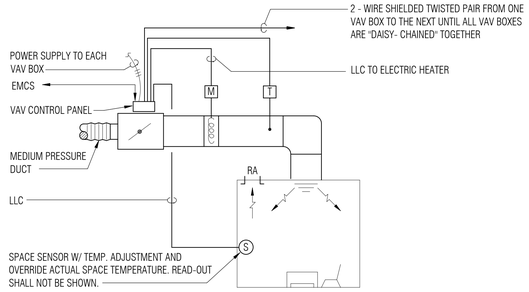
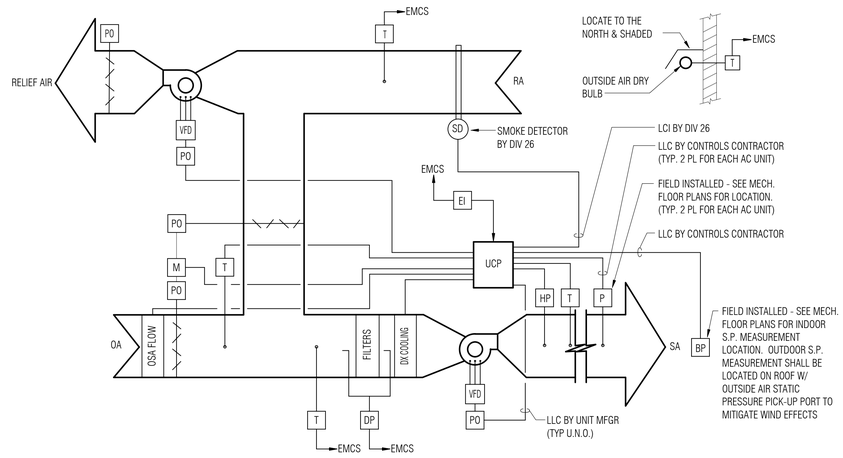
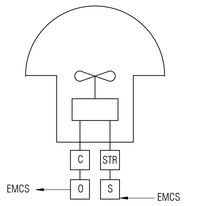


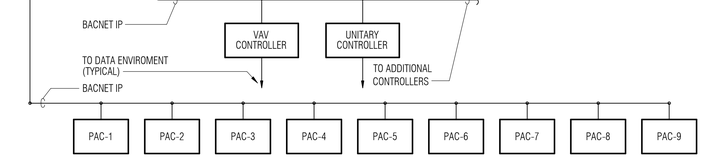
4 m6.1 VAV BOX CONTROL SCHEMATIC
NTS



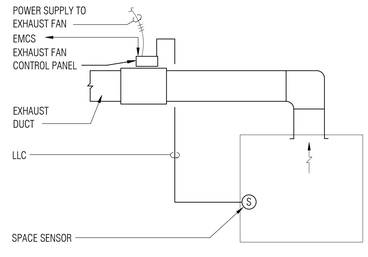
1 m6.1 TYP. PACKAGED AC UNIT SCHEMATIC
NTS



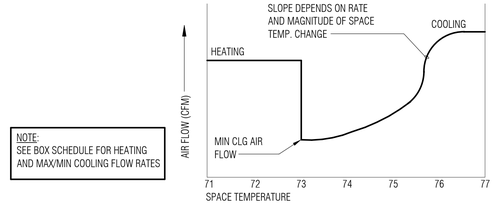
5 m6.1 SCHEDULED EXH. FAN CONTROL SCHEMATIC
NTS



2 m6.1 EMCS SYSTEM ARCHITECTURE
NTS



3 m6.1 ELECTRICAL ROOM EXHAUST FAN CONTROL SCHEMATIC
NTS



3 m6.1 VAV AIR FLOW CONTROL SCHEMATIC
NTS

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REGISTERED PROFESSIONAL ENGINEER
45700
DAVID C. TYRRELL
Date Signed 11/16/18
Arizona U.S.A.
EXPIRES: 12-31-18

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

mechanical controls

m6.1

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SEQUENCE OF OPERATIONS

ROOFTOP PACKAGED VAV UNIT CONTROL :

A. ROOFTOP PACKAGED VAV UNIT SHALL BE COMPLETE WITH A BACNET/IP COMMUNICATIONS CARD.

B. THE EMCS SHALL USE A TIME SCHEDULE TO DETERMINE OCCUPIED AND UNOCCUPIED TIMES. THE EMCS SHALL SWITCH THE UNIT BETWEEN OCCUPIED AND UNOCCUPIED MODE THROUGH THE BACNET CARD. THERE SHALL ALSO BE GRAPHICAL PROVISIONS TO OVERRIDE THE CONTROL TO CONSTANT OCCUPIED OR CONSTANT UNOCCUPIED.

C. ANY TIME UP TO 1 HOUR (ADJ) PRIOR TO PLACING THE UNIT IN THE OCCUPIED MODE, THE EMCS SHALL DETERMINE IF WARM-UP OR COOL-DOWN MODE IS APPROPRIATE.

1. IF THE AVERAGE SPACE TEMPERATURE IS BELOW THE WARM-UP SETPOINT OF 67°F (ADJ) DURING THIS TIME, THE SYSTEM SHALL GO INTO WARM-UP MODE. THE SYSTEM SHALL REMAIN IN WARM-UP MODE UNTIL THE SCHEDULED OCCUPIED TIME WHEN THE SYSTEM SWITCHES INTO OCCUPIED MODE.

2. IF THE AVERAGE ZONE TEMPERATURE IS ABOVE THE COOL-DOWN SETPOINT OF 78°F (ADJ) DURING THIS TIME, THE SYSTEM SHALL GO INTO COOL-DOWN MODE. THE SYSTEM SHALL REMAIN IN COOL-DOWN MODE UNTIL THE SCHEDULED OCCUPIED TIME WHEN THE SYSTEM SWITCHES INTO OCCUPIED MODE.

D. WARM-UP MODE OPERATION

1. ONCE THE SYSTEM IS PLACED IN WARM-UP MODE, THE EMCS SHALL SEND AN OCCUPIED SIGNAL TO THE UNIT. UPON RECEIVING THE OCCUPIED SIGNAL, THE UNIT SHALL START ITS SUPPLY AND RETURN FANS. THE EMCS SHALL ALSO SEND AN OUTSIDE AIRFLOW SETPOINT OF ZERO CFM TO THE UNIT TO EFFECTIVELY CLOSE THE OUTDOOR AIR DAMPER. THE EMCS SHALL SEND A S/A TEMPERATURE SETPOINT OF 90°F (ADJ) TO THE UNIT TO EFFECTIVELY HOLD OFF THE AIR CONDITIONING COMPRESSORS.

2. THE UNIT'S INTERNAL CONTROLS SHALL MAINTAIN SUPPLY AIR SETPOINT, SUPPLY DUCT STATIC PRESSURE, OUTSIDE AIR SETPOINT, AND BUILDING PRESSURE SETPOINT AS DESCRIBED BELOW.

3. A WARM-UP MODE HOA SWITCH SHALL BE AVAILABLE ON THE GRAPHICAL INTERFACE TO DISABLE THE MODE OR LEAVE IT IN AUTOMATIC.

E. COOL-DOWN MODE OPERATION

1. ONCE THE SYSTEM IS PLACED IN COOL-DOWN MODE, THE EMCS SHALL SEND AN OCCUPIED SIGNAL TO THE UNIT. UPON RECEIVING THE OCCUPIED SIGNAL, THE UNIT SHALL START ITS SUPPLY AND RETURN FANS. THE EMCS SHALL ALSO SEND AN OUTSIDE AIRFLOW SETPOINT OF ZERO CFM TO THE UNIT TO EFFECTIVELY CLOSE THE OUTDOOR AIR DAMPER. THE EMCS SHALL RESET S/A TEMPERATURE SETPOINT DURING COOL-DOWN MODE AS DESCRIBED BELOW.

2. THE UNIT'S INTERNAL CONTROLS SHALL MAINTAIN SUPPLY AIR SETPOINT, SUPPLY DUCT STATIC PRESSURE, OUTSIDE AIR SETPOINT, AND BUILDING PRESSURE SETPOINT AS DESCRIBED BELOW.

3. A COOL-DOWN MODE HOA SWITCH SHALL BE AVAILABLE ON THE GRAPHICAL INTERFACE TO DISABLE THE MODE OR LEAVE IT IN AUTOMATIC.

F. UNOCCUPIED MODE OPERATION

1. ONCE PLACED INTO UNOCCUPIED MODE, THE EMCS SHALL SEND AN UNOCCUPIED SIGNAL TO THE UNIT. THE UNIT'S INTERNAL CONTROLS SHALL STOP THE SUPPLY AND RETURN FANS AND CLOSE THE OUTSIDE AIR DAMPER.

G. NIGHT SETBACK MODE OPERATION

1. THE EMCS SHALL MONITOR SPACE TEMPERATURE SENSORS DURING UNOCCUPIED MODE. EACH TERMINAL UNIT SHALL HAVE AN UNOCCUPIED HEATING SETPOINT OF 55°F (ADJ) TO TRIGGER NIGHT SETBACK. IF THE NUMBER OF TERMINAL UNITS IN NIGHT SETBACK EXCEEDS A THRESHOLD OF 2 (ADJ), THE EMCS SHALL SEND AN OCCUPIED SIGNAL TO THE UNIT, AND THE UNIT'S INTERNAL CONTROLS SHALL START ITS SUPPLY AND RETURN FANS. INDIVIDUAL TERMINAL UNITS SHALL REMAIN IN NIGHT SETBACK UNTIL THEIR SPACE TEMPERATURES EXCEED THEIR UNOCCUPIED HEATING SETPOINT PLUS A 5°F (ADJ) DEADBAND. THE SYSTEM SHALL CONTINUE TO RUN IN NIGHT SETBACK MODE UNTIL 1 (ADJ) OR LESS TERMINAL UNITS ARE IN NIGHT SETBACK.

2. THE EMCS SHALL SEND AN OUTSIDE AIRFLOW SETPOINT OF ZERO CFM AND A S/A TEMPERATURE SETPOINT OF 90°F (ADJ) TO THE UNIT TO EFFECTIVELY CLOSE THE OUTDOOR AIR DAMPER AND HOLD OFF THE AIR CONDITIONING COMPRESSORS DURING NIGHT SETBACK MODE.

3. THE UNIT'S INTERNAL CONTROLS SHALL MAINTAIN SUPPLY AIR SETPOINT, SUPPLY DUCT STATIC PRESSURE, OUTSIDE AIR SETPOINT, AND BUILDING PRESSURE SETPOINT AS DESCRIBED BELOW.

4. A NIGHT SETBACK MODE HOA SWITCH SHALL BE AVAILABLE ON THE GRAPHICAL INTERFACE TO DISABLE THE MODE OR LEAVE IT IN AUTOMATIC.

H. NIGHT SETUP MODE OPERATION

1. THE EMCS SHALL MONITOR SPACE TEMPERATURE SENSORS DURING UNOCCUPIED MODE. EACH TERMINAL UNIT SHALL HAVE AN UNOCCUPIED COOLING SETPOINT OF 85°F (ADJ) TO TRIGGER NIGHT SETUP. IF THE NUMBER OF TERMINAL UNITS IN NIGHT SETUP EXCEEDS A THRESHOLD OF 2 (ADJ), THE EMCS SHALL SEND AN OCCUPIED SIGNAL TO THE UNIT, AND THE UNIT'S INTERNAL CONTROLS SHALL START ITS SUPPLY AND RETURN FANS. INDIVIDUAL TERMINAL UNITS SHALL REMAIN IN NIGHT SETUP UNTIL THEIR SPACE TEMPERATURES FALL BELOW THEIR UNOCCUPIED COOLING SETPOINT LESS A 5°F (ADJ) DEADBAND. THE SYSTEM SHALL CONTINUE TO RUN IN NIGHT SETUP MODE UNTIL 1 (ADJ) OR LESS TERMINAL UNITS ARE IN NIGHT SETUP.

2. THE EMCS SHALL SEND AN OUTSIDE AIRFLOW SETPOINT OF ZERO CFM TO THE UNIT TO EFFECTIVELY CLOSE THE OUTDOOR AIR DAMPER DURING NIGHT SETUP MODE. THE EMCS SHALL RESET THE S/A TEMPERATURE SETPOINT AS DESCRIBED BELOW.

3. THE UNIT'S INTERNAL CONTROLS SHALL MAINTAIN SUPPLY AIR SETPOINT, SUPPLY DUCT STATIC PRESSURE, OUTSIDE AIR SETPOINT, AND BUILDING PRESSURE SETPOINT AS DESCRIBED BELOW.

4. A NIGHT SETUP MODE HOA SWITCH SHALL BE AVAILABLE ON THE GRAPHICAL INTERFACE TO DISABLE THE MODE OR LEAVE IT IN AUTOMATIC.

I. OVERRIDE OPERATION

1. EACH SPACE TEMPERATURE SENSOR SHALL HAVE AN OVERRIDE BUTTON.

2. WHEN AN OVERRIDE BUTTON IS PRESSED DURING UNOCCUPIED MODE, THE SYSTEM SHALL ENTER OCCUPIED MODE FOR 60 MINUTES (ADJ) BEFORE IT RETURNS TO UNOCCUPIED MODE.

J. OCCUPIED MODE OPERATION

1. ONCE PLACED INTO OCCUPIED MODE, THE EMCS SHALL SEND AN OCCUPIED SIGNAL TO THE UNIT, AND THE UNIT'S INTERNAL CONTROLS SHALL START THE SUPPLY AND RETURN FANS.

2. THE EMCS SHALL SEND AN OUTSIDE AIRFLOW SETPOINT TO THE UNIT AS SHOWN IN THE ROOFTOP PACKAGED VAV UNIT SCHEDULE. THE UNIT'S INTERNAL CONTROLS SHALL MEASURE OUTSIDE AIRFLOW AND MODULATE THE OUTSIDE AND RETURN AIR DAMPERS AS REQUIRED TO MAINTAIN OUTSIDE AIRFLOW SETPOINT.

3. THE EMCS SHALL SEND A SUPPLY AIR TEMPERATURE SETPOINT (ADJ) TO THE UNIT. THE UNIT SHALL BE EQUIPPED WITH COMPARATIVE ENTHALPY ECONOMIZER CONTROLS. THE UNIT'S INTERNAL CONTROLS SHALL STAGE COMPRESSORS AND/OR MODULATE OUTSIDE AND RETURN AIR DAMPERS DURING ECONOMIZER MODE TO MAINTAIN SUPPLY AIR TEMPERATURE SETPOINT.

4. THE EMCS SHALL SEND A DUCT STATIC PRESSURE SETPOINT (ADJ) TO THE UNIT. THE UNIT SHALL MONITOR DUCT STATIC PRESSURE. THE UNIT SHALL MONITOR DUCT STATIC PRESSURE IN TWO LOCATIONS AND CONTROL TO THE LOWER OF THE TWO READ-OUTS. THE UNIT'S INTERNAL CONTROLS SHALL MODULATE THE SUPPLY FAN VFD TO MAINTAIN DUCT STATIC PRESSURE SETPOINT.

5. THE EMCS SHALL SEND A BUILDING PRESSURE SETPOINT OF +0.03" W.C. (ADJ) TO THE UNIT. THE UNIT SHALL MONITOR BUILDING PRESSURE COMPARED TO OUTDOORS. THE UNIT'S INTERNAL CONTROLS SHALL MODULATE RETURN FAN SPEED TO MAINTAIN BUILDING PRESSURE SETPOINT. THE UNIT SHALL BE COMPLETE WITH A BAROMETRIC DAMPER TO MAINTAIN SLIGHTLY POSITIVE PRESSURE IN THE RETURN PLENUM.

6. CO2 SENSORS SHALL BE PROVIDED BASED ON THE MECHANICAL FLOOR PLANS TO MONITOR INDOOR AIR QUALITY. AN AIRFLOW MONITORING STATION SHALL BE PROVIDED IN THE OUTSIDE AIR DUCTWORK TO MEASURE THE VENTILATION AIR RATE. THE OUTSIDE AND RETURN AIR DAMPERS SHALL BE MODULATED TO MAINTAIN A MINIMUM VENTILATION AIR SET POINT PER THE MECHANICAL SCHEDULE DURING ALL OCCUPIED HOURS. THE OUTSIDE AIR AND RETURN AIR DAMPERS SHALL BE RE-POSITIONED TO MAINTAIN THE DESIGN VENTILATION AIR PER THE MECHANICAL SCHEDULE ANYTIME ANY CO2 SENSOR ASSOCIATED WITH THAT AIR HANDLER REPORTS A CO2 CONCENTRATION GREATER THAN 800 PPM,

K. SUPPLY AIR TEMPERATURE RESET

1. THE EMCS SHALL MONITOR OUTSIDE AIR DRY BULB TEMPERATURE.

2. THE EMCS SHALL RESET THE SUPPLY AIR TEMPERATURE BASED ON OUTDOOR AIR TEMPERATURE. WHEN THE OUTDOOR AIR TEMPERATURE IS ABOVE 75°F (ADJ), THE S/A TEMPERATURE SHALL BE 55°F (ADJ). AS THE OUTDOOR AIR TEMPERATURE DROPS FROM 75°F TO 60°F (ADJ), THE S/A TEMPERATURE SETPOINT SHALL BE RESET LINEARLY FROM 55°F UP TO 65°F (ADJ). WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 60°F, THE S/A TEMPERATURE SHALL BE 65°F.

L. DUCT STATIC PRESSURE RESET

1. THE EMCS SHALL RESET THE DUCT STATIC PRESSURE SETPOINT USING TRIM AND RESPOND LOGIC WITHIN THE RANGE OF 0.15 (ADJ) TO 1.3" W.C (ADJ), OR AS SUGGESTED BY THE TAB CONTRACTOR. WHEN THE FAN IS OFF, THE SETPOINT SHALL BE THE MINIMUM VALUE (0.15").

2. WHEN THE EMCS IS SENDING AN OCCUPIED SIGNAL TO THE EMCS, THE EMCS SHALL POLL THE TERMINAL UNITS EVERY 2 MINUTES FOR PRESSURE REQUESTS. WHERE TERMINAL UNIT DAMPER POSITION IS KNOWN, A PRESSURE REQUEST IS GENERATED WHEN A DAMPER EXCEEDS 95% OPEN. THE PRESSURE REQUEST SHALL REMAIN UNTIL THE DAMPER CLOSES TO LESS THAN 90% OPEN. WHERE VAV ZONE DAMPER POSITION IS UNKNOWN, A PRESSURE REQUEST IS MADE WHEN THE RATIO OF THE ZONE'S ACTUAL SUPPLY AIRFLOW TO SUPPLY AIRFLOW SETPOINT IS LESS THAN 90%. THE PRESSURE REQUEST SHALL REMAIN UNTIL THE RATIO RISES TO 100%.

3. IF THERE ARE MORE THAN 1 (ADJ) PRESSURE REQUESTS, THE EMCS SHALL RESPOND BY INCREASING THE SETPOINT BY 0.06". IF THERE IS 1 (ADJ) OR FEWER PRESSURE REQUESTS, THE EMCS SHALL TRIM THE STATIC PRESSURE SETPOINT BY 0.04".

M. SAFETIES

1. UNIT SHALL BE COMPLETE WITH A HIGH DUCT STATIC PRESSURE SWITCH AT THE UNIT DISCHARGE. HIGH DUCT STATIC PRESSURE SWITCH SHALL BE HARD WIRED TO SHUT DOWN THE SUPPLY AND RETURN FANS IF THE DISCHARGE DUCT PRESSURE RISES ABOVE 4.0" W.C. HIGH DUCT STATIC PRESSURE SWITCH SHALL REQUIRE A MANUAL RESET BEFORE THE FANS CAN RESTART.

2. A DUCT SMOKE DETECTOR SHALL BE PROVIDED IN THE RETURN AIR BY DIVISION 26 TO SHUT DOWN THE SUPPLY AND RETURN FANS ANYTIME SMOKE IS DETECTED.

N. MONITORING

1. THE EMCS SHALL MONITOR DIFFERENTIAL PRESSURE ACROSS THE FILTER BANK. AN ALARM SHALL BE GENERATED WHEN THE DIFFERENTIAL PRESSURE RISES ABOVE 1.0" W.C. (ADJ).

2. THE EMCS SHALL MONITOR ADDITIONAL POINTS THROUGH THE BACNET CARD.

VAV BOX CONTROL :

A. SPACE TEMPERATURE SENSORS WITH OVERRIDES SHALL BE PROVIDED TO MONITOR SPACE TEMPERATURES.

B. ON A RISE IN TEMPERATURE THE VAV DAMPER SHALL OPEN. ON A FALL IN TEMPERATURE THE VAV DAMPER SHALL CLOSE TO A MINIMUM POSITION. IF THE TEMPERATURE CONTINUES TO FALL, THE BOX SHALL OPEN TO HEATING AIR FLOW RATE AND THE EMCS SHALL MODULATE THE PROPORTIONAL ELECTRIC REHEAT TO MAINTAIN SPACE TEMPERATURE.

C. FOR CAV 1-15, THE CONSTANT AIR VOLUME BOX SHALL MAINTAIN THE SCHEDULED AIRFLOW. EMCS SHALL MODULATE THE PROPORTIONAL ELECTRIC REHEAT TO MAINTAIN SPACE TEMPERATURE SETPOINTS.

SCHEDULED EXHAUST FAN CONTROL :

A. SCHEDULED EXHAUST FANS SHALL RUN DURING OCCUPIED HOURS.

B. A CURRENT SWITCH SHALL BE LOCATED ACROSS THE EXHAUST FAN TO MONITOR ON/OFF STATUS. AN ALARM SHALL BE GENERATED IF FAN STATUS IS LOST DURING OCCUPIED HOURS.

IT ROOM CONTROL :

A. FIVE IT ROOMS ARE EQUIPPED WITH A COOLING ONLY DUCTLESS SPLIT SYSTEM FOR PRIMARY COOLING AND A COOLING ONLY VAV BOX FOR BACK-UP.

B. DUCTLESS SPLIT SYSTEMS SHALL OPERATE CONTINUOUSLY UNDER THEIR STAND-ALONE CONTROLS.

C. THE THERMOSTAT FOR THE DUCTLESS SPLIT SYSTEM SHALL BE SET AT 72°F. UNDER NORMAL CONDITIONS, THE DUCTLESS SPLIT SYSTEM SHALL MAINTAIN SPACE TEMPERATURE, AND THE VAV BOX SHALL REMAIN FULLY CLOSED.

D. THE EMCS SHALL MONITOR SPACE TEMPERATURE. IF THE SPACE TEMPERATURE EXCEEDS 77°F, AN ALARM SHALL BE GENERATED, AND THE VAV BOX SHALL OPEN TO MAINTAIN A SPACE TEMPERATURE SETPOINT OF 70°F (ADJ).

E. IF THE VAV BOX'S RESPECTIVE A/C UNIT IS NOT IN OCCUPIED, NIGHT SETUP, OR COOL-DOWN MODE WHEN THE ALARM IS GENERATED, THE VAV BOX'S RESPECTIVE A/C UNIT SHALL BE SWITCHED TO NIGHT SETUP MODE UNTIL OCCUPIED TIME OR THE IT ROOM TEMPERATURE FALLS BELOW 72°F.

F. THE BACK-UP VAV BOX SHALL CONTINUE TO DELIVER AIR TO THE IT ROOM UNTIL THE SPACE TEMPERATURE FALLS BELOW 72°F. AT THAT TIME, THE VAV BOX SHALL CLOSE FULLY, AND THE VAV BOX'S RESPECTIVE A/C UNIT SHALL RESUME NORMAL OPERATION.

ELECTRICAL ROOM EXHAUST FAN CONTROL :

A. SPACE TEMPERATURE SENSORS SHALL BE PROVIDED TO MONITOR SPACE TEMPERATURES.

B. ON A RISE IN TEMPERATURE ABOVE THE SET POINT THE EXHAUST FAN SHALL ENERGIZE. ON A FALL IN TEMPERATURE BELOW 2°F (ADJ) LESS THAN THE SET POINT, THE EXHAUST FAN SHALL DE-ENERGIZE.

EMCS POINTS LIST

	HARDWARE: OUTPUT DGTL.	HARDWARE: OUTPUT ANALOG	HARDWARE: INPUT DIGITAL	HARDWARE: INPUT ANALOG	SOFTWARE: ALARMS DGTL.	SOFTWARE: ALARMS ANALOG	REMARKS
	EMCS INTERFACE CONTROL RELAY; OCCUPIED / UNOCCUPIED EMCS INTERFACE	POSITION ADJUSTMENT	EMCS INTERFACE MORNING WARM-UP MODE DIFFERENTIAL PRESSURE CURRENT SWITCH	EMCS INTERFACE TEMPERATURE °F % RELATIVE HUMIDITY STATIC PRESSURE (IN. W.C.) POSITION FLOW	CONTACT CLOSURE EMCS INTERFACE	HIGH LIMITS LOW LIMITS EMCS INTERFACE	
A/C UNIT	●	●	●	●	●	●	
VAV BOXES							SEE FLOOR PLANS FOR QUANTITY
CFM				●			
SPACE				●			
DAMPER		●		●			
SUPPLY AIR				●			
ELECTRIC HEATER		●					PROPORTIONAL ELECT. HEAT
EXHAUST FAN							SEE FLOOR PLANS FOR QUANTITY
SCHEDULED	●			●			
GENERAL							
O/A				●			

NOTE:
A/C UNITS SHALL BE COMPLETE W/ BACNET/IP COMMUNICATION CARD FOR EMCS INTERFACE. SEE A/C UNIT SCHEDULE FOR LIST OF SOFTWARE POINTS TO BE PASSED BETWEEN A/C UNITS AND EMCS.

CONTROLS LEGEND

EMCS - ENERGY MONITORING & CONTROL SYSTEM
LCI - LOCAL CONTROL INTERLOCK
LLC - LOCAL LOOP CONTROL
SA - SUPPLY AIR
RA - RETURN AIR
OA - OUTSIDE AIR
(S) - SPACE TEMPERATURE SENSOR
(T) - THERMOSTAT
(SD) - SMOKE DETECTOR
[M] - ELECT. DMP. or VLV. OPERATOR
[EI] - EMCS INTERFACE (BACNET/IP)
[P] - DUCT STATIC PRESSURE SENSOR
[BP] - BUILDING STATIC PRESSURE SENSOR
[HP] - HIGH DUCT STATIC PRESSURE SWITCH
[DP] - DIFFERENTIAL PRESSURE SWITCH
[C] - CURRENT SWITCH
[OC] - OCCUPIED / UNOCCUPIED
[BD] - BAROMETRIC DAMPER
[S] - START / STOP INTERFACE
[T] - TEMPERATURE SENSOR
[STR] - MOTOR STARTER
[UCP] - UNIT CONTROL PANEL
[A] - ALARM
[O] - ON/OFF INDICATION
[CR] - CONTROL RELAY
[PU] - PULSE SIGNAL
[F] - FLOW SWITCH
[FI] - FLOW SENSOR
[VFD] - VARIABLE FREQUENCY DRIVE
[PO] - POSITION INDICATION AND ADJUSTMENT

CONTROLS NOTES

1. IT IS POSSIBLE THAT THE BUILDING STATIC PRESSURE SENSORS MAY NEED TO BE RELOCATED DURING COMMISSIONING. CONTROLS CONTRACTORS BID SHALL INCLUDE TIME AND MATERIALS TO RELOCATE ALL BUILDING STATIC PRESSURES SENSORS ONE TIME AFTER CEILINGS HAVE BEEN INSTALLED.

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Pascua Yaqui Tribe
Health Services Center II
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mechanical controls

m6.2

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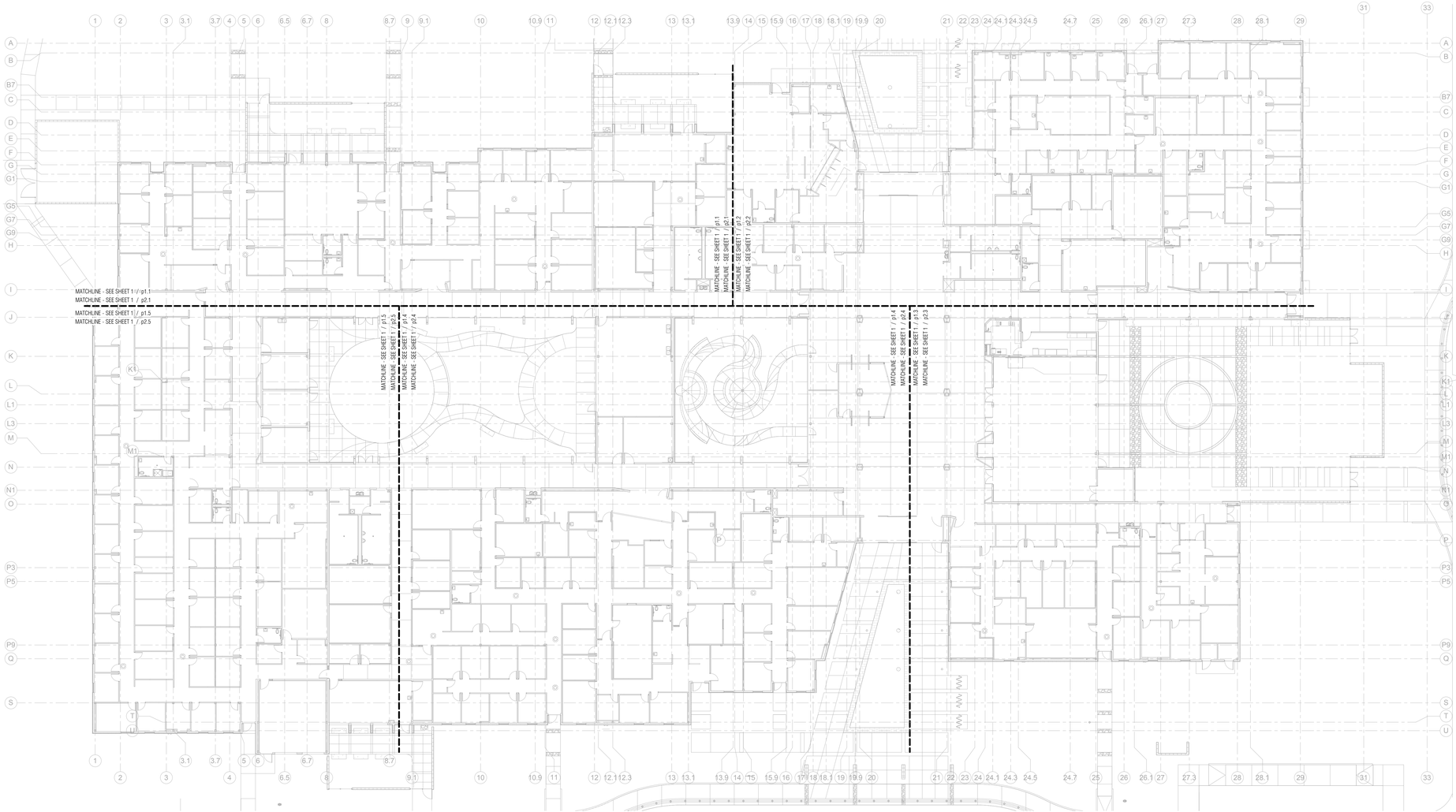
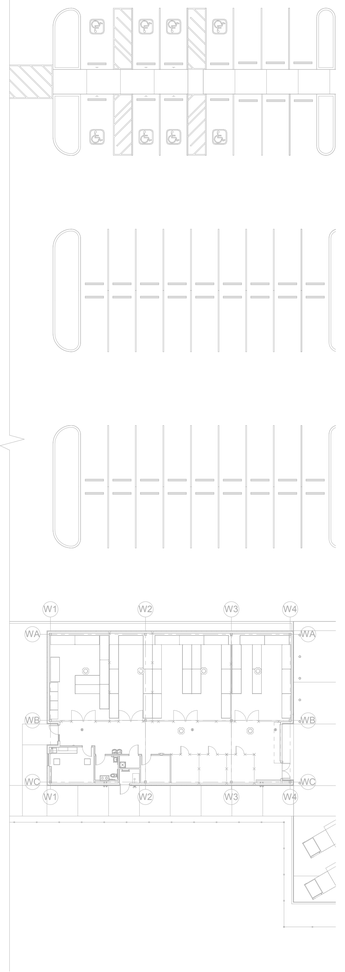


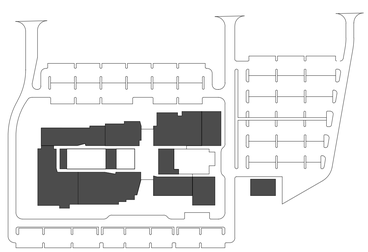
1 p1.0 plumbing floor plan - overall
1" = 20'-0"



north

PLUMBING LEGEND

SYMBOL	ABBREVIATION	ITEM
	CW	COLD WATER
	FCW	FILTERED COLD WATER
	HW	HOT WATER
	HWR	HOT WATER RETURN
	W	WASTE PIPING
	GW	GREASE WASTE PIPING
	V	VENT PIPING
	G	GAS
	MPG	MEDIUM PRESS. GAS
	FP	FIRE PROTECTION LINE
	D	DRAIN LINE
	RWL	RAINWATER LEADER
	ORWL	OVERFLOW RAINWATER LEADER
	VTR	VENT THRU ROOF
	HB	HOSE BIBB
	SOV.	SHUT-OFF VALVE (-TURN BALL VALVE)
		UNION
		CHECK VALVE
		CIRCUIT SETTER
	AP.	ACCESS PANEL
	UG.	UNDERGROUND
	OH.	OVERHEAD
	DN	DOWN
	ABV.	ABOVE
	BLW.	BELOW
	CONN.	CONNECT
	C.I.	CAST IRON
	CLG.	CEILING
	HDR	HEADER
	FCO	FLOOR CLEANOUT
	GCO	GRADE CLEANOUT
	WCO	WALL CLEANOUT
	PT	PRESS./TEMP. RELIEF



north **keyplan**
n.t.s.

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plumbing floor plan - overall

p1.0

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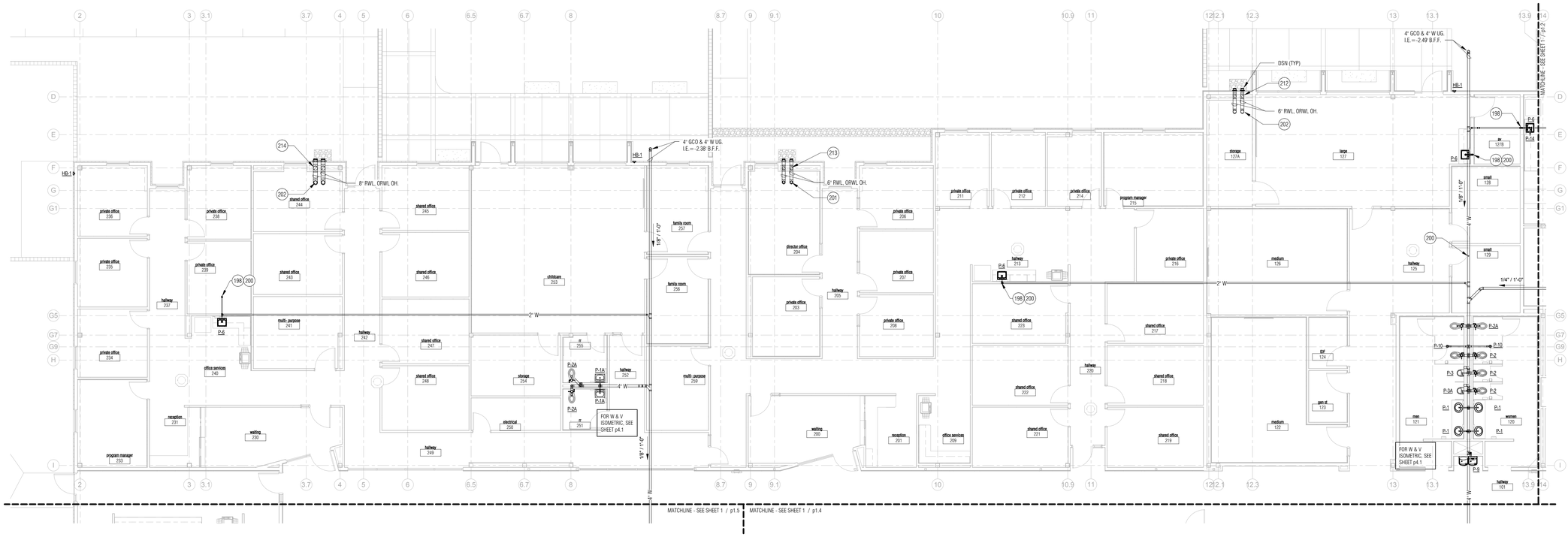

1 / p1.1 plumbing waste floor plan – Sewa U'usim

1/8" = 1'-0"

north

#	KEYNOTES:
198	2" W WITH WCO DN IN WALL TO UG. AND 2" V UP TO OH.
200	2" V UP THRU ROOF. TERMINATE W/ 2" VTR. FOR CONT. SEE for 2/p3.1
201	4" RWL, ORWL DN FROM RD & ORD TO OH.
202	6" RWL, ORWL DN FROM RD & ORD TO OH.
212	6" RWL, ORWL OH. & CN IN CHASE (9,726 SQ. FT.) TO DSN (12" A.F.F.)
213	6" RWL, ORWL OH. & CN IN CHASE (4,055 SQ. FT.) TO DSN (12" A.F.F.).
214	8" RWL, ORWL OH. & CN IN CHASE 11,695 SQ. FT.) TO DSN (12" A.F.F.)

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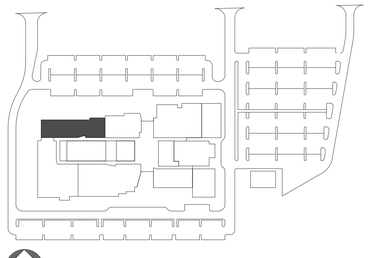
plumbing waste floor plan - Sewa U'usim

p1.1



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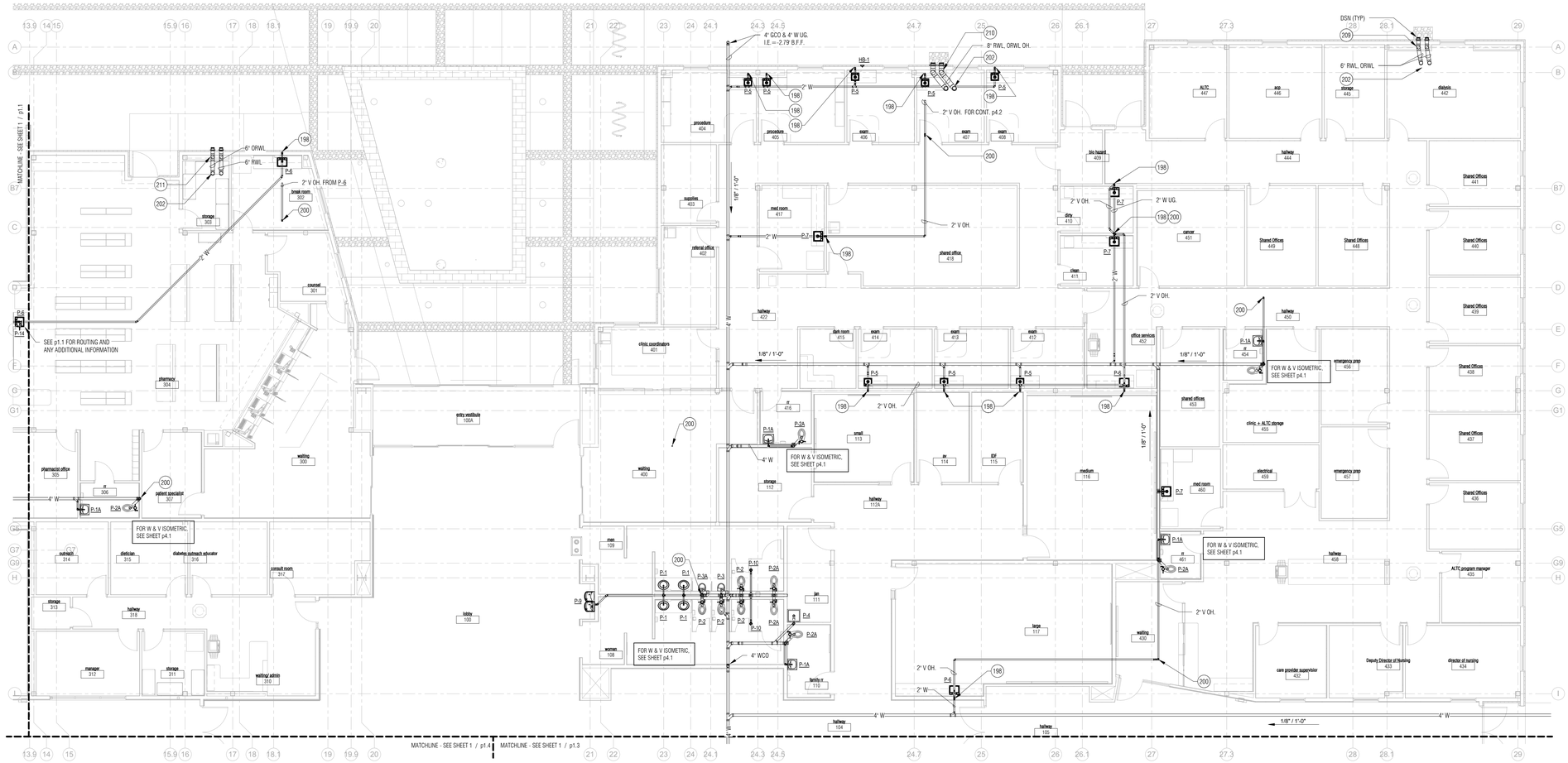
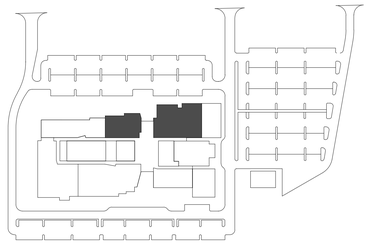


1 p1.2 plumbing waste floor plan – Nursing + Clinics

1/8" = 1'-0"



keyplan

n.t.s.

#	KEYNOTES:
198	2" W WITH WCO DN IN WALL TO UG. AND 2" V UP TO OH.
200	2" V UP THRU ROOF. TERMINATE W/ 2" VTR. FOR CONT. SEE for 2/p3.1
202	6" RWL, ORWL DN FROM RD & ORD TO OH.
209	6" RWL, ORWL OH. & DN IN CHASE (6,940 SQ. FT.) TO DSN (12" A.F.F.).
210	8" RWL, ORWL OH. & DN IN CHASE 10,897 SQ. FT.) TO DSN (12" A.F.F.).
211	6" RWL, ORWL OH. & DN IN CHASE (6,459 SQ. FT.) TO DSN (12" A.F.F.).

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Arizona U.S.A.
EXPIRES: 12-31-18

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Pascua Yaqui Tribe
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plumbing waste floor plan – Nursing + Clinics

p1.2

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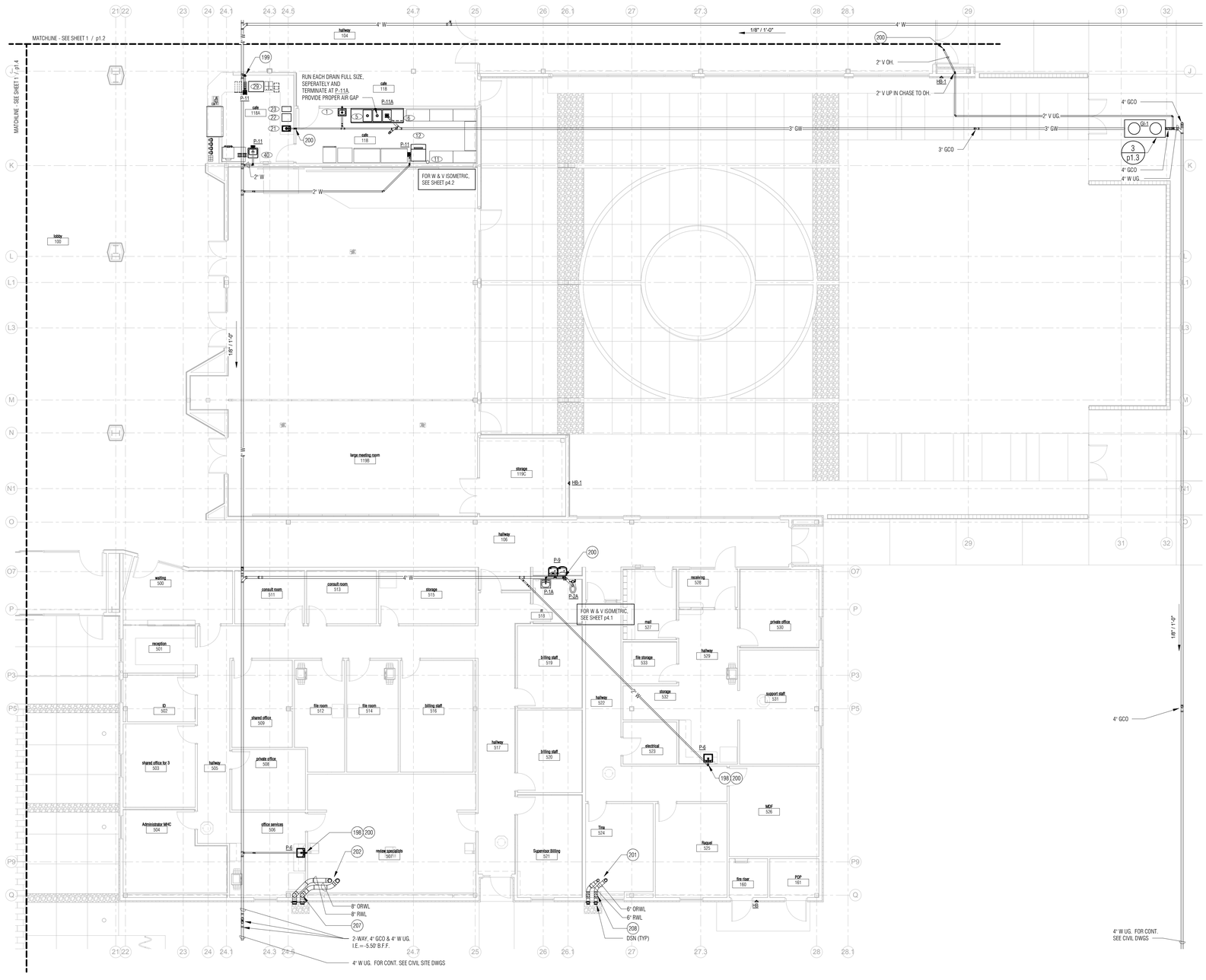
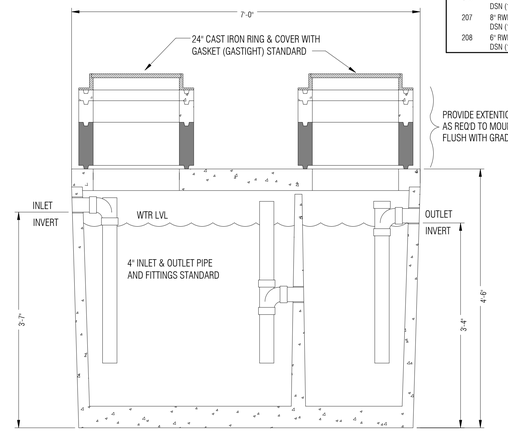


1 p1.3 plumbing waste floor plan – Health Budget + Managed Health / Billing

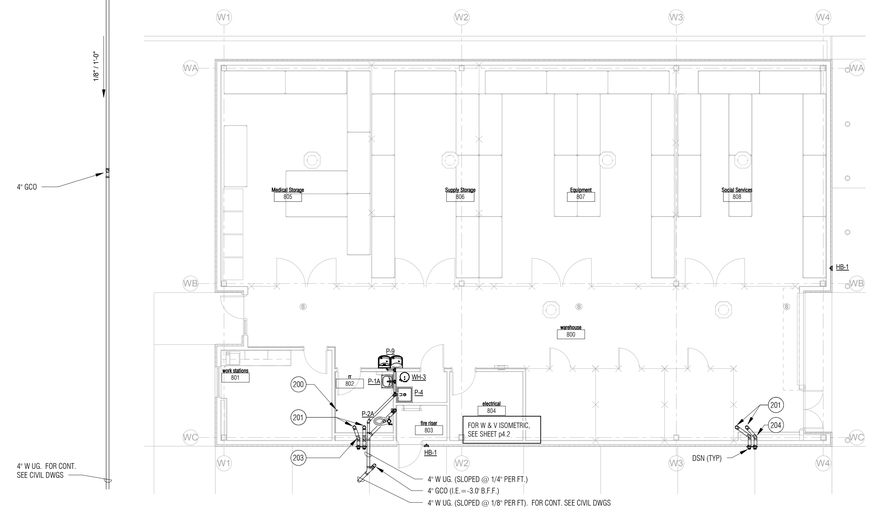
1/8" = 1'-0"

#	KEYNOTES:
198	2" W WITH WCO DN IN WALL TO UG. AND 2" V UP TO OH.
199	2" V IN WALL. TERMINATE WITH AIR ADMITTANCE VALVE "STUDOR, "MINI-VENT" OR EQUIVALENT, AS HIGH AS POSSIBLE BELOW COUNTER, WITH RECESSED BOX & GRILL FOR IN WALL INSTALLATION. INSTALL PER MANUF. RECOMMENDATIONS AND IN ACCORDANCE WITH LOCAL AUTHORITIES
200	2" V UP THRU ROOF. TERMINATE W/ 2" VTR. FOR CONT. SEE tor 2/p3.1
201	4" RWL, ORWL DN FROM RD & ORD TO OH.
202	6" RWL, ORWL DN FROM RD & ORD TO OH.
203	4" RWL, ORWL OH. & DN IN CHASE (2,315 SQ. FT.) TO DSN (12" A.F.F.).
204	4" RWL, ORWL OH. & DN IN CHASE (1,955 SQ. FT.) TO DSN (12" A.F.F.).
207	8" RWL, ORWL OH. & DN IN CHASE (12,400 SQ. FT.) TO DSN (12" A.F.F.).
208	6" RWL, ORWL OH. & DN IN CHASE (5,202 SQ. FT.) TO DSN (12" A.F.F.).



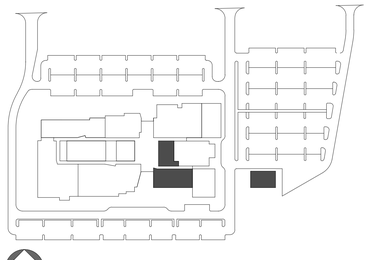
3 P1.3 GRAVITY GREASE INTERCEPTOR - 320 GAL.

SCALE: NTS



2 p1.3 plumbing waste floor plan – Warehouse

1/8" = 1'-0"



keyplan

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plumbing waste floor plan – Health Budget + Managed Health / Billing + Warehouse

p1.3

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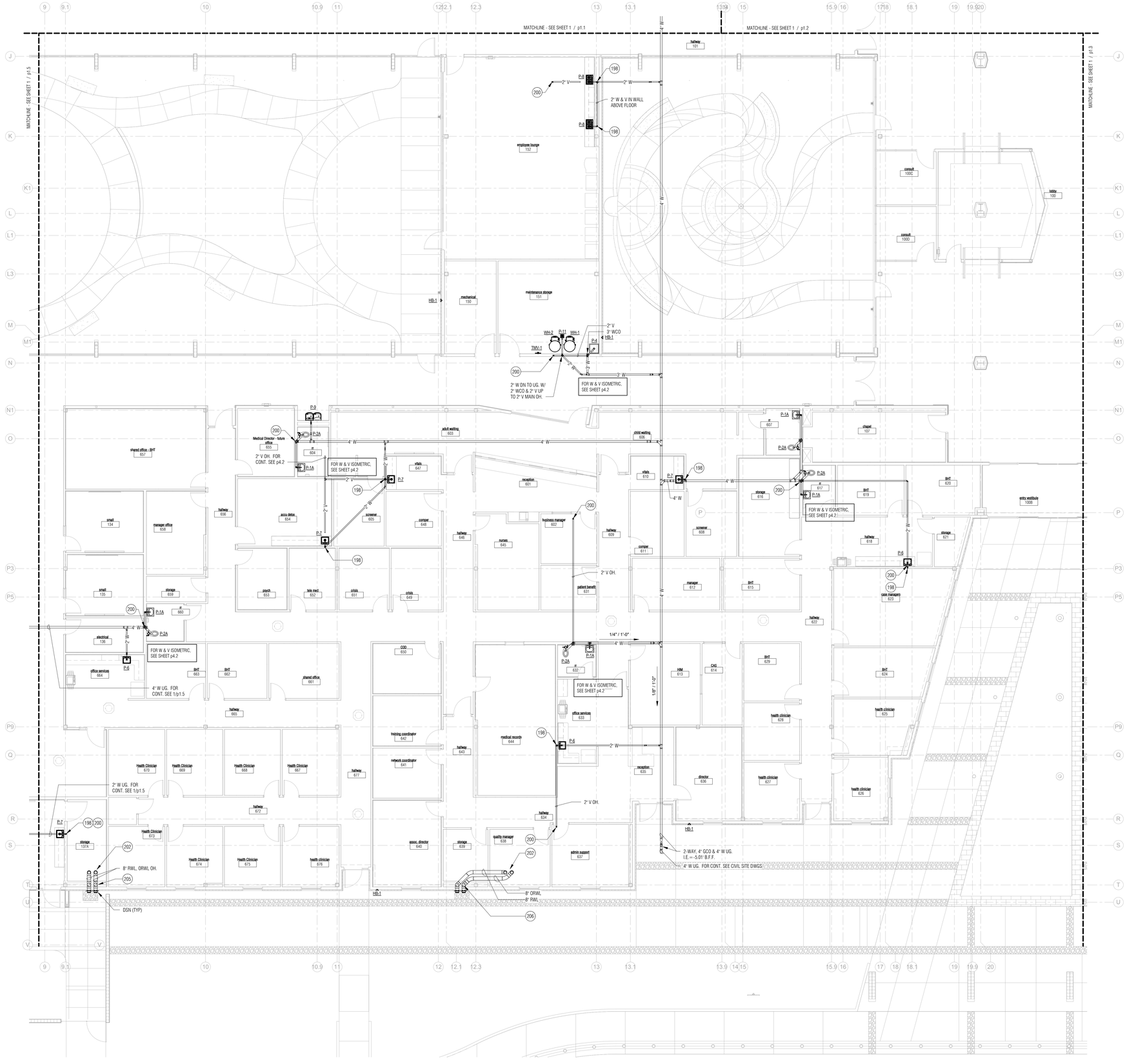
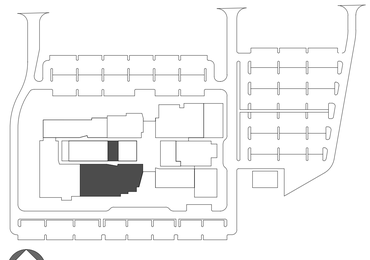


1 p1.4 plumbing waste floor plan – Center Spirit
1/8" = 1'-0"

north



north keyplan
n.t.s.

#	KEYNOTES:
198	2" W WITH WCO DN IN WALL TO UG. AND 2" V UP TO OH.
200	2" V UP THRU ROOF. TERMINATE W/ 2" VTR. FOR CONT. SEE 1/p3.1
202	6" RWL, ORWL DN FROM RD & ORD TO OH.
205	6" RWL, ORWL OH. & DN IN CHASE (10,417 SQ. FT.) TO DSN (12" A.F.F.).
206	8" RWL, ORWL OH. & DN IN CHASE (11,518 SQ. FT.) TO DSN (12" A.F.F.).

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plumbing waste floor plan – Center Spirit

p1.4

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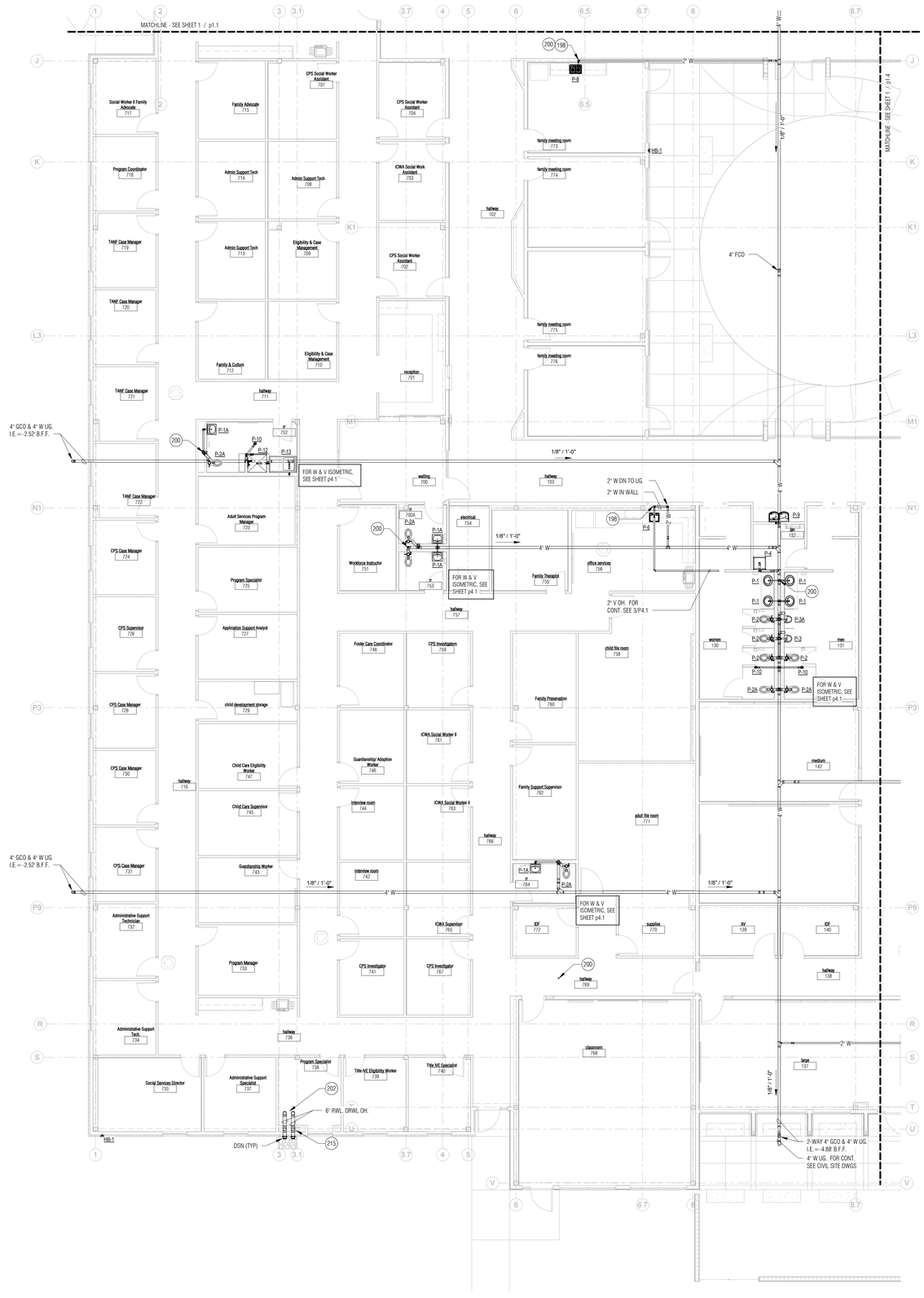

1 / p1.5 plumbing waste floor plan – Social Services

1/8" = 1'-0"

north

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#	KEYNOTES:
198	2" W WITH WCO DN IN WALL TO UG. AND 2" V UP TO OH.
200	2" V UP THRU ROOF. TERMINATE W/ 2" VTR. FOR CONT. SEE for 2/p3.1
202	6" RWL, ORWL DN FROM RD & ORD TO OH.
215	6" RWL, ORWL OH. & DN IN CHASE (8,582 SQ. FT.) TO DSN (12" A.F.F.).

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Health Services Center II
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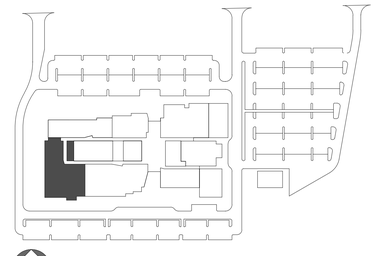
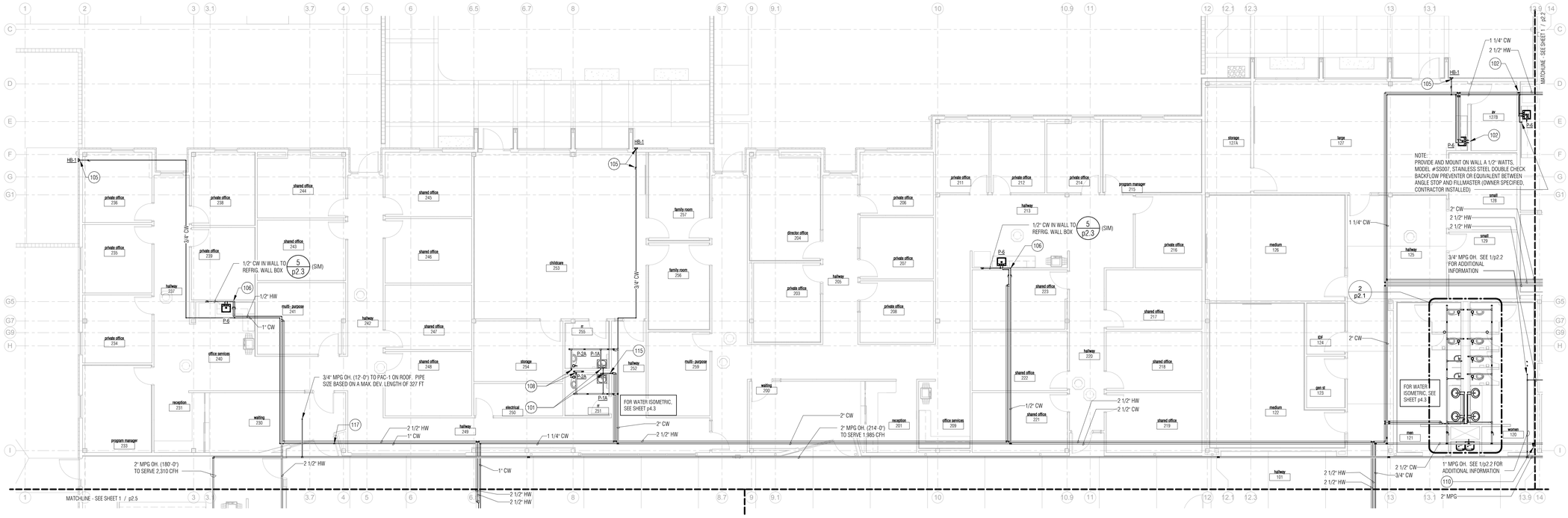
Tucson, AZ 85746

plumbing waste floor plan – Social Services

p1.5



north **keyplan**
n.t.s.

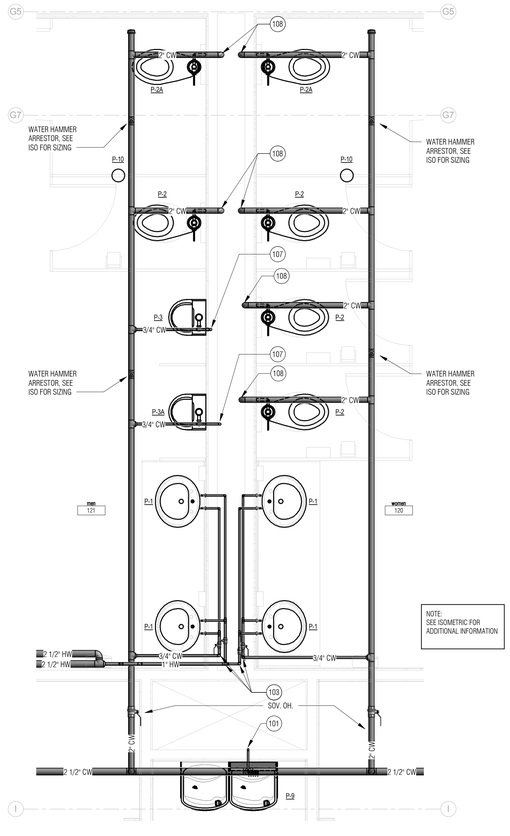


1 p2.1 plumbing water floor plan - Sewa U'usim

1/8" = 1'-0"

north

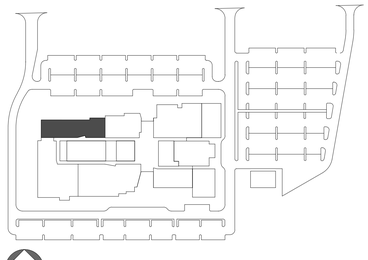
#	KEYNOTES:
101	1/2" CW OH. & DN IN WALL/CHASE TO FIXTURE.
102	1/2" CW, HW OH. & DN TO FIXTURE.
103	3/4" CW, HW OH. & DN TO FIXTURES.
105	3/4" CW OH. W/ SOV. & DN TO FIXTURE.
106	1/2" CW, HW OH. & DN TO FIXTURE. EXTEND 1/2" CW IN WALL TO REFRIGERATOR WALL BOX. PROVIDE SOV. & UNION ON CW LINE, BEHIND 12x12 A.P.
107	3/4" CW OH. & DN IN WALL/CHASE TO FIXTURE(S).
108	2" CW OH. & DN IN WALL/CHASE TO FIXTURE.
110	3/4" CW OH. & UP TO ROOF. PROVIDE SOV. AS SHOWN. PUT IN HORIZONTAL AS REQUIRED. FOR CONT. SEE p3.1.
115	3/4" HW OH. & DN IN WALL TO FIXTURES.
117	3/4" CW OH. & UP TO ROOF. PROVIDE SOV. IN HORIZONTAL. FOR CONT. SEE p3.1.



2 p2.1 enlarged plumbing water floor plan - Sewa U'usim - room 120-121

1/2" = 1'-0"

north



north **keyplan**

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REGISTERED PROFESSIONAL ENGINEER 45700 DAVID C. TYRRELL MECHANICAL 11/18/18 ARIZONA U.S.A.

EXPIRES: 12-31-18

job **1717**

date **11.16.18**

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

plumbing water & gas floor plan - Sewa U'usim

p2.1

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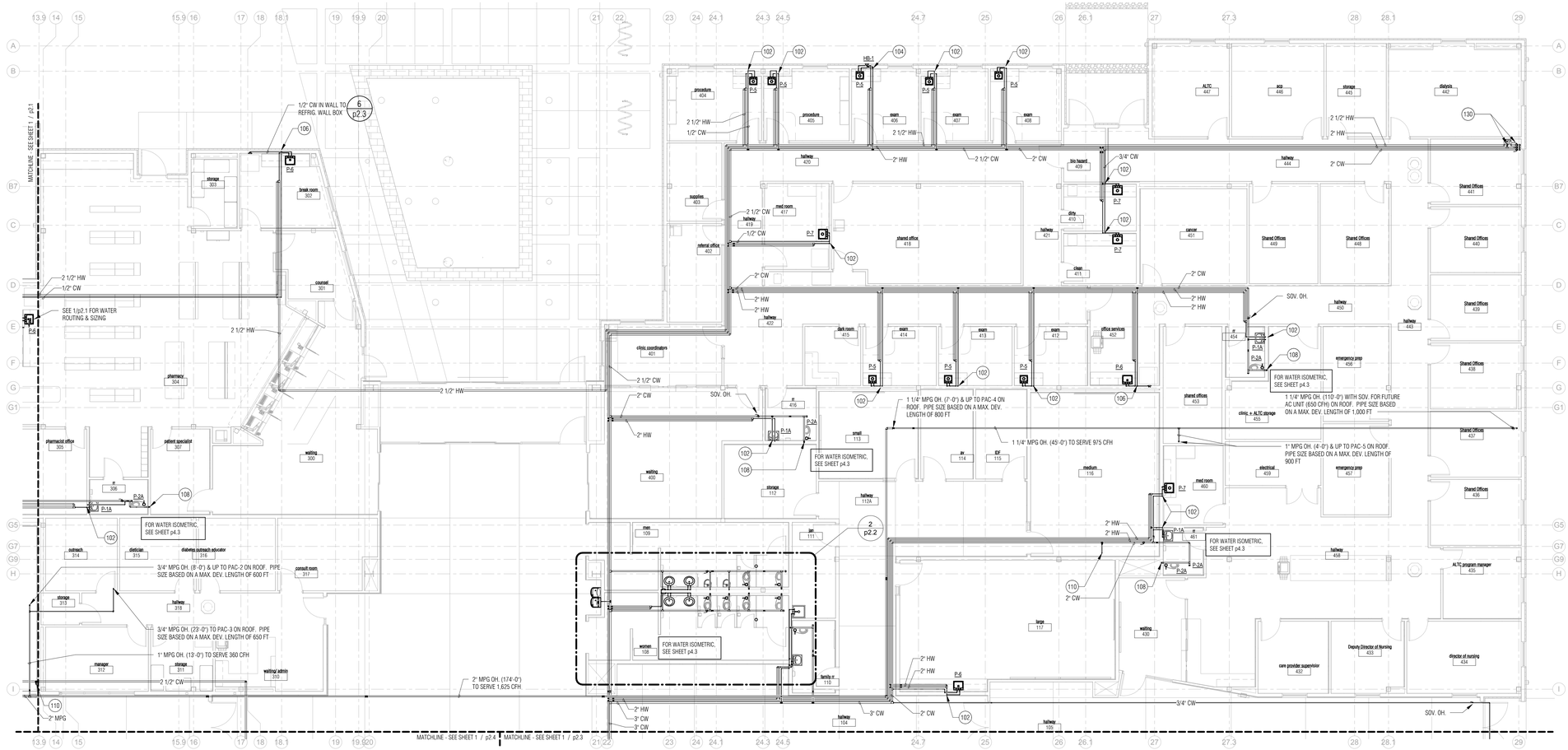
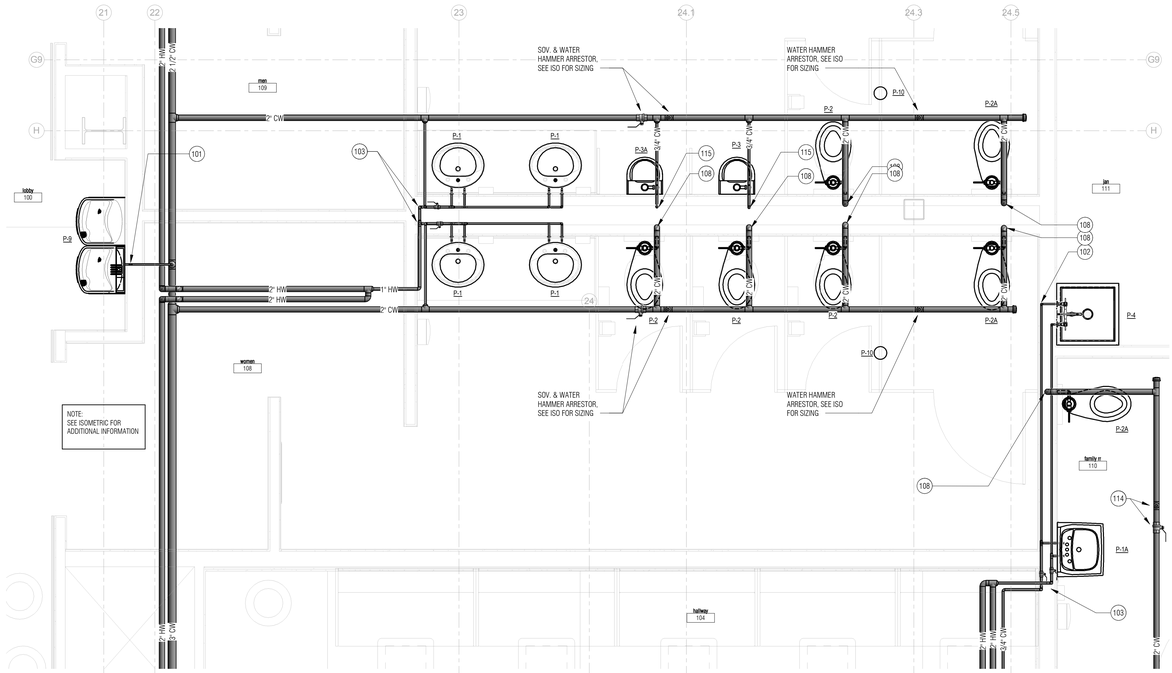


1 p2.2 plumbing water floor plan - Nursing + Clinics

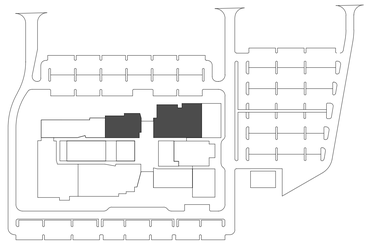
1/8" = 1'-0"



2 p2.2 enlarged plumbing water floor plan - Nursing + Clinics - room 108-111

1/2" = 1'-0"

#	KEYNOTES:
101	1/2" CW OH. & DN IN WALL/CHASE TO FIXTURE.
102	1/2" CW, HW OH. & DN TO FIXTURE.
103	3/4" CW, HW OH. & DN TO FIXTURES.
104	3/4" CW & 1/2" HW OH. & DN TO FIXTURES.
106	1/2" CW, HW OH. & DN TO FIXTURE. EXTEND 1/2" CW IN WALL TO REFRIGERATOR WALL BOX. PROVIDE SOV. & UNION ON CW LINE. BEHIND 12x12 A.P.
108	2" CW OH. & DN IN WALL/CHASE TO FIXTURE.
110	3/4" CW OH. & UP TO ROOF. PROVIDE SOV. AS SHOWN. PUT IN HORIZONTAL AS REQUIRED. FOR CONT. SEE p3.1.
114	SOV. & WATER HAMMER ARRESTOR OH. SEE ISOMETRIC FOR PDI RATING AND ADDITIONAL INFORMATION.
115	3/4" HW OH. & DN IN WALL TO FIXTURES.
130	2" CW, 2 1/2" HW & 2" HW OH. WITH SOV.'S FOR FUTURE CONNECTION. PROVIDE SIGNAGE ABOVE CEILING INDICATING STUB-OUTS WITH SOV.'S TO REMAIN CLOSED AND THE BYPASS VALVE TO REMAIN OPEN



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Registered Professional Architect 45700 DAVID C. TYRRELL Arizona U.S.A.

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date **11.16.18**

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Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

plumbing water & gas floor plan – Nursing + Clinics

p2.2

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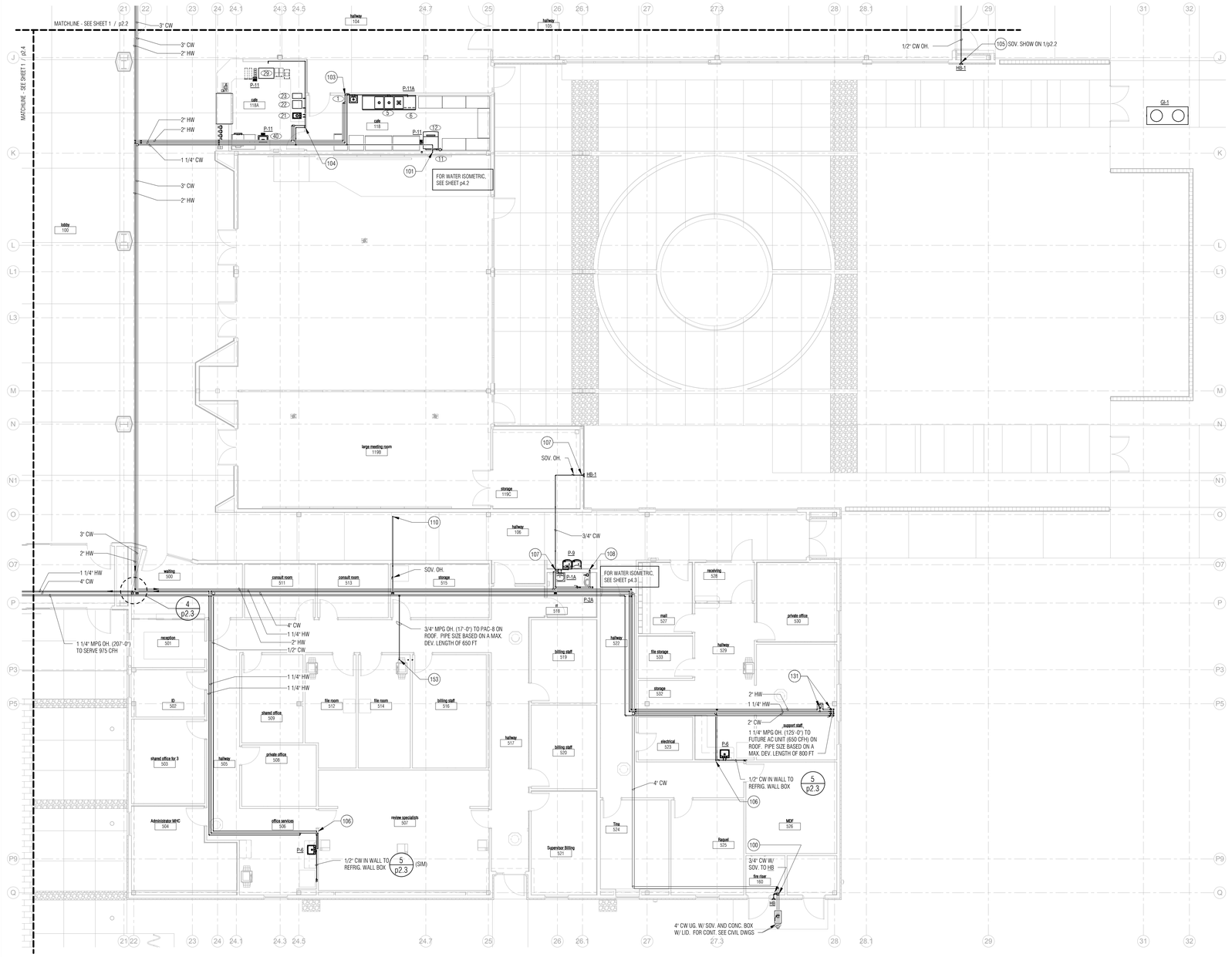
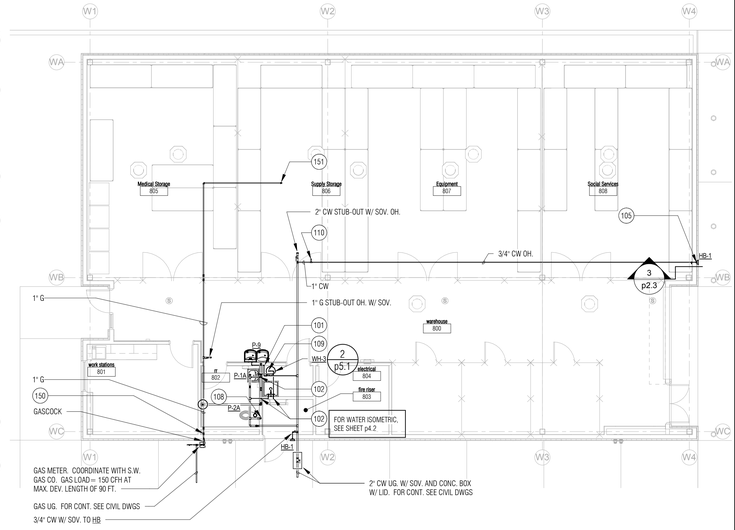
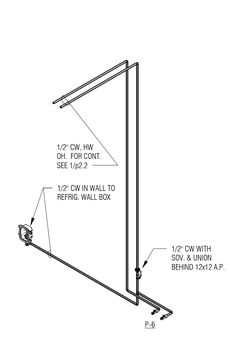
#	KEYNOTES:
100	4" CW UG. UP IN WALL TO OH.
101	1/2" CW OH. & DN IN WALL/CHASE TO FIXTURE.
102	1/2" CW, HW OH. & DN TO FIXTURE.
103	3/4" CW, HW OH. & DN TO FIXTURES.
104	3/4" CW & 1/2" HW OH. & DN TO FIXTURES.
105	3/4" CW OH. W/ SOV. & DN TO FIXTURE.
106	1/2" CW, HW OH. & DN TO FIXTURE. EXTEND 1/2" CW IN WALL TO REFRIGERATOR WALL BOX. PROVIDE SOV. & UNION ON CW LINE, BEHIND 12x12 A.P.
107	3/4" CW OH. & DN IN WALL/CHASE TO FIXTURE(S).
108	2" CW OH. & DN IN WALL/CHASE TO FIXTURE.
109	3/4" CW, HW OH. & DN TO WH-3.
110	3/4" CW OH. & UP TO ROOF. PROVIDE SOV. AS SHOWN. PUT IN HORIZONTAL AS REQUIRED. FOR CONT. SEE p3.1.
131	2" CW, 2" HW & 1 1/4" HW OH. WITH SOV.'S FOR FUTURE CONNECTION. PROVIDE SIGNAGE ABOVE CEILING INDICATING STUB-OUTS WITH SOV.'S TO REMAIN CLOSED AND THE BYPASS VALVE TO REMAIN OPEN
150	1" G UP IN CHASE TO OH.
151	1" G OH. & UP TO ROOF. FOR CONT. SEE 2/p3.1.
153	3/4" MPG OH. & UP TO ROOF TOP UNIT. FOR CONT. SEE 1/p3.1.



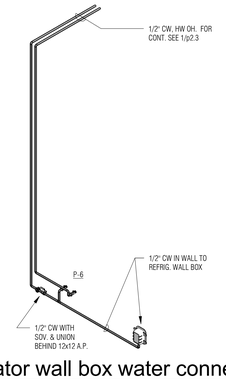
1 p2.3 plumbing water floor plan - Health Budget + Managed Health / Billing
1/8" = 1'-0"



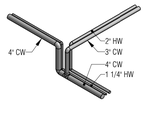
2 p2.3 plumbing water floor plan - Warehouse
1/8" = 1'-0"



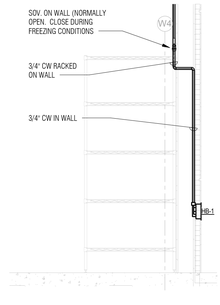
6 p2.3 additional refrigerator wall box water connection



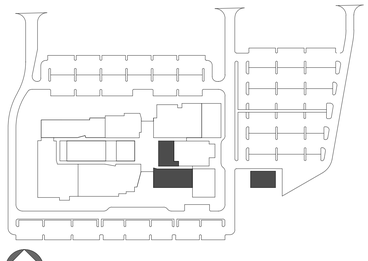
5 p2.3 refrigerator wall box water connection



4 p2.3 plumbing oh. pipe routing



3 p2.3 plumbing section
1/2" = 1'-0"



north keyplan
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Pascua Yaqui Tribe
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plumbing water & gas floor plan – Health Budget + Managed Health / Billing + Warehouse

p2.3

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1 p2.4 plumbing water floor plan - Center Spirit

1/8" = 1'-0"

#	KEYNOTES:
101	1/2" CW OH. & DN IN WALL/CHASE TO FIXTURE.
102	1/2" CW, HW OH. & DN TO FIXTURE.
103	3/4" CW, HW OH. & DN TO FIXTURES.
105	3/4" CW OH. W/ SOV. & DN TO FIXTURE.
106	1/2" CW, HW OH. & DN TO FIXTURE. EXTEND 1/2" CW IN WALL TO REFRIGERATOR WALL BOX. PROVIDE SOV. & UNION ON CW LINE. BEHIND 12x12 A.P.
108	2" CW OH. & DN IN WALL/CHASE TO FIXTURE.
110	3/4" CW OH. & UP TO ROOF. PROVIDE SOV. AS SHOWN. PUT IN HORIZONTAL AS REQUIRED. FOR CONT. SEE p3.1.
112	1/2" CW OH. & DN IN WALL TO REFRIGERATOR WALL BOX(ES).
114	SOV. & WATER HAMMER ARRESTOR OH. SEE ISOMETRIC FOR PDI RATING AND ADDITIONAL INFORMATION.
116	2 1/2" CW, HW & 3/4" HWR OH. & DN IN WALL TO WH-1, WH-2 & TMV-1.
149	3/4" MPG OH. & DN IN WALL TO WH-1 & WH-2.
158	FULL SIZE VENT (FROM REGULATOR) UP IN WALL TO ROOF. FOR CONT. SEE 1/p3.1.

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DAVID C. TYRRELL
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EXPIRES: 12-31-18

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11.16.18

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plumbing water & gas floor plan – Center Spirit

p2.4

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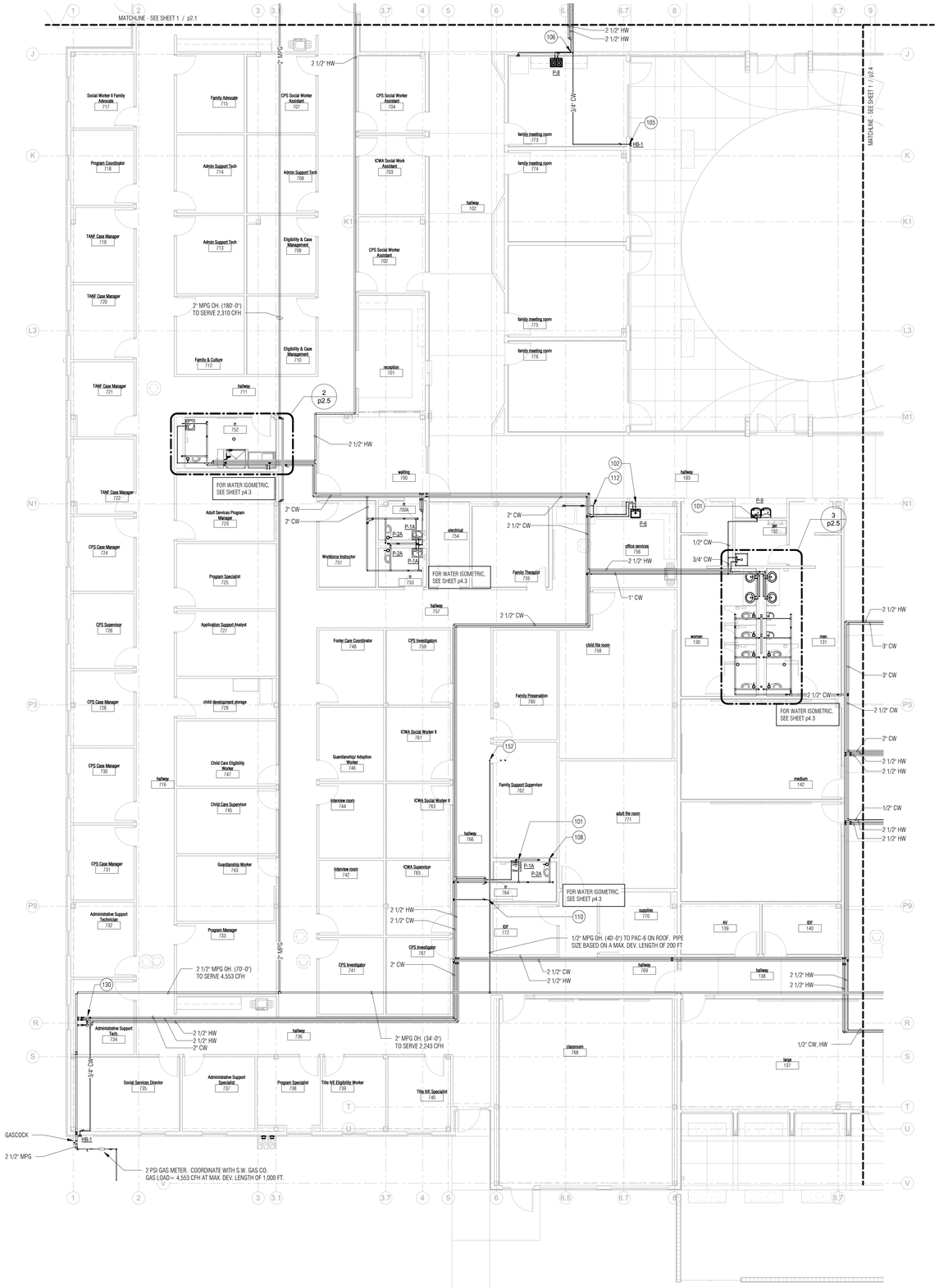
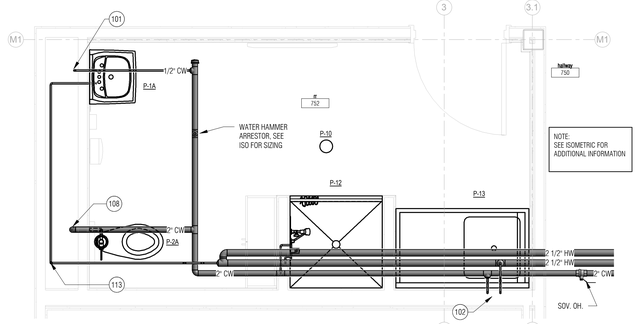


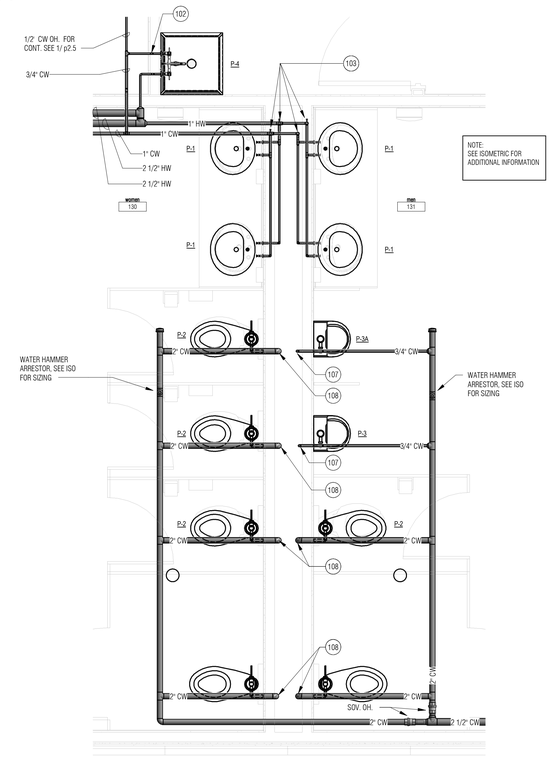
1 p2.5 plumbing water floor plan - Social Services

1/8" = 1'-0"



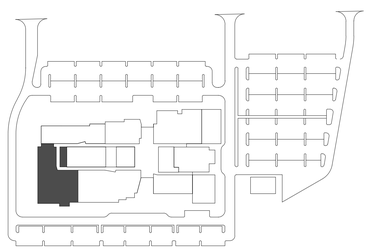
2 p2.5 enlarged plumbing water floor plan - Social Services - room 752

1/2" = 1'-0"



3 p2.5 enlarged plumbing water floor plan - Social Services - room 130-131

1/2" = 1'-0"



keyplan

n.t.s.

#	KEYNOTES:
101	1/2" CW OH. & DN IN WALL/CHASE TO FIXTURE.
102	1/2" CW, HW OH. & DN TO FIXTURE.
103	3/4" CW, HW OH. & DN TO FIXTURES.
105	3/4" CW OH. W/ SOV. & DN TO FIXTURE.
106	1/2" CW, HW OH. & DN TO FIXTURE. EXTEND 1/2" CW IN WALL TO REFRIGERATOR WALL BOX. PROVIDE SOV. & UNION ON CW LINE, BEHIND 13x12 A.P..
107	3/4" CW OH. & DN IN WALL/CHASE TO FIXTURE(S).
108	2" CW OH. & DN IN WALL/CHASE TO FIXTURE.
110	3/4" CW OH. & UP TO ROOF. PROVIDE SOV. AS SHOWN. PUT IN HORIZONTAL AS REQUIRED. FOR CONT. SEE p3.1.
112	1/2" CW OH. & DN IN WALL TO REFRIGERATOR WALL BOX(ES).
113	1/2" HW OH. & DN IN WALL TO P-1A.
130	2" CW, 2 1/2" HW & 2" HW OH. WITH SOV.'S FOR FUTURE CONNECTION. PROVIDE SIGNAGE ABOVE CEILING INDICATING STUB-OUTS WITH SOV.'S TO REMAIN CLOSED AND THE BYPASS VALVE TO REMAIN OPEN
152	1/2" MPG OH. & UP TO ROOF TOP UNIT. FOR CONT. SEE 1/p3.1.

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REGISTERED ARCHITECT 45700 DAVID C. TYRRELL ARIZONA U.S.A.

EXPIRES: 12-31-18

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Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

plumbing water & gas floor plan – Social Services

p2.5

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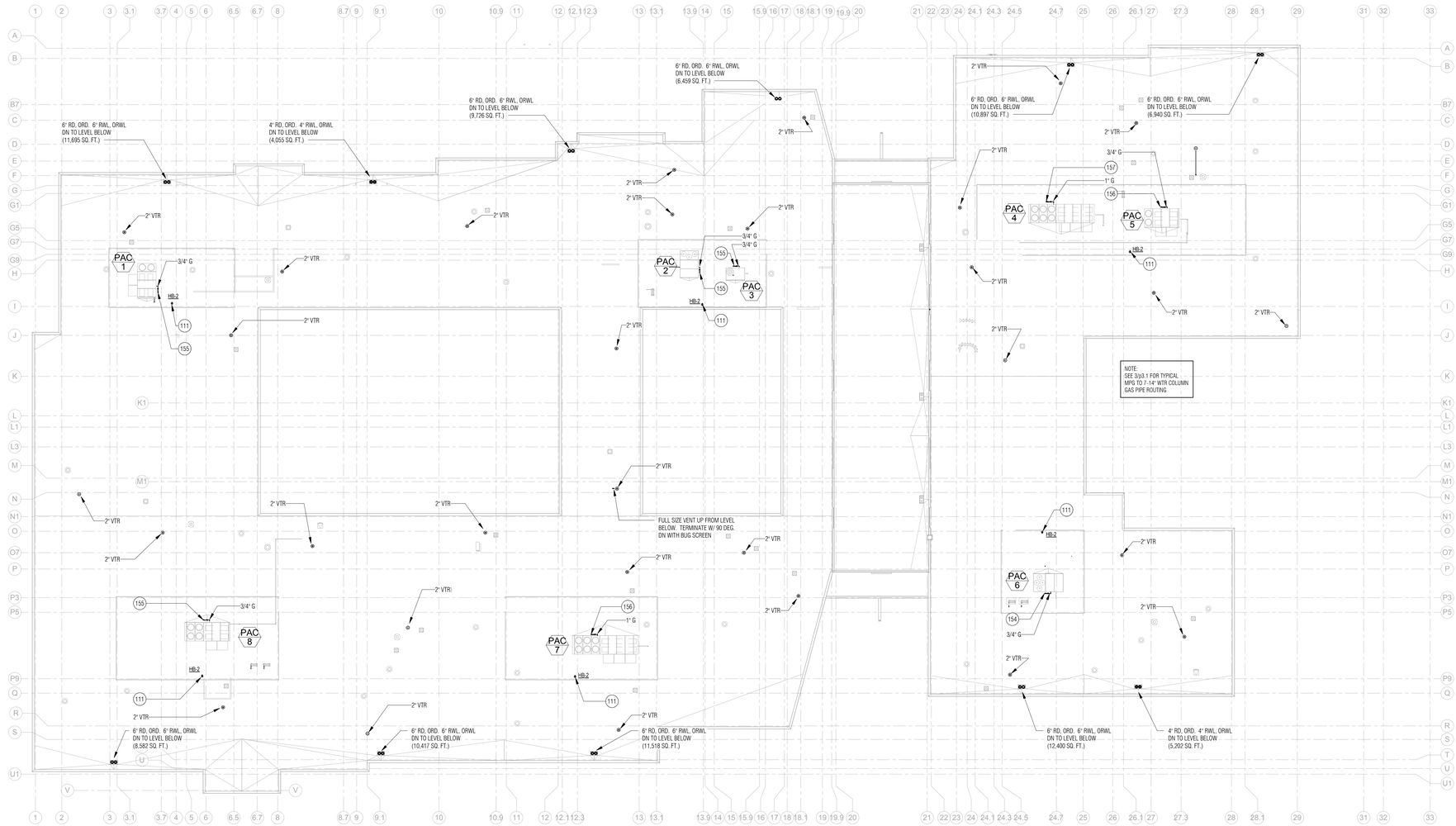
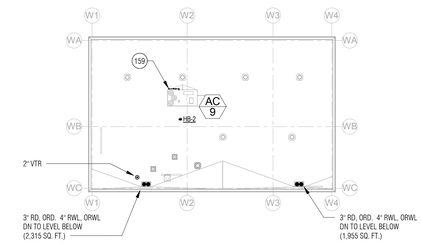
#	KEYNOTES:
111	3/4" CW UP FROM LEVEL BELOW. FOR CONT. SEE FLOOR PLANS.
155	3/4" MPG UP FROM LEVEL BELOW.
156	1" MPG UP FROM LEVEL BELOW.
157	1 1/4" MPG UP FROM LEVEL BELOW.
159	1" G UP FROM LEVEL BELOW. FOR CONT. SEE p2.3.



1 p3.1 **plumbing roof plan**
1" = 20'-0"

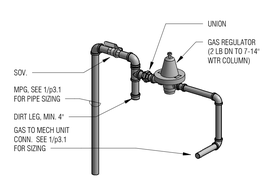


2 p3.1 **plumbing roof plan - warehouse**
1" = 20'-0"

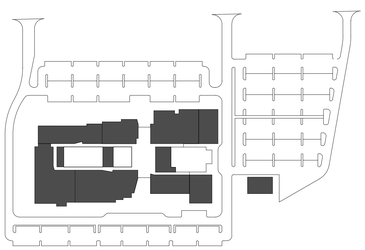
north

WAREHOUSE GAS SCHEDULE						
MARK	APPLIANCE	GAS CFH	MPG DEV. LENGTH	MPG PIPE SIZE	DEV. LENGTH	PIPE SIZE
AC-9	AIR CONDITIONING UNIT	150	N/A	N/A	83'	1"
	BUILDING CFH TOTAL	150				

MAIN BLD'G GAS SCHEDULE						
MARK	GAS UNIT	GAS CFH	MPG DEV. LENGTH	MPG PIPE SIZE	DEV. LENGTH	PIPE SIZE
WH-1	WATER HEATER	199	463'	3/4"	10'	3/4"
WH-2	WATER HEATER	199	463'	3/4"	10'	3/4"
PAC-1	AIR CONDITIONING UNIT	325	327'	3/4"	2'	3/4"
PAC-2	AIR CONDITIONING UNIT	180	603'	3/4"	2'	3/4"
PAC-3	AIR CONDITIONING UNIT	180	622'	3/4"	2'	3/4"
PAC-4	AIR CONDITIONING UNIT	650	810'	1-1/4"	2'	1"
PAC-5	AIR CONDITIONING UNIT	325	874'	1"	2'	3/4"
PAC-6	AIR CONDITIONING UNIT	220	185'	1/2"	2'	3/4"
PAC-7	AIR CONDITIONING UNIT	650	369'	1"	2'	1"
PAC-8	AIR CONDITIONING UNIT	325	640	3/4"	2'	3/4"
	FUTURE AC UNIT SOUTH EAST	650	777'	1-1/4"		
	FUTURE AC UNIT NORTH EAST	650	980'	1-1/4"		
	BUILDING CFH TOTAL	4553	2-1/2"			



3 p3.1 **mpg to gas conn. to mechanical unit (typ 8 pl)**



north **keyplan**
n.t.s.

job **1717**

date **11.16.18**

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Pascua Yaqui Tribe
Health Services Center II
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Tucson, AZ 85746

plumbing roof plan

p3.1

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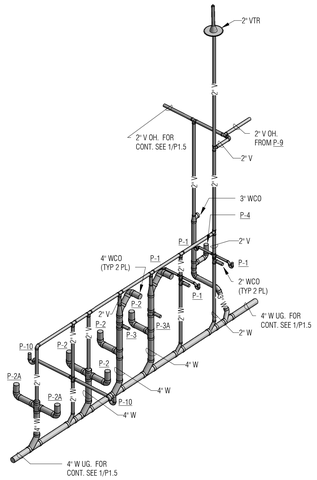
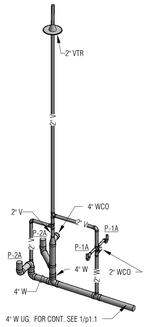
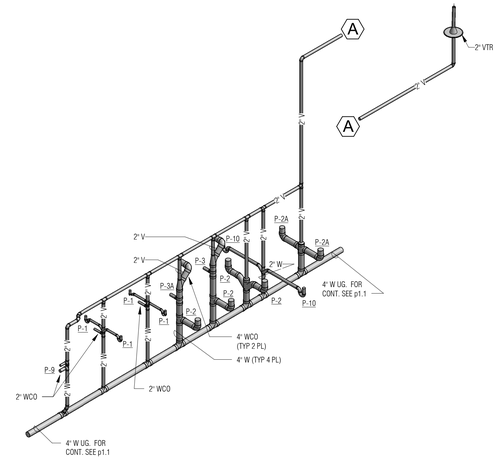


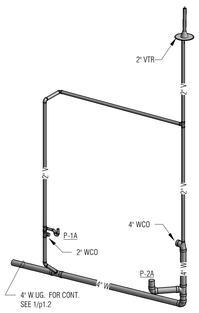
3 p4.1 w & v isometric - rooms 130 & 131
Social Services



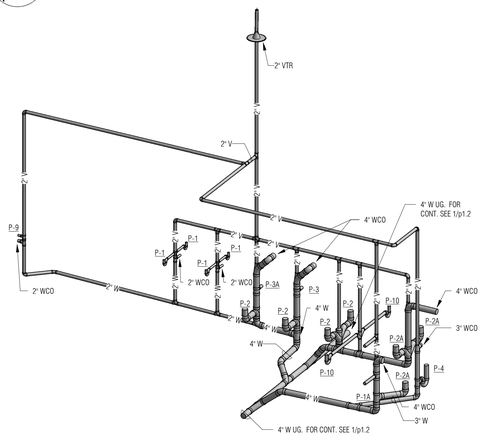
2 p4.1 w & v isometric - room 251 & 255
Sewa U'usim



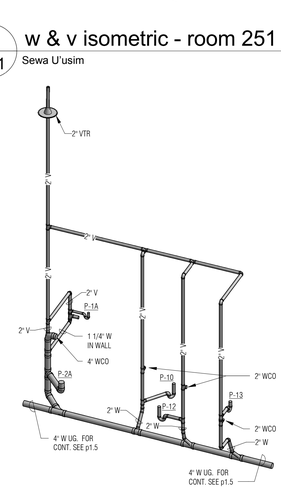
1 p4.1 w & v isometric -rooms 120 & 121
Sewa U'usim



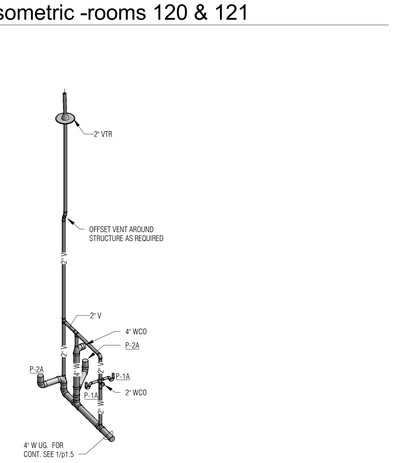
8 p4.1 w & v isometric - room 306
Nursing + Clinics



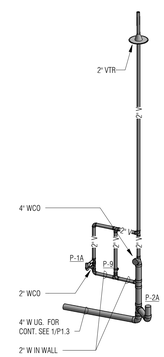
7 p4.1 w & v isometric - rooms 108-111
Nursing + Clinics



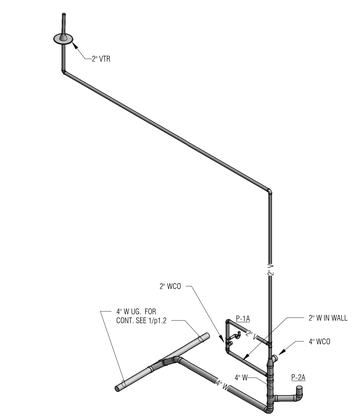
6 p4.1 w & v isometric - room 752
Social Services



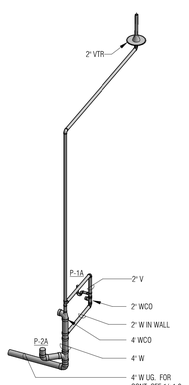
5 p4.1 w & v isometric - rooms 700A & 753
Social Services



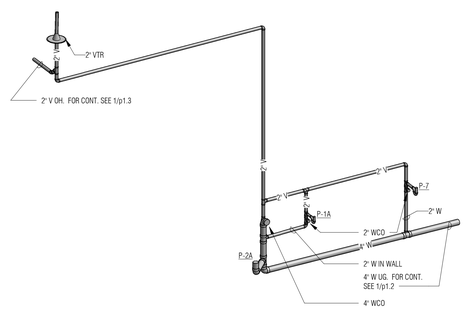
12 p4.1 w & v isometric - room 518
Health Budget + Managed Health / Billing



11 p4.1 w & v isometric - room 416
Nursing + Clinics



10 p4.1 w & v isometric - room 454
Nursing + Clinics



9 p4.1 w & v isometric - room 461
Nursing + Clinics

job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

plumbing w & v isometrics

p4.1

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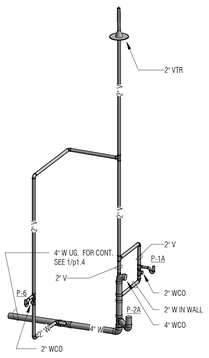
EXPIRES: 12-31-18

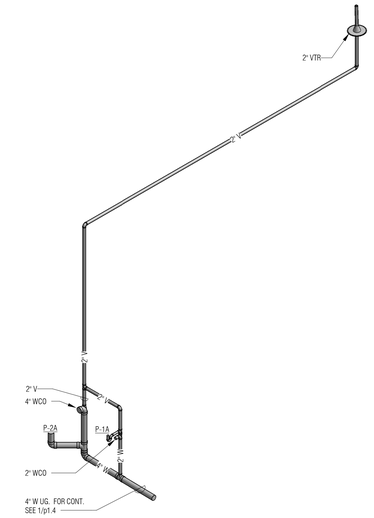
job
1717

date
11.16.18

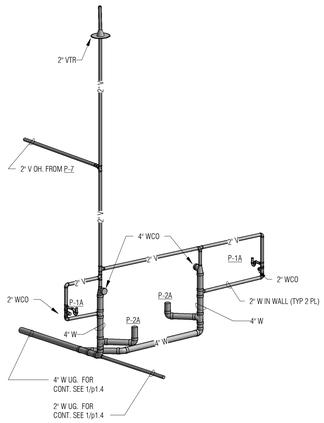
revisions



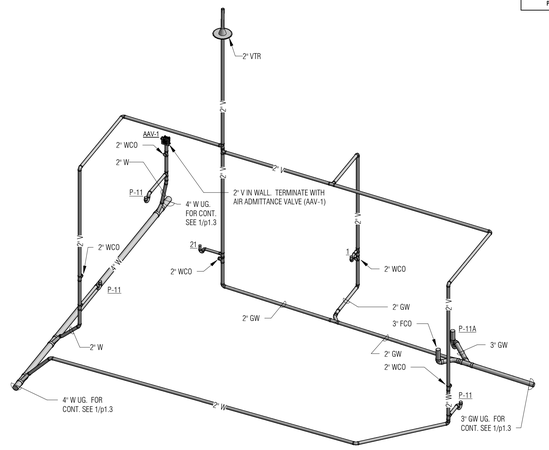
4 / p4.2 w & v isometric - room 660
Center Spirit



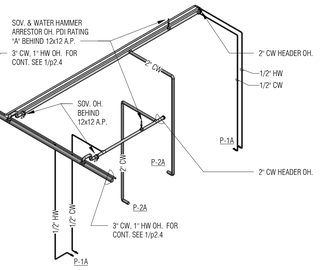
3 / p4.2 w & v isometric - room 632
Center Spirit



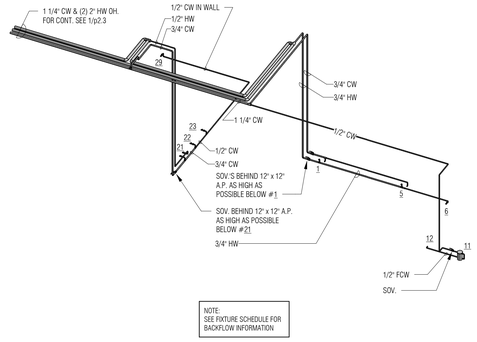
2 / p4.2 w & v isometric - room 607 & 617
Center Spirit



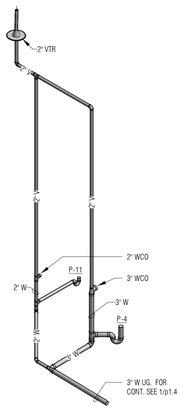
1 / p4.2 w & v isometric - room 118 & 118A
Health Budget + Managed Health / Billing



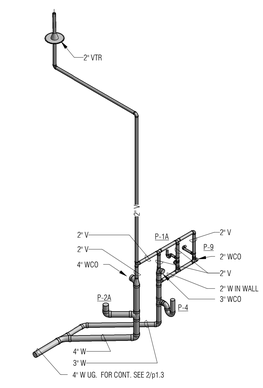
8 / p4.2 water isometric - room 607 & 617
Center Spirit



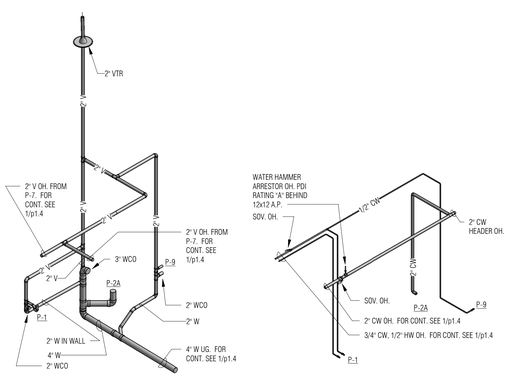
7 / p4.2 water isometric - room 118 & 118A
Health Budget + Managed Health / Billing



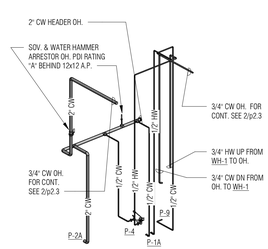
6 / p4.2 w & v isometric - room 151
Center Spirit



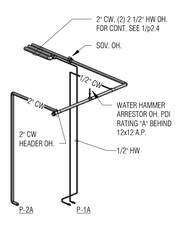
5 / p4.2 w & v isometric - room 802
Warehouse



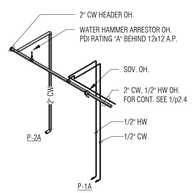
12 / p4.2 w & v and water isometric - room 604



11 / p4.2 water isometric - room 802
Warehouse



10 / p4.2 water isometric - room 660
Center Spirit



9 / p4.2 water isometric - room 632
Center Spirit

plumbing w & v and water isometrics

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p4.2

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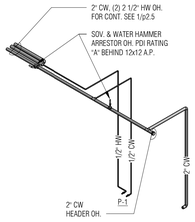
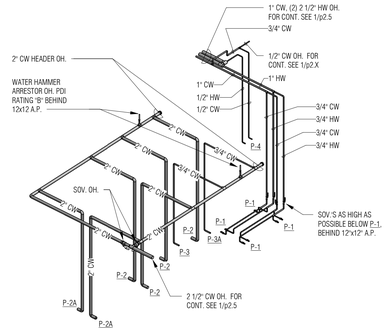


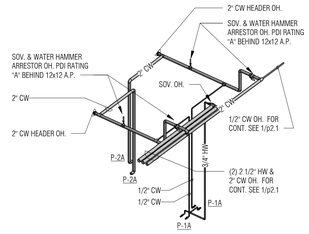
4 p4.3 **water isometric - room 764**

Social Services



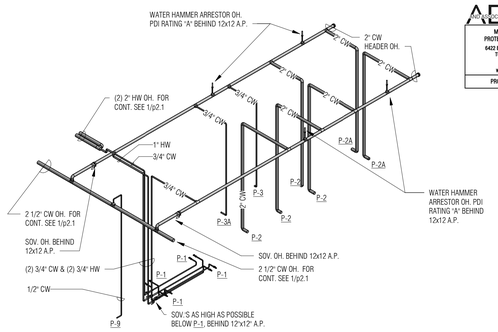
3 p4.3 **water isometric - rooms 130 & 131**

Social Services



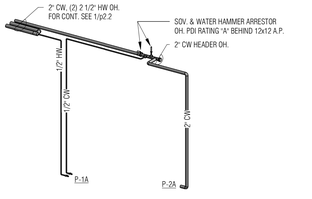
2 p4.3 **water isometric - room 251 & 255**

Sewa U'usim



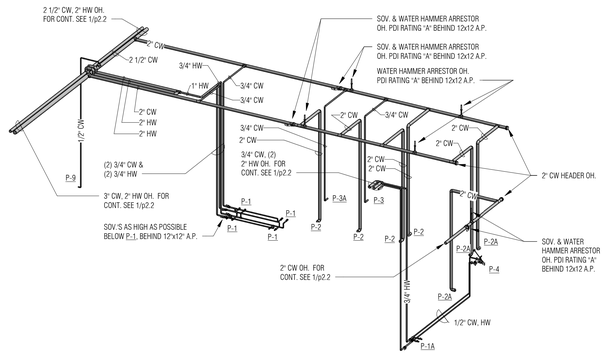
1 p4.3 **water isometric - rooms 120 & 121**

Sewa U'usim



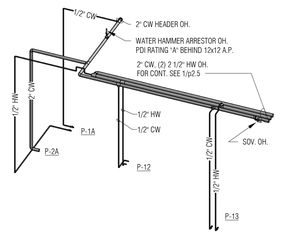
8 p4.3 **water isometric - room 306**

Nursing + Clinics



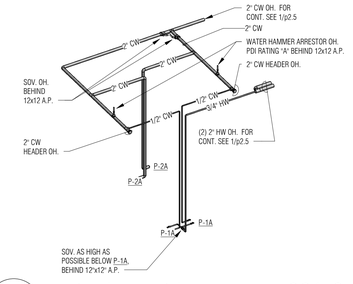
7 p4.3 **water isometric - rooms 108-111**

Nursing + Clinics



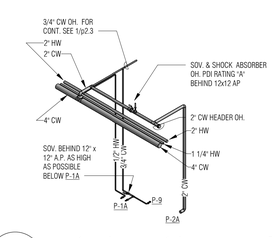
6 p4.3 **water isometric - room 752**

Social Services



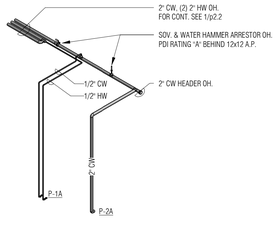
5 p4.3 **water isometric - rooms 700A & 753**

Social Services



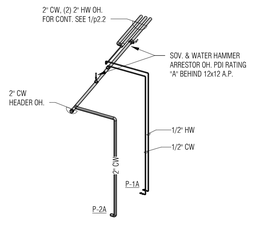
12 p4.3 **water isometric - room 518**

Health Budget + Managed Health / Billing



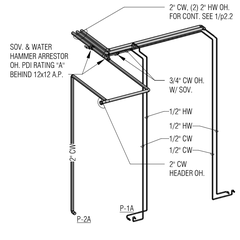
11 p4.3 **water isometric - room 416**

Nursing + Clinics



10 p4.3 **water isometric - room 454**

Nursing + Clinics



9 p4.3 **water isometric - room 461**

Nursing + Clinics

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Registered Professional Engineer (Mechanical)
CERTIFICATE NO.
45700
DAVID
C. TYRRELL
Arizona U.S.A.
EXPIRES: 12-31-18

job
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Health Services Center II
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Tucson, AZ 85746

plumbing water isometrics

p4.3

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REGISTERED PROFESSIONAL ENGINEER
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DAVID C. TYRRELL
Arizona U.S.A.
EXPIRES: 12-31-18

job
1717

date
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PLUMBING FIXTURE SCHEDULE

MARK	FIXTURE	QTY	WASTE F.U.	WASTE F.U. TOTALS	CW F.U.	CW F.U. TOTALS	WASTE	VENT	CW	HW	Comments
1	HAND SINK, WALL MOUNTED	1	2	2	2	2	2"	2"	1/2"	1/2"	
5	3-COMP. SINK	1	0	0	2	2			1/2"	1/2"	FULL SIZE I.W.
6	UNDERCOUNTER DISHWASHER	1	0	0	2	2				1/2"	FULL SIZE I.W.
12	ICE MAKER W/ BIN (#13)	1	0	0	1	1			1/2"		FULL SIZE I.W. PROVIDE BACKFLOW PREVENTER, WATTS, MODEL #ES-LF007 DOUBLE CHECK VALVE, ASSE 1015 CERTIFIED (OR EQUIVALENT)
21	HAND SINK, DROP-IN	1	2	2	2	2	2"	2"	1/2"	1/2"	
22	COFFEE BREWER	1	0	0	0	0			1/2"		FULL SIZE I.W. PROVIDE BACKFLOW PREVENTER, WATTS, #SD-3, ASSE 1022 CERTIFIED (OR EQUIVALENT)
23	TEA BREWER	1	0	0	0	0			1/2"		FULL SIZE I.W. PROVIDE BACKFLOW PREVENTER, WATTS, #SD-3, ASSE 1022 CERTIFIED (OR EQUIVALENT)
29	ESPRESSO/CAPPUCINNO MACHINE	1	0	0	0	0			1/2"		FULL SIZE I.W. PROVIDE BACKFLOW PREVENTER, WATTS, #SD-3, ASSE 1022 CERTIFIED (OR EQUIVALENT)
40	ICE BIN, DROP-IN	1	0	0	0	0					FULL SIZE I.W.
AAV-1	AIR ADMITTANCE VALVE	1	0	0	0	0					
DSN	DOWN SPOUT NOZZLE	26	0	0	0	0	0"	0"	0"	0"	SEE 1/p1.1, 1/p1.2, 1/p1.3, 1/P1.4 & 1/p1.5 FOR SIZES.
ET-1	EXPANSION TANK	1	0	0	0	0					
GI-1	GREASE INTERCEPTOR	1	0	0	0	0	4"	2"			
HB	HOSE BIBB	1	0	0	2.5	2.5			3/4"		
HB-1	HOSE BIBB	14	0	0	1	14			3/4"		
HB-2	HOSE BIBB (ROOFTOP, FREEZELESS)	7	0	0	1	7			3/4"		
ORD	ROOF DRAIN - OVERFLOW	13	0	0	0	0	0"	0"	0"	0"	SEE 1/p3.1 FOR SIZES.
P-1	LAVATORY (COUNTER MOUNTED)	12	1	12	1	12	2"	2"	1/2"	1/2"	
P-1A	LAVATORY (WALL MOUNTED)	18	1	18	1	18	2"	2"	1/2"	1/2"	
P-2	WATER CLOSET (FLUSH VALVE)	12	4	48	5	60	4"	2"	1"		
P-2A	WATER CLOSET (FLUSH VALVE, ADA)	24	4	96	5	120	4"	2"			
P-3	URINAL	3	2	6	4	12	2"	2"	3/4"		
P-3A	URINAL (ADA)	3	2	6	4	12	2"	2"	3/4"		
P-4	MOP BASIN	4	3	12	3	12	3"	2"	1/2"	1/2"	
P-5	EXAM SINK	8	2	16	2	16	2"	2"	1/2"	1/2"	
P-6	SINK, SINGLE COMPARTMENT	13	2	26	2	26	2"	2"	1/2"	1/2"	
P-7	SINK, SINGLE COMPARTMENT	8	2	16	2	16	2"	2"	1/2"	1/2"	
P-8	SINK, DOUBLE COMPARTMENT	3	2	6	2	6	2"	2"	1/2"	1/2"	
P-9	ELECTRIC WATER COOLER	6	1	6	1	6	2"	2"	1/2"		
P-10	FLOOR DRAIN	7	2	14	0	0	2"	2"			
P-11	SANITARY FLOOR DRAIN	4	2	8		0					
P-11A	SANITARY FLOOR DRAIN	1	3	3	0	0	3"	2"			
P-12	SHOWER (ADA)	1	2	2	2	2	2"	2"	1/2"	1/2"	
P-13	SINK WITH LH DRAINBOARD	1	2	2	2	2	2"	2"	1/2"	1/2"	
P-14	EMERGENCY EYEWASH	1	0	0	0	0			1/2"	1/2"	
RD	ROOF DRAIN	13	0	0	0	0	0"	0"	0"	0"	SEE 1/p3.1 FOR SIZES.
TMV-1	THERMOSTATIC MIXING VALVE	1	0	0	0	0					
WH-1	WATER HEATER	1	0	0	0	0					
WH-2	WATER HEATER	1	0	0	0	0					
WH-3	WATER HEATER (10 GAL.)	1	0	0	0	0					
Grand total: 219				301		352.5					

PLUMBING FIXTURE SPECIFICATIONS

MARK	FIXTURE	NOMENCLATURE
1	HAND SINK, WALL MOUNTED	SPECIFIED BY FOOD SERVICE CONSULTANT, CONTRACTOR INSTALLED
5	3-COMP. SINK	SPECIFIED BY FOOD SERVICE CONSULTANT, CONTRACTOR INSTALLED
6	UNDERCOUNTER DISHWASHER	SPECIFIED BY FOOD SERVICE CONSULTANT, CONTRACTOR INSTALLED. PROVIDE AND INSTALL DISHWASHER AIRGAP WITH CHROME CAP, SUPPLIES ETC. AND MAKE ALL FINAL CONNECTIONS TO RENDER A COMPLETE AND THOROUGH INSTALLATION.
12	ICE MAKER W/ BIN (#13)	SPECIFIED BY FOOD SERVICE CONSULTANT, CONTRACTOR INSTALLED
21	HAND SINK, DROP-IN	SPECIFIED BY FOOD SERVICE CONSULTANT, CONTRACTOR INSTALLED
22	COFFEE BREWER	SPECIFIED BY FOOD SERVICE CONSULTANT, CONTRACTOR INSTALLED
23	TEA BREWER	SPECIFIED BY FOOD SERVICE CONSULTANT, CONTRACTOR INSTALLED
29	ESPRESSO/CAPPUCINNO MACHINE	SPECIFIED BY FOOD SERVICE CONSULTANT, CONTRACTOR INSTALLED
40	ICE BIN, DROP-IN	SPECIFIED BY FOOD SERVICE CONSULTANT, CONTRACTOR INSTALLED
AAV-1	AIR ADMITTANCE VALVE	STUDOR, "MINI-VENT" OR EQUIVALENT, AS HIGH AS POSSIBLE BELOW COUNTER, WITH RECESSED BOX & GRILL FOR IN WALL INSTALLATION. INSTALL PER MANUF. RECOMMENDATIONS AND IN ACCORDANCE WITH LOCAL AUTHORITIES
DSN	DOWN SPOUT NOZZLE	WATTS MODEL #RD-940 CAST NICKEL BRONZE DOWNSPOUT NOZZLE WITH NO HUB OUTLET, COUNTERSUNK MOUNTING HOLES AND ANCHOR FLANGE TO SECURE TO WALL.
ET-1	EXPANSION TANK	AMTROL, "THERM-X-TROL," MODEL #ST-25V EXPANSION TANK WITH PRE-CHARGED AIR CHAMBER, AIR VALVE, HEAVY-DUTY DIAPHRAGM AND POLYPROPYLENE LINER. MAXIMUM CAPACITY = 10.3 GALLONS.
GI-1	GREASE INTERCEPTOR	JENSEN PRE CAST, MODEL JP3206E-G, 320 GALLON INDUSTRIAL GREASE INTERCEPTOR, 2-COMPARTMENT, PRE-CAST CONCRETE COMPLETE WITH RISER RINGS AND HEAVY DUTY TRAFFIC RINGS AND COVERS. INSTALL UNIT TO COMPLY AND BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. UNIT SIZED PER IPC SECTION 1003, AND PIMA COUNTY INDUSTRIAL WASTEWATER SIZING AND DESIGN GUIDELINES FOR GRAVITY GREASE INTERCEPTORS. SEE SIZING CALCULATIONS ON SHEET p5.1.
HB	HOSE BIBB	ZURN, MODEL #Z-1350-VB-5-12, 3/4" ANTI-SIPHON MODERATE CLIMATE NARROW WALL HYDRANT WITH STAINLESS STEEL BOX AND COVER WITH BRONZE BODY, TOP INLET CONNECTION, CYLINDER LOCK, AND INTEGRAL VACUUM BREAKER.
HB-1	HOSE BIBB	SAME AS HB.
HB-2	HOSE BIBB (ROOFTOP, FREEZELESS)	WOODFORD, MODEL #SRH-MS, FREESELESS ROOF HYDRANT WITH BACKFLOW PROTECTION AND MOUNTING SYSTEM. 3/4" HOSE CONNECTION. NO DRAIN LINE REQUIRED. CONTRACTOR SHALL PROVIDE OWNER WITH WRITTEN INSTRUCTIONS FOR PROPER USE, INCLUDING ALL WARNINGS FOR HOSE BIBB.
ORD	ROOF DRAIN - OVERFLOW	SAME AS R.D. EXCEPT WADE MODEL #W-3000-D-42-52-53 WITH 2" SOLID DAM.
P-1	LAVATORY (COUNTER MOUNTED)	KOHLER, "PENNINGTON," MODEL #K-2196-1, COUNTERTOP, SELF-RIMMING, VITREOUS CHINA OVAL LAVATORY WITH SINGLE HOLE DRILLING. FAUCET AND DRAIN: ZURN "AQUA-FIT" MODEL #Z6955-XL-S, ADA COMPLIANT, BATTERY POWERED, CHROME PLATED SENSOR FAUCET. .25 GAL PER ACTIVATION. ACTIVATION IS SET FOR 15 SEC. PROVIDE MCGUIRE PRODRAIN (OR EQUIVALENT) GRID STRAINER DRAIN ASSEMBLY AND OFFSET DRAIN. TRAP: MCGUIRE MODEL #8902 CHROME PLATED HEAVY CAST BRASS GROUND JOINT P-TRAP WITH 17 GAUGE TUBULAR BRASS WALL BEND, CAST BRASS CHROME PLATED WALL FLANGE WITH SETSCREW, CLEANOUT PLUG, AND CHROME PLATED BRASS NUTS. 1-1/4" X 1-1/2" SUPPLIES: MCGUIRE MODEL #2165-LK-R15 FLEXIBLE SUPPLIES. COMPLETE WITH CHROME PLATED BRASS 1/2" I.P.S. x 3/8" OD ANGLE STOPS WITH LOOSE KEY HANDLES AND BRASS STEMS. PROVIDE 15" OPTIONAL RISER AND INSULATE HOT AND COLD WATER PIPING AND WASTE PIPING BELOW LAVATORY WITH TRUEBRO #103-K INSULATION KIT. PROVIDE WATTS, MODEL #LFUSG-B, BRONZE BODY, THERMOSTATIC MIXING VALVE (OR EQUIVALENT) WITH INTEGRAL CHECK VALVES IN WATER INLETS AND ADJUSTMENT CAP WITH LOCKING FEATURE, SET AT MAX. 110 DEG. F. INSTALL VALVE IN HOT WATER SUPPLY, PER MANUFACTURERS RECOMMENDATION TO CONTROL THE TEMPERATURE TO THE FIXTURE.
P-1A	LAVATORY (WALL MOUNTED)	KOHLER "KINGSTON" MODEL #K-2007 WALL MOUNTED, ADA COMPLIANT, VITREOUS CHINA LAVATORY SINGLE FAUCET HOLE DRILLING, 21-1/4" X 18-1/8". CARRIER: WADE MODEL #W-520-08 FLOOR MOUNTED SINGLE LAVATORY CARRIER WITH CONCEALED ARMS, STRUCTURAL STEEL UPRIGHTS, BASE FEET, AND NON-SLIP LOCKING DEVICES. FAUCET, DRAIN, TRAP AND SUPPLIES: SAME AS P-1.
P-2	WATER CLOSET (FLUSH VALVE)	KOHLER, "WELLCOMME," MODEL #K-4350, 1.6 GALLON PER FLUSH VITREOUS CHINA, SIPHON JET, ELONGATED WATER CLOSET WITH 1-1/2" TOP SPUD AND BOLT CAPS. SEAT: KOHLER, "STRONGHOLD," MODEL #K-4731C, ADA COMPLIANT (WHEN INSTALLED ON AN ADA COMPLIANT TOILET), WHITE SOLID PLASTIC, ELONGATED OPEN FRONT SEAT, WITH CHECK HINGE. FLUSH VALVE: SLOAN ECOS MODEL #111 EXPOSED SENSOR OPERATED CLOSET FLUSH VALVE, CHROME PLATED, DUAL FILTERED BYPASS, 1" I.P.S. SCREW DRIVER BAK-CHEK ANGLE STOP WITH FREE SPINNING VANDAL RESISTANT CAP, SWEAT SOLDER ADAPTER WITH CAST SET SCREW WALL FLANGE, ADJUSTABLE TAILPIECE, HIGH BACK PRESSURE VACUUM BREAKER FLUSH CONNECTION AND SPUD COUPLING FOR 1-1/2" TOP SPUD WITH WALL AND SPUD FLANGES. 1.1/1.6 GALLON FLUSH.
P-2A	WATER CLOSET (FLUSH VALVE, ADA)	KOHLER "HIGHCLIFF" MODEL #K-4368, 1.6 GALLON PER FLUSH 17-1/2" HIGH VITREOUS CHINA SIPHON JET, ELONGATED WATER CLOSET WITH 1-1/2" TOP SPUD AND BOLT CAPS. SEAT AND FLUSH VALVE: SAME AS P-2.
P-3	URINAL	ZURN "ECOVANTAGE" MODEL #Z5738.206.00, HARDWIRED LOW CONSUMPTION URINAL SYSTEM COMPLETE WITH ADA COMPLIANT, 14" EXTENDED RIM, VITREOUS CHINA URINAL. ZURN MODEL #ZEG6003EV-HW6 SENSOR OPERATED AND HARDWIRED HIGH EFFICIENCY FLUSHOMETER VALVE OPERATED BY AN INFRARED CONVERGENCE-TYPE PROXIMITY SENSOR, POWERED BY 6VDC PLUG-IN. VALVE FURNISHED WITH CHROME PLATED METAL HOUSING, CHLORAMINE RESISTANT INTERNAL SEATS, INTERNAL FLOW REGULATOR AND AN IN-LINE FILTER. HIGH PRESSURE VACUUM BREAKER, ONE PIECE HEX COUPLING NUT, ADJUSTABLE TAILPIECE, SPUD COUPLING AND FLANGE FOR TOP SPUD CONNECTION. CONTROL STOP HAS INTERNAL SIPHON-GUARD PROTECTION, VANDAL RESISTANT STOP CAP, SWEAT SOLDER KIT, AND CAST WALL FLANGE WITH SET SCREW, 2" I.P.S. OUTLET FLANGE AND RUBBER GASKET WITH INTEGRAL TRAP AND VANDAL RESISTANT OUTLET STRAINER. 1/8 GALLON PER FLUSH. CARRIER: ZURN MODEL #Z-1222 SINGLE URINAL CARRIER WITH HANGER DURA-COATED RECTANGULAR STEEL UPRIGHTS WITH WELDED FEET, ADJUSTABLE SUPPORT PLATES AND MOUNTING FASTENERS.
P-3A	URINAL (ADA)	SAME AS P-3, EXCEPT MOUNTED AT ADA COMPLIANT HEIGHT.
P-4	MOP BASIN	FIAT #MSB-2424, MOLDED STONE MOP SERVICE BASIN, 24" X 24" X 10" COMPLETE WITH VINYL BUMPERGUARD (E-77-AA), STAINLESS STEEL DRAIN WITH COMBINATION DOME STRAINER AND LINT BASKET, AND STAINLESS STEEL WALL GUARD PANELS. 3" OUTLET. FAUCET: FIAT #830-AA WALL MOUNTED CHROME PLATED SERVICE FAUCET, COMPLETE WITH VACUUM BREAKER, INTEGRAL STOPS, ADJUSTABLE WALL BRACE, PAIL HOOK AND 3/4" HOSE THREAD ON SPOUT. HOSE AND BRACKET: FIAT #832-AA HOSE AND BRACKET, COMPLETE WITH 30" LONG FLEXIBLE HEAVY DUTY RUBBER HOSE WITH 3/4" BRASS COUPLING AT ONE END, AND 5" x 3", 18 GAUGE #302 STAINLESS STEEL BRACKET WITH RUBBER GRIP. MOP HANGER: FIAT #889-CC, 24" x 3" 18 GAUGE SS WITH THREE (3) RUBBER TOOL GRIPS.
P-5	EXAM SINK	DAYTON, "KINGSFORD" MODEL #K-11515, 23 GAUGE NICKEL BEARING STAINLESS STEEL SINK, SINGLE COMPARTMENT, 12" X 10" X 5-1/8" DEEP, TWO HOLES (PROVIDE HOLE CAP), FULL UNDERCOATING. MODEL #D-1125 STRAINER WITH REMOVABLE BASKET AND NEOPRENE STOPPER. PROVIDE 1-1/2" CHROME PLATED BRASS TAILPIECE. FAUCET: CHICAGO, MODEL #116.670.AB.1, DECK MOUNTED, SINGLE HOLE WITH DUAL BEAM INFRARED SENSOR. VANDAL PROOF LAMINAR FLOW WITH 1.5 GPM, CURVED SPOUT, CHROME PLATED. INTEGRATED EMERGENCY BACKUP POWER SYSTEM. COMES WITH STAINLESS STEEL HOSES. ORDER 12V AC TRANSFORMER WHEN ORDERING FAUCET. TRAP AND SUPPLIES: SAME AS P-1, EXCEPT 1-1/2" X 1-1/2" TRAP.
P-6	SINK, SINGLE COMPARTMENT	ELKAY, MODEL #LR-1918, 18 GAUGE, TYPE 304 STAINLESS STEEL SINK, SINGLE COMPARTMENT, 16" X 11-1/2" X 7-1/2" DEEP, THREE HOLES (PROVIDE HOLE CAPS FOR HOLES) AND FULL UNDERCOATING. PROVIDE MODEL #LK-99 HEAVY GAUGE STAINLESS STEEL BASKET STRAINER WITH 1-1/2" CHROME PLATED BRASS TAILPIECE. FAUCET: CHICAGO, MODEL #116.609.AB.1, DECK MOUNTED, SINGLE HOLE WITH DUAL BEAM INFRARED SENSOR. VANDAL PROOF AERATOR WITH 2.2 GPM (PROVIDE 1.5 GPM INSERT), SWING GOOSENECK SPOUT. INTEGRATED EMERGENCY BACKUP POWER SYSTEM. ORDER 12V AC TRANSFORMER WHEN ORDERING FAUCET. TRAP AND SUPPLIES: SAME AS P-5
P-7	SINK, SINGLE COMPARTMENT	SAME AS P-6.
P-8	SINK, DOUBLE COMPARTMENT	ELKAY, MODEL #LR-3321, 18 GAUGE, 304 STAINLESS STEEL, DOUBLE COMPARTMENT SINK, (2) 13-1/2" x 16" x 7-3/4" COMPARTMENTS, THREE HOLES . PROVIDE TWO MODEL #LK-99 HEAVY GAUGE STAINLESS STEEL BASKET STRAINERS WITH 1-1/2" CHROME PLATED BRASS AND DISHWASHER TAILPIECE. FAUCET: SAME AS P-6. TRAP AND SUPPLIES: SAME AS P-1, EXCEPT PROVIDE 1-1/2" X 1-1/2" TRAP AND 1-1/2" 17 GAUGE CONTINUOUS WASTE.
P-9	ELECTRIC WATER COOLER	ELECTRIC WATER COOLER, ELKAY MODEL #EZSTL-8C, STAINLESS STEEL FINISHED, WHEELCHAIR ACCESSIBLE, TWO-LEVEL UNIT WITH ONE PIECE BASINS, NON- PRESSURIZED COOLING TANK, SAFETY BUBBLERS, EASY-TOUCH CONTROLS AND OPTIONAL GLASS FILLER, HFC-134A REFRIGERANT, 8.0 GPH, 1/5 HP, 370 WATTS, 4.0 FLA, 115/1/60.
P-10	FLOOR DRAIN	WATTS, MODEL #FD15-R, CAST IRON FLOOR DRAIN WITH FLANGES, REVERSIBLE CLAMPING COLLAR AND ADJUSTABLE 6" ROUND NICKEL BRONZE STRAINER, 2" OUTLET (PROVIDE DEEP SEAL TRAP AND 'SURESEAL' MODEL #SS2009, IAPMO LISTED, IN-LINE. FLOOR DRAIN TRAP SEALER).
P-11	SANITARY FLOOR DRAIN	WATTS, MODEL #FS-740-3, 12" x 12" x 8" CAST IRON SANITARY FLOOR DRAIN WITH PORCELAIN ENAMEL COATED INTERIOR, ALUMINUM DOME STRAINER AND NICKEL BRONZE TOP, 2" OUTLET (PROVIDE DEEP SEAL TRAP AND 'SURESEAL' MODEL #SS2009, IAPMO LISTED, IN-LINE, FLOOR DRAIN TRAP SEALER).
P-11A	SANITARY FLOOR DRAIN	WATTS, MODEL #FS-740-3, 12" x 12" x 8" CAST IRON SANITARY FLOOR DRAIN WITH PORCELAIN ENAMEL COATED INTERIOR, ALUMINUM DOME STRAINER AND NICKEL BRONZE TOP, 3" OUTLET (PROVIDE DEEP SEAL TRAP AND 'SURESEAL' MODEL #SS2009, IAPMO LISTED, IN-LINE, FLOOR DRAIN TRAP SEALER).
P-12	SHOWER (ADA)	SYMMONS "TEMPTROL II" MODEL #BP-56-500-B30-V-X-QD, ADA COMPLIANT, BP SERIES SHOWER UNIT COMPLETE WITH PRESSURE BALANCING MIXING VALVE WITH ADJUSTABLE STOP SCREW TO LIMIT HANDLE TURN, INTEGRAL SERVICE STOPS, CLEAR-FLO SHOWER HEAD WITH ARM AND FLANGE, 2 GPM FLOW RESTRICTOR, LEVER DIVERTER VALVE WITH INTEGRAL VOLUME CONTROL, WALL/HAND SHOWER WITH FLEXIBLE METAL HOSE, WALL CONNECTION AND FLANGE AND QUICK DISCONNECT. DRAIN: WATTS MODEL #FD15-R CAST IRON FLOOR DRAIN WITH FLANGES, REVERSIBLE CLAMPING COLLAR AND ADJUSTABLE 6" ROUND NICKEL BRONZE STRAINER (PROVIDE DEEP SEAL TRAP).
P-13	SINK WITH LH DRAINBOARD	ELKAY, "SSP," MODEL #1C24X24-L-24K, 12" STANDARD SERIES SINK WITH ONE COMPARTMENT, LEFT DRAINBOARD, 16 GAUGE, 300 SERIES STAINLESS STEEL SINK WITH GALVANIZED LEGS, 12" X 12" X 12" DEEP. INCLUDES 3-1/2" BASKET STRAINER. FAUCET: ELKAY, MODEL #LKB72C, SINGLE HOLE, WALL MOUNTED, CHROME PLATED, INFRARED FAUCET WITH GOOSENECK SPOUT. 2.0 GPM AERATOR. INCLUDES AC PLUG-IN AND BATTER HOLDER WITH FOUR BATTERYS. TRAP AND SUPPLIES: SAME AS P-1, EXCEPT 1-1/2" X 1-1/2" TRAP.
P-14	EMERGENCY EYEWASH	GUARDIAN, MODEL #G1809LH, DECK MOUNTED, CHROME PLATED BRASS, AUTOFLOW, 90 DEG. SWIVEL, LEFT HAND MOUNTING EYEWASH. EACH HEAD HAS FLIPTOP DUST COVER, INTERNAL FLOW CONTROL AND FILTER TO REMOVE IMPURITIES. THERMOSTATIC MIXING VALVE: PROVIDE WATTS, MODEL #LFUSG-B, BRONZE BODY, THERMOSTATIC MIXING VALVE (OR EQUIVALENT) WITH INTEGRAL CHECK VALVES IN WATER INLETS AND ADJUSTMENT CAP WITH LOCKING FEATURE, SET AT MAX. 85 DEG. F. INSTALL VALVE IN HOT WATER SUPPLY, PER MANUFACTURERS RECOMMENDATION TO CONTROL THE TEMPERATURE TO THE FIXTURE.
RD	ROOF DRAIN	WADE MODEL #W-3000-42-52-53 CAST IRON ROOF DRAIN WITH FLANGE, FLASHING RING WITH GRAVEL STOP AND CAST IRON MUSHROOM DOME. PROVIDE OPTIONAL DECK CLAMP AND BEARING PAN. (PROVIDE EXTENSION AS REQUIRED TO ACCOMMODATE ROOF THICKNESS.)
TMV-1	THERMOSTATIC MIXING VALVE	SYMMONS, "TEMPCONTROL," MODEL #7-1000A-P-W-RC, 'A' SERIES, 1-1/2" INLETS AND 2" OUTLET MIXING VALVE WITH CHECK STOPS, REMOVABLE CARTRIDGE WITH STRAINER, STAINLESS STEEL PISTON, LIQUID FILL THERMAL MOTOR WITH BELLOWS, VOLUME CONTROL SHUT OFF VALVE, DIAL THERMOMETER AND ALL FITTINGS AND UNIONS. PROVIDE POLISH CHROME FINISH, WALL MOUNTING BRACKET AND SPARE CARTRIDGES FOR UN-INTERRUPTED SERVICE. 38 GPM AT 5 PSI PRESSURE DROP.
WH-1	WATER HEATER	HEAT TRANSFER PRODUCTS, "PHOENIX" SERIES, MODEL #PH199-119, SEALED COMBUSTION SYSTEM, W/ 199,000 BTUH INPUT RATING AND 119 GAL. RECOVERY, FIRST HOUR IS 335 GAL'S AND 287 GPH AT 80 DEG. RISE. STORAGE, STAINLESS STEEL TANK CONSTRUCTION, CORROSION RESISTANT, CUPRO-NICKEL HEAT EXCHANGER. (120/1/60), 15 AMP DEDICATED SERVICE. 3" ROOF VENT WITH TEE (INTAKE) PROVIDED WITH THE WATER HEATER AND COUPLING (EXHAUST). CONDENSATE NEUTRALIZER PART #N1100 WITH SCHEDULE 40 PVC CONDENSATE LINE AND TEE AFTER THE NEUTRALIZER TO REDUCE VACUUM LOCK. PROVIDE MEANS FOR EASY REMOVAL FOR PERIODIC REPLACEMENT. START-UP AND FINAL TUNING BY FACTORY AUTHORIZED TECHNICIAN.
WH-2	WATER HEATER	SAME AS WH-1.
WH-3	WATER HEATER (10 GAL.)	A.O. SMITH, "LOWBOY," MODEL #DEL-10, ELECTRIC WATER HEATER WITH 10 GALLON CAPACITY, 3/3 kW NON-SIMULTANEOUS DUAL ELEMENT INPUT WITH 20 GPH RECOVERY AT 60 DEG. F RISE. 480/1/ (6.3 FLA.)

PLUMBING GENERAL NOTES

- COORDINATE ALL OVERHEAD PIPING WITH HVAC DUCTWORK AND WORK OF OTHER TRADES.
- OFFSET ALL NEW V.T.R.'S TO TERMINATE A MIN. OF 3'-0" FROM ALL VERTICAL SURFACES AND A MIN. OF 10'-0" FROM OR AT LEAST 3'-0" ABOVE ALL OUTSIDE AIR INTAKES.
- PLUMBER TO VERIFY INVERTS TO ASSURE PROPER SLOPE MAY BE OBTAINED BEFORE BEGINNING WORK.
- RUN ALL WASTE LINES AND RAINWATER LEADERS AT 2% SLOPE UNLESS NOTED OTHERWISE.
- TERMINATE RWLS & ORWLS TO DAYLIGHT WITH DOWNSPOUT NOZZLE (DSN). SEE PLUMBING FIXTURE SPECIFICATION.
- COORDINATE EXACT LOCATION OF EACH RWL & ORWL TERMINATION WITH ARCHITECTURAL DRAWINGS.
- ALL SLAB PENETRATIONS SHALL BE SEALED USING 3M FIRE BARRIER WATER TIGHT SEALANT 1003SL SELF-LEVELING FIRE STOP FOR FLOOR APPLICATIONS OR EQUIV. INSTALLED BY TRAINED AND CERTIFIED PERSONNEL.
- PROVIDE GASCOCK, UNION, AND A MINIMUM 6" DIRTLEG AT EACH GAS APPLIANCE/EQUIPMENT CONNECTION. INSTALL READILY ACCESSIBLE AND AS CLOSE AS POSSIBLE TO INLET.
- PROVIDE AN ADAPTER AT TAILPIECE OF FIXTURE, WHERE REQUIRED FOR CONDENSATE DRAIN CONNECTION. FIXTURES WITH CONDENSATE CONNECTION SHALL HAVE A FRONT OVERFLOW. SEE DETAIL 3/p5.1 AND PLUMBING/MECHANICAL FLOOR PLANS FOR EXACT SIZE AND LOCATION.
- EXTEND P-T RELIEF (FULL SIZE) FROM WATER HEATERS AND 1" (PVC SCHEDULE 40) DRAIN LINE FROM DRAIN PAN ADAPTOR TO P-4 (MOP BASIN). TERMINATE WITH MIN. 1" AIRGAP.
- PROVIDE 1/2" HW SUPPLY FROM KITCHEN EQUIPMENT #'S TO DISHWASHER. INSTALL PER MFGR'S RECOMMENDATIONS AND IN ACCORDANCE WITH LOCAL AUTHORITIES AND THE 2012 INTERNATIONAL PLUMBING CODE.
- COORDINATE LOCATION OF WATER METER AND BACKFLOW PREVENTION ASSEMBLY WITH CIVIL DRAWINGS. COORDINATE EXACT SIZES OF WATER METER AND BACKFLOW PREVENTION ASSEMBLY WITH WATER CALCULATION TABLE ON THIS SHEET.
- CONTRACTOR TO FIELD VERIFY ROUGH-IN DIMENSIONS.
- BACKWATER VALVE IS **NOT** REQUIRED ON THIS PROJECT.
  BUILDING FINISHED LOOR ELEVATION = 2,571.50 FT.
  UPSTREAM MANHOLE= SEE CIVIL DWGS
  RIM ELEVATION = SEE CIVIL DWGS
  COORDINATE ELEVATIONS WITH CIVIL DRAWINGS.
- THIS PROJECT SHALL BE IN CODE COMPLIANCE WITH THE 2012 IBC, THE 2012 IECC, THE 2012 IPC, 2006 UPC (FOR WATER PIPE SIZING ONLY) AND ALL LOCAL CODE AMENDMENTS.

WATER CALCULATIONS

TOTAL FIXTURE UNITS = 352.5 = 118 GPM

WATER PIPE SIZE CRITERIA

AVAIL. PRESS. RANGE FROM WATER MAIN IN STREET:	51-58 PSI
AVAIL. PRESS. FROM WATER MAIN IN STREET:	51 PSI
PRESS. LOSS AT MTR (BASED UPON - 2" MTR @ 118 GPM):	4.1 PSI
PRESS. LOSS AT 3" RPBP:	12 PSI
AVAIL. PRESS. AFTER RPBP:	34.9 PSI
PRESS. REGULATOR (SET PRESS. TO 78 MAX PSI):	0 PSI
AVAIL. PRESSURE TO BLDG:	34.9 PSI
PRESS. REQ'D AT FURTHEST FIXTURE:	15 PSI
PSI (ELEVATION (0.43 X 20 = 8.6):	8.6 PSI
PRESSURE AVAILABLE FOR PIPE LOSSES:	11.3 PSI

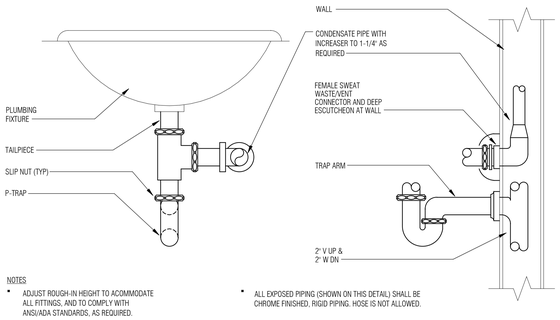
DEVELOPED LENGTH OF PIPE FROM: STREET MAIN TO FURTHEST FIXTURE =
661 FEET
661 X 1.25 (FITTINGS) = 826.25 FT

PIPE LOSS CALCULATION

11.3 PSI / 826.25 FT X 100 FT. =1.4 PSI / 100 FT OF PIPE
(ALLOWABLE PRESSURE LOSS PER 100 FT. OF PIPE)

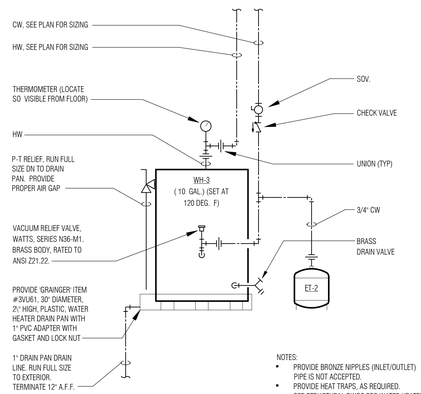
NOTES:

1. PIPE SIZE (INSIDE BLDG.) BASED UPON A MAXIMUM VELOCITY OF 5 FT./SECOND.
2. PROVIDE REDUCED PRESSURE BACKFLOW PREVENTER EQUIVALENT TO WATTS SERIES 909QT-S AS CLOSE AS POSSIBLE TO WATER METER. COORDINATE LOCATIONS WITH CIVIL UTILITY DRAWINGS.
3. AN ALTERNATE ENGINEERING METHOD (UPC 06) WAS USED TO SIZE THE DOMESTIC WATER PIPE. AS PER IPC 12, SEC. 105.2, 604.1 & E103.2.1.



NOTES
- ADJUST ROUGH-IN HEIGHT TO ACOMMODATE ALL FITTINGS, AND TO COMPLY WITH ANSI/ADA STANDARDS, AS REQUIRED.
- ALL EXPOSED PIPING (SHOWN ON THIS DETAIL) SHALL BE CHROME FINISHED, RIGID PIPING. HOSE IS NOT ALLOWED.
- CONTINUOUS WASTE W/THREADED END OUTLET AND TAILPIECE FITTING TO BE MOUNTED AS HIGH AS POSSIBLE.
- SEE MECHANICAL PLANS FOR EXACT SIZE AND LOCATION OF CONDENSATE PIPING.

3 p5.1 CONDENSATE DRAIN CONNECTION DETAIL
SCALE: NTS


CW, SEE PLAN FOR SIZING
HW, SEE PLAN FOR SIZING
THERMOMETER (LOCATE SO VISIBLE FROM FLOOR)
HW
P-T RELIEF, RUN FULL SIZE DN TO DRAIN PAN. PROVIDE PROPER AIR GAP
VACUUM RELIEF VALVE, WATTS, SERIES N36-M1. BRASS BODY, RATED TO ANSI Z21.22.
PROVIDE 'GRAINGER' ITEM #3VU61, 30" DIAMETER, 2½" HIGH, PLASTIC, WATER HEATER DRAIN PAN WITH 1" PVC ADAPTER WITH GASKET AND LOCK NUT
1" DRAIN PAN DRAIN LINE. RUN FULL SIZE TO EXTERIOR. TERMINATE 12" A.F.F.

ELECTRICAL SYMBOLS

WIRING SYMBOLS

'LP'-1,3,5 — HOMERUN TO PANEL. 'LP' INDICATES PANEL DESIGNATION. 1,3,5 INDICATES CIRCUIT BREAKER NUMBER

NEW CONDUIT

UNDERGROUND CONDUIT

FLEXIBLE CONDUIT

NEUT. HOT — NUMBER OF SLASHES INDICATE NUMBER OF WIRES (WHEN MORE THAN TWO). PROVIDE GROUND WIRE IN ALL CONDUITS (SIZE GROUND PER NEC 250.122, U.O.N.); GROUND ARE NOT SHOWN BY SLASHES. SLASHES WHERE SHOWN ARE FOR CONVENIENCE OF THE CONTRACTOR ONLY; PROVIDE NUMBER OF CONDUCTORS AS REQUIRED BY CIRCUIT FUNCTION.

POWER DEVICES ON NORMAL BRANCH

J — JUNCTION BOX

= SYSTEMS FURNITURE WHIP PROVIDED BY SYSTEMS FURNITURE, INSTALLED BY ELECTRICAL/ DATA CABLING CONTRACTOR

DUPLEX RECEPTACLE OUTLET, NEMA 5-20R, MOUNTED 18" AFF (U.O.N.)
TP = TAMPER PROOF

DUPLEX RECEPTACLE OUTLET, NEMA 5-20R, ABOVE 42" COUNTER (U.O.N.)

GFCI — GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLE 20 AMPERE FEED THROUGH TYPE

QUADRAPLEX - TWO DUPLEX RECEPTACLE UNDER A TWO GANG RING, MOUNTED 18" AFF (U.O.N.)

QUADRAPLEX - TWO DUPLEX RECEPTACLE UNDER A TWO GANG RING, ABOVE 42" COUNTER (U.O.N.)

$M — TOGGLE SWITCH TYPE MANUAL MOTOR STARTER SWITCH

30A/3P 3R (3) 30A FU — EXTERNALLY OPERATED FUSED DISCONNECT SWITCH, SIZE, FUSE SIZE, PHASE AND QUANTITY AS INDICATED, NUMBER INDICATES NEMA TYPE ENCLOSURE, NO NUMBER INDICATES NEMA '1' TYPE ENCLOSURE.

30A/3P 3R — EXTERNALLY OPERATED NON-FUSED DISCONNECT SWITCH, SIZE AND PHASE AS INDICATED, 'N' INDICATES NEMA TYPE ENCLOSURE. NO NUMBER INDICATES NEMA '1' TYPE ENCLOSURE.

LEGRAND WIREMOLD 'RFB6' SERIES FLOOR BOX WITH DEVICES AS INDICATED ON SHEETS. PROVIDE 'FPBTC' COVER, COORDINATE WITH ARCHITECT FOR FINISH. PROVIDE COMMUNICATIONS BARRIER KIT WHERE REQUIRED. PROVIDE INTERNAL DUPLEX BRACKET(S) FOR DUPLEX RECEPTACL(S). PROVIDE COMMUNICATION BRACKET FOR RJ KEYSTONE OPENINGS AS REQUIRED BY OWNER.

SPECIAL PURPOSE RECEPTACLE PER EQUIPMENT REQUIREMENTS. CONTRACTOR SHALL VERIFY EXACT NEMA CONFIGURATION PRIOR TO ORDERING.

DISTRIBUTION EQUIPMENT

PANELBOARD

T — TRANSFORMER

SERVICE ENTRANCE SWITCHBOARD

NOTE: ACCESS AND WORKING SPACE OF ALL NEW ELECTRICAL EQUIPMENT SHALL COMPLY WITH ARTICLE 110.26 OF THE NEC. THERE SHALL NOT BE ANY PIPING, DUCTS, LEAK PROTECTION APPARATUS OR OTHER EQUIPMENT FOREIGN TO THE ELECTRICAL INSTALLATION 6 FEET ABOVE THE ELECTRICAL EQUIPMENT PER ARTICLE 110.26(F)(1).

SPECIAL SYSTEMS DEVICES

(NOTE: PROVIDE PULLCORD ON ALL EMPTY CONDUITS)

DATA OUTLET, MOUNTED 18" AFF (U.O.N.). PROVIDE A FLUSH 4" SQUARE DEEP BOX 18" AFF (U.O.N.) WITH 1 GANG MUD RING AND 1" CONDUIT ROUTED TO ABOVE NEAREST ACCESSIBLE CEILING SPACE. PROVIDE PLASTIC BUSHING AT END OF CONDUIT.

FLOOR OUTLET. REFER TO POWER SYMBOL FOR INFORMATION.

TV — PROVIDE BOX EQUAL TO MIDDLE ATLANTIC PRX-W8-14X14. ROUTE (2) 1" EC W/ PULLCORD TO ABOVE CEILING SPACE.

A/V — AV BOX. REFER TO DETAIL #5, SHEET ep703 FOR ADDITIONAL INFORMATION.

WP — ANALOG VIDEO CAMERA. PROVIDE 4S BOX WITH SINGLE GANG MUD RING AND 1" EC W/ PULL STRING ROUTED TO NEAREST CABLE TRAY. PROVIDE BUSHING AT END OF CONDUIT. COORDINATE EXACT LOCATION WITH ARCHITECT PRIOR TO ROUGH-IN.

WP = WEATHERPROOF. PROVIDE 4S BOX WITH SINGLE GANG MUD RING AND 1" EC W/ PULL STRING STUBBED TO INTERIOR AND ROUTED TO NEAREST CABLE TRAY.

PUSH BUTTON

CR — CARD READER. REFER TO DETAIL #___, SHEET ___.

FIRE ALARM DEVICES

F — MANUAL PULL STATION, MOUNT @ 42" (U.O.N.)

F/C — HORN/STROBE, MOUNT @ 80" AFF (U.O.N.) C = CEILING MOUNT

L — STROBE LIGHT, MOUNT @ 80" AFF (U.O.N.)

SD — SMOKE DETECTOR

DD — DUCT SMOKE DETECTOR

FACP — FIRE ALARM CONTROL PANEL

B — BELL HORN

TS — FIRE ALARM - TAMPER SWITCH

FS — FIRE ALARM - FLOW SWITCH

FAAP — FIRE ALARM ANNUNCIATOR PANEL

LIGHT FIXTURE DESIGNATION

3 / A / a — FIXTURE TYPE DESIGNATION; SWITCH REFERENCE; CIRCUIT NUMBER

LIGHT FIXTURES ON NORMAL BRANCH

RECESSED OR SURFACE MOUNTED LUMINAIRE

RECESSED 2' x 2' LUMINAIRE

RECESSED 2' x 4' LUMINAIRE

POLE LIGHT

LINEAR

STRIP LUMINAIRE

WALL LUMINAIRE

WALL LUMINAIRE

NL = LIGHT FIXTURE CONNECTED FOR 24 HOUR OPERATION.

LIGHT FIXTURES W/ BATTERY BACK-UP

RECESSED OR SURFACE MOUNTED LUMINAIRE

2' x 2' LUMINAIRE

2' x 4' LUMINAIRE

EM — STRIP LUMINAIRE

WALL LUMINAIRE

LIGHT FIXTURES CONNECTED TO LIFE-SAFETY BRANCH

2' x 2' LUMINAIRE

2' x 4' LUMINAIRE

RECESSED OR SURFACE MOUNTED LUMINAIRE

EXIT LIGHT FIXTURE WITH DIRECTIONAL ARROW(S)

LINEAR

WALL LUMINAIRE

LIGHTING CONTROL

$ — SINGLE POLE SWITCH, 20 AMPERE OR LOW VOLTAGE TYPE. MAX. HEIGHT = 42" TO CENTER LINE UON.

$3 — THREE WAY SWITCH, 20 AMPERE

$D — 0-10V DIMMER SWITCH EQUAL TO SYNERGY ISD SERIES. PROVIDE DIMMING LOW-VOLTAGE CONDUCTORS PER MANUF REQUIREMENTS.

EQUIPMENT DESIGNATIONS

NE-PH-E-01

- NE — AREA
- PH — EQUIPMENT NAME
- E — SYSTEM/VOLTAGE
- 01 — SOURCE
- SEQUENCE #

NUMBER IN SEQUENCE - 01,02,03, ECT.

BLANK - NORMAL SOURCE
E - EMERGENCY (ARTICLE 700)
OS - OPTIONAL STANDYBY SYSTEM (ARTICLE 702)

H - 480Y/277V
L - 208Y/120V

SES - SERVICE ENTRANCE SWITCHBOARD
T - TRANSFORMER
SB - SWITCHBOARD
DP - DISTRIBUTION PANEL
P - PANEL
FD - FUSED DISCONNECT SWITCH
ND - NON-FUSED DISCONNECT SWITCH
G - GENERATOR

NE - NORTH EAST
NW - NORTH WEST
SE - SOUTH EAST
SW - SOUTH WEST
CS - CENTER SOUTH
PH - PHARMACY
WH - WAREHOUSE

ABBREVIATIONS

A	AMPERES	FMC	FLEXIBLE METAL CONDUIT	LFMC	LIQUIDTIGHT FLEXIBLE METAL CONDUIT
ADA	AMERICANS WITH DISABILITIES ACT (1990)	EMT	ELECTRICAL METALLIC TUBING	PVC	POLYVINYL CHLORIDE
AFF	ABOVE FINISHED FLOOR	HP	HORSEPOWER	REM	REMARK
AFG	ABOVE FINISHED GRADE	KW	KILOWATTS	RGS	RIGID GALVANIZED STEEL
AIC	AMPERES INTERRUPTING CAPACITY	KVA	KILOVOLT AMPS	SDBC	STRANDED BARE COPPER
AMP	AMPACITY	MCB	MAIN CIRCUIT BREAKER	SHLD,SH	SHIELDED
AC	ALTERNATING CURRENT	MCP	MOTOR CIRCUIT PROTECTOR	SN	SOLID NEUTRAL
AWG	AMERICAN WIRE GAUGE	MLO	MAIN LUGS ONLY	SP	SPARE
#/C	NUMBER OF CONDUCTORS	M	MOTOR	TYP	TYPICAL
C	CONDUIT	MCC	MOTOR CONTROL CENTER	UL	UNDERWRITER'S LABORATORIES
EWC	ELECTRIC WATER COOLER	MFG	MANUFACTURER	UPS	UNINNTERUPTABLE POWER SOURCE
FU	FUSE	NEC	NATIONAL ELECTRICAL CODE	UON	UNLESS OTHERWISE NOTED
GFI	GROUND FAULT INTERRUPTER	NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION	V	VOLTS
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	N, NEU	NEUTRAL	W	WATTS
GND	GROUND	PH	PHASE	WP	WEATHERPROOF
		PR	PAIR	XFMR	TRANSFORMER

LIGHT FIXTURE SCHEDULE

TYPE	DESCRIPTION/ MANUFACTURER	VOLT	LAMPS	MOUNTING	FINISH	REMARKS
L1	2'x4' LED VOLUMETRIC LIGHT FIXTURE LITHONIA LIGHTING 2BLT4-48L-ADP-EZ1-LP840-N80	277	LED	GRID	STANDARD	• 45 MAX VA • nLIGHT ENABLED
L1A	2'x4' LED VOLUMETRIC LIGHT FIXTURE LITHONIA LIGHTING 2BLT4-48L-ADP-EZ1-LP840-N80-DGA24	277	LED	FLANGE	STANDARD	• 45 MAX VA • nLIGHT ENABLED • PROVIDE DRYWALL GRID ADAPTER
L2	2'x4' LED VOLUMETRIC LIGHT FIXTURE LITHONIA LIGHTING 2BLT4-60L-ADP-EZ1-LP840-N80	277	LED	GRID	STANDARD	• 53 MAX VA • nLIGHT ENABLED
L2A	2'x4' LED VOLUMETRIC LIGHT FIXTURE LITHONIA LIGHTING 2BLT4-60L-ADP-EZ1-LP840-N80	277	LED	FLANGE	STANDARD	• 53 MAX VA • nLIGHT ENABLED • PROVIDE DRYWALL GRID ADAPTER
L3	2'x4' LED TROFFER LITHONIA LIGHTING 2TL4-40L-FW-A12-EZ1-LP840-N80	277	LED	GRID	STANDARD	• 32 MAX VA • nLIGHT ENABLED
L3A	2'x4' LED TROFFER LITHONIA LIGHTING 2TL4-40L-FW-A12-EZ1-LP840-N80-DGA24	277	LED	GRID	STANDARD	• 32 MAX VA • nLIGHT ENABLED • PROVIDE DRYWALL GRID ADAPTER
L4	2'x2' LED VOLUMETRIC LIGHT FIXTURE LITHONIA LIGHTING 2BLT2-33L-ADP-EZ1-LP840	277	LED	GRID	STANDARD	• 30 MAX VA • nLIGHT ENABLED
L4A	2'x2' LED VOLUMETRIC LIGHT FIXTURE LITHONIA LIGHTING 2BLT2-33L-ADP-EZ1-LP840	277	LED	FLANGE	STANDARD	• 30 MAX VA • PROVIDE DRYWALL GRID ADAPTER • nLIGHT ENABLED
L5	2'x2' LED VOLUMETRIC LIGHT FIXTURE LITHONIA LIGHTING 2BLT2-40L-ADP-EZ1-LP840-N80	277	LED	GRID	STANDARD	• 39 MAX VA • nLIGHT ENABLED
L6	4' INDUSTRIAL LED STRIP LIGHT FIXTURE LITHONIA LIGHTING CLX-L48--5000LM-SEF-WDL-WD-GZ10-40K-90CRI-N100	277	LED	SURFACE/SUSPENDED (HEIGHT AS INDICATED ON DWGS)	STANDARD	• 35 MAX VA • nLIGHT ENABLED WHERE INDICATED
L7	LED LINEAR DIRECT LIGHT FIXTURE MARK ARCHITECTURAL LIGHTING SL2L-LOP-FLP-TG-90CRI-35K-800LMF-MIN1-nLIGHT-277	277	LED (533 LUMENS/FT)	GRID	STANDARD	• 6 MAX VA/LF • nLIGHT ENABLED • SEE NOTE #5.
L7A	LED LINEAR DIRECT LIGHT FIXTURE MARK ARCHITECTURAL LIGHTING SL2L-LOP-FLP-TG-90CRI-35K-800LMF-MIN1-nLIGHT-277	277	LED (705 LUMENS/FT)	GRID	STANDARD	• 8 MAX VA/LF • nLIGHT ENABLED
L8	2' LED VANITY FIXTURE LITHONIA LIGHTING FMVCSL-24IN-MVOLT-40-90CRI-BN	277	LED	WALL ABOVE MIRROR	BRUSHED ALUMINUM	• 18 MAX VA
L9	4' LED VANITY FIXTURE LITHONIA LIGHTING FMVCSL-48IN-MVOLT-40K-90CRI-BN	277	LED	WALL ABOVE MIRROR	BRUSHED ALUMINUM	• 34 MAX VA
L10	2'x4' LED VOLUMETRIC LIGHT FIXTURE LITHONIA LIGHTING 2BLT4-72L-ADP-EZ1-LP840-N80	277	LED	GRID	STANDARD	• 59 MAX VA • nLIGHT ENABLED
L11	2'x4' LED VOLUMETRIC LIGHT FIXTURE LITHONIA LIGHTING 2BLT4-30L-ADP-EZ1-LP840-N80	277	LED	GRID	STANDARD	• 24 MAX VA • nLIGHT ENABLED
L12	4' LED WALL UPLIGHT/DOWN LIGHT FIXTURE AXIS LIGHTING TWRWLED-SL 90/10-1250-80-35-VL-4-AP-UNV-D	277	LED	WALL MOUNT ON SOFFIT. BOTTOM OF FIXTURE SHALL BE MOUNTED AT SAME LEVEL AS BOTTOM OF SOFFIT.	ALUMINUM	• 50 MAX VA
R1	6" LED DOWNLIGHT GOTHAM LIGHTING EVO-40/20-6AR-WD-LSS-MVOLT-NPS80EZ	277	LED	RECESSED	CLEAR	• 23 MAX VA • nLIGHT ENABLED
R2	4" LED DOWNLIGHT GOTHAM LIGHTING EVO-40/07-4AR-WD-LSS-MVOLT-NPS80EZ	277	LED	RECESSED	CLEAR	• 11 MAX VA • nLIGHT ENABLED
R3	6" LED DOWNLIGHT GOTHAM LIGHTING EVO-40/20-6-DFR-MVOLT-NPS80EZ	277	LED	RECESSED	WET LOCATION	• 23 MAX VA • nLIGHT ENABLED
W1	WALL MOUNT LED FIXTURE LITHONIA LIGHTING DSXW1 LED-10C-1000-30K-T4M-MVOLT-DDBXD	277	LED	WALL MOUNT @ 13'-0" AFF.	DARK BRONZE	• 40 MAX VA • PROVIDE FULL CUTOFF
W2	WALL MOUNT LED FIXTURE LITHONIA LIGHTING DSXW1 LED-10C-700-30K-T3M-MVOLT-DDBXD	277	LED (2567 LUMENS)	WALL MOUNT @ 12'-0" AFF.	DARK BRONZE	• 26 MAX VA • PROVIDE WET LOCATION LISTED
WW	4' WALL MOUNT WALL WASH VODE LIGHTING 107-WG-01-48-WA-18-1P-AE-2-Z-LO-309-AL	277	LED (984 LUMENS)	WALL MOUNT @ 7'-0" AFF. (COORDINATE MOUNTING HEIGHT W/ INTERIOR DESIGNER)	CLEAR ANODIZED	• 16 MAX VA • ADJUST LIGHT FIXTURE TO AIM AS REQUIRED BY OWNER
WW2	6' WALL MOUNT WALL WASH VODE LIGHTING 107-WG-01-72-WA-18-1P-AE-2-Z-LO-309-AL	277	LED (1476 LUMENS)	WALL MOUNT @ 7'-0" AFF. (COORDINATE MOUNTING HEIGHT W/ INTERIOR DESIGNER)	CLEAR ANODIZED	• 23 MAX VA • ADJUST LIGHT FIXTURE TO AIM AS REQUIRED BY OWNER
WW1	WALL WASH LED FIXTURE PRUDENTIAL LIGHTING P23-PER-FLSH-LED3-SO-8'-TMW-MWW-D1R-LP-SC-UNV-X7-DM10	277	LED	RECESSED	STANDARD	• 80 MAX VA
P1	SINGLE HEAD LIGHT POLE LITHONIA LIGHTING DSX1 LED-P6-30K-T3M-480-DDXD	480	LED (17,683 LUMENS)	SEE DETAIL #2, SHEET es101	DARK BRONZE	• 163 MAX VA • PROVIDE FULL CUTOFF
P2	DOUBLE HEAD LIGHT POLE LITHONIA LIGHTING DSX1 LED-P6-30K-T5W-480-DDBXD	480	LED (18,228 LUMENS/HEAD)	SEE DETAIL #2, SHEET es101	DARK BRONZE	• 163 MAX VA/HEAD • PROVIDE FULL CUTOFF
SP1	SINGLE HEAD FLOODLIGHT LUMENPULSE LIGHTING LQL-277-30K-NF-WM-BK	277	LED	MOUNT 8' AFF TO PILLARS AS INDICATED ON el104, el105. ANGLE UP TOWARDS CANOPY.	BLACK	• 50 MAX VA • PROVIDE FULL CUTOFF
B1	BOLLARD LED LIGHT FIXTURE LITHONIA LIGHTING DSXB LED-16C-350-30K-SYM-480-DDBXD	480	LED (1558 LUMENS)	BOLLARD	DARK BRONZE	• 20 MAX VA • PROVIDE FULL CUTOFF
EX	LED EXIT SIGN LITHONIA LIGHTING LRP-GC-120/277-ELN	277	5W LED	WALL, CEILING OR PENDANT AS REQUIRED	STANDARD	• 5 MAX VA
EX2	LED EXIT SIGN LITHONIA LIGHTING WLTE-W-R	277	5W LED	WALL, CEILING OR PENDANT AS REQUIRED	STANDARD	• 5 MAX VA

1. PROVIDE INTEGRAL, 1400 LUMENS, 90 MINUTE BATTERY BACK UP FOR LIGHTING FIXTURES WHERE INDICATED ON PLANS.

2. FIXTURE SCHEDULE INDICATES GENERAL DESCRIPTION OF LIGHTING FIXTURES AND MANUFACTURERS CATALOG NUMBERS. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE CORRECT CEILING CONFIGURATION AND PROVIDE THE FIXTURES WITH ALL NECESSARY TRIMS AND MOUNTING HARDWARE SO THAT BOTH THE CEILING SYSTEM AND THE FIXTURE CONSTRUCTION MATCH.

3. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO VERIFY EXACT LOCATIONS OF ALL LIGHTING FIXTURES AND TYPE OF CEILING WITH THE ARCHITECTURAL REFLECTED CEILING PLAN PRIOR TO ANY WORK. REFER TO ARCHITECTURAL ELEVATION DRAWINGS FOR MOUNTING HEIGHTS OF WALL MOUNTED FIXTURES.

4. PROVIDE NUMBER OF FIXTURES AS INDICATED ON PLAN. PROVIDE ALL FITTINGS AND ACCESSORIES REQUIRED FOR A COMPLETE SYSTEM.

5. PROVIDE 90° CORNER FITTINGS WHERE REQUIRED.

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job 1717

date 11.16.18

revisions

Pascua Yaqui Tribe
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symbols & abbreviations

e001

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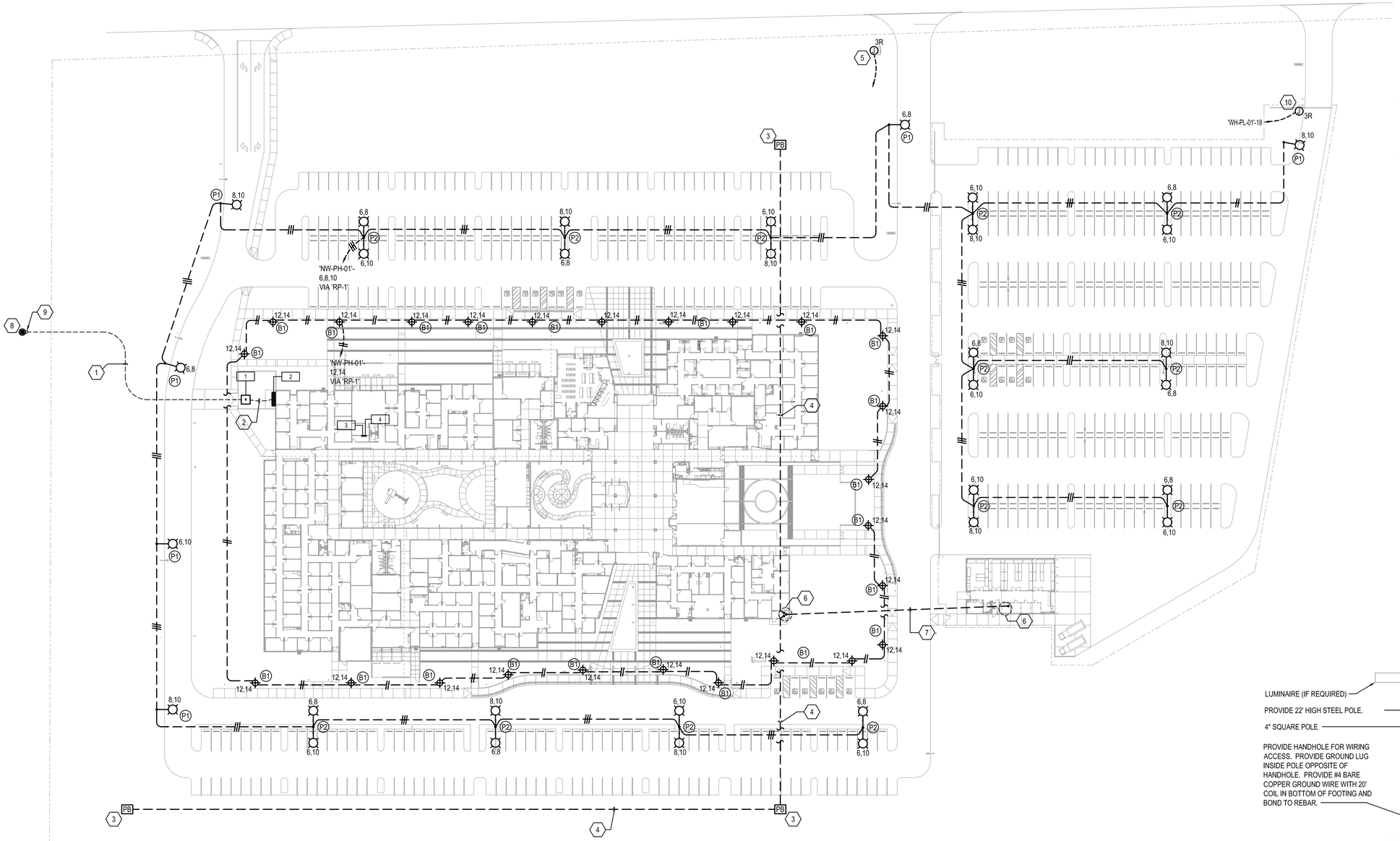


1 es101 **electrical site plan**
1" = 40'-0"

general notes:

A. UTILITY CONDUIT ROUTING IS APPROXIMATELY CONTRACTOR SHALL REFER TO THE UTILITY COMPANY DRAWINGS AND SHALL INSTALL THE CONDUITS AND TRENCHING PER THE UTILITY COMPANY REQUIREMENTS. PROVIDE ADDITIONAL PULL BOXES, HAND HOLES, CONDUIT AND EQUIPMENT AS REQUIRED PER UTILITY COMPANY REQUIREMENTS.

B. PROVIDE A TRACER WIRE FOR ALL UNDERGROUND SITE CONDUITS PER ARIZONA STATE STATUTE REF. 40-360.22-M.

C. CONTRACTOR TO BLUE STAKE ALL (E) UTILITIES PRIOR TO INSTALLING (N) CONDUITS.

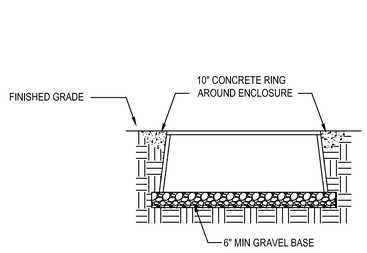
D. PROVIDE SAW CUTTING OF (E) ASPHALT/CONCRETE FOR (N) CONDUITS WHERE REQUIRED AS REQUIRED

keynotes: (#)

1. 4" EC W/ PULLCORD PER TEP REQUIREMENTS.
2. REFER TO SINGLE LINE DIAGRAM, ep701 FOR SIZE & QUANTITY OF CONDUIT & CONDUCTORS.
3. 36"x60" PULL BOX EQUAL TO PENCELL, MODEL NUMBER PM366024PCH00012 (COMMUNICATIONS). SEE PULL BOX DETAIL, THIS SHEET.
4. (4) 4" EC W/ PULLCORD PER TELECOMMUNICATIONS PROVIDER REQUIREMENTS.
5. NEMA-3R J-BOX FOR CONNECTION OF OUTDOOR SIGN. COORDINATE EXACT MOUNTING LOCATION W/ ARCHITECT PRIOR TO ROUGH-IN.
6. STUB CONDUITS INSIDE MDF/COMM ROOM. STUF 12" AFF & COORDINATE STUB OUT LOCATION W/ TELECOMMUNICATION DESIGNER PRIOR TO ROUGH-IN.
7. (2) 4" EC W/ PULLCORD.
8. (E) UTILITY POLE TO REMAIN.
9. (N) RISER PER TEP REQUIREMENTS.
10. NEMA-3R J-BOX FOR CONNECTION OF GATE POWER. COORDINATE EXACT MOUNTING LOCATION W/ ARCHITECT PRIOR TO ROUGH-IN.

equip. keynotes: (·)

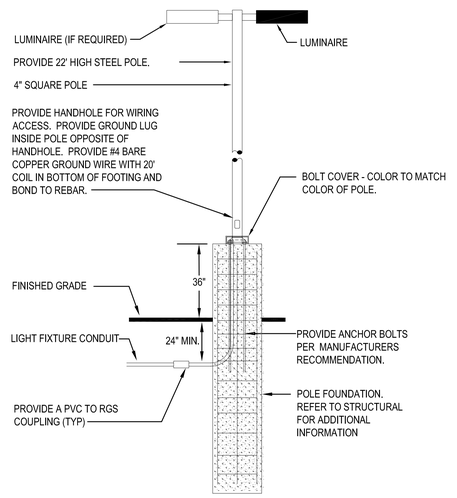
1. TEP UTILITY XFMR. PROVIDE PAD PER TEP REQUIREMENTS.
2. SERVICE ENTRANCE SWITCHBOARD 'SES-1'.
3. PANEL 'NW-PH-01'.
4. LIGHTING CONTROL RELAY PANEL 'RP1'.



NOTE:

- CONCRETE ENCASEMENT TO BE 3,000 PSI MINIMUM.

3 es101 **typical pull box detail**
n.t.s.



2 es101 **typical light pole detail**
n.t.s.

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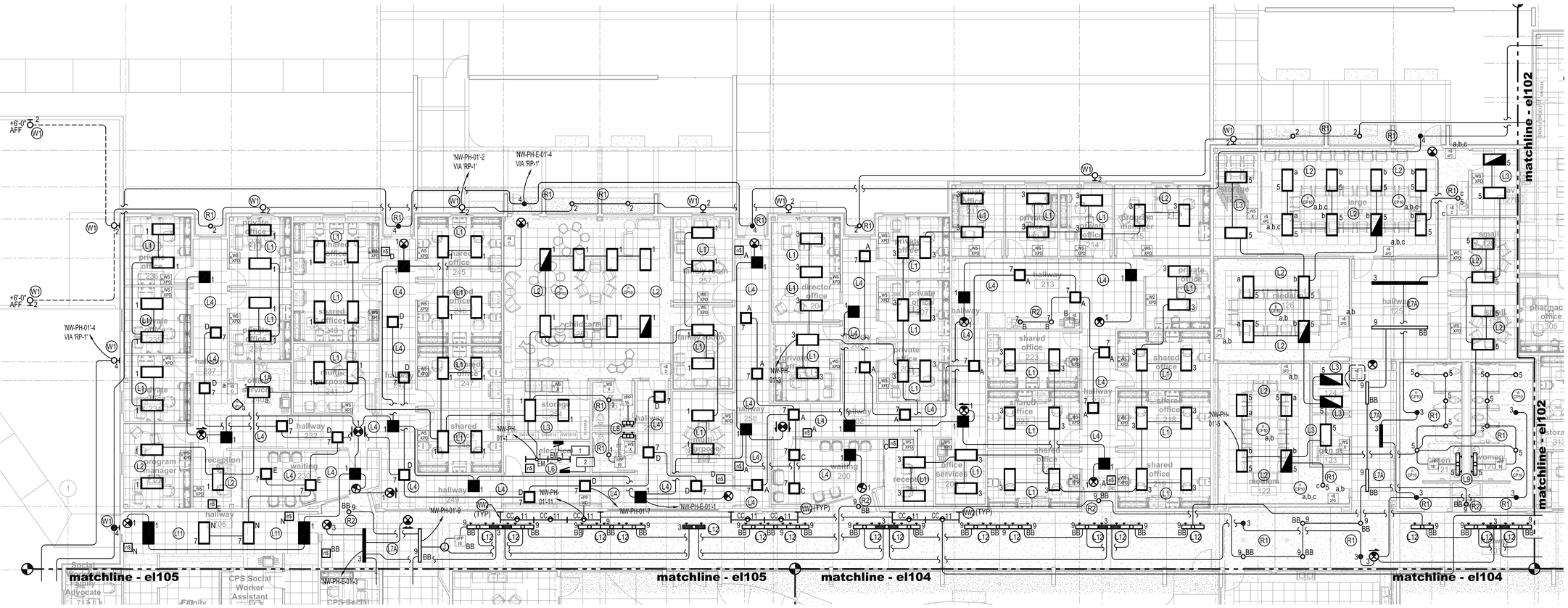


1 el101 **lighting plan - Sewa U'usim**

1/8" = 1'-0"

0' 4' 8' 16'

north

general notes:

A. MAINTAIN ALL NEC REQUIRED WORKING CLEARANCES FOR ALL ELECTRICAL EQUIPMENT.

B. ALL WIRING SHALL BE (2) #12, #12 GRD., UNLESS OTHERWISE NOTED.

C. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. SHARED NEUTRALS ARE NOT ALLOWED. (U.O.N.)(NEC ARTICLE 200.4)

D. ALL LIGHT FIXTURE(S) SHOWN WITH HALF SHADE (INTEGRAL BATTERY PACK) REQUIRES AN UNSWITCHED CIRCUIT.

E. LOW-VOLTAGE WIRING BETWEEN LOW-VOLTAGE CONTROL DEVICE & LIGHT FIXTURE(S) ARE NOT SHOWN ON THIS DRAWING. REFER TO CONTROL DIAGRAMS, SHEET ep703 FOR ADDITIONAL INFORMATION.

equip. keynotes: -

1. PANEL 'NW-PH-01'.
2. PANEL 'NW-PH-E-01'.

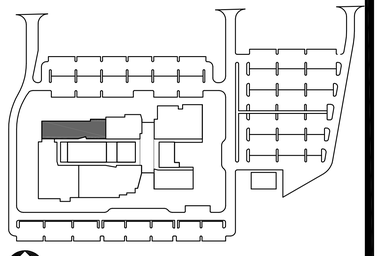
nLIGHT SYSTEM SYMBOLS LEGEND (REFER TO SHEET ep705 FOR nLIGHT SCHEDULE & DETAILS)

- nCM-PDT-10-RJB — nLIGHT, nCM-PDT-10-RJB CEILING MOUNT SENSOR; MICROPHONIC-DUAL TECHNOLOGY, 12 TO 24 VOLT VDC/VAC. DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).
- nWV — nLIGHT ENABLE nWV-PDT-KIT WIDE VIEW SENSOR MICROPHONIC- DUAL TECHNOLOGY (PDT), 12 TO 24 VDC/VAC USE OPTION WV-BR FOR CEILING MOUNTING. DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).
- WSX PDT — nLIGHT, nWSX-PDT-LV DUAL TECHNOLOGY WALL SENSOR, RAISE/LOWER DIM CONTROL, 12 TO 24 VOLT VDC/VAC. (SENSOR SHALL BE SET MANUAL 'ON', AUTO 'OFF'), DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).
- WSX — nLIGHT, nWSX-LV PASSIVE INFRARED WALL SENSOR, 12 TO 24 VOLT VDC/VAC. (SENSOR SHALL BE SET MANUAL 'ON', AUTO 'OFF'), DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).
- nS — nLIGHT LOW VOLTAGE PUSH-BUTTON WALL POD, RAISE/LOWER DIMMING "nPODM-DX". DEVICE SHALL CONTROL LIGHTING WITHIN THE SPACE (U.O.N).
- nS 2PD — a,b — nLIGHT LOW VOLTAGE PUSH-BUTTON WALL POD, TWO POLE, RAISE/LOWER DIMMING "nPODM-2P-DX" "a,b" INDICATES LIGHTING ZONE(S) CONTROLLED WITHIN THE SPACE (U.O.N),
- nS 4PD — a,b,c — nLIGHT LOW VOLTAGE PUSH-BUTTON WALL POD, FOUR POLE, RAISE/LOWER DIMMING "nPODM-4P-DX" "a,b,c..." INDICATES LIGHTING CONTROLLED WITHIN THE SPACE (U.O.N).
- nS — nLIGHT LOW VOLTAGE PUSH-BUTTON WALL POD, SINGLE POLE, NON-DIMMING "nPODM". DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).

nLIGHT SYSTEM NOTES

1. COORDINATE WITH nLIGHT FOR EXACT MATERIAL AND INSTALLATION REQUIREMENTS PRIOR TO ORDERING/INSTALLATION.
2. FOR NON n-LIGHT ENABLED FIXTURES, PROVIDE PROPER DEVICE INTERFACE. COORDINATE WITH MANUFACTURER FOR REQUIREMENTS.
3. ALL CABLING SHALL BE ROUTED IN FREE AIR ABOVE ACCESSIBLE CEILING SPACE. CABLE SHALL BE ROUTED VIA J-HOOKS. BOXES, SIZED PER MANUFACTURERS RECOMMENDATIONS AND SHALL BE PROVIDED FOR ALL WALL DEVICES W/ 1" CONDUIT ROUTED 6" TO ABOVE ACCESSIBLE CEILING SPACE.
4. ALL CABLING SHALL BE PLENUM RATED.
5. PROVIDE ADDITIONAL J-BOXES WHERE REQUIRED BY MANUFACTURER.
6. PROVIDE SHOP DRAWING FOR nLIGHT SYSTEM.
7. 'a,b/A,B' INDICATES LIGHTING ZONE(S) CONTROLLED WITH-IN THE SPACE.

- nPP 16 — nLIGHT POWER/RELAY PACK "nPP16-EFP" 120/277V VAC.
- nPP 16D — nLIGHT POWER/RELAY PACK "nPP16D-EFP" 120/277V VAC W/ 0-10VDC DIMMING.



north **keyplan**

n.t.s.

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lighting plan - Sewa U'usim

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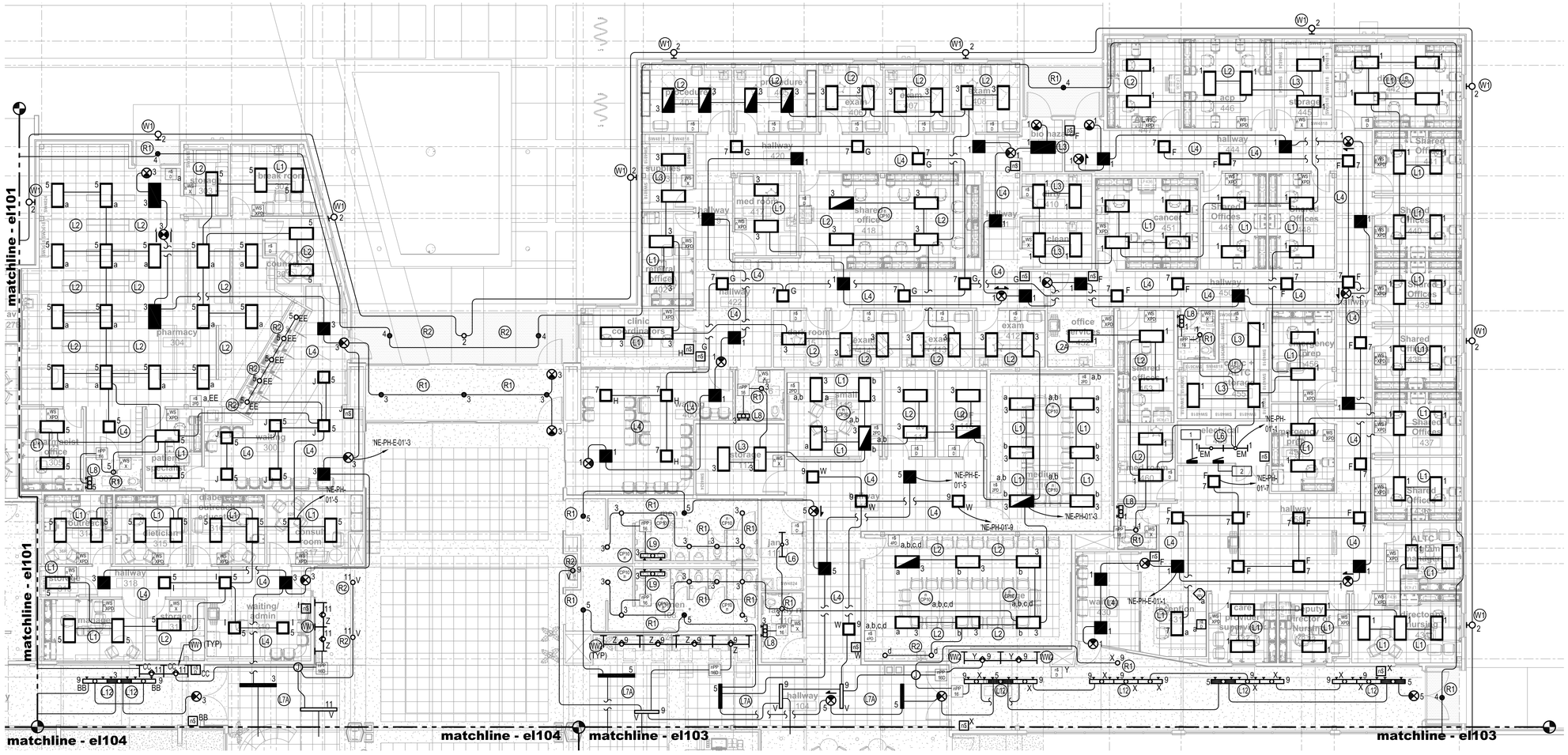
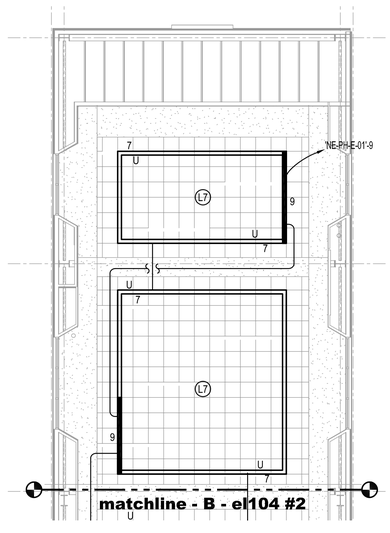
el101





2 el102 **lighting plan - main lobby lighting**
1/8" = 1'-0"
0 4 8 16
north

general notes:

A. MAINTAIN ALL NEC REQUIRED WORKING CLEARANCES FOR ALL ELECTRICAL EQUIPMENT.

B. ALL WIRING SHALL BE (2) #12, #12 GRD., UNLESS OTHERWISE NOTED.

C. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. SHARED NEUTRALS ARE NOT ALLOWED. (U.O.N.)(NEC ARTICLE 200.4)

D. ALL WORK LOCATED IN PATIENT CARE AREAS SHALL BE IN ACCORDANCE WITH ARTICLE 517 OF THE NEC.

E. ALL LIGHT FIXTURE(S) SHOWN WITH HALF SHADE (INTEGRAL BATTERY PACK) REQUIRES AN UNSWITCHED CIRCUIT.

F. LOW-VOLTAGE WIRING BETWEEN LOW-VOLTAGE CONTROL DEVICE & LIGHT FIXTURE(S) ARE NOT SHOWN ON THIS DRAWING. REFER TO CONTROL DIAGRAMS, SHEET ep703 FOR ADDITIONAL INFORMATION.

equip. keynotes:

1. PANEL 'NE-PH-01'.
2. PANEL 'NE-PH-E-01'.

nLIGHT SYSTEM SYMBOLS LEGEND (REFER TO SHEET ep705 FOR nLIGHT SCHEDULE & DETAILS)

nLIGHT, nCM-PDT-10-RJB CEILING MOUNT SENSOR; MICROPHONIC-DUAL TECHNOLOGY, 12 TO 24 VOLT VDC/VAC. DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).

nLIGHT ENABLE nWV-PDT-KIT WIDE VIEW SENSOR MICROPHONIC- DUAL TECHNOLOGY (PDT), 12 TO 24 VDC/VAC USE OPTION WV-BR FOR CEILING MOUNTING. DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).

nLIGHT, nWSX-PDT-LV DUAL TECHNOLOGY WALL SENSOR, RAISE/LOWER DIM CONTROL, 12 TO 24 VOLT VDC/VAC. (SENSOR SHALL BE SET MANUAL 'ON', AUTO 'OFF'). DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).

nLIGHT, nWSX-LV PASSIVE INFRARED WALL SENSOR, 12 TO 24 VOLT VDC/VAC. (SENSOR SHALL BE SET MANUAL 'ON', AUTO 'OFF'). DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).

nLIGHT LOW VOLTAGE PUSH-BUTTON WALL POD, RAISE/LOWER DIMMING "nPODM-DX". DEVICE SHALL CONTROL LIGHTING WITHIN THE SPACE (U.O.N).

nLIGHT LOW VOLTAGE PUSH-BUTTON WALL POD, TWO POLE, RAISE/LOWER DIMMING "nPODM-2P-DX" "a,b" INDICATES LIGHTING ZONE(S) CONTROLLED WITHIN THE SPACE (U.O.N).

nLIGHT LOW VOLTAGE PUSH-BUTTON WALL POD, FOUR POLE, RAISE/LOWER DIMMING "nPODM-4P-DX" "a,b,c..." INDICATES LIGHTING CONTROLLED WITHIN THE SPACE (U.O.N).

nLIGHT LOW VOLTAGE PUSH-BUTTON WALL POD, SINGLE POLE, NON-DIMMING "nPODM", DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).

nLIGHT SYSTEM NOTES

1. COORDINATE WITH nLIGHT FOR EXACT MATERIAL AND INSTALLATION REQUIREMENTS PRIOR TO ORDERING/INSTALLATION.
2. FOR NON n-LIGHT ENABLED FIXTURES, PROVIDE PROPER DEVICE INTERFACE. COORDINATE WITH MANUFACTURER FOR REQUIREMENTS.
3. ALL CABLING SHALL BE ROUTED IN FREE AIR ABOVE ACCESSIBLE CEILING SPACE. CABLE SHALL BE ROUTED VIA J-HOOKS. BOXES, SIZED PER MANUFACTURERS RECOMMENDATIONS AND SHALL BE PROVIDED FOR ALL WALL DEVICES W/ 1" CONDUIT ROUTED 6" TO ABOVE ACCESSIBLE CEILING SPACE.
4. ALL CABLING SHALL BE PLENUM RATED.
5. PROVIDE ADDITIONAL J-BOXES WHERE REQUIRED BY MANUFACTURER.
6. PROVIDE SHOP DRAWING FOR nLIGHT SYSTEM.
7. 'a,b/A,B' INDICATES LIGHTING ZONE(S) CONTROLLED WITH-IN THE SPACE.

nLIGHT POWER/RELAY PACK "nPP16-EFP" 120/277V VAC.

nLIGHT POWER/RELAY PACK "nPP16D-EFP" 120/277V VAC W/ 0-10VDC DIMMING.

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Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

lighting plan - nursing + clinics

el102

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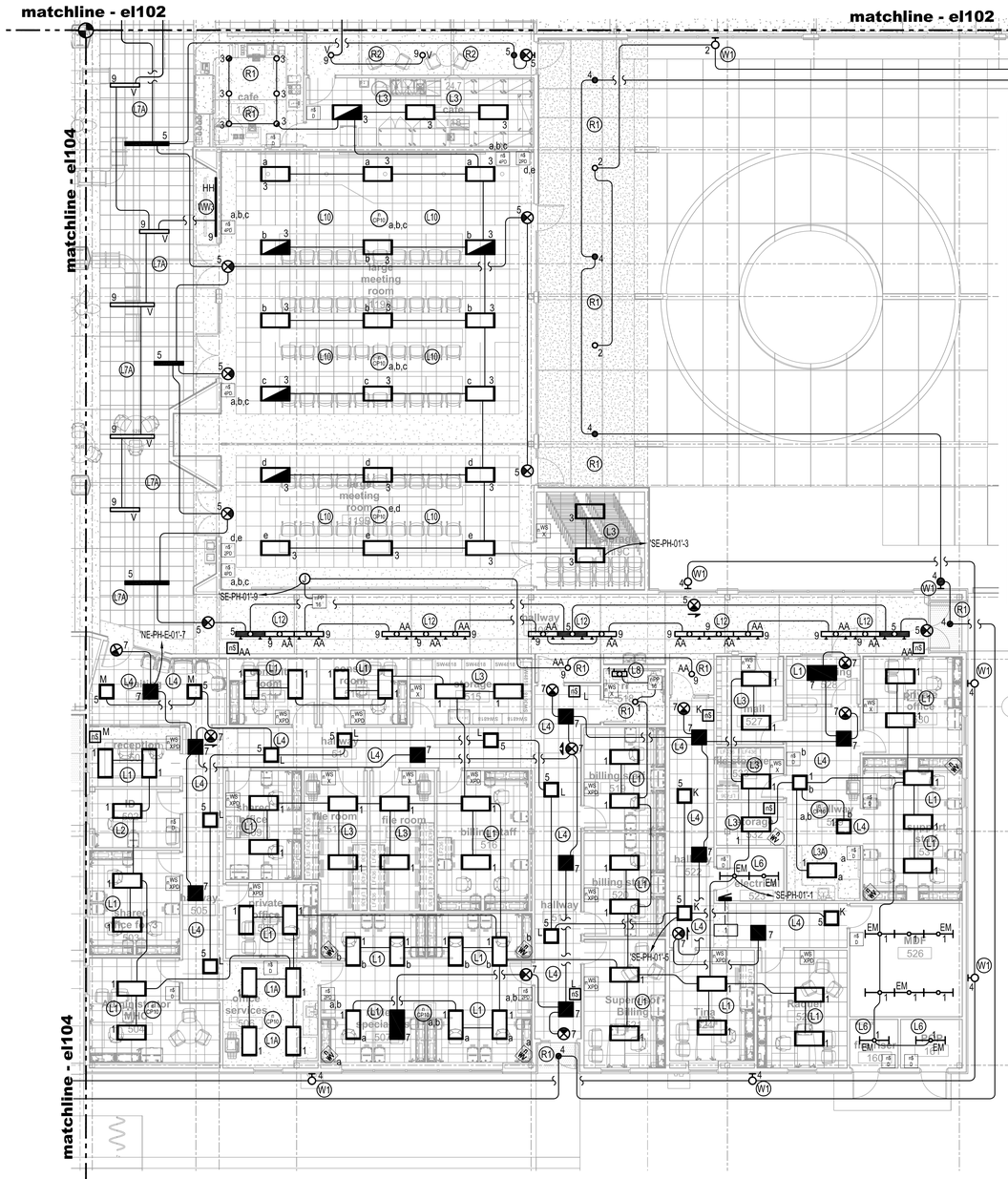


1 el103 **lighting plan - Health Budget + Managed Health / Billing**
1/8" = 1'-0"

2 el103 **lighting plan - Warehouse**
1/8" = 1'-0"

nLIGHT SYSTEM SYMBOLS LEGEND (REFER TO SHEET ep705 FOR nLIGHT SCHEDULE & DETAILS)

- nLIGHT, nCM-PDT-10-RJB CEILING MOUNT SENSOR; MICROPHONIC-DUAL TECHNOLOGY, 12 TO 24 VOLT VDC/VAC. DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).
- nLIGHT ENABLE nWV-PDT-KIT WIDE VIEW SENSOR MICROPHONIC- DUAL TECHNOLOGY (PDT), 12 TO 24 VDC/VAC USE OPTION WV-BR FOR CEILING MOUNTING. DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).
- nLIGHT, nWSX-PDT-LV DUAL TECHNOLOGY WALL SENSOR, RAISE/LOWER DIM CONTROL, 12 TO 24 VOLT VDC/VAC. (SENSOR SHALL BE SET MANUAL 'ON', AUTO 'OFF'). DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).
- nLIGHT, nWSX-LV PASSIVE INFRARED WALL SENSOR, 12 TO 24 VOLT VDC/VAC. (SENSOR SHALL BE SET MANUAL 'ON', AUTO 'OFF'). DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).
- nLIGHT LOW VOLTAGE PUSH-BUTTON WALL POD, RAISE/LOWER DIMMING "nPODM-DX". DEVICE SHALL CONTROL LIGHTING WITHIN THE SPACE (U.O.N).
- nLIGHT LOW VOLTAGE PUSH-BUTTON WALL POD, TWO POLE, RAISE/LOWER DIMMING "nPODM-2P-DX" "a,b" INDICATES LIGHTING ZONE(S) CONTROLLED WITHIN THE SPACE (U.O.N).
- nLIGHT LOW VOLTAGE PUSH-BUTTON WALL POD, FOUR POLE, RAISE/LOWER DIMMING "nPODM-4P-DX" "a,b,c..." INDICATES LIGHTING CONTROLLED WITHIN THE SPACE (U.O.N).
- nLIGHT LOW VOLTAGE PUSH-BUTTON WALL POD, SINGLE POLE, NON-DIMMING "nPODM". DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).

nLIGHT SYSTEM NOTES

1. COORDINATE WITH nLIGHT FOR EXACT MATERIAL AND INSTALLATION REQUIREMENTS PRIOR TO ORDERING/INSTALLATION.
2. FOR NON n-LIGHT ENABLED FIXTURES, PROVIDE PROPER DEVICE INTERFACE. COORDINATE WITH MANUFACTURER FOR REQUIREMENTS.
3. ALL CABLING SHALL BE ROUTED IN FREE AIR ABOVE ACCESSIBLE CEILING SPACE. CABLE SHALL BE ROUTED VIA J-HOOKS, BOXES, SIZED PER MANUFACTURERS RECOMMENDATIONS AND SHALL BE PROVIDED FOR ALL WALL DEVICES W/ 1" CONDUIT ROUTED 6" TO ABOVE ACCESSIBLE CEILING SPACE.
4. ALL CABLING SHALL BE PLENUM RATED.
5. PROVIDE ADDITIONAL J-BOXES WHERE REQUIRED BY MANUFACTURER.
6. PROVIDE SHOP DRAWING FOR nLIGHT SYSTEM.
7. 'a,b/A,B' INDICATES LIGHTING ZONE(S) CONTROLLED WITH-IN THE SPACE.

- nLIGHT POWER/RELAY PACK "nPP16-EFP" 120/277V VAC.
- nLIGHT POWER/RELAY PACK "nPP16D-EFP" 120/277V VAC W/ 0-10VDC DIMMING.

general notes:

A. MAINTAIN ALL NEC REQUIRED WORKING CLEARANCES FOR ALL ELECTRICAL EQUIPMENT.

B. ALL WIRING SHALL BE (2) #12, #12 GRD., UNLESS OTHERWISE NOTED.

C. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. SHARED NEUTRALS ARE NOT ALLOWED. (U.O.N.)(NEC ARTICLE 200.4)

D. ALL LIGHT FIXTURE(S) SHOWN WITH HALF SHADE (INTEGRAL BATTERY PACK) REQUIRES AN UNSWITCHED CIRCUIT.

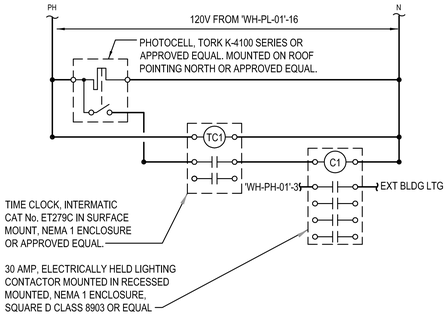
E. LOW-VOLTAGE WIRING BETWEEN LOW-VOLTAGE CONTROL DEVICE & LIGHT FIXTURE(S) ARE NOT SHOWN ON THIS DRAWING. REFER TO CONTROL DIAGRAMS, SHEET ep703 FOR ADDITIONAL INFORMATION.

keynotes: (#)

1. LTG CONTROLLER 'TC1'. REFER TO CONTROL DIAGRAM THIS SHEET.

equip. keynotes: (-)

1. PANEL 'SE-PH-01'.
2. PANEL 'WH-PH-01'.



3 el103 **time clock 'TC-1' diagram**
NO SCALE

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lighting plan - health budget + managed health/billing, warehouse

el103

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matchline - el101

matchline - el101

matchline - el102

matchline - el102

matchline - el103

matchline - el105

matchline - el105

DAYLIT AREA

'CS-PH-01-5

'CS-PH-01-3

'CS-PH-01-1

'CS-PH-01-7

'NE-PH-E-01-11

'SE-PH-01-7

matchline - B - el102

1 el104 **lighting plan - Center Spirit**
1/8" = 1'-0"

2 el104 **lighting plan - main lobby lighting**
1/8" = 1'-0"

general notes:

A. MAINTAIN ALL NEC REQUIRED WORKING CLEARANCES FOR ALL ELECTRICAL EQUIPMENT.

B. ALL WIRING SHALL BE (2) #12, #12 GRD., UNLESS OTHERWISE NOTED.

C. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. SHARED NEUTRALS ARE NOT ALLOWED. (U.O.N.)(NEC ARTICLE 200.4)

D. ALL LIGHT FIXTURE(S) SHOWN WITH HALF SHADE (INTEGRAL BATTERY PACK) REQUIRES AN UNSWITCHED CIRCUIT.

E. LOW-VOLTAGE WIRING BETWEEN LOW-VOLTAGE CONTROL DEVICE & LIGHT FIXTURE(S) ARE NOT SHOWN ON THIS DRAWING. REFER TO CONTROL DIAGRAMS, SHEET ep703 FOR ADDITIONAL INFORMATION.

equip. keynotes: -

1. PANEL 'CS-PH-01'.

nLIGHT SYSTEM SYMBOLS LEGEND (REFER TO SHEET ep705 FOR nLIGHT SCHEDULE & DETAILS)

- nLIGHT, nCM-PDT-10-RJB CEILING MOUNT SENSOR; MICROPHONIC-DUAL TECHNOLOGY, 12 TO 24 VOLT VDC/VAC. DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).
- nLIGHT ENABLE nWV-PDT-KIT WIDE VIEW SENSOR MICROPHONIC- DUAL TECHNOLOGY (PDT), 12 TO 24 VDC/VAC USE OPTION WV-BR FOR CEILING MOUNTING. DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).
- nLIGHT, nWSX-PDT-LV DUAL TECHNOLOGY WALL SENSOR, RAISE/LOWER DIM CONTROL, 12 TO 24 VOLT VDC/VAC. (SENSOR SHALL BE SET MANUAL 'ON', AUTO 'OFF'), DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).
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- nLIGHT LOW VOLTAGE PUSH-BUTTON WALL POD, RAISE/LOWER DIMMING "nPODM-DX", DEVICE SHALL CONTROL LIGHTING WITHIN THE SPACE (U.O.N).
- nLIGHT LOW VOLTAGE PUSH-BUTTON WALL POD, TWO POLE, RAISE/LOWER DIMMING "nPODM-2P-DX" "a,b" INDICATES LIGHTING ZONE(S) CONTROLLED WITHIN THE SPACE (U.O.N).
- nLIGHT LOW VOLTAGE PUSH-BUTTON WALL POD, FOUR POLE, RAISE/LOWER DIMMING "nPODM-4P-DX" "a,b,c..." INDICATES LIGHTING CONTROLLED WITHIN THE SPACE (U.O.N).
- nLIGHT LOW VOLTAGE PUSH-BUTTON WALL POD, SINGLE POLE, NON-DIMMING "nPODM". DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).
- nLIGHT POWER/RELAY PACK "nPP16-EFP" 120/277V VAC.
- nLIGHT POWER/RELAY PACK "nPP16D-EFP" 120/277V VAC W/ 0-10VDC DIMMING.

nLIGHT SYSTEM NOTES

1. COORDINATE WITH nLIGHT FOR EXACT MATERIAL AND INSTALLATION REQUIREMENTS PRIOR TO ORDERING/INSTALLATION.
2. FOR NON n-LIGHT ENABLED FIXTURES, PROVIDE PROPER DEVICE INTERFACE. COORDINATE WITH MANUFACTURER FOR REQUIREMENTS.
3. ALL CABLING SHALL BE ROUTED IN FREE AIR ABOVE ACCESSIBLE CEILING SPACE. CABLE SHALL BE ROUTED VIA J-HOOKS. BOXES, SIZED PER MANUFACTURERS RECOMMENDATIONS AND SHALL BE PROVIDED FOR ALL WALL DEVICES W/ 1" CONDUIT ROUTED 6" TO ABOVE ACCESSIBLE CEILING SPACE.
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5. PROVIDE ADDITIONAL J-BOXES WHERE REQUIRED BY MANUFACTURER.
6. PROVIDE SHOP DRAWING FOR nLIGHT SYSTEM.
7. 'a,b/A,B' INDICATES LIGHTING ZONE(S) CONTROLLED WITH-IN THE SPACE.

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Health Services Center II
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lighting plan - center spirit

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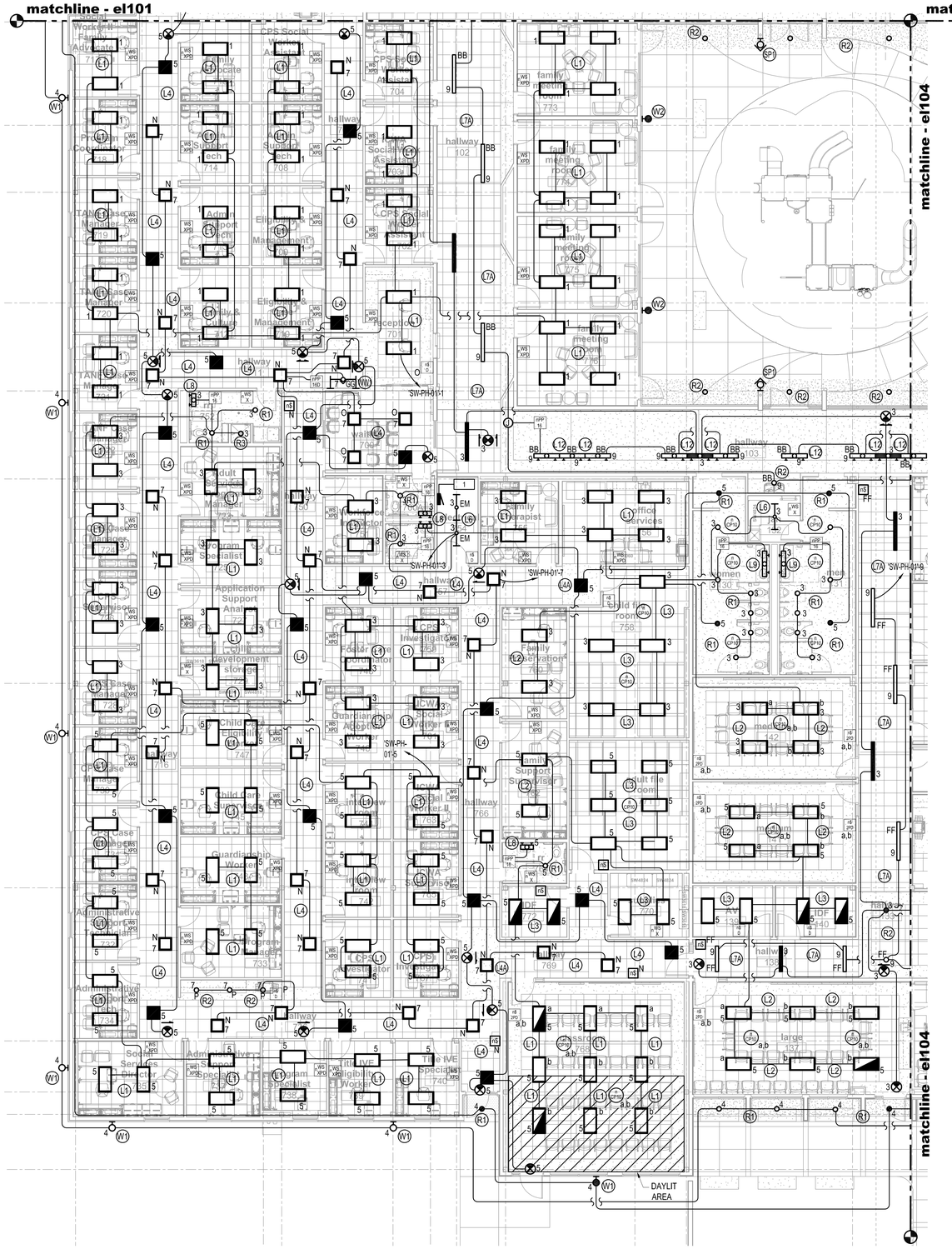

1 el105 **lighting plan - Social Services**
1/8" = 1'-0"

general notes:

A. MAINTAIN ALL NEC REQUIRED WORKING CLEARANCES FOR ALL ELECTRICAL EQUIPMENT.

B. ALL WIRING SHALL BE (2) #12, #12 GRD., UNLESS OTHERWISE NOTED.

C. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. SHARED NEUTRALS ARE NOT ALLOWED. (U.O.N.)(NEC ARTICLE 200.4)

D. ALL LIGHT FIXTURE(S) SHOWN WITH HALF SHADE (INTEGRAL BATTERY PACK) REQUIRES AN UNSWITCHED CIRCUIT.

E. LOW-VOLTAGE WIRING BETWEEN LOW-VOLTAGE CONTROL DEVICE & LIGHT FIXTURE(S) ARE NOT SHOWN ON THIS DRAWING. REFER TO CONTROL DIAGRAMS, SHEET ep703 FOR ADDITIONAL INFORMATION.

equip. keynotes:

1. PANEL 'SW-PH-01'.

nLIGHT SYSTEM SYMBOLS LEGEND (REFER TO SHEET ep705 FOR nLIGHT SCHEDULE & DETAILS)

- nLIGHT, nCM-PDT-10-RJB CEILING MOUNT SENSOR; MICROPHONIC-DUAL TECHNOLOGY, 12 TO 24 VOLT VDC/VAC. DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).
- nLIGHT ENABLE nWV-PDT-KIT WIDE VIEW SENSOR MICROPHONIC- DUAL TECHNOLOGY (PDT), 12 TO 24 VDC/VAC USE OPTION WV-BR FOR CEILING MOUNTING, DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).
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- nLIGHT LOW VOLTAGE PUSH-BUTTON WALL POD, SINGLE POLE, NON-DIMMING "nPODM". DEVICE SHALL CONTROL LIGHTING WITH-IN THE SPACE (U.O.N).

nLIGHT SYSTEM NOTES

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2. FOR NON n-LIGHT ENABLED FIXTURES, PROVIDE PROPER DEVICE INTERFACE. COORDINATE WITH MANUFACTURER FOR REQUIREMENTS.
3. ALL CABLING SHALL BE ROUTED IN FREE AIR ABOVE ACCESSIBLE CEILING SPACE. CABLE SHALL BE ROUTED VIA J-HOOKS. BOXES, SIZED PER MANUFACTURERS RECOMMENDATIONS AND SHALL BE PROVIDED FOR ALL WALL DEVICES W/ 1" CONDUIT ROUTED 6" TO ABOVE ACCESSIBLE CEILING SPACE.
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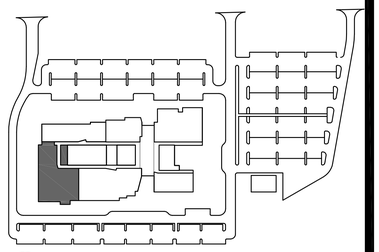
- nLIGHT POWER/RELAY PACK "nPP16D-EFP" 120/277V VAC W/ 0-10VDC DIMMING.



north **keyplan**
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lighting plan - social services

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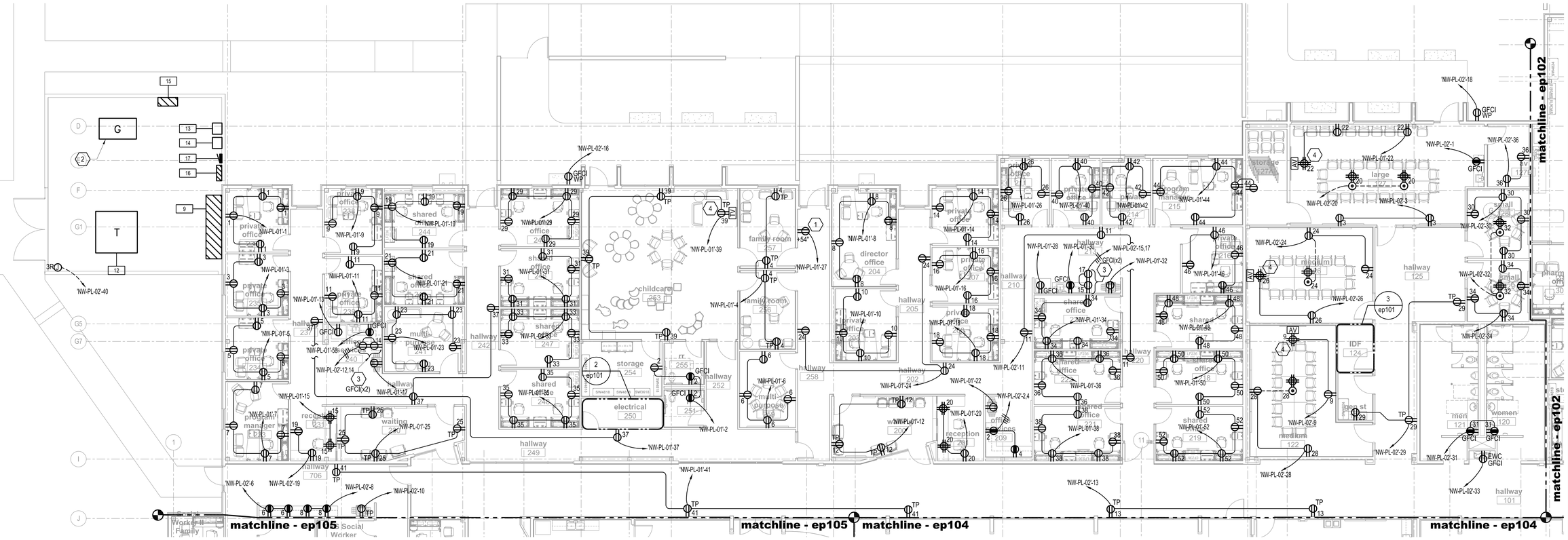
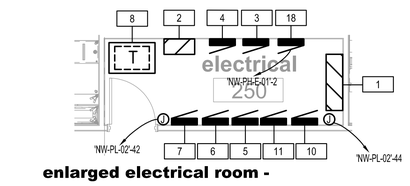
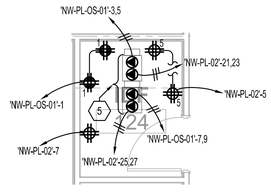


power plan - Sewa U'usim
1/8" = 1'-0"



enlarged electrical room - Sewa U'usim
1/4" = 1'-0"



enlarged IDF room - Sewa U'usim
1/4" = 1'-0"

general notes:

A. MAINTAIN ALL NEC REQUIRED WORKING CLEARANCES FOR ALL ELECTRICAL EQUIPMENT.

B. ALL WIRING SHALL BE (2) #12, #12 GRD., UNLESS OTHERWISE NOTED.

C. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. SHARED NEUTRALS ARE NOT ALLOWED. (U.O.N.)(NEC ARTICLE 200.4)

D. ACCESS AND WORKING SPACE OF ALL NEW ELECTRICAL EQUIPMENT SHALL COMPLY WITH ARTICLE 110.26 OF THE NEC. THERE SHALL NOT BE ANY PIPING, DUCTS, LEAK PROTECTION APPARATUS OR OTHER EQUIPMENT FOREIGN TO THE ELECTRICAL INSTALLATION 6 FEET ABOVE THE ELECTRICAL EQUIPMENT PER ARTICLE 110.28(E)(1).

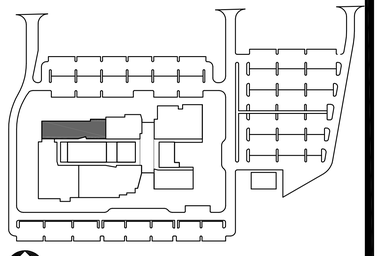
E. COORDINATE EXACT RECEPTACLE LOCATION(S) W/ FURNITURE PROVIDER PRIOR TO ROUGH-IN.

keynotes: (#)

1. DEVICE PROVIDED FOR TIMECLOCK. COORDINATE EXACT LOCATION WITH TIMECLOCK PROVIDER PRIOR TO ROUGH-IN.
2. 100KW DIESEL GENERATOR. SEE SINGLE LINE DIAGRAM, SHEETS EP701, EP702 FOR ADDITIONAL INFORMATION.
3. RECEPTACLE(S) MOUNTED INSIDE UPPER MICROWAVE SHELVES. COORDINATE EXACT MOUNTING LOCATION W/ ARCHITECT PRIOR TO ROUGH-IN.
4. RECEPTACLE MOUNTED INSIDE A/V BOX FOR TV. COORDINATE EXACT MOUNTING LOCATION W/ ARCHITECT PRIOR TO ROUGH-IN. REFER TO BOX DESCRIPTION ON SHEET e001.
5. RECEPTACLES MOUNTED ON TOP OF RACKS. COORDINATE EXACT MOUNTING LOCATION W/ OWNER'S REPRESENTATION PRIOR TO INSTALLATION.
6. J-BOX PROVIDED FOR IRRIGATION CONTROLLER. COORDINATE EXACT MOUNTING LOCATION WITH LANDSCAPING PRIOR TO ROUGH-IN.

equip. keynotes: (·)

1. DISTRIBUTION PANEL 'NW-DPH-01'.
2. DISTRIBUTION PANEL 'NW-DPL-01'.
3. PANEL 'NW-PH-01'.
4. PANEL 'NW-PH-02'.
5. PANEL 'NW-PL-01'.
6. PANEL 'NW-PL-02'.
7. PANEL 'NW-PL-03'.
8. PAD MOUNT DRY-TYPE TRANSFORMER 'NW-T-01', & 'NW-T-OS-01' MOUNTED ON TOP. PROVIDE METAL CHANNEL FRAME AS REQUIRED.
9. MAIN SERVICE ENTRANCE SWITCHBOARD 'NW-SESH-01'.
10. PANEL 'NW-PL-OS-01'.
11. PANEL 'NW-PH-E-01'.
12. TEP PAD MOUNT XFMR. PROVIDE PAD PER TEP REQUIREMENTS.
13. AUTOMATIC TRANSFER SWITCH 'ATS-1'.
14. AUTOMATIC TRANSFER SWITCH 'ATS-2'.
15. DISTRIBUTION PANEL 'NW-GDP-01'.
16. DISTRIBUTION PANEL 'NW-DPH-E-01'.
17. DISTRIBUTION PANEL 'NW-DPH-O-01'.
18. LIGHTING CONTROL RELAY PANEL 'RP1'.



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job
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11.16.18

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Health Services Center II
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power plan - Sewa U'usim

ep101

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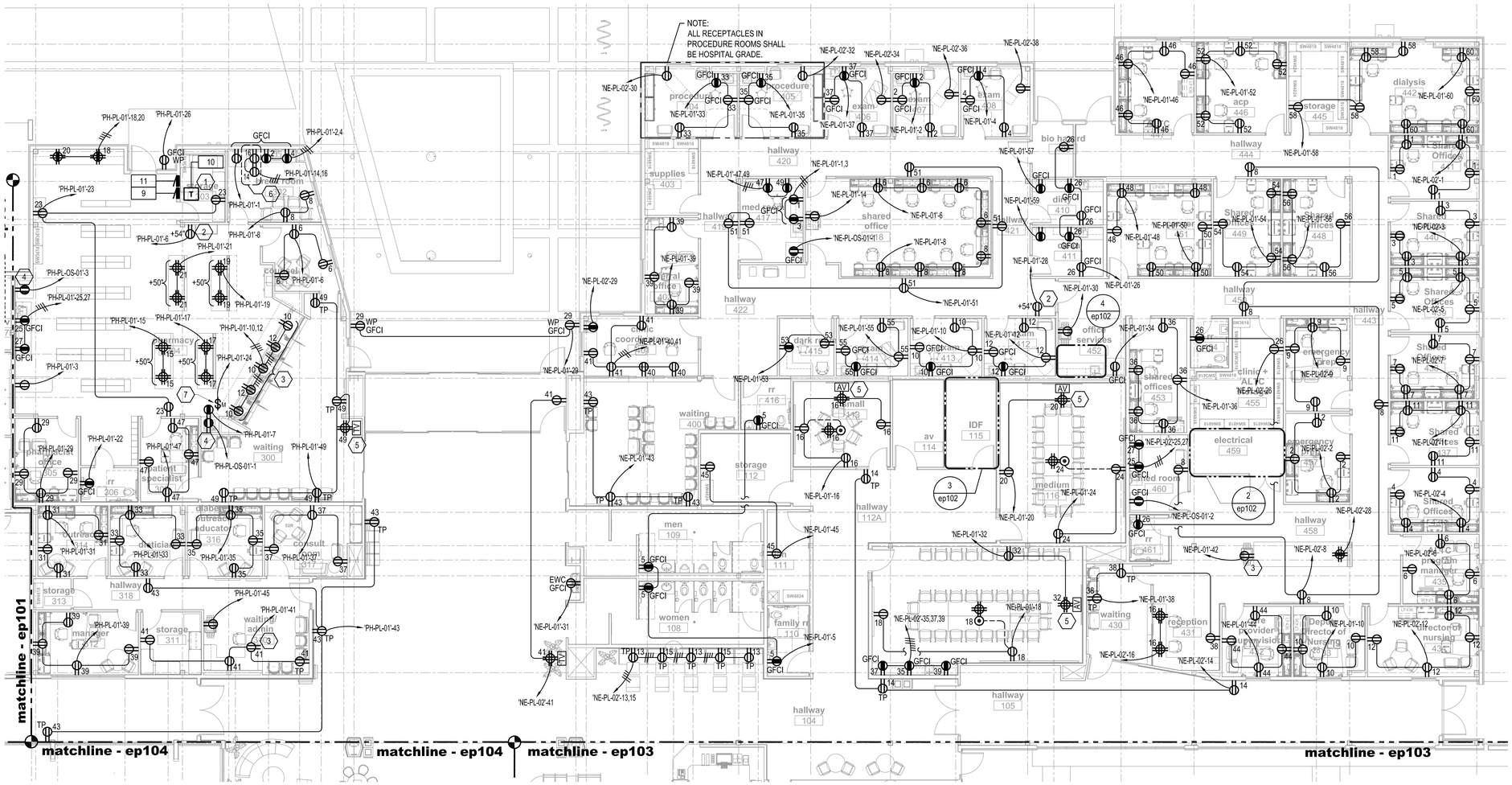
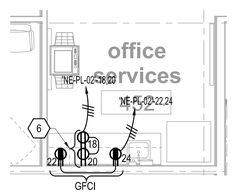
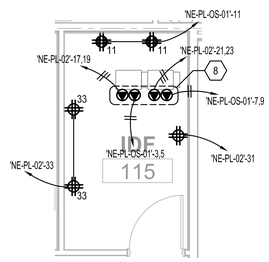


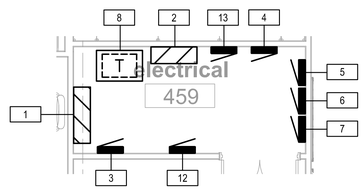
1 ep102 **power plan - Nursing + Clinics**
1/8" = 1'-0"



4 ep102 **enlarged office services 452**
1/4" = 1'-0"



3 ep102 **enlarged electrical room - nursing + clinics**
1/4" = 1'-0"



2 ep102 **enlarged electrical room - nursing + clinics**
1/4" = 1'-0"

general notes:

A. MAINTAIN ALL NEC REQUIRED WORKING CLEARANCES FOR ALL ELECTRICAL EQUIPMENT.

B. ALL WIRING SHALL BE (2) #12, #12 GRD., UNLESS OTHERWISE NOTED.

C. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. SHARED NEUTRALS ARE NOT ALLOWED. (U.O.N.)(NEC ARTICLE 200.4)

D. ACCESS AND WORKING SPACE OF ALL NEW ELECTRICAL EQUIPMENT SHALL COMPLY WITH ARTICLE 110.26 OF THE NEC. THERE SHALL NOT BE ANY PIPING, DUCTS, LEAK PROTECTION APPARATUS OR OTHER EQUIPMENT FOREIGN TO THE ELECTRICAL INSTALLATION 6 FEET ABOVE THE ELECTRICAL EQUIPMENT PER ARTICLE 110.26(E)(1).

E. ALL WORK SHALL BE IN ACCORDANCE WITH ARTICLE 517 OF THE NEC.

F. COORDINATE EXACT RECEPTACLE LOCATION(S) W/ FURNITURE PROVIDER PRIOR TO ROUGH-IN.

keynotes: (#)

1. DRY-TYPE TRANSFORMER MOUNTED ABOVE CEILING SPACE. SEE SINGLE LINE DIAGRAM(S), SHEET(S) ep701, ep702 FOR ADDITIONAL INFORMATION.
2. DEVICE PROVIDED FOR TIMECLOCK. COORDINATE EXACT LOCATION WITH TIMECLOCK PROVIDER PRIOR TO ROUGH-IN.
3. DEVICE(S) MOUNTED IN MILLWORK. COORDINATE EXACT MOUNTING LOCATION WITH MILLWORK PROVIDER PRIOR TO ROUGH-IN.
4. RECEPTACLE FOR REFRIGERATOR. COORDINATE EXACT MOUNTING LOCATION W/ ARCHITECT PRIOR TO ROUGH-IN.
5. RECEPTACLE MOUNTED INSIDE A/V BOX FOR TV. COORDINATE EXACT MOUNTING LOCATION W/ ARCHITECT PRIOR TO ROUGH-IN. REFER TO BOX DESCRIPTION ON SHEET e001.
6. RECEPTACLE(S) MOUNTED INSIDE UPPER MICROWAVE SHELVES. COORDINATE EXACT MOUNTING LOCATION W/ ARCHITECT PRIOR TO ROUGH-IN.
7. MAKE CONNECTION TO OVERHEAD GRILL. COORDINATE EXACT MOUNTING LOCATION WITH ARCHITECT PRIOR TO ROUGH-IN.
8. RECEPTACLE MOUNTED ON TOP OF RACKS. COORDINATE EXACT MOUNTING LOCATION W/ OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.

equip. keynotes: (-)

1. DISTRIBUTION PANEL 'NE-DPH-01'.
2. DISTRIBUTION PANEL 'NE-DPL-01'.
3. PANEL 'NE-PH-01'.
4. PANEL 'NE-PH-02'.
5. PANEL 'NE-PL-01'.
6. PANEL 'NE-PL-02'.
7. PANEL 'NE-PL-03'.
8. PAD MOUNT DRY-TYPE TRANSFORMER 'NE-T-01' & 'NE-T-OS-01' MOUNTED ON TOP. PROVIDE METAL CHANNEL FRAME AS REQUIRED.
9. PANEL 'PH-PL-01'.
10. DRY-TYPE TRANSFORMER 'NE-T-02' MOUNTED ABOVE ACCESSIBLE CEILING SPACE. PROVIDE METAL CHANNEL FRAME AS REQUIRED FOR MOUNTING OF TRANSFORMER.
11. PANEL 'PH-PL-OS-01'.
12. PANEL 'NE-PH-E-01'.
13. PANEL 'NE-PL-OS-01'.

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power plan - nursing + clinics

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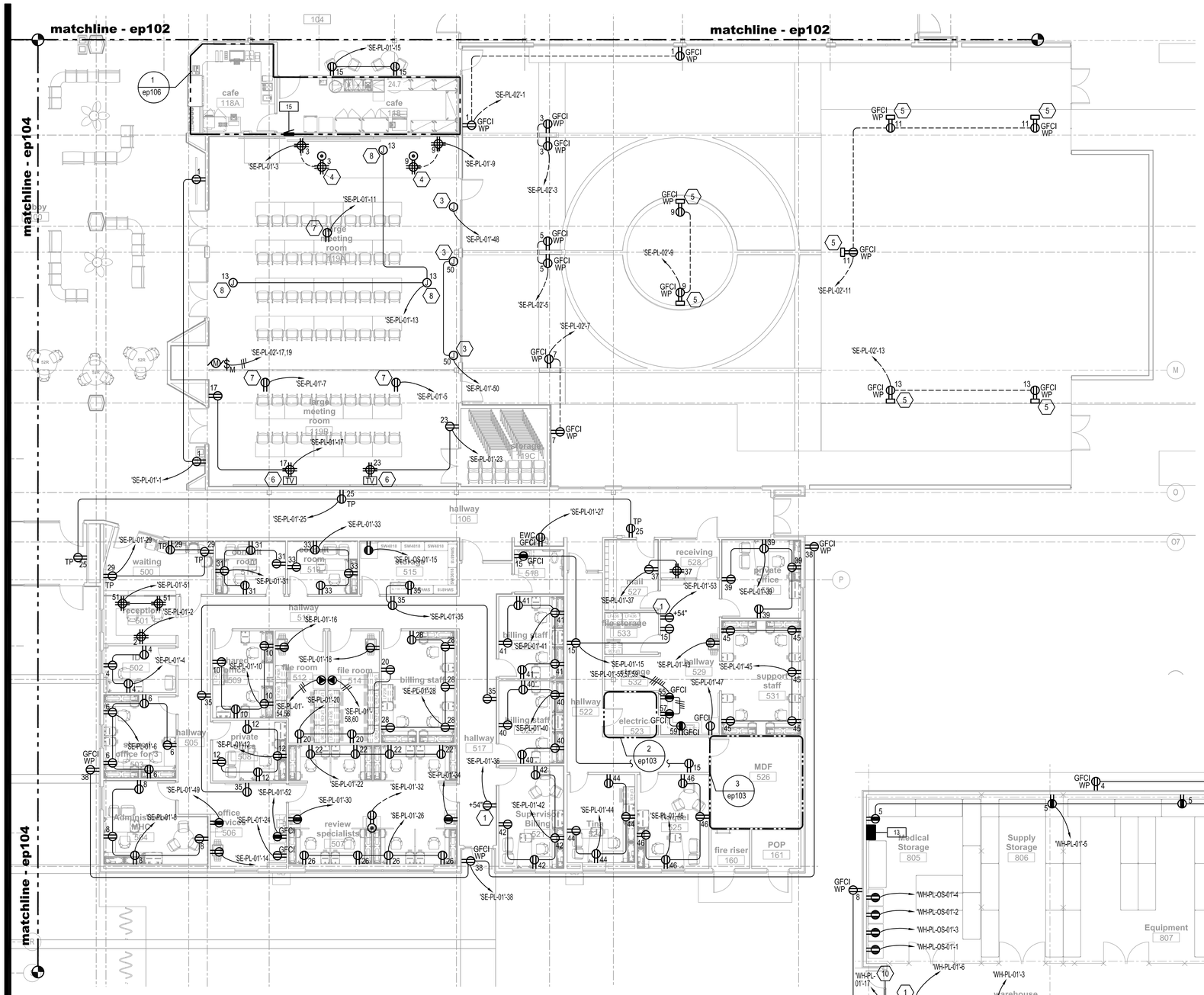
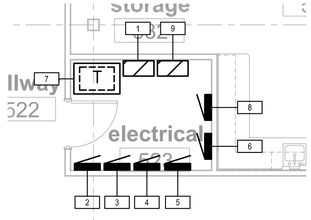
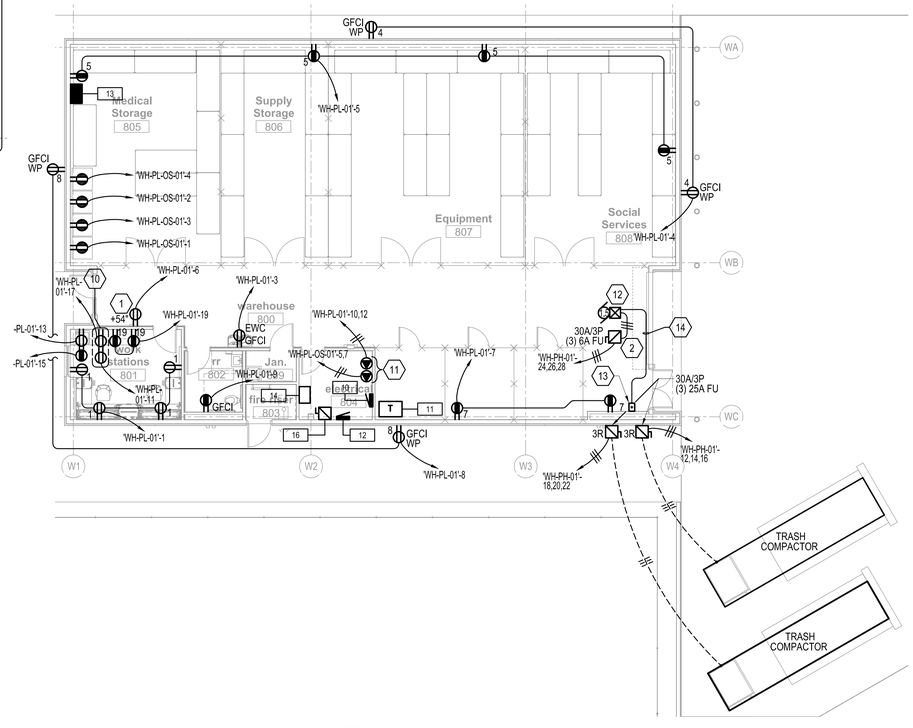


1 ep103 **power plan - Health Budget + Managed Health / Billing**
1/8" = 1'-0"



2 ep103 **enlarged electrical room - Health Budget + Managed Health / Billing**
1/4" = 1'-0"

3 ep103 **enlarged MDF room - Health Budget + Managed Health / Billing**
1/4" = 1'-0"



4 ep103 **power plan - Warehouse**
1/8" = 1'-0"

general notes:

A. MAINTAIN ALL NEC REQUIRED WORKING CLEARANCES FOR ALL ELECTRICAL EQUIPMENT.

B. ALL WIRING SHALL BE (2) #12, #12 GRD., UNLESS OTHERWISE NOTED.

C. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. SHARED NEUTRALS ARE NOT ALLOWED. (U.O.N.)(NEC ARTICLE 200.4)

D. ACCESS AND WORKING SPACE OF ALL NEW ELECTRICAL EQUIPMENT SHALL COMPLY WITH ARTICLE 110.26 OF THE NEC. THERE SHALL NOT BE ANY PIPING, DUCTS, LEAK PROTECTION APPARATUS OR OTHER EQUIPMENT FOREIGN TO THE ELECTRICAL INSTALLATION 6 FEET ABOVE THE ELECTRICAL EQUIPMENT PER ARTICLE 110.26(E)(1).

E. COORDINATE EXACT RECEPTACLE LOCATION(S) W/ FURNITURE PROVIDER PRIOR TO ROUGH-IN.

keynotes: (#)

1. DEVICE PROVIDED FOR TIMECLOCK. COORDINATE EXACT LOCATION WITH TIMECLOCK PROVIDER PRIOR TO ROUGH-IN.
2. DISCONNECT SWITCH FOR DOOR OPERATOR. MAKE CONNECTION AS REQUIRED.
3. JUNCTION BOX FOR CONNECTION OF ELECTRIC SHADES. COORDINATE EXACT MOUNTING LOCATION W/ ARCHITECT PRIOR TO ROUGH-IN.
4. COORDINATE EXACT MOUNTING LOCATION W/ ARCHITECT.
5. OUTDOOR POST/RECEPTACLE EQUAL TO ARLINGTON #GPD19B.
6. RECEPTACLE MOUNTED INSIDE A/V BOX FOR TV. COORDINATE EXACT MOUNTING LOCATION W/ ARCHITECT PRIOR TO ROUGH-IN. REFER TO BOX DESCRIPTION ON SHEET e001.
7. CLG MOUNT RECEPTACLE FOR CONNECTION OF PROJECTOR. COORDINATE EXACT MOUNTING LOCATION W/ ARCHITECT PRIOR TO ROUGH-IN.
8. JUNCTION BOX LOCATED ABOVE CEILING FOR CONNECTION OF PROJECTOR SCREEN.
9. RECEPTACLE(S) MOUNTED ON TOP OF RACKS. COORDINATE EXACT MOUNTING LOCATION W/ OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
10. RECEPTACLE(S) MOUNTED INSIDE UPPER MICROWAVE SHELVES. COORDINATE EXACT MOUNTING LOCATION WITH ARCHITECT PRIOR TO ROUGH-IN.
11. RECEPTACLE(S) FOR RACK COMM EQUIPMENT. COORDINATE EXACT MOUNTING LOCATION W/ OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
12. DOOR OPERATOR PROVIDED WITH STARTER.
13. DOOR OPERATOR CONTROL STATION PROVIDED W/ DOOR OPERATOR.
14. 3/4" C W/ CONDUCTORS PER MANUFACTURER REQUIREMENTS.
15. OPERABLE WALL MOTOR LOCATED ABOVE ACCESSIBLE CEILING SPACE. MAKE CONNECTION AS REQUIRED.

equip. keynotes: (·)

1. DISTRIBUTION PANEL 'SE-DPL-01'.
2. PANEL 'SE-PH-01'.
3. PANEL 'SE-PH-02'.
4. PANEL 'SE-PL-01'.
5. PANEL 'SE-PL-02'.
6. PANEL 'SE-PL-03'.
7. PAD MOUNT DRY-TYPE TRANSFORMER 'SE-T-01' WITH TRANSFORMER 'SE-T-OS-01' MOUNTED ON TOP. PROVIDE METAL CHANNEL FRAME AS REQUIRED.
8. PANEL SE-PL-OS-01.
9. DISTRIBUTION PANEL 'SE-DPH-01'.
10. PANEL WH-PL-01.
11. DRY-TYPE TRANSFORMER WH-T-01.
12. PANEL WH-PH-01.
13. MINI-POWER CENTER WH-PL-OS-01.
14. AUTOMATIC TRANSFER SWITCH ATS-3.
15. PANEL 'CF-P-L-01'
16. MAIN STAND-BY DISCONNECT SWITCH 'WH-FD-H-OS-01'.

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power plan - health budget + managed health/billing, warehouse

ep103

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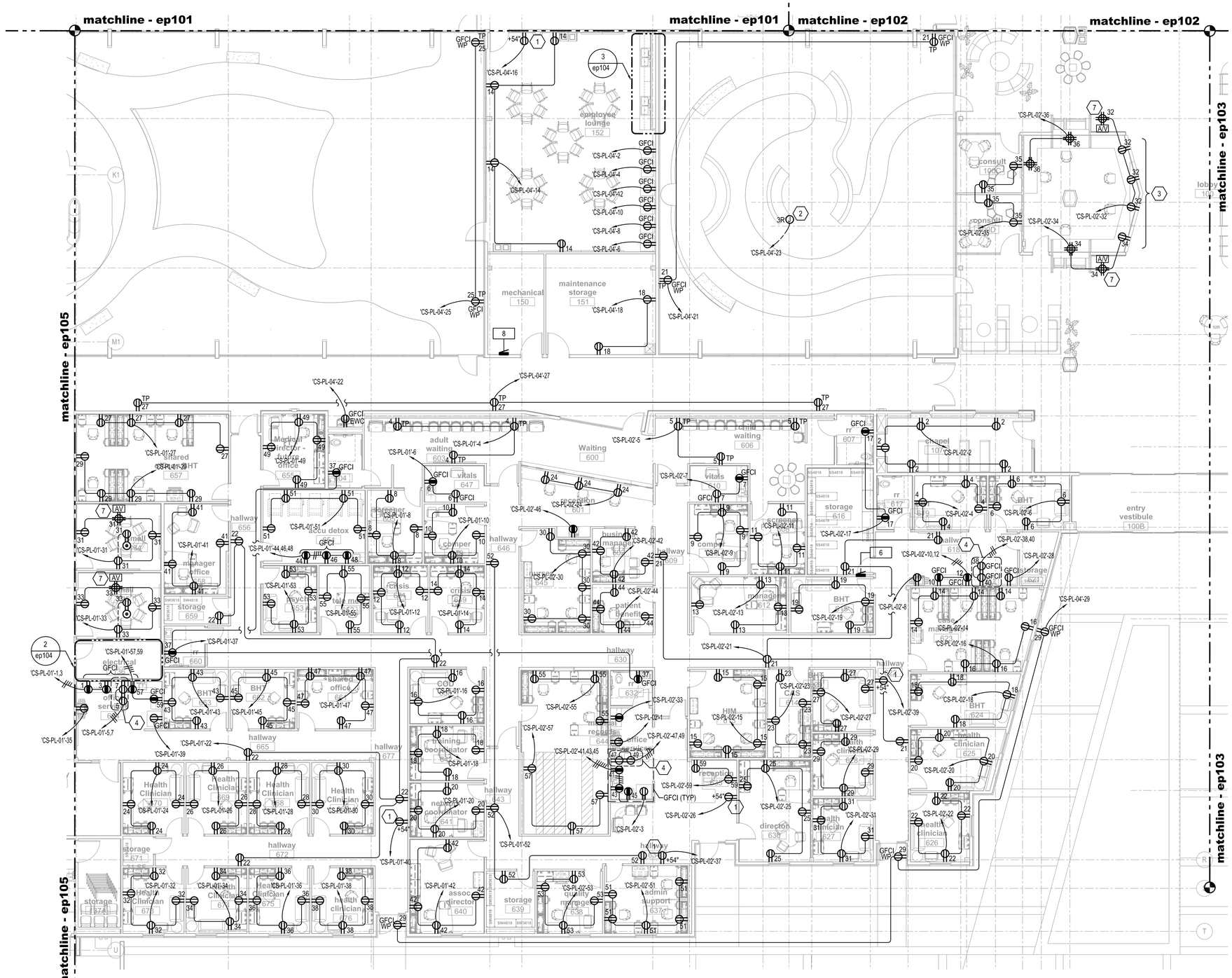
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matchline - ep105
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employee lounge 152
mechanical 150
maintenance storage 151
lobby 100
consult 100C
consult 100D
Waiting 600
adult waiting 603
vitals 647
Medical director - ophthalmology office 654
Shared office 657
hallway 656
accu detox 655
Shared office 652
manager office 658
storage 659
electrical 660
Shared office 662
Shared office 663
BHT 633
BHT 632
hallway 665
Health Clinician 670
Health Clinician 669
Health Clinician 668
Health Clinician 667
storage 671
hallway 672
Health Clinician 675
Health Clinician 674
Health Clinician 673
storage 676
hallway 677
hallway 646
hallway 609
hallway 630
hallway 643
training coordinator 644
new hire coordinator 641
assoc director 640
storage 639
quality manager 638
admin support 637
director 638
HIM 635
recepti 634
office 633
BHT 622
BHT 623
BHT 624
health clinician 625
health clinician 626
health clinician 627
health clinician 628
health clinician 629
CMS 621
manager 612
BHT 616
storage 616
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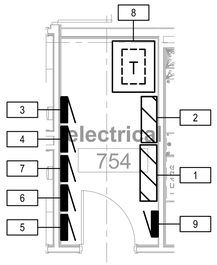
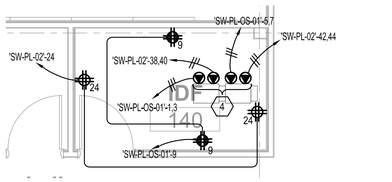


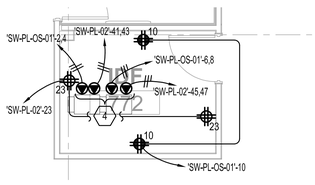
enlarged electrical room - social services

2 / ep105 — 1/4" = 1'-0"



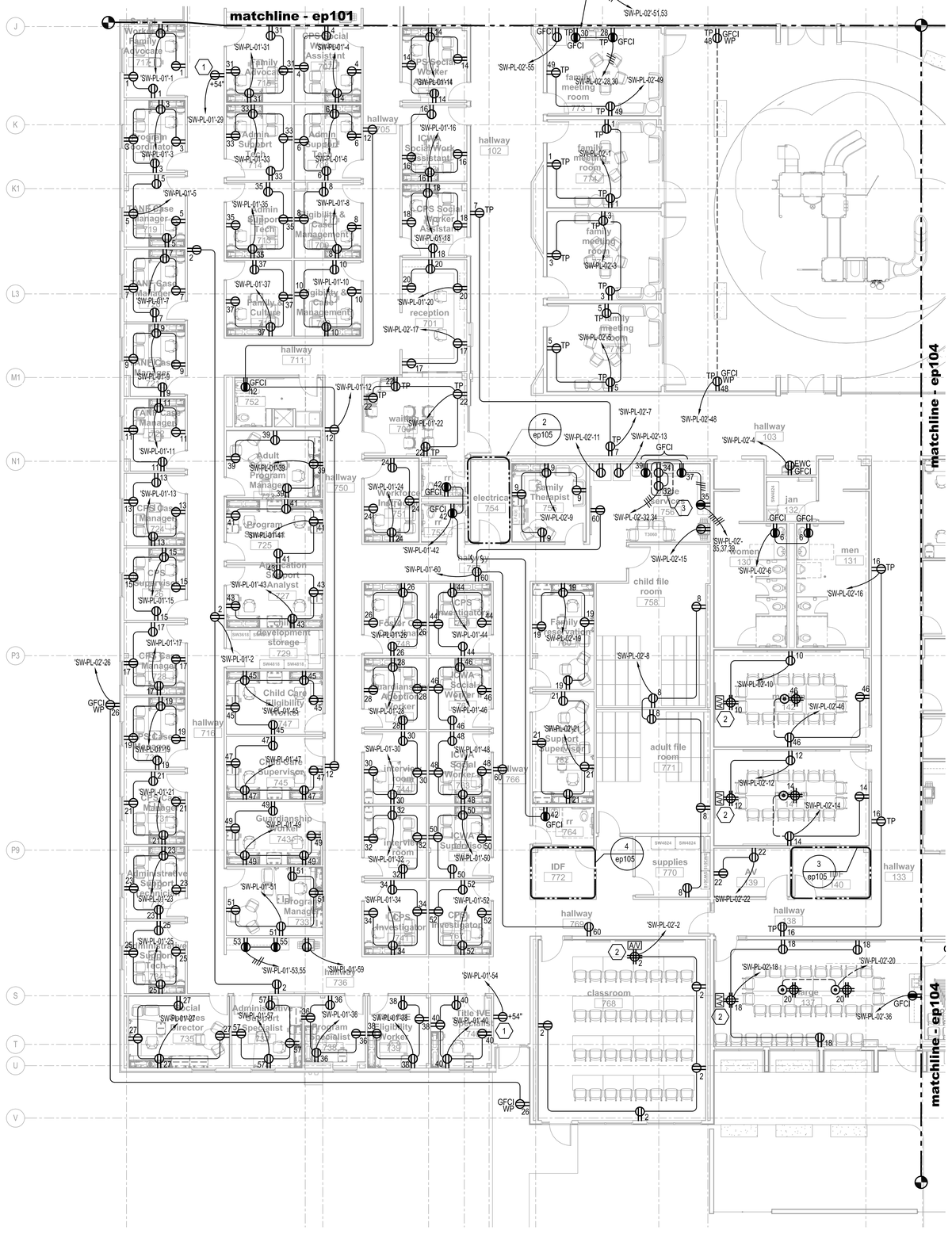
enlarged IDF room 140 - social services

3 / ep105 — 1/4" = 1'-0"



enlarged IDF room 772 - social services

4 / ep105 — 1/4" = 1'-0"



1 / ep105 — **power plan - Social Services** — 1/8" = 1'-0"

general notes:

A. MAINTAIN ALL NEC REQUIRED WORKING CLEARANCES FOR ALL ELECTRICAL EQUIPMENT.

B. ALL WIRING SHALL BE (2) #12, #12 GRD., UNLESS OTHERWISE NOTED.

C. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. SHARED NEUTRALS ARE NOT ALLOWED. (U.O.N.)(NEC ARTICLE 200.4)

D. ACCESS AND WORKING SPACE OF ALL NEW ELECTRICAL EQUIPMENT SHALL COMPLY WITH ARTICLE 110.26 OF THE NEC. THERE SHALL NOT BE ANY PIPING, DUCTS, LEAK PROTECTION APPARATUS OR OTHER EQUIPMENT FOREIGN TO THE ELECTRICAL INSTALLATION 6 FEET ABOVE THE ELECTRICAL EQUIPMENT PER ARTICLE 110.26(E)(1).

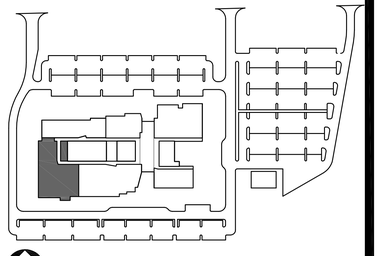
E. COORDINATE RECEPTACLE LOCATION(S) W/ FURNITURE PROVIDER PRIOR TO ROUGH-IN.

keynotes: (#)

1. DEVICE PROVIDED FOR TIMECLOCK. COORDINATE EXACT LOCATION WITH TIMECLOCK PROVIDER PRIOR TO ROUGH-IN.
2. RECEPTACLE MOUNTED INSIDE A/V BOX FOR TV. COORDINATE EXACT MOUNTING LOCATION W/ ARCHITECT PRIOR TO ROUGH-IN. REFER TO BOX DESCRIPTION ON SHEET e001.
3. RECEPTACLE(S) MOUNTED INSIDE UPPER MICROWAVE SHELVES. COORDINATE EXACT MOUNTING LOCATION W/ ARCHITECT.
4. RECEPTACLE(S) MOUNTED ON TOP OF RACKS. COORDINATE EXACT MOUNTING LOCATION W/ OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.

equip. keynotes: (-)

1. DISTRIBUTION PANEL 'SW-DPH-01'.
2. DISTRIBUTION PANEL 'SW-DPL-01'.
3. PANEL 'SW-PH-01'.
4. PANEL 'SW-PH-02'.
5. PANEL 'SW-PL-01'.
6. PANEL 'SW-PL-02'.
7. PANEL 'SW-PL-03'.
8. PAD MOUNT DRY-TYPE TRANSFORMER 'SW-T-01' WITH TRANSFORMER 'SW-T-OS-01' MOUNTED ON TOP. PROVIDE METAL CHANNEL FRAME AS REQUIRED.
9. PANEL 'SW-PL-OS-01'.



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Expires: 03/31/20

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1717

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revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
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power plan - social services

ep105

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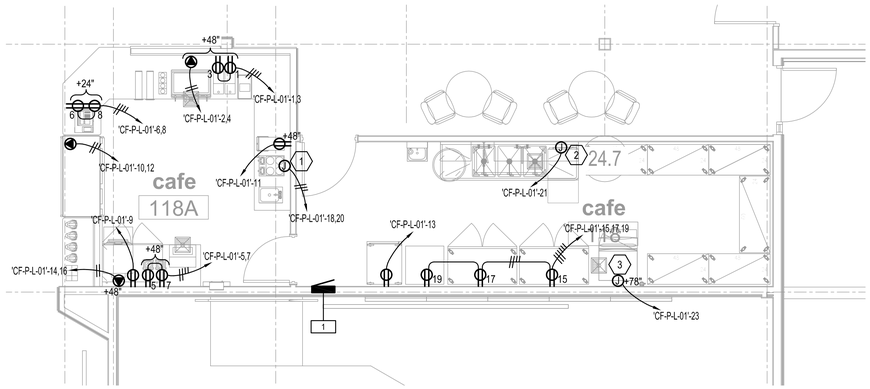

1 ep106 **enlarged power plan - cafe**

1/4" = 1'-0"

0 1' 2' 4' 8'

north

general notes:

1. MAINTAIN ALL NEC REQUIRED WORKING CLEARANCES FOR ALL ELECTRICAL EQUIPMENT.
2. ALL WIRING SHALL BE (2) #12, #12 GND., UNLESS OTHERWISE NOTED.
3. COORDINATE EXACT LOCATION FOR ALL EQUIPMENT WITH EQUIPMENT PROVIDER PRIOR TO ROUGH-IN.
4. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. SHARED NEUTRALS ARE NOT ALLOWED. (NEC ARTICLE 200.4).
5. ALL EXPOSED CONDUITS EXPOSED TO WIDELY DIFFERENT TEMPERATURES SHALL BE SEALED TO PREVENT AIR CIRCULATION AND PROVIDED WITH EXPANSION JOINTS WHERE NECESSARY PER NEC 300.7.
6. ALL RECEPTACLES SHOWN ON THIS SHEET SHALL BE GFCI TYPE.

keynotes: (#)

1. WALL MOUNT J-BOX FOR CONNECTION OF COFFEE MAKER. INSTALL PER MANUFACTURER REQUIREMENTS.
2. WALL MOUNT J-BOX FOR CONNECTION OF UNDER COUNTER DISH WASHER. INSTALL PER MANUFACTURER REQUIREMENTS.
3. WALL MOUNT J-BOX FOR CONNECTION OF ICE MACHINE. INSTALL PER MANUFACTURER REQUIREMENTS.

equip. keynotes: [-]

1. PANEL 'CF-P-L-01'

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Health Services Center II
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enlarged power plan - cafe area

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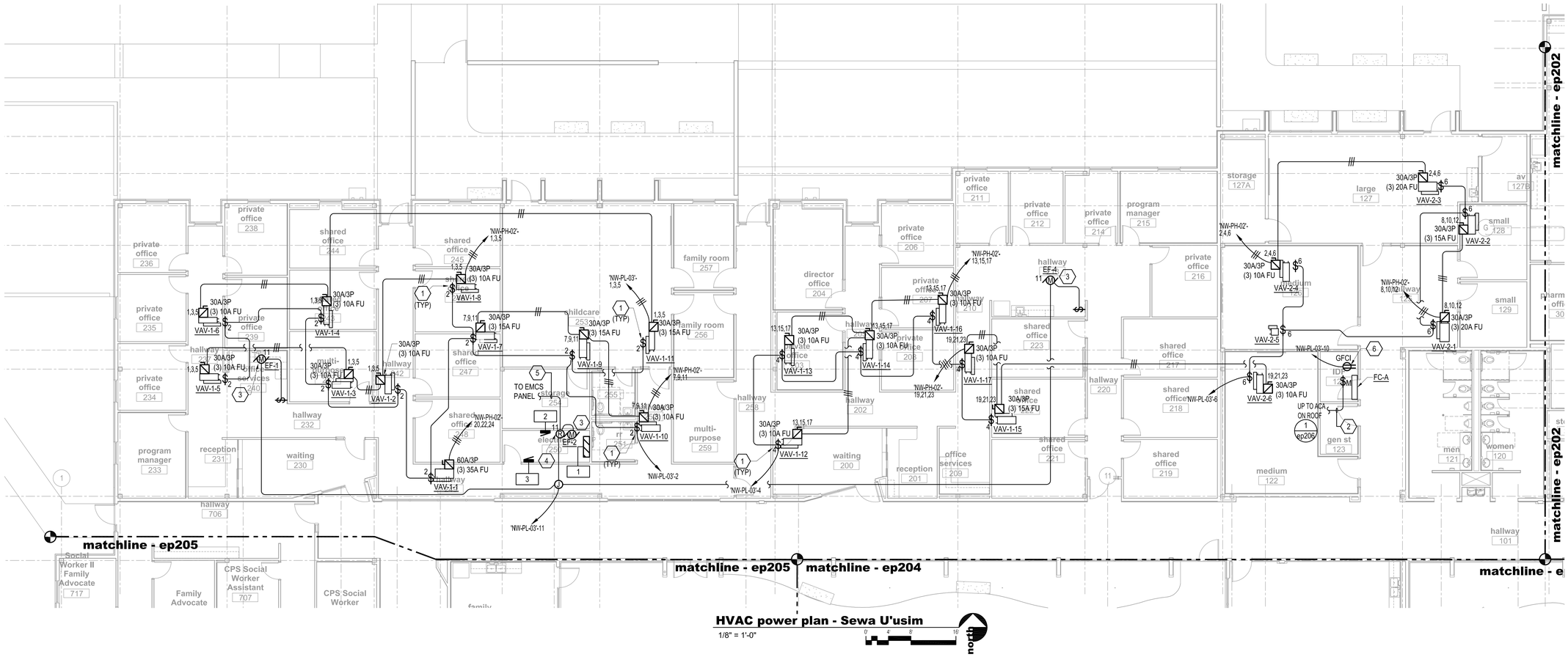
ep106



HVAC power plan - Sewa U'usim

1/8" = 1'-0"

north

general notes:

A. MAINTAIN ALL NEC REQUIRED WORKING CLEARANCES FOR ALL ELECTRICAL EQUIPMENT.

B. ALL WIRING SHALL BE (2) #12, #12 GND., UNLESS OTHERWISE NOTED.

C. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. SHARED NEUTRALS ARE NOT ALLOWED. (U.O.N.)(NEC ARTICLE 200.4)

D. ACCESS AND WORKING SPACE OF ALL NEW ELECTRICAL EQUIPMENT SHALL COMPLY WITH ARTICLE 110.26 OF THE NEC. THERE SHALL NOT BE ANY PIPING, DUCTS, LEAK PROTECTION APPARATUS OR OTHER EQUIPMENT FOREIGN TO THE ELECTRICAL INSTALLATION 6 FEET ABOVE THE ELECTRICAL EQUIPMENT PER ARTICLE 110.26(E)(1).

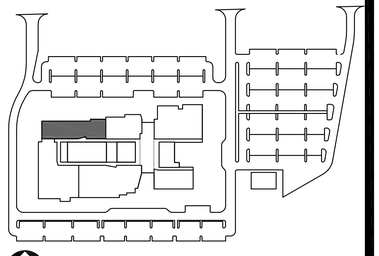
E. COORDINATE ALL MECHANICAL EQUIPMENT LOCATION WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.

keynotes: (#)

1. PROVIDE SWITCH FOR CONNECTION OF VAV CONTROL POWER.
2. 1" C W/ CONDUCTORS PER MANUFACTURER REQUIREMENTS. ROUTING SHALL FOLLOW REFRIGERANT PIPING.
3. EXHAUST FAN PROVIDED WITH INTEGRAL THERMAL OVERLOAD PROTECTION & DISCONNECT PLUG.
4. 120V AC CONTROL RELAY W/ 15 AMPERE CONTACTS IN NEMA-1 ENCLOSURE FOR CONTROL OF EXHAUST FAN. COIL VOLTAGE TO MATCH EMCS CONTROL VOLTAGE. RELAY SHALL ENERGIZE VIA EMCS SYSTEM.
5. 3/4" C W/ CONDUCTORS PER CONTROLS CONTRACTOR. VERIFY LOCATION OF EMCS PANEL W/ MECHANICAL CONTRACTOR.
6. RECEPTACLE FOR CONNECTION OF FAN COIL CONDENSATE PUMP.

equip. keynotes: (-)

1. DISTRIBUTION PANEL 'NW-DPH-01'.
2. PANEL 'NW-PH-02'.
3. PANEL 'NW-PL-03'.



north **keyplan**

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Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
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HVAC power plan - Sewa U'usim

ep201

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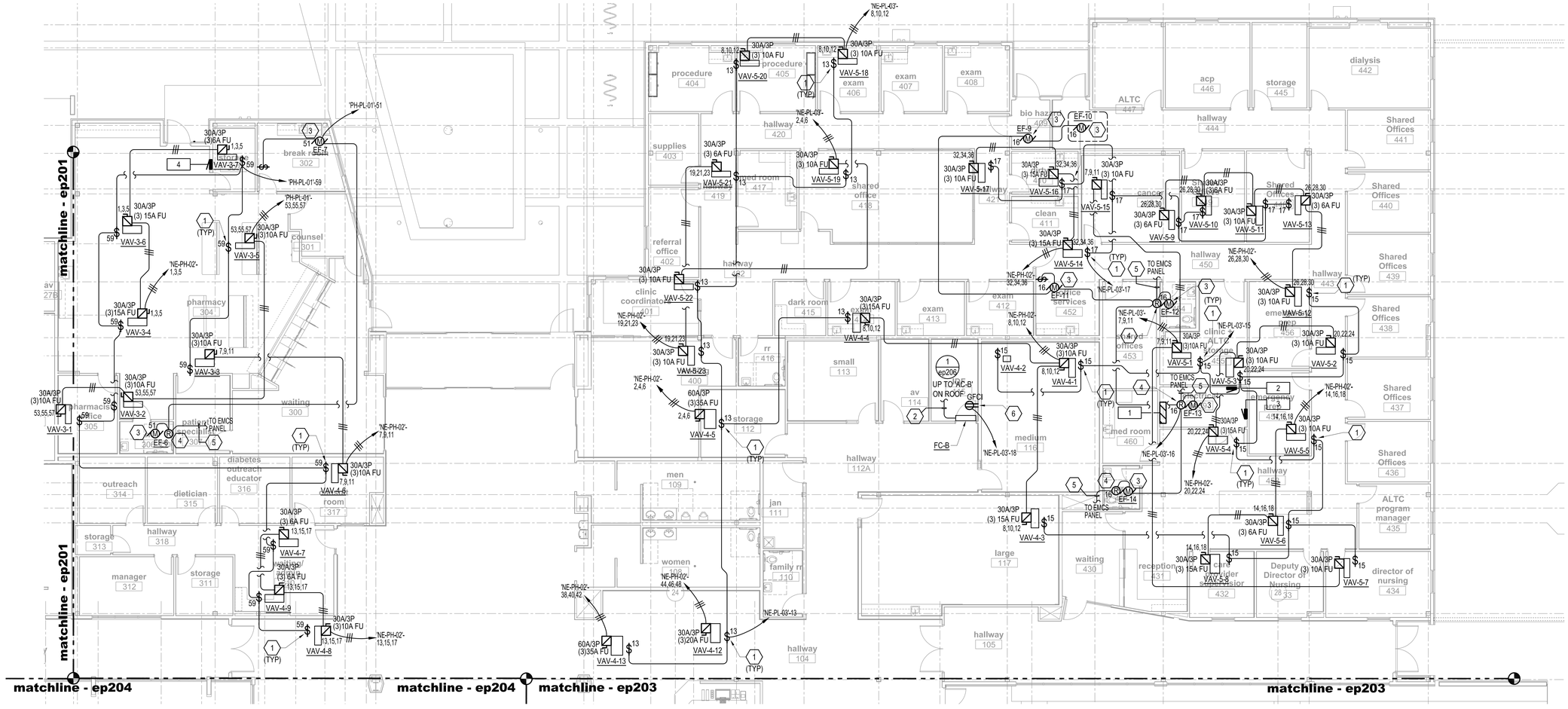

HVAC power plan - Nursing + Clinics

1/8" = 1'-0"

north

general notes:

A. MAINTAIN ALL NEC REQUIRED WORKING CLEARANCES FOR ALL ELECTRICAL EQUIPMENT.

B. ALL WIRING SHALL BE (2) #12, #12 GRD., UNLESS OTHERWISE NOTED.

C. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. SHARED NEUTRALS ARE NOT ALLOWED. (U.O.N.)(NEC ARTICLE 200.4)

D. ACCESS AND WORKING SPACE OF ALL NEW ELECTRICAL EQUIPMENT SHALL COMPLY WITH ARTICLE 110.26 OF THE NEC. THERE SHALL NOT BE ANY PIPING, DUCTS, LEAK PROTECTION APPARATUS OR OTHER EQUIPMENT FOREIGN TO THE ELECTRICAL INSTALLATION 6 FEET ABOVE THE ELECTRICAL EQUIPMENT PER ARTICLE 110.26(E)(1).

E. COORDINATE ALL MECHANICAL EQUIPMENT LOCATION WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.

keynotes:

1. PROVIDE SWITCH FOR CONNECTION OF VAV CONTROL POWER.
2. 1" C W/ CONDUCTORS PER MANUFACTURER REQUIREMENTS. ROUTING SHALL FOLLOW REFRIGERANT PIPING.
3. EXHAUST FAN PROVIDED WITH INTEGRAL THERMAL OVERLOAD PROTECTION & DISCONNECT PLUG.
4. 120V AC CONTROL RELAY W/ 15 AMPERE CONTACTS IN NEMA-1 ENCLOSURE FOR CONTROL OF EXHAUST FAN. COIL VOLTAGE TO MATCH EMCS CONTROL VOLTAGE. RELAY SHALL ENERGIZE VIA EMCS SYSTEM.
5. 3/4" C W/ CONDUCTORS PER CONTROLS CONTRACTOR. VERIFY LOCATION OF EMCS PANEL W/ MECHANICAL CONTRACTOR.
6. RECEPTACLE FOR CONNECTION OF FAN COIL CONDENSATE PUMP. COORDINATE EXACT MOUNTING LOCATION W/ MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.

equip. keynotes: -

1. DISTRIBUTION PANEL 'NE-DPH-01'.
2. PANEL 'NE-PH-02'.
3. PANEL 'NE-PL-03'.
4. PANEL 'PH-PL-01'

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revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

HVAC power plan - nursing + clinics

ep202

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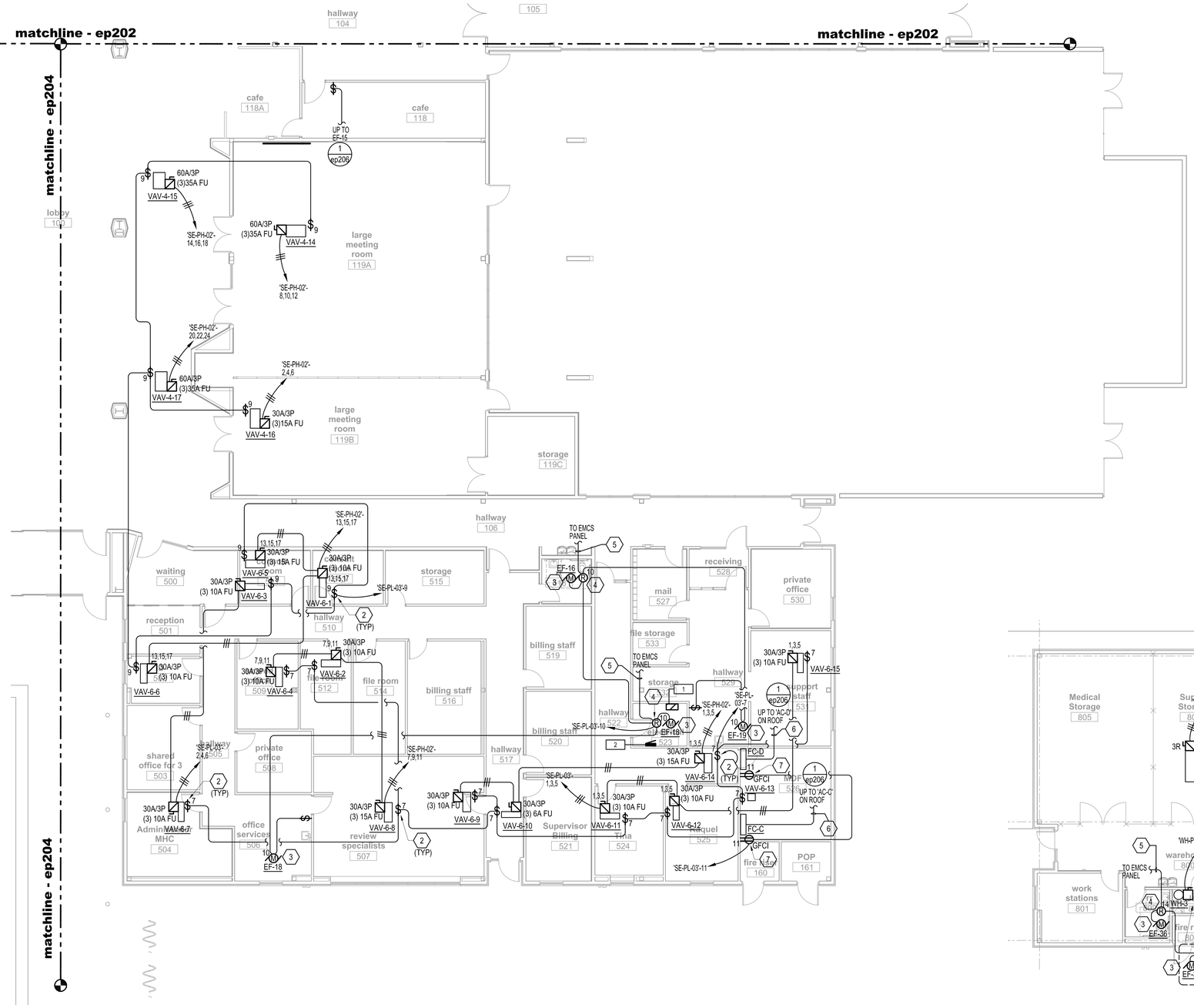
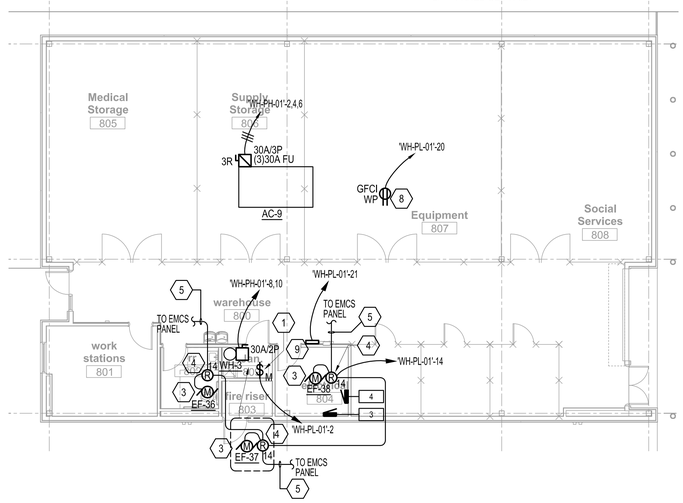


HVAC power plan - Health Budget + Managed Health / Billing

1/8" = 1'-0"



HVAC power plan - Warehouse

1/8" = 1'-0"

general notes:

A. MAINTAIN ALL NEC REQUIRED WORKING CLEARANCES FOR ALL ELECTRICAL EQUIPMENT.

B. ALL WIRING SHALL BE (2) #12, #12 GND., UNLESS OTHERWISE NOTED.

C. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. SHARED NEUTRALS ARE NOT ALLOWED. (U.O.N.)(NEC ARTICLE 200.4)

D. ACCESS AND WORKING SPACE OF ALL NEW ELECTRICAL EQUIPMENT SHALL COMPLY WITH ARTICLE 110.26 OF THE NEC. THERE SHALL NOT BE ANY PIPING, DUCTS, LEAK PROTECTION APPARATUS OR OTHER EQUIPMENT FOREIGN TO THE ELECTRICAL INSTALLATION 6 FEET ABOVE THE ELECTRICAL EQUIPMENT PER ARTICLE 110.26(E)(1).

E. COORDINATE ALL MECHANICAL EQUIPMENT LOCATION WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.

keynotes: (#)

1. 120V MANUAL MOTOR SWITCH W/ OVERLOADS PER MOTOR NAMEPLATE. MAKE CONNECTION TO RECIRCULATION PUMP AND COORDINATE EXACT MOUNTING LOCATION W/ PLUMBING CONTRACTOR.
2. PROVIDE SWITCH FOR CONNECTION OF VAV CONTROL POWER.
3. EXHAUST FAN PROVIDED WITH INTEGRAL THERMAL OVERLOAD PROTECTION & DISCONNECT PLUG.
4. 120V AC CONTROL RELAY W/ 15 AMPERE CONTACTS IN NEMA-1 ENCLOSURE FOR CONTROL OF EXHAUST FAN. COIL VOLTAGE TO MATCH EMCS CONTROL VOLTAGE. RELAY SHALL ENERGIZE VIA EMCS SYSTEM.
5. 3/4" C W/ CONDUCTORS PER CONTROLS CONTRACTOR. VERIFY LOCATION OF EMCS PANEL W/ MECHANICAL CONTRACTOR.
6. 1" C W/ CONDUCTORS PER MANUFACTURER REQUIREMENTS. ROUTING SHALL FOLLOW REFRIGERANT PIPING.
7. RECEPTACLE FOR CONNECTION OF FAN COIL CONDENSATE PUMP. COORDINATE EXACT MOUNTING LOCATION W/ MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.
8. ROOF MOUNT RECEPTACLE.
9. EMCS PANEL PER MECHANICAL DRAWINGS. COORDINATE EXACT MOUNTING LOCATION WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.

equip. keynotes: (-)

1. PANEL 'SE-DPH-01'.
2. PANEL 'SE-PH-02'.

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Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

HVAC power plan - health budget + managed health/billing, warehouse

ep203

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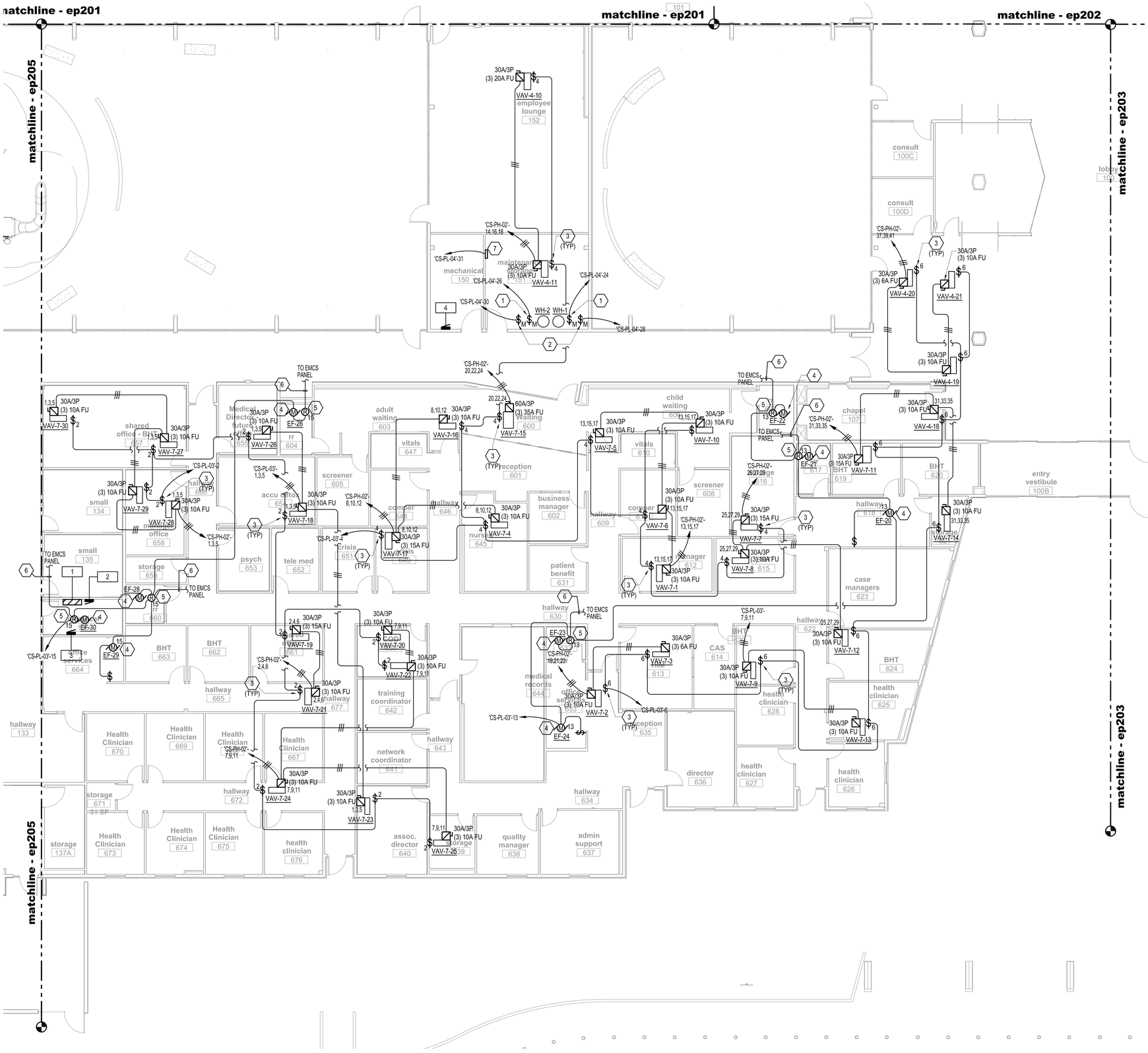

1 ep204 **HVAC power plan - Center Spirit**

1/8" = 1'-0"

0 4' 8' 16'

north

general notes:

A. MAINTAIN ALL NEC REQUIRED WORKING CLEARANCES FOR ALL ELECTRICAL EQUIPMENT.

B. ALL WIRING SHALL BE (2) #12, #12 GND., UNLESS OTHERWISE NOTED.

C. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. SHARED NEUTRALS ARE NOT ALLOWED. (U.O.N.)(NEC ARTICLE 200.4)

D. ACCESS AND WORKING SPACE OF ALL NEW ELECTRICAL EQUIPMENT SHALL COMPLY WITH ARTICLE 110.26 OF THE NEC. THERE SHALL NOT BE ANY PIPING, DUCTS, LEAK PROTECTION APPARATUS OR OTHER EQUIPMENT FOREIGN TO THE ELECTRICAL INSTALLATION 6 FEET ABOVE THE ELECTRICAL EQUIPMENT PER ARTICLE 110.26(E)(1).

E. COORDINATE ALL MECHANICAL EQUIPMENT LOCATION WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.

keynotes: (#)

1. 120V MANUAL MOTOR SWITCH WITHOUT OVERLOADS FOR CONNECTION OF WATER HEATER IGNITER. COORDINATE EXACT MOUNTING LOCATION & INSTALLATION REQUIREMENTS WITH PLUMBING CONTRACTOR & MANUFACTURER.
2. 120V MANUAL MOTOR SWITCH W/ OVERLOADS PER MOTOR NAMEPLATE. MAKE CONNECTION TO RECIRCULATION PUMP AS REQUIRED. COORDINATE EXACT LOCATION W/ PLUMBING CONTRACTOR PRIOR TO ROUGH-IN.
3. PROVIDE SWITCH FOR CONTROL OF VAV CONTROL POWER.
4. EXHAUST FAN PROVIDED WITH INTEGRAL THERMAL OVERLOAD PROTECTION & DISCONNECT PLUG.
5. 120V AC CONTROL RELAY W/ 15 AMPERE CONTACTS IN NEMA-1 ENCLOSURE FOR CONTROL OF EXHAUST FAN. COIL VOLTAGE TO MATCH EMCS CONTROL VOLTAGE. RELAY SHALL ENERGIZE VIA EMCS SYSTEM.
6. 3/4" C W/ CONDUCTORS PER CONTROLS CONTRACTOR. VERIFY LOCATION OF EMCS PANEL W/ MECHANICAL CONTRACTOR.
7. EMCS PANEL PER MECHANICAL DRAWINGS. COORDINATE EXACT MOUNTING LOCATION WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.

equip. keynotes: (-)

1. DISTRIBUTION PANEL 'CS-DPH-01'.
2. PANEL 'CS-PH-02'.
3. PANEL 'CS-PL-03'.
4. PANEL 'CS-PL-04'.

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job 1717

date 11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
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Tucson, AZ 85746

HVAC power plan - center spirit

ep204

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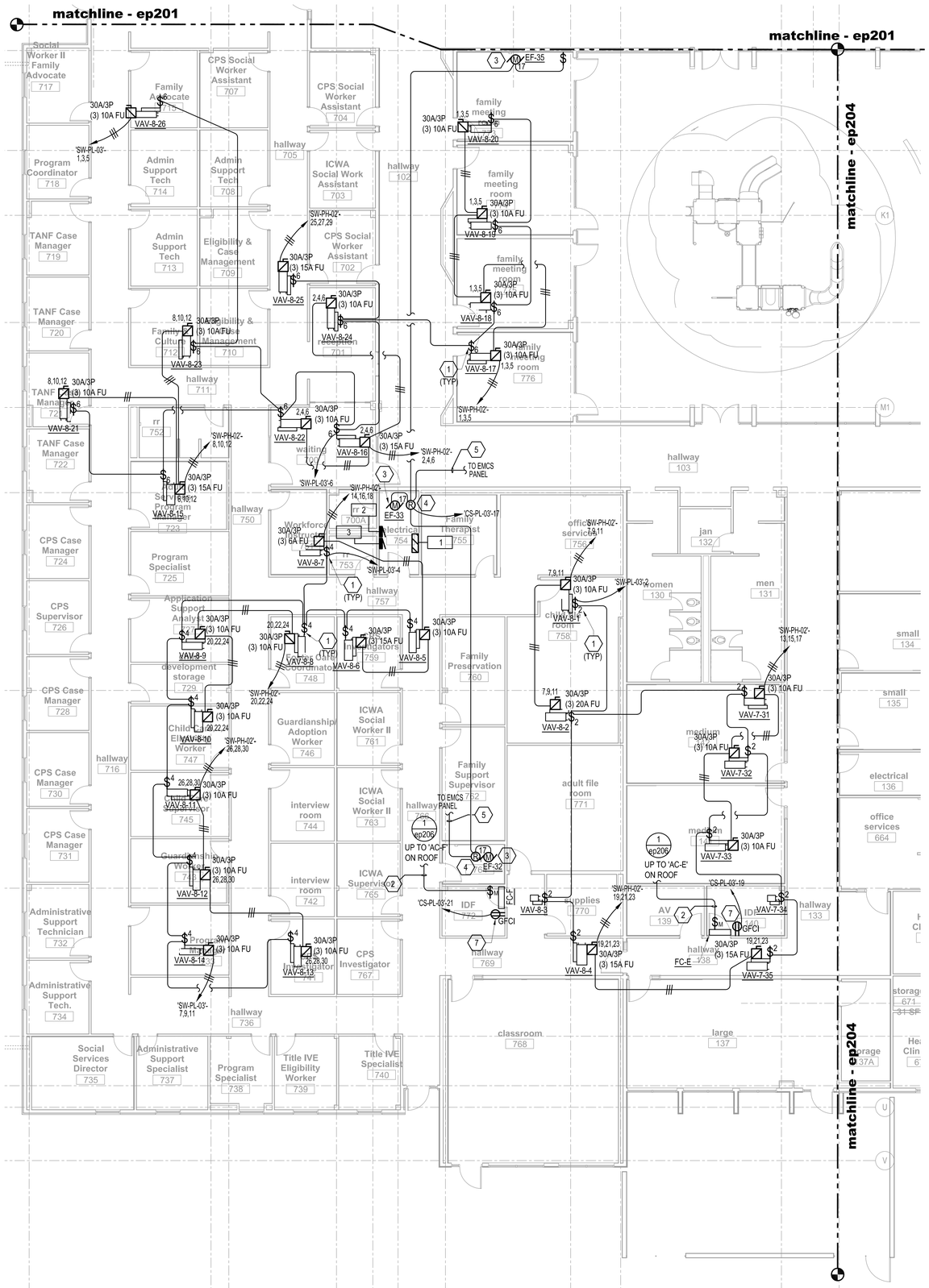


1 ep205 **HVAC power plan - Social Services**
1/8" = 1'-0"

0 4 8 16 north

general notes:

A. MAINTAIN ALL NEC REQUIRED WORKING CLEARANCES FOR ALL ELECTRICAL EQUIPMENT.

B. ALL WIRING SHALL BE (2) #12, #12 GND., UNLESS OTHERWISE NOTED.

C. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. SHARED NEUTRALS ARE NOT ALLOWED. (U.O.N.)(NEC ARTICLE 200.4)

D. ACCESS AND WORKING SPACE OF ALL NEW ELECTRICAL EQUIPMENT SHALL COMPLY WITH ARTICLE 110.26 OF THE NEC. THERE SHALL NOT BE ANY PIPING, DUCTS, LEAK PROTECTION APPARATUS OR OTHER EQUIPMENT FOREIGN TO THE ELECTRICAL INSTALLATION 6 FEET ABOVE THE ELECTRICAL EQUIPMENT PER ARTICLE 110.26(E)(1).

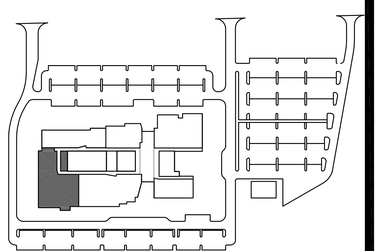
E. COORDINATE ALL MECHANICAL EQUIPMENT LOCATION WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.

keynotes: (#)

1. PROVIDE SWITCH FOR CONTROL OF VAV CONTROL POWER.
2. 1" C. W/ CONDUCTORS PER MANUFACTURER REQUIREMENTS. ROUTING SHALL FOLLOW REFRIGERANT PIPING.
3. EXHAUST FAN PROVIDED WITH INTEGRAL THERMAL OVERLOAD PROTECTION & DISCONNECT PLUG.
4. 120V AC CONTROL RELAY W/ 15 AMPERE CONTACTS IN NEMA-1 ENCLOSURE FOR CONTROL OF EXHAUST FAN. COIL VOLTAGE TO MATCH EMCS CONTROL VOLTAGE. RELAY SHALL ENERGIZE VIA EMCS SYSTEM.
5. 3/4" C W/ CONDUCTORS PER CONTROLS CONTRACTOR. VERIFY LOCATION OF EMCS PANEL W/ MECHANICAL CONTRACTOR.
6. 1" C W/ CONDUCTORS PER MANUFACTURER REQUIREMENTS. ROUTING SHALL FOLLOW REFRIGERANT PIPING.
7. RECEPTACLE FOR CONNECTION OF FAN COIL CONDENSATE PUMP. COORDINATE EXACT MOUNTING LOCATION W/ MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.

equip. keynotes: (-)

1. DISTRIBUTION PANEL 'SW-DPH-01'.
2. PANEL 'SW-PH-02'.
3. PANEL 'SW-PL-03'.



north **keyplan**
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Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
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HVAC power plan - social services

ep205

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1 ep206 **roof HVAC power plan**
1/16" = 1'-0"

north

general notes:

A. MAINTAIN ALL NEC REQUIRED WORKING CLEARANCES FOR ALL ELECTRICAL EQUIPMENT.

B. ALL WIRING SHALL BE (2) #12, #12 GND., UNLESS OTHERWISE NOTED.

C. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. SHARED NEUTRALS ARE NOT ALLOWED. (U.O.N.)(NEC ARTICLE 200.4)

D. ACCESS AND WORKING SPACE OF ALL NEW ELECTRICAL EQUIPMENT SHALL COMPLY WITH ARTICLE 110.26 OF THE NEC. THERE SHALL NOT BE ANY PIPING, DUCTS, LEAK PROTECTION APPARATUS OR OTHER EQUIPMENT FOREIGN TO THE ELECTRICAL INSTALLATION 6 FEET ABOVE THE ELECTRICAL EQUIPMENT PER ARTICLE 110.26(E)(1).

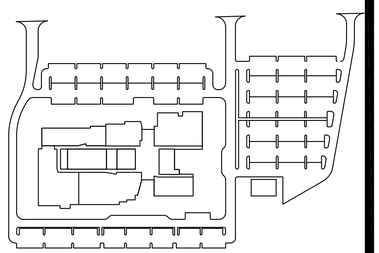
E. COORDINATE ALL MECHANICAL EQUIPMENT LOCATION WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.

keynotes:

1. ROOF MOUNT RECEPTACLES.
2. 1" C W/ CONDUCTORS PER MANUFACTURER REQUIREMENTS. ROUTING SHALL FOLLOW REFRIGERANT PIPING.
3. 120V AC CONTROL RELAY W/ 15 AMPERE CONTACTS IN NEMA-3R ENCLOSURE FOR CONTROL OF EXHAUST FAN. COIL VOLTAGE TO MATCH EMCS CONTROL VOLTAGE. RELAY SHALL ENERGIZE VIA EMCS SYSTEM.
4. 3/4" C W/ CONDUCTORS PER CONTROLS CONTRACTOR. VERIFY LOCATION OF EMCS PANEL W/ MECHANICAL CONTRACTOR.

equip. keynotes: ·

1. DISTRIBUTION PANEL 'NW-DPH-01'.
2. DISTRIBUTION PANEL 'NE-DPH-01'.
3. DISTRIBUTION PANEL 'SE-DPH-01'.
4. DISTRIBUTION PANEL 'CS-DPH-01'.
5. DISTRIBUTION PANEL 'SW-DPH-01'.
6. PANEL 'NE-PL-03'.
7. PANEL 'CS-PL-03'.
8. PANEL 'SE-PL-03'.
9. PANEL 'SW-PL-03'.
10. PANEL 'NW-PL-03'.
11. PANEL 'PH-PL-01'.
12. PANEL 'CS-PL-04'.



north **keyplan**
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Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

HVAC roof power plan

ep206

PANEL 'NW-PH-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 100A
SERVICE: 480 | 277 WYE | FED FROM: NW-DPH-01 | MAINS: MLO
POLES: 30 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 250 | CONDUITS PER NEC, BASED ON TYPE | AIC: 42,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	SEWA U'USIM WEST LTG	#12	3/4"	20A	1	2.19	0.96		1	20A	3/4"	#8	BLDG LTG	2
3	SEWA U'USIM CENTER LTG	#12	3/4"	20A	1		1.68	0.88	1	20A	3/4"	#8	BLDG LTG	4
5	SEWA U'USIM EAST LTG	#12	3/4"	20A	1			1.83	1.79						6
7	SEWA U'USIM HALL/WAIT LTG	#12	3/4"	20A	1	0.81	1.71		3	20A	3/4"	#8	PARKING LOT LTG	8
9	HALLS 101,102,103 LTG	#10	3/4"	20A	1		2.59	1.71							10
11	HALL 101 WW/LOBBY LTG	#10	3/4"	20A	1			1.01	0.24	2	20A	3/4"	#8	SITE BOLLLARDS	12
13	SPACE			20A	1	0.24									14
15	SPACE			20A	1					1	20A			SPARE	16
17	SPACE			20A	1					1	20A			SPARE	18
19	SPACE			20A	1					1	20A			SPARE	20
21	SPACE									1	20A			SPARE	22
23	SPACE													SPACE	24
25	SPACE													SPACE	26
27	SPACE													SPACE	28
29	SPACE													SPACE	30
	TOTAL CONNECTED kVA					6.02	6.86	4.67							
	TOTAL CONNECTED AMPS					21.7	24.8	16.8							

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	17.54	125%	21.93	TOTAL CONN. LOAD	17.5	kVA
NON-CONTINOUS kVAD	0.00	100%	0.00	TOTAL EST. DEMAND	21.9	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	21.1	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	26.4	AMP

NOTES:

PANEL 'NW-PH-02'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 400A
SERVICE: 480 | 277 WYE | FED FROM: NW-DPH-01 | MAINS: MLO
POLES: 48 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 250 | CONDUITS PER NEC, BASED ON TYPE | AIC: 42,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1						6.00	5.33							2
3	VAV-1-2, 1-3, 1-5, 1-8	#10	3/4"	30A	3		6.00	5.33	3	25A	3/4"	#10	VAV 2-3, VAV-2-4	4
5								6.00	5.33					6
7						6.67	6.67							8
9	VAV 1-7, 1-9, 1-10	#8-#10	3/4"	35A	3		6.67	6.67	3	35A	3/4"	#8-#10	VAV 2-1, VAV-2-2	10
11								6.67	6.67					12
13						6.00	10.89							14
15	VAV 1-12, 1-13, 1-14, 1-16	#10	3/4"	30A	3		6.00	10.89	3	40A	3/4"	#8-#10	PAC-2	16
17								6.00	10.88					18
19						6.00	6.67							20
21	VAV 1-15, 1-17, 2-6	#10	3/4"	30A	3		6.00	6.67	3	35A	3/4"	#8-#10	VAV-1-1	22
23								6.00	6.67					24
25						7.48			1	20A			SPARE	26
27	PAC-3	#8-#10	3/4"	40A	3		7.48		1	20A			SPARE	28
29								7.48					SPACE	30
31	SPARE			20A	1								SPACE	32
33	SPARE			20A	1								SPACE	34
35	SPARE			20A	1								SPACE	36
37	SPARE			20A	1								SPACE	38
39	SPACE												SPACE	40
41	SPACE												SPACE	42
43	SPACE												SPACE	44
45	SPACE												SPACE	46
47	SPACE												SPACE	48
	TOTAL CONNECTED kVA					61.71	61.71	61.70						
	TOTAL CONNECTED AMPS					222.8	222.8	222.8						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	185.1	kVA
NON-CONTINOUS kVAD	152.47	100%	152.47	TOTAL EST. DEMAND	193.3	kVA
MOTOR kVA + 25%	32.66	125%	40.82	TOTAL CONNECTED CURRENT	222.7	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	232.5	AMP

NOTES:

PANEL 'NW-PL-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225A
SERVICE: 208 | 120 WYE | FED FROM: NW-DPL-01 | MAINS: MLO
POLES: 60 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 250 | CONDUITS PER NEC, BASED ON TYPE | AIC: 10,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RM 236 RECPTS	#12	3/4"	20A	1	0.72	0.54		1	20A	3/4"	#10	RMS 254,255,251 RECPTS	2
3	RM 235 RECPTS	#12	3/4"	20A	1		0.72	0.72	1	20A	3/4"	#10	RMS 257,256 RECPTS	4
5	RM 234 RECPTS	#12	3/4"	20A	1			0.72	0.72	1	20A	3/4"	#12	RM 259 RECPTS	6
7	RM 233 RECPTS	#12	3/4"	20A	1	0.72	0.72		1	20A	3/4"	#10	RM 204 RECPTS	8
9	RM 238 RECPTS	#12	3/4"	20A	1		0.72	0.72	1	20A	3/4"	#10	RM 203 RECPTS	10
11	RM 239 RECPTS	#12	3/4"	20A	1			0.72	0.54	1	20A	3/4"	#10	RM 200 RECPTS	12
13	RM 240 REFRIG	#12	3/4"	20A	1	1.00	0.72		1	20A	3/4"	#10	RM 206 RECPTS	14
15	RM 231 RECEPTS	#12	3/4"	20A	1		0.72	0.72	1	20A	3/4"	#10	RM 207 RECPTS	16
17	RM 240 PRINTER	#12	3/4"	20A	1			1.20	0.72	1	20A	3/4"	#10	RM 208 RECPTS	18
19	RM 244 RECPTS	#12	3/4"	20A	1	0.72	0.90		1	20A	3/4"	#10	RMS 201 RECPTS	20
21	RM 243 RECPTS	#12	3/4"	20A	1		0.72	1.20	1	20A	3/4"	#10	RM 209 PRINTER	22
23	RM 241 RECPTS	#12	3/4"	20A	1			0.90	0.54	1	20A	3/4"	#12	RMS 202,205,213,258 RECPTS	24
25	RM 230 RECPTS	#12	3/4"	20A	1	0.72	0.72		1	20A	3/4"	#10	RM 211 RECPTS	26
27	TIMECLOCK RECPT	#12	3/4"	20A	1		0.50	1.00	1	20A	3/4"	#10	RM 213 REFRIG	28
29	RM 245 RECPTS	#12	3/4"	20A	1			0.90	1.20	1	20A	3/4"	#10	RM 213 DEDICATED RECEPT	30
31	RM 246 RECPTS	#12	3/4"	20A	1	0.90	1.20		1	20A	3/4"	#10	RM 213 COPY MACHINE	32
33	RM 247 RECPTS	#12	3/4"	20A	1		0.90	0.90	1	20A	3/4"	#10	RM 223 RECPTS	34
35	RM 248 RECPTS	#12	3/4"	20A	1			0.90	0.90	1	20A	3/4"	#10	RM 222 RECPTS	36
37	RM 249 RECPTS	#12	3/4"	20A	1	0.72	0.90		1	20A	3/4"	#10	RM 221 RECPTS	38
39	RM 253 RECPTS	#12	3/4"	20A	1		0.72	0.72	1	20A	3/4"	#10	RM 212 RECPTS	40
41	RM 101 RECPTS	#12	3/4"	20A	1			0.54	0.72	1	20A	3/4"	#10	RM 214 RECPTS	42
43	SPARE			20A	1	0.90			1	20A	3/4"	#10	RM 215,127A RECPTS	44
45	SPARE			20A	1		0.72		1	20A	3/4"	#10	RM 216 RECPTS	46
47	SPARE			20A	1			0.90	1	20A	3/4"	#10	RM 217 RECPTS	48
49	SPARE			20A	1	0.90			1	20A	3/4"	#10	RM 218 RECPTS	50
51	SPARE			20A	1		0.90		1	20A	3/4"	#10	RM 219 RECPTS	52
53	SPARE			20A	1				1	20A			SPARE	54
55	SPARE			20A	1				1	20A			SPARE	56
57	SPARE			20A	1		1.20		1	20A	3/4"	#12	RM 240 DEDICATED RECEPT	58
59	SPARE			20A	1				1	20A			SPARE	60
	TOTAL CONNECTED kVA					13.00	13.80	12.12						
	TOTAL CONNECTED AMPS					108.3	115.0	101.0						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	38.9	kVA
NON-CONTINOUS kVAD	38.92	100%	38.92	TOTAL EST. DEMAND	38.9	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	108.0	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	108.0	AMP

NOTES: PROVIDE FEED THRU LUGS

PANEL 'NW-PL-02'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225A
SERVICE: 208 | 120 WYE | FED FROM: NW-DPL-01 | MAINS: MLO
POLES: 60 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 250 | CONDUITS PER NEC, BASED ON TYPE | AIC: 10,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RM 127 DEDICATED RECPT	#8	3/4"	20A	1	1.00	0.50		1	20A	3/4"	#12	RM 209 RECPT	2
3	RM 127 RECPTS	#8	3/4"	20A	1		0.36	0.50	1	20A	3/4"	#12	RM 209 RECPT	4
5	RM 124 RECPTS	#10	3/4"	20A	1			0.72	0.36	1	20A	3/4"	#12	RM 706 RECPTS	6
7	RM 124 RECPT	#10	3/4"	20A	1	0.36	0.36		1	20A	3/4"	#12	RM 706 RECPTS	8
9	RM 122 RECPTS	#10	3/4"	20A	1		0.54	1.20	1	20A	3/4"	#12	RM 706 COPY	10
11	RMS 210,213,220 RECPTS	#12	3/4"	20A	1			0.54	1.20	1	20A	3/4"	#12	RM 240 MICROWAVE	12
13	RM 101 RECPTS	#12	3/4"	20A	1	0.36	1.20		1	20A	3/4"	#12	RM 240 MICROWAVE	14
15	RM 213 MICROWAVE	#10	3/4"	20A	1		1.20	0.18	1	20A	3/4"	#12	NW OUTDOOR RECPT	16
17	RM 213 MICROWAVE	#10	3/4"	20A	1			1.20	1.00	1	20A	3/4"	#12	N OUTDOOR RECPT	18
19	RM 231 RECPTS	#12	3/4"	20A	1	0.36	0.72		1	20A	3/4"	#8	RM 127 FLOOR RECEPTS	20
21	RM 124 RECPT	#10	3/4"	30A	2		1.75	0.72	1	20A	3/4"	#8	RM 127 RECEPTS	22
23								1.75	0.72	1	20A	3/4"	#8	RM 126 RECEPTS	24
25	RM 124 RECPT	#10	3/4"	30A	2	1.75	0.54		1	20A	3/4"	#8	RM 126 RECEPTS	26
27							1.75	0.72	1	20A	3/4"	#10	RM 122 RECEPTS	28
29	RM 125 HALL RECEPTS	#10	3/4"	20A	1			0.54	0.72	1	20A	3/4"	#10	RM 128 RECEPTS	30
31	RM 120/121 RECEPTS	#10	3/4"	20A	1	0.36	0.72		1	20A	3/4"	#10	RM 128/129 FLOOR RECEPTS	32
33	RM 101 EWC	#10	3/4"	20A	1		0.70	0.72	1	20A	3/4"	#10	RM 129 RECEPTS	34
35	SPARE							0.36	1	20A	3/4"		SPARE	36
37	SPARE								1	20A	3/4"		SPARE	38
39	SPARE						0.18		1	20A	3/4"	#12	IRRIGATION CONTROLLER	40
41	SPARE							0.18	1	20A	3/4"	#12	IRRIGATION CONTROLLER	42
43	SPARE					0.18			1	20A	3/4"	#12	IRRIGATION CONTROLLER	44
45	SPARE								1	20A			SPARE	46
47	SPARE								1	20A			SPARE	48
49	SPARE								1	20A			SPARE	50
51	SPARE								1	20A			SPARE	52
53	SPARE								1	20A			SPARE	54
55	SPARE								1	20A			SPARE	56
57	SPARE								1	20A			SPARE	58
59	SPARE								1	20A			SPARE	60
	TOTAL CONNECTED kVA					8.41	10.52	9.29						
	TOTAL CONNECTED AMPS					70.1	87.6	77.4						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	28.2	kVA
NON-CONTINOUS kVAD	28.22	100%	28.22	TOTAL EST. DEMAND	28.2	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	78.3	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	78.3	AMP

NOTES: PROVIDE FEED THRU LUGS

PANEL 'NW-PL-OS-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 100A
SERVICE: 208 | 120 WYE | FED FROM: NW-DPH-OS-01 | MAINS: MLO
POLES: 60 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 250 | CONDUITS PER NEC, BASED ON TYPE | AIC: 10,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RM 124 RECPTS	#12	3/4"	20A	1	0.72			1	20A			SPARE	2
3	RM 124 RECPT	#10	3/4"	30A	2		1.75		1	20A			SPARE	4
5								1.75	1	20A			SPARE	6
7	RM 124 RECPT	#10	3/4"	30A	2	1.75			1	20A			SPARE	8
9							1.75		1	20A			SPARE	10
11	SPARE			20A	1				1	20A			SPARE	12
13	SPARE			20A	1				1	20A			SPARE	14
15	SPARE			20A	1				1	20A			SPARE	16
17	SPARE			20A	1				1	20A			SPARE	18
19	SPARE			20A	1				1	20A			SPARE	20
21	SPARE			20A	1				1	20A			SPARE	22
23	SPARE			20A	1				1	20A			SPARE	24
25	SPARE			20A	1				1	20A			SPARE	26
27	SPARE			20A	1				1	20A			SPARE	28
29	SPARE			20A	1				1	20A			SPARE	30
	TOTAL CONNECTED kVA					2.47	3.50	1.75						
	TOTAL CONNECTED AMPS					20.6	29.2	14.6						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	7.7	kVA
NON-CONTINOUS kVAD	7.72	100%	7.72	TOTAL EST. DEMAND	7.7	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	21.4	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	21.4	AMP

NOTES:

PANEL 'NW-PL-03'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225A
SERVICE: 208 | 120 WYE | FED FROM: NW-DPL-01 | MAINS: MLO
POLES: 42 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 250 | CONDUITS PER NEC, BASED ON TYPE | AIC: 10,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1						2.33	1.10		1	20A	3/4"	#12	VAV CONTROLS	2
3	VAV 1-4, 1-6, 1-11	#10	3/4"	30A	3		2.33	0.60	1	20A	3/4"	#12	VAV CONTROLS	4
5								2.33	0.60	1	20A	3/4"	#12	VAV CONTROLS	6
7	SPARE			20A	1	0.18			1	20A	3/4"	#12	ROOF MOUNT RECPT	8
9	SPARE			20A	1		0.50		1	20A	3/4"	#12	FC-A CONDENSATE PUMP	10
11	EF-1,2,4	#12	3/4"	15A	1			0.24	1	20A			SPARE	12
13	EF-3	#12	3/4"	15A	1	0.70			1	20A			SPARE	14
15	SPARE			20A	1				1	20A			SPARE	16
17	SPARE			20A	1				1	20A			SPARE	18
19	SPARE			20A	1				1	20A			SPARE	20
21	SPARE			20A	1				1	20A			SPARE	22
23	SPARE			20A	1				1	20A			SPARE	24
25	SPARE			20A	1				1	20A			SPARE	26
27	SPARE			20A	1				1	20A			SPARE	28
29	SPARE			20A	1				1	20A			SPARE	30
31	SPARE			20A	1				1	20A			SPARE	32
33	SPARE			20A	1				1	20A			SPARE	34
35	SPARE			20A	1				1	20A			SPARE	36
37	SPARE			20A	1				1	20A			SPARE	38
39	SPARE			20A	1				1	20A			SPARE	40
41	SPARE			20A	1				1	20A			SPARE	42
	TOTAL CONNECTED kVA					4.31	3.43	3.17						
	TOTAL CONNECTED AMPS					35.9	28.6	26.4						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	10.9	kVA
NON-CONTINOUS kVAD	10.91	100%	10.91	TOTAL EST. DEMAND	10.9	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	30.3	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	30.3	AMP

NOTES:

PANEL 'NW-PH-E-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 100A
SERVICE: 480 | 277 WYE | FED FROM: NW-DPH-E-01 | MAINS: MLO
POLES: 18 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 250 | CONDUITS PER NEC, BASED ON TYPE | AIC: 35,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	SEWA U'USIM EM LTG	#12	3/4"	20A	1	0.62	0.10		1	20A	3/4"	#12	RELAY PANEL 'RP1'	2
3	HALL 101,102,103 EM LTG	#12	3/4"	20A	1		1.15	0.58	1	20A	3/4"	#8	BLDG RM LTG	4
5	SOCIAL SERVICE EM LTG	#12	3/4"	20A	1			0.72	1	20A			SPARE	6
7	SPARE			20A	1				1	20A			SPARE	8
9	SPARE			20A	1				1	20A			SPARE	10
11	SPARE			20A	1				1	20A			SPARE	12
13	SPACE												SPACE	14
15	SPACE												SPACE	16
17	SPACE												SPACE	18
	TOTAL CONNECTED kVA					0.72	1.73	0.72						
	TOTAL CONNECTED AMPS					2.6	6.3	2.6						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	3.07	125%	3.84	TOTAL CONN. LOAD	3.2	kVA
NON-CONTINOUS kVAD	0.10	100%	0.10	TOTAL EST. DEMAND	3.9	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	3.8	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	4.7	AMP

NOTES:

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PANEL 'NE-PH-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 100A
SERVICE: 480 | 277 WYE | FED FROM: NE-DPH-01 | MAINS: MLO
POLES: 30 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 459 | CONDUITS PER NEC, BASED ON TYPE | AIC: 22,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	NURSING/CLINICS EAST LTG	#12	3/4"	20A	1	2.58			1	20A			SPARE	2
3	NURSING/CLINICS WEST LTG	#12	3/4"	20A	1		2.97		1	20A			SPARE	4
5	PHARMACY LTG	#10	3/4"	20A	1			2.20	1	20A			SPARE	6
7	NURSING+CLINICS HALL/WAIT LTG	#12	3/4"	20A	1	0.83			1	20A			SPARE	8
9	HALL 104,105,112A,E LOBBY LTG	#10	3/4"	20A	1		1.05		1	20A			SPARE	10
11	SPARE			20A	1				1	20A			SPARE	12
13	SPARE			20A	1				1	20A			SPARE	14
15	SPARE			20A	1								SPACE	16
17	SPARE			20A	1								SPACE	18
19	SPARE			20A	1								SPACE	20
21	SPACE												SPACE	22
23	SPACE												SPACE	24
25	SPACE												SPACE	26
27	SPACE												SPACE	28
29	SPACE												SPACE	30
	TOTAL CONNECTED kVA					3.40	4.03	2.20						
	TOTAL CONNECTED AMPS					12.3	14.5	7.9						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS	
CONTINUOUS kVA @125%	9.63	125%	12.03	TOTAL CONN. LOAD	9.6 kVA
NON-CONTINOUS kVAD	0.00	100%	0.00	TOTAL EST. DEMAND	12.0 kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	11.6 AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	14.5 AMP

NOTES:

PANEL 'PH-PL-OS-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 100A
SERVICE: 208 | 120 WYE | FED FROM: NW-DPH-OS-01 | MAINS: 100A
POLES: 30 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: 100%
LOCATION: PHARMACY 304 | CONDUITS PER NEC, BASED ON TYPE | AIC: 10,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RM 304 UC REFRIG	#12	3/4"	20A	1	1.00			1	20A			SPARE	2
3	RM 304 REFRIG	#12	3/4"	20A	1		1.20		1	20A			SPARE	4
5	SPARE			20A	1				1	20A			SPARE	6
7	SPARE			20A	1				1	20A			SPARE	8
9	SPARE			20A	1				1	20A			SPARE	10
11	SPARE			20A	1				1	20A			SPARE	12
13	SPARE			20A	1				1	20A			SPARE	14
15	SPACE												SPACE	16
17	SPACE												SPACE	18
19	SPACE												SPACE	20
21	SPACE												SPACE	22
23	SPACE												SPACE	24
25	SPACE												SPACE	26
27	SPACE												SPACE	28
29	SPACE												SPACE	30
	TOTAL CONNECTED kVA					1.00	1.20	0.00						
	TOTAL CONNECTED AMPS					8.3	10.0	0.0						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS	
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	2.2 kVA
NON-CONTINOUS kVAD	2.20	100%	2.20	TOTAL EST. DEMAND	2.2 kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	6.1 AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	6.1 AMP

NOTES:

PANEL 'PH-PL-OS-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 100A
SERVICE: 208 | 120 WYE | FED FROM: NW-DPH-OS-01 | MAINS: 100A
POLES: 30 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: 100%
LOCATION: PHARMACY 304 | CONDUITS PER NEC, BASED ON TYPE | AIC: 10,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RM 304 UC REFRIG	#12	3/4"	20A	1	1.00			1	20A			SPARE	2
3	RM 304 REFRIG	#12	3/4"	20A	1		1.20		1	20A			SPARE	4
5	SPARE			20A	1				1	20A			SPARE	6
7	SPARE			20A	1				1	20A			SPARE	8
9	SPARE			20A	1				1	20A			SPARE	10
11	SPARE			20A	1				1	20A			SPARE	12
13	SPARE			20A	1				1	20A			SPARE	14
15	SPACE												SPACE	16
17	SPACE												SPACE	18
19	SPACE												SPACE	20
21	SPACE												SPACE	22
23	SPACE												SPACE	24
25	SPACE												SPACE	26
27	SPACE												SPACE	28
29	SPACE												SPACE	30
	TOTAL CONNECTED kVA					1.00	1.20	0.00						
	TOTAL CONNECTED AMPS					8.3	10.0	0.0						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS	
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	2.2 kVA
NON-CONTINOUS kVAD	2.20	100%	2.20	TOTAL EST. DEMAND	2.2 kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	6.1 AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	6.1 AMP

NOTES:

PANEL 'NE-PL-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225A
SERVICE: 208 | 120 WYE | FED FROM: NE-DPL-01 | MAINS: MLO
POLES: 60 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 459 | CONDUITS PER NEC, BASED ON TYPE | AIC: 22,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RM 417 DEDICATED RECPT	#12	20A	20A	1	1.00	0.54		1	20A	3/4"	#12	RM 407 RECPTS	2
3	RM 417 DEDICATED RECPT	#12	20A	20A	1		1.00	0.54	1	20A	3/4"	#12	RM 408 RECPTS	4
5	RMS 108,109,110,416 RECPTS	#12	20A	20A	1			0.72	0.72	1	20A	3/4"	#12	RM 418 RECPTS	6
7	SPARE			20A	1	0.72			1	20A	3/4"	#12	RM 418 RECPTS	8
9	SPARE			20A	1		0.72		1	20A	3/4"	#12	RM 413 RECPTS	10
11	SPARE			20A	1			0.72	1	20A	3/4"	#12	RM 412 RECPTS	12
13	SPARE			20A	1	1.00			1	20A	3/4"	#12	RM 418 PRINTER	14
15	SPARE			20A	1		1.26		1	20A	3/4"	#12	RM 113 RECPTS	16
17	SPARE			20A	1			0.72	1	20A	3/4"	#12	RM 117 RECPTS	18
19	SPARE			20A	1	0.54			1	20A	3/4"	#12	RM 116 RECPTS	20
21	SPARE			20A	1				1	20A			SPARE	22
23	SPARE			20A	1			0.72	1	20A	3/4"	#12	RM 116 RECPTS	24
25	SPARE			20A	1	0.90			1	20A	3/4"	#12	RMS 409,410,411 RECPTS	26
27	SPARE			20A	1		0.50		1	20A	3/4"	#12	TIMECLOCK RECPT	28
29	ENTRY RECPTS	#12	3/4"	20A	1			0.36	1.20	1	20A	3/4"	#12	RM 452 COPY	30
31	ENTRY EWC	#10	3/4"	20A	1	1.00	0.54		1	20A	3/4"	#12	RM 117 RECPTS	32
33	RM 404 RECPTS	#12	3/4"	20A	1		0.54	1.00	1	20A	3/4"	#12	RM 452 REFRIG	34
35	RM 405 RECPTS	#12	3/4"	20A	1			0.54	0.90	1	20A	3/4"	#12	RM 453 RECPTS	36
37	RM 406 RECPTS	#12	3/4"	20A	1	0.54	0.54		1	20A	3/4"	#12	RM 430, 431 RECPTS	38
39	RM 402 RECPTS	#12	3/4"	20A	1		0.72	0.36	1	20A	3/4"	#12	RM 401 RECPTS	40
41	RM 401 RECPTS	#12	3/4"	20A	1			0.54	1.20	1	20A	3/4"	#12	RM 458 COPY	42
43	RM 400 RECPTS	#12	3/4"	20A	1	0.72	0.72		1	20A	3/4"	#12	RM 432 RECPTS	44
45	RMS 111,112 RECPTS	#12	3/4"	20A	1		0.36	0.90	1	20A	3/4"	#12	RM 447 RECPTS	46
47	RM 417 DEDICATED RECPT	#12	3/4"	20A	1			1.00	0.54	1	20A	3/4"	#12	RM 451 RECPTS	48
49	RM 417 DEDICATED RECPT	#12	3/4"	20A	1	1.00	0.54		1	20A	3/4"	#12	RM 451 RECPTS	50
51	RM 419,420,421,422 RECPTS	#12	3/4"	20A	1		0.90	0.90	1	20A	3/4"	#12	RM 446 RECPTS	52
53	RMS 415 RECPTS	#12	3/4"	20A	1			0.36	0.72	1	20A	3/4"	#12	RM 449 RECPTS	54
55	RM 414 RECPTS	#12	3/4"	20A	1	0.72	0.72		1	20A	3/4"	#12	RM 448 RECPTS	56
57	RM 410 AUTOCLAVE	#12	3/4"	20A	1		1.20	0.72	1	20A	3/4"	#12	RMS 442, 445 RECPTS	58
59	RM 411 AUTOCLAVE	#12	3/4"	20A	1			1.20	0.72	1	20A	3/4"	#12	RM 442 RECPTS	60
	TOTAL CONNECTED kVA					11.74	11.62	12.88							
	TOTAL CONNECTED AMPS					97.8	96.8	107.3							

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS	
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	36.2 kVA
NON-CONTINOUS kVAD	36.24	100%	36.24	TOTAL EST. DEMAND	36.2 kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	100.6 AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	100.6 AMP

NOTES: PROVIDE FEED THRU LUGS

PANEL 'NE-PL-02'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225A
SERVICE: 208 | 120 WYE | FED FROM: NE-DPL-01 | MAINS: MLO
POLES: 60 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 459 | CONDUITS PER NEC, BASED ON TYPE | AIC: 22,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RM 441 RECPTS	#12	3/4"	20A	1	0.90	0.72		1	20A	3/4"	#12	RM 457 RECPTS	2
3	RM 440 RECPTS	#12	3/4"	20A	1		0.90	0.90	1	20A	3/4"	#12	RM 436 RECPTS	4
5	RM 439 RECPTS	#12	3/4"	20A	1			0.90	0.72	1	20A	3/4"	#12	RM 435 RECPTS	6
7	RM 438 RECPTS	#12	3/4"	20A	1	0.72	0.90		1	20A	3/4"	#10	RM 458 RECPTS	8
9	RM 456 RECPTS	#12	3/4"	20A	1		0.90	0.72	1	20A	3/4"	#12	RM 433 RECPTS	10
11	RM 437 RECPTS	#12	3/4"	20A	1			0.90	0.72	1	20A	3/4"	#12	RM 434 RECPTS	12
13	RM 104 RECPTS	#12	3/4"	20A	1	0.54	0.54		1	20A	3/4"	#12	RMS 104,105,112A RECPTS	14
15	RM 104 RECPTS	#12	3/4"	20A	1		0.36	0.72	1	20A	3/4"	#12	RM 431 RECPTS	16
17	RM 115 RECPT	#10	3/4"	30A	2			1.75	1.20	1	20A	3/4"	#12	RM 452 MICROWAVE	18
19						1.75	1.20			1	20A	3/4"	#12	RM 452 MICROWAVE	20
21	RM 115 RECPT	#10	3/4"	30A	2		1.75	1.20		1	20A	3/4"	#12	RM 452 DEDICATED RECEPT	22
23								1.75	1.20	1	20A	3/4"	#12	RM 452 DEDICATED RECEPT	24
25	RM 460 DEDICATED RECPT	#12	3/4"	20A	1	1.00	0.54		1	20A	3/4"	#12	RM 454,455,461 RECPTS	26
27	RM 460 DEDICATED RECPT	#12	3/4"	20A	1		1.00	0.36	1	20A	3/4"	#12	RM 458 RECPT	28
29	RM 401 PRINTER	#12	3/4"	20A	1			1.20	1.20	1	20A	3/4"	#10	RM 404 EXAM TABLE	30
31	RM 115 RECPTS	#12	3/4"	20A	1	0.36	1.20		1	20A	3/4"	#10	RM 405 EXAM TABLE	32
33	RM 115 RECPTS	#12	3/4"	20A	1		0.72	1.20	1	20A	3/4"	#10	RM 406 EXAM TABLE	34
35	RM 117 DEDICATED RECEPT	#12	3/4"	20A	1			1.20	1.20	1	20A	3/4"	#10	RM 407 EXAM TABLE	36
37	RM 117 DEDICATED RECEPT	#12	3/4"	20A	1	1.20	1.20		1	20A	3/4"	#10	RM 408 EXAM TABLE	38
39	RM 117 DEDICATED RECPT	#12	3/4"	20A	1		1.20		1	20A			SPARE	40
41	LOBBY RECEPTS	#12	3/4"	20A	1			0.54		1	20A		SPARE	42
43	SPARE			20A	1				1	20A			SPARE	44
45	SPARE			20A	1				1	20A			SPARE	46
47	SPARE			20A	1				1	20A			SPARE	48
49	SPARE			20A	1				1	20A			SPARE	50
51	SPARE			20A	1				1	20A			SPARE	52
53	SPARE			20A	1				1	20A			SPARE	54
55	SPARE			20A	1				1	20A			SPARE	56
57	SPARE			20A	1				1	20A			SPARE	58
59	SPARE			20A	1				1	20A			SPARE	60
	TOTAL CONNECTED kVA					12.77	11.93	14.48						
	TOTAL CONNECTED AMPS					106.4	99.4	120.7						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS	
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	39.2 kVA
NON-CONTINOUS kVAD	39.18	100%	39.18	TOTAL EST. DEMAND	39.2 kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	108.8 AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	108.8 AMP

NOTES: PROVIDE FEED THRU LUGS

PANEL 'PH-PL-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225A
SERVICE: 208 | 120 WYE | FED FROM: NE-DPL-01 | MAINS: MLO
POLES: 60 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: PHARM RM 304 | CONDUITS PER NEC, BASED ON TYPE | AIC: 10,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RM 302 REFRIG	#12	3/4"	20A	1	1.20	1.20		1	20A	3/4"	#12	RM 302 RECPT	2
3	RM 304 PILL MACHINE	#12	3/4"	20A	1		1.20	1.20	1	20A	3/4"	#12	RM 302 RECPT	4
5	SPARE			20A	1			0.54	1	20A	3/4"	#12	RM 301 RECPTS	6
7	RM 304 PRINTER	#12	3/4"	20A	1	1.20	0.36		1	20A	3/4"	#12	RM 302 RECPTS	8
9	RM 304 TIME CLOCK	#12	3/4"	20A	1		0.18	0.54	1	20A	3/4"	#12	RM 304 RECPTS	10
11	SPARE			20A	1			0.36	1	20A	3/4"	#12	RM 304 RECPTS	12
13	SPARE			20A	1		1.20		1	20A	3/4"	#12	RM 302 MICROWAVE	14
15	RM 304 RECPTS	#12	3/4"	20A	1			0.72	1.20	1	20A	3/4"	#12	RM 302 MICROWAVE	16
17	RM 304 RECPTS	#12	3/4"	20A	1				0.72	0.36	1	20A	3/4"	RM 304 RECPT	18
19	RM 304 RECPTS	#12	3/4"	20A	1	0.72	0.36							RM 304 RECPT	20
21	RM 304 RECPTS	#12	3/4"	20A	1			0.72	0.18	1	20A	3/4"	#12	RM 306 RECPT	22
23	RMS 303,304 RECPTS	#12	3/4"	20A	1				0.54	1.80	1	20A	3/4"	RM 304 OVERHEAD GRILL	24
25	RM 304 RECPT	#12	3/4"	20A	1	1.20	0.50							EXT RECEPT	26
27	RM 304 RECPT	#12	3/4"	20A	1		1.20	0.18	1	20A	3/4"	#12	RM 302 RECPT	ROOF RECEPT	28
29	RM 305 RECEPTS	#12	3/4"	20A	1				0.72	1.66	2	25A	3/4"	#10	AC-A, FCA	30
31	RM 314 RECEPTS	#12	3/4"	20A	1	0.72	1.66									32
33	RM 315 RECEPTS	#12	3/4"	20A	1		0.72									34
35	RM 316 RECEPTS	#12	3/4"	20A	1			0.72	1	20A				SPARE		36
37	RM 319 RECEPTS	#12	3/4"	20A	1	0.54			1	20A				SPARE		38
39	RM 312 RECEPTS	#12	3/4"	20A	1		0.72		1	20A				SPARE		40
41	RMS 310/311 RECEPTS	#12	3/4"	20A	1			0.72	1	20A				SPARE		42
43	LOBBY/CORRIDOR RECEPTS	#12	3/4"	20A	1	0.72			1	20A				SPARE		44
45	RM 310 COPY	#12	3/4"	20A	1		1.20		1	20A				SPARE		46
47	RM 307 RECEPTS	#12	3/4"	20A	1			0.72	1	20A				SPARE		48
49	RM 300 RECEPTS	#12	3/4"	20A	1	0.72			1	20A				SPARE		50
51	EF-6,7	#12	3/4"	20A	1		0.10		1	20A				SPARE		52
53								2.00	1	20A				SPARE		54
55	VAV 3-5, 3-2, 3-1	#10	3/4"	25A	3	2.00			1	20A				SPARE		56
57							2.00		1	20A				SPARE		58
59	VAV CONTROLS	#12	3/4"	20A	1			1.00	1	20A				SPARE		60
	TOTAL CONNECTED kVA					14.30	12.06	11.96								
	TOTAL CONNECTED AMPS					119.2	100.5	99.7								

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS	
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	38.3 kVA
NON-CONTINOUS kVAD	38.33	100%	38.33	TOTAL EST. DEMAND	38.3 kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	106.4 AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	106.4 AMP

NOTES:

PANEL 'NE-PH-02'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 400A
SERVICE: 480 | 277 WYE | FED FROM: NE-DPH-01 | MAINS: MLO
POLES: 48 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 459 | CONDUITS PER NEC, BASED ON TYPE | AIC: 14,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1						5.67	6.67							2
3	VAV 3-4, 3-6, 3-7	#10	3/4"	30A	3		5.67	6.67	3	35A	3/4"	#8-#10	VAV 4-5	4
5								5.67	6.67					6
7						3.67	6.33							8
9	VAV 3-3, 4-6	#10	3/4"	20A	3		3.67	6.33	3	30A	3/4"	#10	VAV 4-1, 4-3, 4-4	10
11								3.67	6.33					12
13						3.83	5.33							14
15	VAV 4-7, 4-8, 4-9	#10	3/4"	20A	3		3.83	5.33	3	30A	3/4"	#10	VAV 5-5, 5-6, 5-8	16
17								3.83	5.33					18
19						2.67	6.00							20
21	VAV 5-21, 5-23	#12	3/4"	15A	3		2.67	6.00	3	30A	3/4"	#10	VAV 5-2, 5-3, 5-4	22
23								2.67	6.00					24
25	SPARE			20A	1	6.17								26
27	SPARE			20A	1		6.17		3	30A	3/4"	#10	VAV 5-9, 5-10, 5-11, 5-12, 5-13	28
29	SPARE			20A	1			6.17						30
31	SPARE			20A	1	6.00								32
33	SPARE			20A	1		6.00		3	30A	3/4"	#10	VAV 5-14, 5-16, 5-17	34
35	SPARE			20A	1			6.00						36
37	SPARE			20A	1	6.67								38
39	SPARE			20A	1		6.67		3	35A	3/4"	#8-#10	VAV 4-13	40
41	SPARE			20A	1			6.67						42
43	SPACE					4.00								44
45	SPACE						4.00		3	20A	3/4"	#12	VAV 4-12	46
47	SPACE							4.00						48
	TOTAL CONNECTED kVA					63.00	63.00	63.00						
	TOTAL CONNECTED AMPS					227.4	227.4	227.4						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS	
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	189.0 kVA
NON-CONTINOUS kVAD	189.00	100%	189.00	TOTAL EST. DEMAND	189.0 kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	227.3 AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	227.3 AMP

NOTES:

PANEL 'NE-PL-03'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 200
SERVICE: 208 | 120 WYE | FED FROM: NE-DPL-01 | MAINS: MLO
POLES: 42 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 459 | CONDUITS PER NEC, BASED ON TYPE | AIC: 22,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	SPARE			20A	1		1.33							2
3	SPARE			20A	1			1.33	3	20A	3/4"	#10	VAV 5-19, 5-22	4
5	SPARE			20A	1			1.33						6
7						2.00	1.33							8
9	VAV 5-1, 5-7, 5-15	#10	3/4"	25A	3		2.00	1.33	3	20A	3/4"	#10	VAV 5-18, 5-20	10
11								2.00	1.33					12
13	SPARE			20A	1	0.36			1	20A	3/4"	#10	ROOF MOUNT RECPT	14
15	VAV CONTROLS	#12	3/4"	20A	1		1.00	0.32	1	20A	3/4"	#12	EF-9,10,11,12,13,14	16
17	VAV CONTROLS	#12	3/4"	20A	1			0.80	0.50	1	20A	3/4"	#12	FCB CONDENSATE PUMP	18
19	ACB, FCB	#10	3/4"	25A	2	1.14	0.70			1	20A	3/4"	#10	EF-8	20
21							1.14	0.70		1	20A	3/4"	#10	EF-15	22
23	SPARE			20A	1					1	20A			SPARE	24
25	SPARE			20A	1					1	20A			SPARE	26
27	SPARE			20A	1					1	20A			SPARE	28
29	SPARE			20A	1					1	20A			SPARE	30
31	SPARE			20A	1					1	20A			SPARE	32
33	SPARE			20A	1					1	20A			SPARE	34
35	SPARE			20A	1					1	20A			SPARE	36
37	SPARE			20A	1					1	20A			SPARE	38
39	SPARE			20A	1					1	20A			SPARE	40
41	SPARE			20A	1					1	20A			SPARE	42
	TOTAL CONNECTED kVA					6.86	7.82	5.96							
	TOTAL CONNECTED AMPS					57.2	65.2

PANEL 'SE-PH-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 100A
SERVICE: 480 | 277 WYE | FED FROM: SE-DPH-01 | MAINS: MLO
POLES: 30 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 523 | CONDUITS PER NEC, BASED ON TYPE | AIC: 22,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	BUDGET/BILLING SOUTH LTG	#12	3/4"	20A	1	2.71			1	20A			SPARE	2
3	RMS 121,120 LTG/EM LTG	#12	3/4"	20A	1		1.36		1	20A			SPARE	4
5	BUDGET/BILLING HALL LTG	#12	3/4"	20A	1			0.36	1	20A			SPARE	6
7	LOBBY LTG	#12	3/4"	20A	1	2.15			1	20A			SPARE	8
9	HALL 106 LTG	#12	3/4"	20A	1		0.85		1	20A			SPARE	10
11	SPARE			20A	1				1	20A			SPARE	12
13	SPARE			20A	1				1	20A			SPARE	14
15	SPARE			20A	1								SPACE	16
17	SPARE			20A	1								SPACE	18
19	SPARE			20A	1								SPACE	20
21	SPACE												SPACE	22
23	SPACE												SPACE	24
25	SPACE												SPACE	26
27	SPACE												SPACE	28
29	SPACE												SPACE	30
	TOTAL CONNECTED kVA					4.86	2.01	0.36						
	TOTAL CONNECTED AMPS					17.6	7.2	1.3						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	7.23	125%	9.04	TOTAL CONN. LOAD	7.2	kVA
NON-CONTINOUS kVAD	0.00	100%	0.00	TOTAL EST. DEMAND	9.0	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	8.7	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	10.9	AMP

NOTES:

PANEL 'SE-PH-02'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225
SERVICE: 480 | 277 WYE | FED FROM: SE-DPH-01 | MAINS: MLO
POLES: 42 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 523 | CONDUITS PER NEC, BASED ON TYPE | AIC: 22,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1						6.00	3.00							2
3	VAV 6-9, 6-10, 6-14	#10	3/4"	30A	3		6.00	3.00	3	15A	3/4"	#10	VAV 4-16	4
5								6.00	3.00					6
7						5.00	6.67							8
9	VAV 6-2, 6-4, 6-8	#10	3/4"	30A	3		5.00	6.67	3	35A	3/4"	#8-#10	VAV 4-14	10
11								5.00	6.67					12
13						5.00	6.67							14
15	VAV 6-1, 6-6, 6-5	#10	3/4"	30A	3		5.00	6.67	3	35A	3/4"	#8-#10	VAV 4-15	16
17								5.00	6.67					18
19	SPARE			20A	1	6.67								20
21	SPARE			20A	1		6.67		3	35A	3/4"	#8-#10	VAV 4-17	22
23	SPARE			20A	1			6.67						24
25	SPARE			20A	1				1	20A			SPARE	26
27	SPARE			20A	1				1	20A			SPARE	28
29	SPARE			20A	1				1	20A			SPARE	30
31	SPARE			20A	1				1	20A			SPARE	32
33	SPACE												SPACE	34
35	SPACE												SPACE	36
37	SPACE												SPACE	38
39	SPACE												SPACE	40
41	SPACE												SPACE	42
	TOTAL CONNECTED kVA					39.01	39.01	39.01						
	TOTAL CONNECTED AMPS					140.8	140.8	140.8						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	117.0	kVA
NON-CONTINOUS kVAD	117.03	100%	117.03	TOTAL EST. DEMAND	117.0	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	140.8	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	140.8	AMP

NOTES:

PANEL 'SE-PL-OS-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225A
SERVICE: 208 | 120 WYE | FED FROM: NW-DPH-OS-01 | MAINS: 150A
POLES: 30 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 523 | CONDUITS PER NEC, BASED ON TYPE | AIC: 10,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RM 526 RACK RECPT	#10	3/4"	30A	2	1.75	1.75		2	30A	3/4"	#10	RM 526 RACK RECPT	2
3							1.75	1.75						4
5	RM 526 RACK RECPT	#10	3/4"	30A	2			1.75	1.75	2	30A	3/4"	#10	RM 526 RACK RECPT	6
7						1.75	1.75								8
9	RM 526 RACK RECPT	#10	3/4"	30A	2		1.75	1.75	2	30A	3/4"	#10	RM 526 RACK RECPT	10
11								1.75	1.75						12
13	RM 526 RECPTS	#12	3/4"	20A	1	0.72			1	20A			SPARE	14
15	RM 515 REFRIG	#12	3/4"	20A	1		1.20		1	20A			SPARE	16
17	SPARE			20A	1				1	20A			SPARE	18
19	SPARE			20A	1				1	20A			SPARE	20
21	SPARE			20A	1				1	20A			SPARE	22
23	SPARE			20A	1				1	20A			SPARE	24
25	SPARE			20A	1				1	20A			SPARE	26
27	SPARE			20A	1				1	20A			SPARE	28
29	SPARE			20A	1				1	20A			SPARE	30
	TOTAL CONNECTED kVA					7.72	8.20	7.00						
	TOTAL CONNECTED AMPS					64.3	68.3	58.3						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	22.9	kVA
NON-CONTINOUS kVAD	22.92	100%	22.92	TOTAL EST. DEMAND	22.9	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	63.6	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	63.6	AMP

NOTES:

PANEL 'SE-PL-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225A
SERVICE: 208 | 120 WYE | FED FROM: SE-DPL-01 | MAINS: MLO
POLES: 60 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 523 | CONDUITS PER NEC, BASED ON TYPE | AIC: 10,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RMS 100 RECPTS	#12	3/4"	20A	1	0.36	0.36		1	20A	3/4"	#12	RM 501 RECPT	2
3	RM 119A RECPTS	#10	3/4"	20A	1		0.72	0.54	1	20A	3/4"	#12	RM 502 RECPTS	4
5	RM 119B PROJECTOR	#10	3/4"	20A	1			1.00	0.90	1	20A	3/4"	#12	RM 503 RECPTS	6
7	RM 119B PROJECTOR	#10	3/4"	20A	1	1.00	0.72		1	20A	3/4"	#12	RM 504 RECPTS	8
9	RM 119A RECPTS	#10	3/4"	20A	1		0.72	0.72	1	20A	3/4"	#12	RM 509 RECPTS	10
11	RM 119B PROJECTOR	#10	3/4"	20A	1			1.00	0.72	1	20A	3/4"	#12	RM 508 RECPTS	12
13	RM 119A SCREENS	#10	3/4"	20A	1	0.90	1.20		1	20A	3/4"	#12	RM 506 PRINTER	14
15	RM 104 RECEPTS	#10	3/4"	20A	1		0.36	1.20	1	20A	3/4"	#12	RM 512 COPY	16
17	RM 119B RECEPTS	#10	3/4"	20A	1			0.54	1.20	1	20A	3/4"	#12	RM 514 COPY	18
19	SPARE			20A	1	0.54			1	20A	3/4"	#12	RMS 512,514,516 RECPTS	20
21	SPARE			20A	1		0.72		1	20A	3/4"	#12	RM 507 RECPTS	22
23	RM 119B RECPTS	#10	3/4"	20A	1			0.54	1.20	1	20A	3/4"	#12	RM 506 REFRIG	24
25	RM 106 RECPTS	#12	3/4"	20A	1	0.54	0.72		1	20A	3/4"	#12	RM 507 RECPTS	26
27	RM 106 EWC	#12	3/4"	20A	1		1.00	0.90	1	20A	3/4"	#12	RM 516 RECPTS	28
29	RM 500 RECPTS	#12	3/4"	20A	1			0.54	1.00	1	20A	3/4"	#12	RM 507 PRINTER	30
31	RM 514 RECPTS	#12	3/4"	20A	1	0.72	1.00		1	20A	3/4"	#12	RM 507 PRINTER	32
33	RM 513 RECPTS	#12	3/4"	20A	1		0.72	1.00	1	20A	3/4"	#12	RM 507 PRINTER	34
35	RMS 505, 515, 517 RECPTS	#12	3/4"	20A	1			0.90	0.50	1	20A	3/4"	#12	RM 517 TIMECLOCK	36
37	RMS 518,527,528 RECPTS	#12	3/4"	20A	1	0.54	0.54		1	20A	3/4"	#12	OUTDOOR RECPTS	38
39	RM 530 RECPTS	#12	3/4"	20A	1		0.72	0.90	1	20A	3/4"	#12	RM 520 RECPTS	40
41	RMS 519 RECEPTS	#12	3/4"	20A	1			0.90	0.90	1	20A	3/4"	#12	RM 521 RECPTS	42
43	RM 529 COPY	#12	3/4"	20A	1	1.20	0.72		1	20A	3/4"	#12	RM 524 RECPTS	44
45	RM 531 RECPTS	#12	3/4"	20A	1		0.90	0.72	1	20A	3/4"	#12	RM 525 RECPTS	46
47	RM 529 DEDICATED RECEPT	#12	3/4"	20A	1			1.00	0.50	1	20A	3/4"	#10	RM 119A SHADE	48
49	RM 506 DEDICATED RECEPT	#12	3/4"	20A	1	1.00	0.50		1	20A	3/4"	#10	RM 119A SHADE	50
51	RM 501 RECPTS	#12	3/4"	20A	1		0.72	1.20	1	20A	3/4"	#12	RM 506 MICROWAVE	52
53	RM 533 TIME CLOCK	#12	3/4"	20A	1			0.18	2.50	2	30A	3/4"	#10	RM 512 SHREDDER	54 #
55	RM 529 DEDICATED RECEPT	#12	3/4"	20A	1	1.20	2.50								56
57	RM 529 DEDICATED RECEPT	#12	3/4"	20A	1		1.20	2.50	2	30A	3/4"	#10	RM 514 SHREDDER	58 #
59	RM 529 DEDICATED RECEPT	#12	3/4"	20A	1			1.20	2.50						60
	TOTAL CONNECTED kVA					16.26	17.46	19.72							
	TOTAL CONNECTED AMPS					135.5	145.5	164.3							

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	53.4	kVA
NON-CONTINOUS kVAD	53.44	100%	53.44	TOTAL EST. DEMAND	53.4	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	148.3	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	148.3	AMP

NOTES: PROVIDE FEED THRU LUGS
CONTRACTOR TO VERIFY EXACT OVERCURRENT PROTECTION SIZE & VOLTAGE PRIOR TO INSTALLATION.

PANEL 'SE-PL-02'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225A
SERVICE: 208 | 120 WYE | FED FROM: SE-DPL-01 | MAINS: MLO
POLES: 48 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 523 | CONDUITS PER NEC, BASED ON TYPE | AIC: 10,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	EAST COURTYARD RECEPTS	#10	3/4"	20A	1	0.36	1.75		2	30A	3/4"	#10	RM 526 RACK RECPT	2
3	EAST COURTYARD RECEPTS	#10	3/4"	20A	1		0.36	1.75						4
5	EAST COURTYARD RECEPTS	#10	3/4"	20A	1			0.36	1.75	2	30A	3/4"	#10	RM 526 RACK RECPT	6
7	EAST COURTYARD RECEPTS	#10	3/4"	20A	1	0.36	1.75								8
9	EAST COURTYARD RECEPTS	#10	3/4"	20A	1		0.36	1.75	2	30A	3/4"	#10	RM 526 RACK RECPT	10
11	EAST COURTYARD RECEPTS	#10	3/4"	20A	1			0.54	1.75						12
13	EAST COURTYARD RECEPTS	#10	3/4"	20A	1	0.36	1.75		2	30A	3/4"	#10	RM 526 RACK RECPT	14
15	HALLS 522,529,518 RECEPTS	#12	3/4"	20A	1		0.72	1.75							16
17	PARITION MOTOR	#12	3/4"	20A	2			1.04	1.75	2	30A	3/4"	#10	RM 526 RACK RECPT	18
19						1.04	1.75								20
21	SPARE			20A	1			1.75	2	30A	3/4"	#10	RM 526 RACK RECPT	22
23	SPARE			20A	1				1.75						24
25	SPARE			20A	1		0.72			1	20A	3/4"	#12	RM 526 RECPTS	26
27	SPARE			20A	1			0.72		1	20A	3/4"	#12	RM 526 RECPTS	28
29	SPARE			20A	1					1	20A			SPARE	30
31	SPARE			20A	1					1	20A			SPARE	32
33	SPARE			20A	1					1	20A			SPARE	34
35	SPARE			20A	1					1	20A			SPARE	36
37	SPARE			20A	1					1	20A			SPARE	38
39	SPARE			20A	1					1	20A			SPARE	40
41	SPARE			20A	1					1	20A			SPARE	42
43	SPARE			20A	1					1	20A			SPARE	44
45	SPARE			20A	1					1	20A			SPARE	46
47	SPARE			20A	1					1	20A			SPARE	48
	TOTAL CONNECTED kVA					9.84	9.16	8.94							
	TOTAL CONNECTED AMPS					82.0	76.3	74.5							

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	27.9	kVA
NON-CONTINOUS kVAD	27.94	100%	27.94	TOTAL EST. DEMAND	27.9	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	77.6	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	77.6	AMP

NOTES: PROVIDE FEED THRU LUGS

PANEL 'SE-PL-03'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 200A
SERVICE: 208 | 120 WYE | FED FROM: SE-DPL-01 | MAINS: MLO
POLES: 42 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 523 | CONDUITS PER NEC, BASED ON TYPE | AIC: 10,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1						2.00	1.33							2
3	VAV 6-11, 6-12, 6-15	#10	3/4"	30A	3		2.00	1.33	3	20A	3/4"	#12	VAV 6-3, 6-7	4
5								2.00	1.33					6
7	VAV CONTROLS	#12	3/4"	20A	1	1.00	0.18		1	20A	3/4"	#10	ROOF MOUNT RECPT	8
9	VAV CONTROLS	#12	3/4"	20A	1		0.70	0.27	1	20A	3/4"	#12	EF-16,17,18,19	10
11	FC-C,D CONDENSATE PUMP	#12	3/4"	20A	1			0.50	2.60	2	35A	3/4"	#8-#10	AC-C, FC-C	12
13	SPARE			20A	1	2.60									14
15	SPARE			20A	1		2.60		2	35A	3/4"	#8-#10	AC-D, FC-D	16
17	SPARE			20A	1			2.60							18
19	SPARE			20A	1				1	20A			SPARE	20
21	SPARE			20A	1				1	20A			SPARE	22
23	SPARE			20A	1				1	20A			SPARE	24
25	SPARE			20A	1				1	20A			SPARE	26
27	SPARE			20A	1				1	20A			SPARE	28
29	SPARE			20A	1				1	20A			SPARE	30
31	SPARE			20A	1				1	20A			SPARE	32
33	SPARE			20A	1				1	20A			SPARE	34
35	SPARE			20A	1				1	20A			SPARE	36
37	SPARE			20A	1				1	20A			SPARE	38
39	SPARE			20A	1				1	20A			SPARE	40
	TOTAL CONNECTED kVA					7.11	6.90	9.03						
	TOTAL CONNECTED AMPS					59.3	57.5	75.3						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	23.0	kVA
NON-CONTINOUS kVAD	17.85	100%	17.85	TOTAL EST. DEMAND	24.3	kVA
MOTOR kVA + 25%	5.20	125%	6.50	TOTAL CONNECTED CURRENT	64.0	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	67.6	AMP

NOTES:

MINI-POWER CENTER 'WH-PL-OS-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY:
SERVICE: 208 | 120 WYE | FED FROM: ATS-3 | PRIMARY MCB: 70A | SECONDARY MCB: 70A
POLES: 18 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: | FULL
LOCATION: RM 805 | CONDUITS PER NEC, BASED ON TYPE | AIC:
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RM 805 REFRIG	#12	3/4"	20A	1	1.20	1.20		1	20A	3/4"	#12	RM 805 REFRIG	2
3	RM 805 REFRIG	#12	3/4"	20A	1		1.20	1.20	1	20A	3/4"	#12	RM 805 REFRIG	4
5	RM 804 RACK	#12	3/4"	30A	2			1.75	1	20A			SPARE	6
7						1.75			1	20A			SPARE	8
9	SPARE			20A	1				1	20A			SPARE	10
11	SPARE			20A	1				1	20A			SPARE	12
13	SPARE			20A	1				1	20A			SPARE	14
15	SPARE			20A	1				1	20A			SPARE	16
17	SPARE			20A	1				1	20A			SPARE	18
	TOTAL CONNECTED kVA					4.15	2.40	1.75						
	TOTAL CONNECTED AMPS					34.6	20.0	14.6						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	8.3	kVA
NON-CONTINOUS kVAD	8.30	100%	8.30	TOTAL EST. DEMAND	8.3	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	23.0	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	23.0	AMP

NOTES:

PANEL 'WH-PL-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 150A
SERVICE: 208 | 120 WYE | FED FROM: WH-PH-01 VIA XFMR 'WH-T-01' | MAINS: 150A
POLES: 42 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 807 | CONDUITS PER NEC, BASED ON TYPE | AIC: 10,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RM 801 RECPTS	#12	3/4"	20A	1	0.90	0.50		1	15A	3/4"	#12	WH-3 RECIRC PUMP	2
3	RM 800 EWC	#12	3/4"	20A	1		1.00	0.36	1	20A	3/4"	#12	N, E OUTDOOR RECPTS	4
5	RMS 805,806,807,808 RECPTS	#12	3/4"	20A	1			0.72	0.18	1	20A	3/4"	#12	RM 800 TIME CLOCK	6
7	RM 800 RECPTS	#12	3/4"	20A	1	0.36	0.36		1	20A	3/4"	#12	W, S OUTDOOR RECPTS	8
9	RM 802 RECPT	#12	3/4"	20A	1		0.18	1.75	2	30A	3/4"	#10	RM 804 RACK RECEPT	10
11	RM 801 MICROWAVE	#12	3/4"	20A	1			1.20	1.75						12
13	RM 801 UC REFRIG	#12	3/4"	20A	1	1.00	0.24		1	15A	3/4"	#12	EF-36,37,38	14
15	RM 801 PRINTER	#12	3/4"	20A	1		1.00	0.50	1	20A	3/4"	#12	CONTROLLER 'LC1'	16
17	RM 801 MICROWAVE	#12	3/4"	20A	1			1.20	1.20	1	20A	3/4"	#4-#6	GATE	18
19	RM 801 MICROWAVE	#12	3/4"	20A	1	0.36				1	20A			SPARE	20
21	EMCS	#12	3/4"	20A	1		0.10			1	20A			SPARE	22
23	SPARE			20A	1					1	20A			SPARE	24
25	SPARE			20A	1					1	20A			SPARE	26
27	SPARE			20A	1					1	20A			SPARE	28
29	SPARE			20A	1					1	20A			SPARE	30
31	SPARE			20A	1					1	20A			SPARE	32
33	SPARE			20A	1					1	20A			SPARE	34
35	SPARE			20A	1					1	20A			SPARE	36
37	SPARE			20A	1					1	20A			SPARE	38
39	SPARE			20A	1					1	20A			SPARE	40
41	SPARE			20A	1					1	20A			SPARE	42
	TOTAL CONNECTED kVA					3.72	4.89	6.25							
	TOTAL CONNECTED AMPS					31.0	40.8	52.1							

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	14.9	kVA
NON-CONTINOUS kVAD	14.86	100%	14.86	TOTAL EST. DEMAND	14.9	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	41.3	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	41.3	AMP

NOTES:

PANEL 'WH-PH-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225A
SERVICE: 480 | 277 WYE | FED FROM: NW-SESH-01 | MAINS: 225 MCB
POLES: 30 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC 804 | CONDUITS PER NEC, BASED ON TYPE | AIC: 10,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	WAREHOUSE LTG/EM LTG	#12	3/4"	20A	1	2.25	7.76							2
3	WAREHOUSE BLDG LTG/EM	#12	3/4"	20A	1		0.33	7.76	3	30A	3/4"	#10	AC-9	4
5	SPARE			20A	1			7.76						6
7	SPARE			20A	1	1.65			2	15A	3/4"	#12	WH-3	8
9	SPARE			20A	1		1.65							10
11	SPARE			20A	1			3.90						12
13	SPARE			20A	1	3.90			3	35A	3/4"	#8-#10	TRASH COMPACTOR	14 #
15	SPARE			20A	1		3.90							16
17	SPARE			20A	1			3.90						18
19						3.72	3.90		3	35A	3/4"	#8-#10	TRASH COMPACTOR	20 #
21	WH-PL-01 VIA WH-T-01	#4-#8	1-1/4"	70A	3		4.28	3.90						22
23								5.05	0.83					24
25						4.15	0.83		3	15A	3/4"	#12	OVERHEAD DOOR	26
27	ATS-3	#4-#8	1-1/4"	70A	3		2.48	0.83						28
29								1.75	1	20A			SPARE	30
	TOTAL CON

PANEL 'CS-PH-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 100A
SERVICE: 480 | 277 WYE | FED FROM: CS-DPH-01 | MAINS: MLO
POLES: 30 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 136 | CONDUITS PER NEC, BASED ON TYPE | AIC: 22,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	CENTER SPIRIT WEST LTG	#12	3/4"	20A	1	2.80			1	20A			SPARE	2
3	CENTER SPIRIT CENTER&EAST LTG	#12	3/4"	20A	1		3.58		1	20A			SPARE	4
5	CENTER SPIRIT RMS150-152 LTG	#12	3/4"	20A	1			0.83	1	20A			SPARE	6
7	CENTER SPIRIT HALL LTG	#12	3/4"	20A	1	1.38			1	20A			SPARE	8
9	HALL 103 WALL WASH LTG	#12	3/4"	20A	1		0.32		1	20A			SPARE	10
11	SPACE								1	20A			SPARE	12
13	SPACE								1	20A			SPARE	14
15	SPACE								1	20A			SPARE	16
17	SPACE												SPACE	18
19	SPACE												SPACE	20
21	SPACE												SPACE	22
23	SPACE												SPACE	24
25	SPACE												SPACE	26
27	SPACE												SPACE	28
29	SPACE												SPACE	30
	TOTAL CONNECTED kVA					4.16	3.90	0.63						
	TOTAL CONNECTED AMPS					15.0	14.1	2.3						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	8.69	125%	10.86	TOTAL CONN. LOAD	8.7	kVA
NON-CONTINOUS kVAD	0.00	100%	0.00	TOTAL EST. DEMAND	10.9	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	10.4	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	13.1	AMP

NOTES:

PANEL 'CS-PL-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225A
SERVICE: 208 | 120 WYE | FED FROM: CS-DPL-01 | MAINS: MLO
POLES: 60 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 136 | CONDUITS PER NEC, BASED ON TYPE | AIC: 22,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RM 664 DEDICATED RECEPT	#12	3/4"	20A	1	1.20	1.00		1	20A	3/4"	#12	RM 103 EWC	2
3	RM 664 DEDICATED RECEPT	#12	3/4"	20A	1		1.20	0.54	1	20A	3/4"	#12	RM 603 RECPTS	4
5	RM 664 MICROWAVE	#12	3/4"	20A	1			1.20	0.54	1	20A	3/4"	#12	RMS 604, 647 RECPTS	6
7	RM 664 MICROWAVE	#12	3/4"	20A	1	1.20	0.72		1	20A	3/4"	#12	RM 605 RECPTS	8
9	SPARE			20A	1		1.00	0.72	1	20A	3/4"	#12	RM 648 RECPTS	10
11	SPARE			20A	1			1.00	0.72	1	20A	3/4"	#12	RM 651 RECPTS	12
13	SPARE			20A	1	1.00	0.72		1	20A	3/4"	#12	RM 649 RECPTS	14
15	SPARE			20A	1		1.00	0.72	1	20A	3/4"	#12	RM 650 RECPTS	16
17	SPARE			20A	1			0.36	0.72	1	20A	3/4"	#12	RM 642 RECPTS	18
19	SPARE			20A	1	0.72	0.72		1	20A	3/4"	#12	RM 641 RECPTS	20
21	SPARE			20A	1		0.72	1.08	1	20A	3/4"	#12	RMS 656,665,672,677 RECPTS	22
23	SPARE			20A	1			0.36	0.72	1	20A	3/4"	#12	RM 670 RECPTS	24
25	SPARE			20A	1	0.54	0.72		1	20A	3/4"	#12	RM 669 RECPTS	26
27	RM 657 RECPTS	#12	3/4"	20A	1		0.72	0.72	1	20A	3/4"	#12	RM 668 RECPTS	28
29	RM 657 RECPTS	#12	3/4"	20A	1			0.72	0.72	1	20A	3/4"	#12	RM 667 RECPTS	30
31	RM 134 RECPTS	#12	3/4"	20A	1	1.08	0.72		1	20A	3/4"	#12	RM 673 RECPTS	32
33	RM 135 RECPTS	#12	3/4"	20A	1		1.08	0.72	1	20A	3/4"	#12	RM 674 RECPTS	34
35	RM 664 COPY	#12	3/4"	20A	1			1.20	0.72	1	20A	3/4"	#12	RM 675 RECPTS	36
37	RMS 604,632,660 RECPTS	#12	3/4"	20A	1	0.54	0.72		1	20A	3/4"	#12	RM 676 RECPTS	38
39	RM 664 REFRIG	#12	3/4"	20A	1		1.00	0.50	1	20A	3/4"	#12	RM 677 TIMECLOCK	40
41	RM 658 RECPTS	#12	3/4"	20A	1			0.72	0.72	1	20A	3/4"	#12	RM 640 RECPTS	42
43	RM 663 RECPTS	#12	3/4"	20A	1	0.72	1.20		1	20A	3/4"	#12	RM 654 DEDICATED RECEPT	44
45	RM 662 RECPTS	#12	3/4"	20A	1		0.72	1.20	1	20A	3/4"	#12	RM 654 DEDICATED RECEPT	46
47	RM 661 RECPTS	#12	3/4"	20A	1			0.90	1.20	1	20A	3/4"	#12	RM 654 DEDICATED RECEPT	48
49	RM 655 RECPTS	#12	3/4"	20A	1	0.72			1	20A					50
51	RM 654 RECPTS	#12	3/4"	20A	1		0.72	0.72	1	20A	3/4"	#12	RMS 634,639,643,646 RECPTS	52
53	RM 653 RECPTS	#12	3/4"	20A	1			0.72	1	20A					54
55	RM 652 RECPTS	#12	3/4"	20A	1	0.72			1	20A					56
57	RM 664 DEDICATED RECPT	#12	3/4"	20A	1		1.20		1	20A					58
59	RM 664 DEDICATED RECPT	#12	3/4"	20A	1			1.20	1	20A					60
	TOTAL CONNECTED kVA					14.96	16.28	14.44						
	TOTAL CONNECTED AMPS					124.7	135.7	120.3						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	45.7	kVA
NON-CONTINOUS kVAD	45.68	100%	45.68	TOTAL EST. DEMAND	45.7	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	126.8	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	126.8	AMP

NOTES: PROVIDE FEED THRU LUGS

PANEL 'CF-P-L-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 150
SERVICE: 208 | 120 WYE | FED FROM: SE-DPL-01 | MAINS: MLO
POLES: 36 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: CAFÉ RM 118 | CONDUITS PER NEC, BASED ON TYPE | AIC: 10,000
MOUNTING: FLUSH | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	COFFEE GRINDER	#12	3/4"	20A	1	1.13	2.50		2	30A	3/4"	#10	ESPRESSO/CAPPUCINO	2
3	COFFEE GRINDER	#12	3/4"	20A	1		1.13	2.50						4
5	BLENDER	#12	3/4"	20A	1			0.48	1.20	1	20A	3/4"	#12	POS RECPT	6
7	BLENDER	#12	3/4"	20A	1	0.48	1.20		1	20A	3/4"	#12	POS PRINTER	8
9	UC REFRIG	#12	3/4"	20A	1			0.36	1.09	2	20A	3/4"	#12	REFRIG SELF SERVICE	10
11	TEA BREWER	#12	3/4"	20A	1				1.80	1.09					12
13	HOLDING CABINET	#12	3/4"	20A	1	2.00	2.50		2	30A	3/4"	#10	MICROWAVE CONVECTION	14
15	REACH-IN FREEZER	#12	3/4"	20A	1		1.50	2.50					OVEN	16
△ 17	REACH-IN REFRIG	#12	3/4"	20A	1			0.70	2.50	2	30A	3/4"	#10	COFFEE BREWER	18 △
19	POPCORN MACHINE	#12	3/4"	20A	1	1.20	2.50								20
21	UC DISH WASHER	#12	3/4"	20A	1		1.60		1	20A			SPARE	22
23	ICE MACHINE	#12	3/4"	20A	1			1.30	1	20A			SPARE	24
25	SPARE			20A	1				1	20A			SPARE	26
27	SPARE			20A	1				1	20A			SPARE	28
29	SPARE			20A	1				1	20A			SPARE	30
31	SPARE			20A	1				1	20A			SPARE	32
33	SPARE			20A	1				1	20A			SPARE	34
35	SPARE			20A	1				1	20A			SPARE	36
	TOTAL CONNECTED kVA					13.50	10.67	9.05						
	TOTAL CONNECTED AMPS					112.5	88.9	75.5						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	33.2	kVA
NON-CONTINOUS kVAD	33.22	100%	33.22	TOTAL EST. DEMAND	33.2	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	92.2	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	92.2	AMP

NOTES: △ VERIFY EXACT OVERCURRENT DEVICE SIZE W/ MANUFACTURER.

PANEL 'CS-PH-02'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 400A
SERVICE: 480 | 277 WYE | FED FROM: CS-DPH-01 | MAINS: MLO
POLES: 48 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 136 | CONDUITS PER NEC, BASED ON TYPE | AIC: 35,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1						6.00	4.33							2
3	VAV 7-27, 7-28, 7-29, 7-30	#10	3/4"	30A	3		6.00	4.33	3	25A	3/4"	#10	VAV 7-21, 7-19	4
5								6.00	4.33					6
7						6.00	5.67							8
9	VAV 7-20, 7-22, 7-24, 7-25	#10	3/4"	30A	3		6.00	5.67	3	30A	3/4"	#10	VAV 7-4, 7-17, 7-16	10
11								6.00	5.67					12
13						6.00	5.67							14
15	VAV 7-1, 7-6, 7-10,7-5	#10	3/4"	30A	3		6.00	5.67	3	30A	3/4"	#10	VAV 4-10, 4-11	16
17								6.00	5.67					18
19						2.33	6.67							20
21	VAV 7-2, 7-3	#10	3/4"	20A	3		2.33	6.67	3	35A	3/4"	#8-#10	VAV 7-15	22
23								2.33	6.67					24
25						5.33			1	20A			SPARE	26
27	VAV 7-7, 7-8, 7-12	#10	3/4"	30A	3		5.33		1	20A			SPARE	28
29								5.33	1	20A			SPARE	30
31						6.00			1	20A			SPARE	32
33	VAV 4-18, 7-11, 7-14	#10	3/4"	30A	3		6.00		1	20A			SPARE	34
35								6.00	1	20A			SPARE	36
37						4.00			1	20A			SPARE	38
39	VAV 4-19, 4-20, 4-21	#10	3/4"	25A	3		4.00		1	20A			SPARE	40
41								4.00					SPACE	42
43	SPACE												SPACE	44
45	SPACE												SPACE	46
47	SPACE												SPACE	48
	TOTAL CONNECTED kVA					58.01	58.01	58.01						
	TOTAL CONNECTED AMPS					209.4	209.4	209.4						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	174.0	kVA
NON-CONTINOUS kVAD	174.02	100%	174.02	TOTAL EST. DEMAND	174.0	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	209.3	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	209.3	AMP

NOTES:

PANEL 'CS-PL-02'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225A
SERVICE: 208 | 120 WYE | FED FROM: CS-DPL-01 | MAINS: MLO
POLES: 60 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: STORAGE RM 616 | CONDUITS PER NEC, BASED ON TYPE | AIC: 22,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RM 633 COPY	#12	3/4"	20A	1	1.20	0.90		1	20A	3/4"	#12	RM 107 RECPTS	2
3	RM 633 REFRIG	#12	3/4"	20A	1		1.00	0.72	1	20A	3/4"	#12	RM 619 RECPTS	4
5	RM 606 RECPTS	#12	3/4"	20A	1			0.54	0.72	1	20A	3/4"	#12	RM 620 RECPTS	6
7	RM 610 RECPTS	#12	3/4"	20A	1	0.36	1.20		1	20A	3/4"	#12	RM 618 COPY	8
9	RM 611 RECPTS	#12	3/4"	20A	1		0.72	1.20	1	20A	3/4"	#12	RM 618 DEDICATED RECPT	10
11	RM 608 RECPTS	#12	3/4"	20A	1			0.72	1.20	1	20A	3/4"	#12	RM 618 DEDICATED RECPT	12
13	RM 612 RECPTS	#12	3/4"	20A	1	0.72	0.72		1	20A	3/4"	#12	RM 623 RECPTS	14
15	RM 613 RECPTS	#12	3/4"	20A	1		0.90	0.54	1	20A	3/4"	#12	RM 623 RECPTS	16
17	RMS 607, 617 RECPTS	#12	3/4"	20A	1			0.36	0.72	1	20A	3/4"	#12	RM 624 RECPTS	18
19	RM 615 RECPTS	#12	3/4"	20A	1	0.72	0.72		1	20A	3/4"	#12	RM 625 RECPTS	20
21	RMS 609,616,618,622 RECPTS	#12	3/4"	20A	1		0.90	0.72	1	20A	3/4"	#12	RM 626 RECPTS	22
23	RM 614 RECPTS	#12	3/4"	20A	1			0.72	0.54	1	20A	3/4"	#12	RM 601 RECEPTS	24
25	RM 636 RECPTS	#12	3/4"	20A	1	0.72	0.50		1	20A	3/4"	#12	RM 635 TIMECLOCK	26
27	RM 629 RECPTS	#12	3/4"	20A	1		0.72	1.00	1	20A	3/4"	#12	RM 618 REFRIG	28
29	RM 628 RECPTS	#12	3/4"	20A	1			0.72	0.90	1	20A	3/4"	#12	RM 645 RECPTS	30
31	RM 627 RECPTS	#12	3/4"	20A	1	0.72	0.90		1	20A	3/4"	#12	RM 100 RECEPTS	32
33	RM 633 DEDICATED	#12	3/4"	20A	1		1.00	0.90	1	20A	3/4"	#12	RM 100 RECPTS	34
35	RMS 100C,100D RECEPTS	#10	3/4"	20A	1			0.72	0.72	1	20A	3/4"	#12	RM 100 RECPTS	36
37	RM 634 TIME CLOCK	#12	3/4"	20A	1	0.18	1.20		1	20A	3/4"	#10	RM 618 MICROWAVE	38
39	RM 622 TIME CLOCK	#12	3/4"	20A	1		0.18	1.20	1	20A	3/4"	#10	RM 618 MICROWAVE	40
41	RM 633 DEDICATEDRECPT	#12	3/4"	20A	1			1.20	0.72	1	20A	3/4"	#12	RM 602 RECPTS	42
43	RM 633 DEDICATED RECPT	#12	3/4"	20A	1	1.20	0.72		1	20A	3/4"	#12	RM 631 RECEPTS	44
45	RM 633 DEDICATED RECPT	#12	3/4"	20A	1		1.20	1.00	1	20A	3/4"	#12	RM 601 PRINTER	46
47	RM 633 MICROWAVE	#12	3/4"	20A	1			1.20	1.20	1	20A	3/4"	#12	RM 654 RECPT	48
49	RM 633 MICROWAVE	#12	3/4"	20A	1	1.20			1	20A			SPARE	50
51	RM 637 RECEPTS	#12	3/4"	20A	1		0.90		1	20A			SPARE	52
53	RM 638 RECEPTS	#12	3/4"	20A	1			0.72	1	20A			SPARE	54
55	RM 644 RECEPTS	#12	3/4"	20A	1	0.54			1	20A			SPARE	56
57	RM 644 RECEPTS	#12	3/4"	20A	1		0.54		1	20A			SPARE	58
59	RM 635 RECEPTS	#12	3/4"	20A	1			0.36	1	20A			SPARE	60
	TOTAL CONNECTED kVA					14.42	15.34	13.98						
	TOTAL CONNECTED AMPS					120.2	127.8	116.5						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	43.7	kVA
NON-CONTINOUS kVAD	43.74	100%	43.74	TOTAL EST. DEMAND	43.7	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	121.4	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	121.4	AMP

NOTES: PROVIDE FEED THRU LUGS

PANEL 'CS-PL-04'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225A
SERVICE: 208 | 120 WYE | FED FROM: CS-DPL-01 | MAINS: 200 MCB
POLES: ☐ 48 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: MECH RM 150 | CONDUITS PER NEC, BASED ON TYPE | AIC: 10,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RM 152 GARBAGE DISP	#12	3/4"	20A	1	0.70	1.20		1	20A	3/4"	#12	RM 152 VENDING	2
3	RM 152 GARBAGE DISP	#12	3/4"	20A	1		0.70	1.20	1	20A	3/4"	#12	RM 152 VENDING	4
5	RM 152 DEDICATED RECEPT	#12	3/4"	20A	1			1.20	1.20	1	20A	3/4"	#12	RM 152 REFRIG	6
7	RM 152 DEDICATED RECEPT	#12	3/4"	20A	1	1.20	1.20		1	20A	3/4"	#12	RM 152 REFRIG	8
9	RM 152 DEDICATED RECEPT	#12	3/4"	20A	1		1.20	1.20	1	20A	3/4"	#12	RM 152 REFRIG	10
11	RM 152 DEDICATED RECEPT	#12	3/4"	20A	1			1.20	1.20	1	20A	3/4"	#12	RM 152 REFRIG	12
13	RM 152 MICROWAVE	#12	3/4"	20A	1	1.20	1.20		1	20A	3/4"	#12	RM 152 RECEPTS	14
15	RM 152 MICROWAVE	#12	3/4"	20A	1		1.20	1.80	1	20A	3/4"	#12	RM 152 TIMECLOCK	16
17	RM 152 MICROWAVE	#12	3/4"	20A	1			1.20	0.36	1	20A	3/4"	#12	RM 151 RECEPTS	18
19	RM 152 MICROWAVE	#12	3/4"	20A	1	1.20	0.70		1	20A	3/4"	#12	RM 103 EWC	20
21	COURTYARD RECEPTS	#12	3/4"	20A	1		0.36		1	20A			SPARE	22
23	OUTDOOR FOUNTAIN	#12	3/4"	20A	1			0.50	0.10	1	15A	3/4"	#12	WH-1 IGNITOR	24
25	OUTDOOR RECEPTS	#12	3/4"	20A	1	0.36	0.10		1	15A	3/4"	#12	WH-2 IGNITOR	26
27	HALL 103 RECEPTS	#12	3/4"	20A	1		0.54	0.50	1	15A	3/4"	#12	WH-1 RECIRC PUMP	28
29	SOUTH OUTDOOR RECEPTS	#12	3/4"	20A	1			0.54	0.50	1	15A	3/4"	#12	WH-2 RECIRC PUMP	30
31	EMCS PANEL	#12	3/4"	20A	1	0.10	0.70		1	20A	3/4"	#12	EF-25	32
33	SPARE			20A	1				1	20A			SPARE	34
35	SPARE			20A	1				1	20A			SPARE	36
37	SPARE			20A	1				1	20A			SPARE	38
39	SPARE			20A	1				1	20A			SPARE	40
41	SPARE			20A	1				1	20A			SPARE	42
43	SPARE			20A	1				1	20A			SPARE	44
45	SPARE			20A	1				1	20A			SPARE	46
47	SPARE			20A	1				1	20A			SPARE	48
	TOTAL CONNECTED kVA					9.85	8.70	8.00						
	TOTAL CONNECTED AMPS					82.1	72.5	66.7						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	26.5	kVA
NON-CONTINOUS kVAD	26.54	100%	26.54	TOTAL EST. DEMAND	26.5	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	73.7	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	73.7	AMP

NOTES: ☐ PROVIDE GFCI CIRCUIT BREAKER

PANEL 'CS-PL-OS-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225A
SERVICE: 208 | 120 WYE | FED FROM: NW-DPH-OS-01 | MAINS: 150A
POLES: 30 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 136 | CONDUITS PER NEC, BASED ON TYPE | AIC: 10,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	SPARE			20A	1				1	20A			SPARE	2
3	SPARE			20A	1				1	20A			SPARE	4
5	SPARE			20A	1				1	20A			SPARE	6
7	SPARE			20A	1				1	20A			SPARE	8
9	SPARE			20A	1				1	20A			SPARE	10
11	SPARE			20A	1				1	20A			SPARE	12
13	SPARE			20A	1				1	20A			SPARE	14
15	SPACE												SPACE	16
17	SPACE												SPACE	18
19	SPACE												SPACE	20
21	SPACE												SPACE	22
23	SPACE												SPACE	24
25	SPACE												SPACE	26
27	SPACE												SPACE	28
29	SPACE												SPACE	30
	TOTAL CONNECTED kVA					0.00	0.00	0.00						
	TOTAL CONNECTED AMPS					0.0	0.0	0.0						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS		
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	0.0	kVA
NON-CONTINOUS kVAD	0.00	100%	0.00	TOTAL EST. DEMAND	0.0	kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	0.0	AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	0.0	AMP

NOTES:

PANEL 'CS-PL-03'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 200A
SERVICE: 208 | 120 WYE | FED FROM: CS-DPL-01 | MAINS: MLO
POLES: 42 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 136 | CONDUITS PER NEC, BASED ON TYPE | AIC: 22,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1						2.00	1.30		1	20A	3/4"	#12	VAV CONTROLS	2
3	VAV 7-18, 7-23, 7-26	#10	3/4"	25A	3		2.00	1.20	1	20A	3/4"	#12	VAV CONTROLS	4
5								2.00	1.10	1	20A	3/4"	#12	VAV CONTROLS	6
7						1.33			1	20A			SPARE	8
9	VAV 7-9, 7-13	#10	3/4"	20A	3		1.33		1	20A			SPARE	10
11								1.33	1	20A			SPARE	12
13	EF-20-24	#10	3/4"	15A	1	0.14			1	20A			SPARE	14
15	EF-26,28,29,30	#12	3/4"	15A	1		0.27	0.18	1	20A	3/4"	#10	ROOF MOUNT RECEPTACLE	16
17	EF-32,33,35	#12	3/4"	15A	1			0.24	0.70	1	15A	3/4"	#12	EF-27	18
19	FC-E CONDENSATE PUMP	#12	3/4"	15A	1	0.50			1	20A			SPARE		20
21	FC-F CONDENSATE PUMP	#12	3/4"	15A	1		0.50		1	20A			SPARE		22

PANEL 'SW-PH-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 100A
SERVICE: 480 | 277 WYE | FED FROM: SW-DPH-01 | MAINS: MLO
POLES: 30 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 754 | CONDUITS PER NEC, BASED ON TYPE | AIC: 35,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	SOCIAL SERVICES NORTH LTG	#12	3/4"	20A	1	2.25			1	20A			SPARE	2
3	SOCIAL SERVICES CENTER LTG	#12	3/4"	20A	1		2.53		1	20A			SPARE	4
5	SOCIAL SERVICES SOUTH LTG	#12	3/4"	20A	1			3.24	1	20A			SPARE	6
7	SOCIAL SERVICES HALL LTG	#12	3/4"	20A	1	1.16			1	20A			SPARE	8
9	HALLWAY 133,138 LTG	#12	3/4"	20A	1		0.23		1	20A			SPARE	10
11	SPARE			20A	1				1	20A			SPARE	12
13				20A	1				1	20A			SPARE	14
15				20A	1								SPACE	16
17				20A	1								SPACE	18
19				20A	1								SPACE	20
21	SPACE												SPACE	22
23													SPACE	24
25													SPACE	26
27													SPACE	28
29													SPACE	30
	TOTAL CONNECTED kVA					3.41	2.76	3.24						
	TOTAL CONNECTED AMPS					12.3	10.0	11.7						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS	
CONTINUOUS kVA @125%	9.41	125%	11.76	TOTAL CONN. LOAD	9.4 kVA
NON-CONTINOUS kVAD	0.00	100%	0.00	TOTAL EST. DEMAND	11.8 kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	11.3 AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	14.1 AMP

NOTES:

PANEL 'SW-PH-02'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 400A
SERVICE: 480 | 277 WYE | FED FROM: SW-DPH-01 | MAINS: MLO
POLES: 42 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 754 | CONDUITS PER NEC, BASED ON TYPE | AIC: 35,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1						5.33	6.00							2
3	VAV 8-17, 8-18, 8-19, 8-20	#10	3/4"	30A	3		5.33	6.00	3	30A	3/4"	#10	VAV 8-16, 8-22, 8-24	4
5								5.33	8.00					6
7						5.00	6.00							8
9	VAV 8-1, 8-2	#10	3/4"	30A	3		5.00	6.00	3	30A	3/4"	#10	VAV 8-15, 8-21, 8-23	10
11								5.00	6.00					12
13						4.00	5.17							14
15	VAV 7-31, 7-32, 7-33	#10	3/4"	25A	3		4.00	5.17	3	30A	3/4"	#10	VAV 8-5, 8-6, 8-7	16
17								4.00	5.17					18
19						5.33	5.33							20
21	VAV 8-4, 7-35	#10	3/4"	30A	3		5.33	5.33	3	30A	3/4"	#10	VAV 8-8, 8-9, 8-10	22
23								5.33	5.33					24
25						2.33	5.00							26
27	VAV 8-25	#12	3/4"	15A	3		2.33	5.00	3	30A	3/4"	#10	VAV 8-11, 8-12, 8-13	28
29								2.33	5.00					30
31	SPARE			20A	1				1	20A			SPARE	32
33	SPARE			20A	1				1	20A			SPARE	34
35	SPARE			20A	1				1	20A			SPARE	36
37	SPACE												SPACE	38
39	SPACE												SPACE	40
41	SPACE												SPACE	42
	TOTAL CONNECTED kVA					49.49	49.49	49.49						
	TOTAL CONNECTED AMPS					178.7	178.7	178.7						

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS	
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	148.5 kVA
NON-CONTINOUS kVAD	148.48	100%	148.48	TOTAL EST. DEMAND	148.5 kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	178.6 AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	178.6 AMP

NOTES:

PANEL 'SW-PL-OS-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225A
SERVICE: 208 | 120 WYE | FED FROM: NW-DPH-OS-01 | MAINS: 150A
POLES: 30 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 754 | CONDUITS PER NEC, BASED ON TYPE | AIC: 10,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RM 140 RACK RECPT	#10	3/4"	30A	2	1.75	1.75		2	30A	3/4"	#10	RM 772 RACK RECPT	2
3							1.75	1.75						4
5	RM 140 RACK RECPT	#10	3/4"	30A	2			1.75	1.75	2	30A	3/4"	#10	RM 772 RACK RECPT	6
7						1.75	1.75								8
9	RM 140 RECPTS	#12	3/4"	20A	1		0.72	0.72		1	20A	3/4"	#12	RM 772 RECPTS	10
11	SPARE			20A	1					1	20A			SPARE	12
13	SPARE			20A	1					1	20A			SPARE	14
15	SPARE			20A	1					1	20A			SPARE	16
17	SPARE			20A	1					1	20A			SPARE	18
19	SPARE			20A	1					1	20A			SPARE	20
21	SPARE			20A	1					1	20A			SPARE	22
23	SPARE			20A	1					1	20A			SPARE	24
25	SPARE			20A	1					1	20A			SPARE	26
27	SPARE			20A	1					1	20A			SPARE	28
29	SPARE			20A	1					1	20A			SPARE	30
	TOTAL CONNECTED kVA					7.00	4.94	3.50							
	TOTAL CONNECTED AMPS					58.3	41.2	29.2							

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS	
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	15.4 kVA
NON-CONTINOUS kVAD	15.44	100%	15.44	TOTAL EST. DEMAND	15.4 kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	42.9 AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	42.9 AMP

NOTES:

PANEL 'SW-PL-01'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225A
SERVICE: 208 | 120 WYE | FED FROM: SW-DPL-01 | MAINS: MLO
POLES: 60 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 754 | CONDUITS PER NEC, BASED ON TYPE | AIC: 22,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RM 717 RECPTS	#10	3/4"	20A	1	0.72	0.54		1	20A	3/4"	#12	RM 716 RECPTS	2
3	RM 718 RECPTS	#10	3/4"	20A	1		0.72	0.72	1	20A	3/4"	#10	RM 707 RECPTS	4
5	RM 719 RECPTS	#10	3/4"	20A	1			0.72	0.72	1	20A	3/4"	#10	RM 708 RECPTS	6
7	RM 720 RECPTS	#12	3/4"	20A	1	0.72	0.72		1	20A	3/4"	#12	RM 709 RECPTS	8
9	RM 721 RECPTS	#12	3/4"	20A	1		0.72	0.72	1	20A	3/4"	#12	RM 710 RECPTS	10
11	RM 722 RECPTS	#12	3/4"	20A	1			0.72	0.72	1	20A	3/4"	#12	RMS 705,750,752 RECPTS	12
13	RM 724 RECPTS	#12	3/4"	20A	1	0.72	0.72		1	20A	3/4"	#12	RM 704 RECPTS	14
15	RM 726 RECPTS	#12	3/4"	20A	1		0.72	0.72	1	20A	3/4"	#12	RM 703 RECPTS	16
17	RM 728 RECPTS	#12	3/4"	20A	1			0.72	0.72	1	20A	3/4"	#12	RM 702 RECPTS	18
19	RM 730 RECPTS	#12	3/4"	20A	1	0.72	0.54		1	20A	3/4"	#12	RM 701 RECPTS	20
21	RM 731 RECPTS	#10	3/4"	20A	1		0.72	0.72	1	20A	3/4"	#12	RM 700 RECPTS	22
23	RM 732 RECPTS	#10	3/4"	20A	1			0.72	0.72	1	20A	3/4"	#12	RM 751 RECPTS	24
25	RM 734 RECPTS	#10	3/4"	20A	1	0.72	0.72		1	20A	3/4"	#12	RM 748 RECPTS	26
27	RM 735 RECPTS	#10	3/4"	20A	1		0.72	0.72	1	20A	3/4"	#12	RM 746 RECPTS	28
29	TIMECLOCK	#12	3/4"	20A	1			0.50	0.72	1	20A	3/4"	#12	RM 744 RECPTS	30
31	RM 715 RECPTS	#10	3/4"	20A	1	0.72	0.72		1	20A	3/4"	#12	RM 742 RECPTS	32
33	RM 714 RECPTS	#10	3/4"	20A	1		0.72	0.72	1	20A	3/4"	#12	RM 741 RECPTS	34
35	RM 713 RECPTS	#12	3/4"	20A	1			0.72	0.72	1	20A	3/4"	#10	RM 738 RECPTS	36
37	RM 712 RECPTS	#12	3/4"	20A	1	0.72	0.72		1	20A	3/4"	#10	RM 739 RECPTS	38
39	RM 723 RECPTS	#12	3/4"	20A	1		0.72	0.72	1	20A	3/4"	#10	RM 740 RECPTS	40
41	RM 725 RECPTS	#12	3/4"	20A	1			0.72	0.54	1	20A	3/4"	#12	RMS 700C,753,764 RECPTS	42
43	RM 727 RECPTS	#12	3/4"	20A	1	0.72	0.72		1	20A	3/4"	#12	RM 759 RECPTS	44
45	RM 747 RECPTS	#12	3/4"	20A	1		0.90	0.72	1	20A	3/4"	#12	RM 761 RECPTS	46
47	RM 745 RECPTS	#12	3/4"	20A	1			0.90	0.72	1	20A	3/4"	#12	RM 763 RECPTS	48
49	RM 743 RECPTS	#12	3/4"	20A	1	0.90	0.72		1	20A	3/4"	#12	RM 765 RECPTS	50
51	RM 733 RECPTS	#12	3/4"	20A	1		0.72	0.72	1	20A	3/4"	#12	RM 767 RECPTS	52
53	RM 736 RECPT	#10	3/4"	20A	1			1.20	0.50	1	20A	3/4"	#12	RM 766 TIMECLOCK	54
55	RM 736 RECPT	#10	3/4"	20A	1	1.20			1	20A				SPARE	56
57	RM 737 RECPTS	#10	3/4"	20A	1		0.72		1	20A				SPARE	58
59	RM 736 COPY	#12	3/4"	20A	1			1.20	0.72	1	20A	3/4"	#12	RMS 757,766,769 RECPTS	60
	TOTAL CONNECTED kVA					13.98	13.86	14.92							
	TOTAL CONNECTED AMPS					116.5	115.5	124.3							

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS	
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	42.8 kVA
NON-CONTINOUS kVAD	42.76	100%	42.76	TOTAL EST. DEMAND	42.8 kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	118.7 AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	118.7 AMP

NOTES: PROVIDE FEED THRU LUGS

PANEL 'SW-PL-02'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 225A
SERVICE: 208 | 120 WYE | FED FROM: SW-DPL-01 | MAINS: MLO
POLES: 60 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 754 | CONDUITS PER NEC, BASED ON TYPE | AIC: 22,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1	RM 774 RECPTS	#12	3/4"	20A	1	0.54	1.08		1	20A	3/4"	#12	RM 768 RECPTS	2
3	RM 775 RECPTS	#12	3/4"	20A	1		0.54	1.00	1	20A	3/4"	#12	RM 103 EWC	4
5	RM 776 RECPTS	#12	3/4"	20A	1			0.54	0.36	1	20A	3/4"	#12	RM 130,131 RECPTS	6
7	RMS 102, 103 RECPTS	#12	3/4"	20A	1	0.36	0.90		1	20A	3/4"	#12	RMS 758,770,771 RECPTS	8
9	RM 755 RECPTS	#12	3/4"	20A	1		0.72	0.54	1	20A	3/4"	#12	RMS 142 RECPTS	10
11	RM 756 REFRIG	#12	3/4"	20A	1			1.00	0.54	1	20A	3/4"	#12	RM 141 RECPTS	12
13	RM 756 REFRIG	#12	3/4"	20A	1	1.00	0.72		1	20A	3/4"	#12	RM 141 RECPTS	14
15	RM 756 COPY	#12	3/4"	20A	1		1.20	0.54	1	20A	3/4"	#12	RMS 133, 138 RECPTS	16
17	RM 701 RECPTS	#12	3/4"	20A	1			0.36	0.90	1	20A	3/4"	#10	RM 137 RECPTS	18
19	RM 760 RECPTS	#12	3/4"	20A	1	0.72	0.72		1	20A	3/4"	#12	RM 137 RECPTS FLOOR	20
21	RM 762 RECPTS	#12	3/4"	20A	1		0.72	0.36	1	20A	3/4"	#12	RM 139 RECPTS	22
23	RM 772 RECPTS	#12	3/4"	20A	1			0.72	0.72	1	20A	3/4"	#12	RM 140 RECPTS	24
25	SPARE			20A	1	0.36			1	20A	3/4"	#10		SW OUTDOOR RECPTS	26
27	SPARE			20A	1		1.20		1	20A	3/4"	#12		RM 773 DEDICATED RECEPT	28
29	SPARE			20A	1			1.20	1	20A	3/4"	#12		RM 773 DEDICATED RECEPT	30
31	SPARE			20A	1	1.20			1	20A	3/4"	#12		RM 756 MICROWAVE	32
33	RM 756 DEDICATED RECPT	#12	3/4"	20A	1		1.20	1.20	1	20A	3/4"	#12		RM 756 MICROWAVE	34
35	RM 756 DEDICATED RECPT	#12	3/4"	20A	1			1.20	1.20	1	20A	3/4"	#12	RM 137 RECPT	36
37	RM 756 DEDICATED RECPT	#12	3/4"	20A	1	1.20	1.75		2	30A	3/4"	#10		RM 140 RACK RECPT	38
39	RM 756 DEDICATED RECPT	#12	3/4"	20A	1		1.20	1.75							40
41	RM 772 RACK RECPT	#10	3/4"	30A	2			1.75	1.75	2	30A	3/4"	#10	RM 140 RACK RECPT	42
43						1.75	1.75								44
45	RM 772 RACK RECPT	#10	3/4"	30A	2		1.75	0.72	1	20A	3/4"	#12		RM 142 RECPTS	46
47								1.75	0.36	1	20A	3/4"	#12	COURTYARD RECPTS	48
49	RM 773 RECEPTS	#12	3/4"	20A	1	0.36			1	20A				SPARE	50
51	RM 773 MICROWAVE	#12	3/4"	20A	1		1.20		1	20A				SPARE	52
53	RM 773 MICROWAVE	#12	3/4"	20A	1			1.20		1	20A			SPARE	54
55	RM 773 REFRIG	#12	3/4"	20A	1	1.20			1	20A				SPARE	56
57	SPARE			20A	1				1	20A				SPARE	58
59	SPARE			20A	1				1	20A				SPARE	60
	TOTAL CONNECTED kVA					15.61	15.84	15.55							
	TOTAL CONNECTED AMPS					130.1	132.0	129.6							

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS	
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	47.0 kVA
NON-CONTINOUS kVAD	47.00	100%	47.00	TOTAL EST. DEMAND	47.0 kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	130.5 AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	130.5 AMP

NOTES: PROVIDE FEED THRU LUGS

PANEL 'SW-PL-03'

TYPE: | PROJECT: M3-PN180040 | BUS AMPACITY: 200A
SERVICE: 208 | 120 WYE | FED FROM: SW-DPL-01 | MAINS: MLO
POLES: 42 | UNLESS OTHERWISE NOTED, SIZE | NEUTRAL: FULL
LOCATION: ELEC RM 754 | CONDUITS PER NEC, BASED ON TYPE | AIC: 22,000
MOUNTING: SURFACE | THWN/XHHW | NEMA: 1

#	LOAD NAME	WIRE GND	COND	CB	POLE	CKT. KVA A	CKT. KVA B	CKT. KVA C	POLE	CB	COND	WIRE GND	LOAD NAME	#
1						0.67	0.90		1	20A	3/4"	#12	VAV CONTROLS	2
3	VAV 8-26	#12	3/4"	15A	3		0.67	1.00	1	20A	3/4"	#12	VAV CONTROLS	4
5								0.67	1.20	1	20A	3/4"	#12	VAV CONTROLS	6
7						0.67	0.18		1	20A	3/4"	#12	ROOF RECPT	8
9	VAV 8-14	#12	3/4"	15A	3		0.67	0.70	1	15A	3/4"	#12	EF-34	10
11								0.67	0.70	1	15A	3/4"	#12	EF-31	12
13	AC-E, FC-E	#10	3/4"	25A	2	1.66			1	20A				SPARE	14
15							1.66			1	20A			SPARE	16
17	AC-F, FC-F	#10	3/4"	25A	2			1.66		1	20A			SPARE	18
19						1.66				1	20A			SPARE	20
21	SPARE			20A	1					1	20A			SPARE	22
23	SPARE			20A	1					1	20A			SPARE	24
25	SPARE			20A	1					1	20A			SPARE	26
27	SPARE			20A	1					1	20A			SPARE	28
29	SPARE			20A	1					1	20A			SPARE	30
31	SPARE			20A	1					1	20A			SPARE	32
33	SPARE			20A	1					1	20A			SPARE	34
35	SPARE			20A	1					1	20A			SPARE	36
37	SPARE			20A	1					1	20A			SPARE	38
39	SPARE			20A	1					1	20A			SPARE	40
41	SPARE			20A	1					1	20A			SPARE	42
	TOTAL CONNECTED kVA					5.74	4.69	4.89							
	TOTAL CONNECTED AMPS					47.9	39.1	40.8							

	CONN. LOAD	DEMAND FACTOR	EST. DEMAND	PANEL TOTALS	
CONTINUOUS kVA @125%	0.00	125%	0.00	TOTAL CONN. LOAD	15.3 kVA
NON-CONTINOUS kVAD	15.33	100%	15.33	TOTAL EST. DEMAND	15.3 kVA
MOTOR kVA + 25%	0.00	125%	0.00	TOTAL CONNECTED CURRENT	42.6 AMP
KITCHEN kVA 0	0.00	100%	0.00	TOTAL EST. DEMAND CURRENT	42.6 AMP

NOTES: PROVIDE FEED THRU LUGS

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revisions

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panel schedules - social services

ep605

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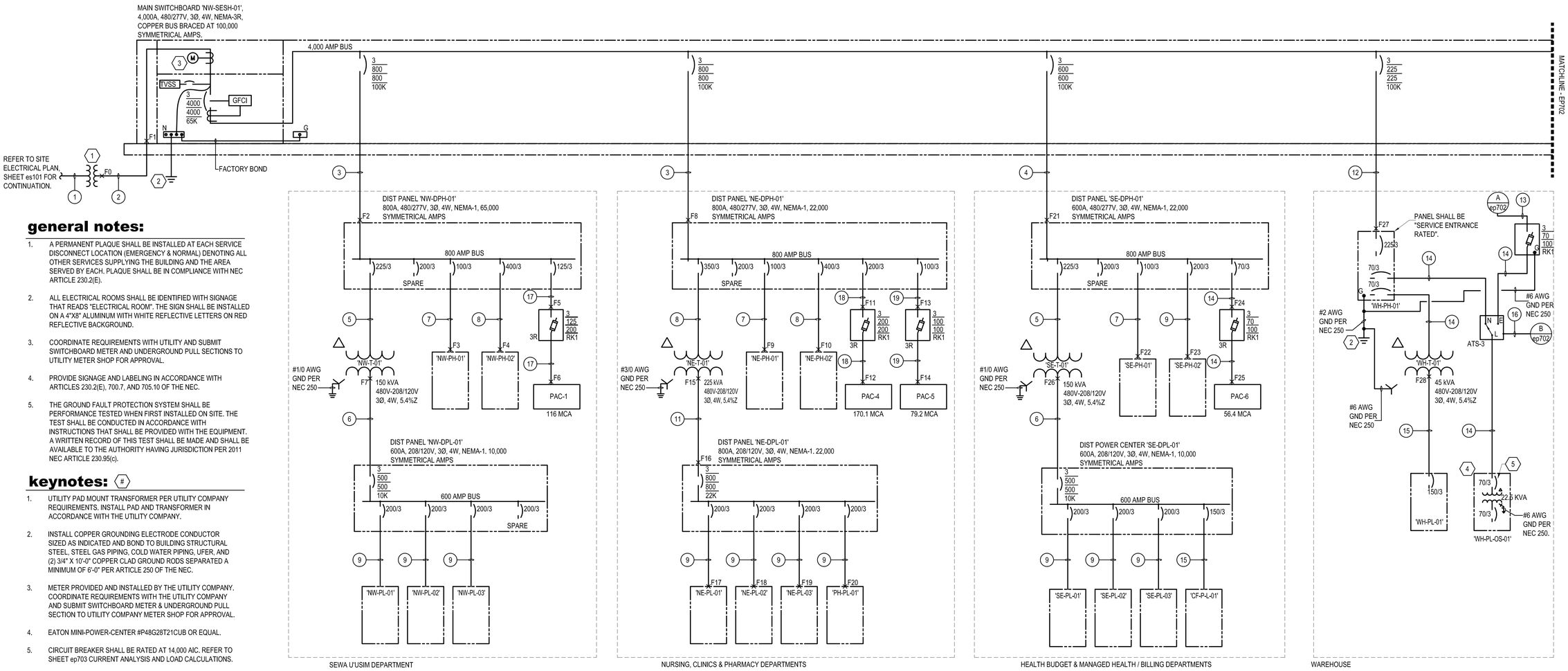

SEWA U'USIM DEPARTMENT

NURSING, CLINICS & PHARMACY DEPARTMENTS

HEALTH BUDGET & MANAGED HEALTH / BILLING DEPARTMENTS

WAREHOUSE

general notes:

1. A PERMANENT PLAQUE SHALL BE INSTALLED AT EACH SERVICE DISCONNECT LOCATION (EMERGENCY & NORMAL) DENOTING ALL OTHER SERVICES SUPPLYING THE BUILDING AND THE AREA SERVED BY EACH. PLAQUE SHALL BE IN COMPLIANCE WITH NEC ARTICLE 230.2(E).
2. ALL ELECTRICAL ROOMS SHALL BE IDENTIFIED WITH SIGNAGE THAT READS "ELECTRICAL ROOM". THE SIGN SHALL BE INSTALLED ON A 4"X8" ALUMINUM WITH WHITE REFLECTIVE LETTERS ON RED REFLECTIVE BACKGROUND.
3. COORDINATE REQUIREMENTS WITH UTILITY AND SUBMIT SWITCHBOARD METER AND UNDERGROUND PULL SECTIONS TO UTILITY METER SHOP FOR APPROVAL.
4. PROVIDE SIGNAGE AND LABELING IN ACCORDANCE WITH ARTICLES 230.2(E), 700.7, AND 705.10 OF THE NEC.
5. THE GROUND FAULT PROTECTION SYSTEM SHALL BE PERFORMANCE TESTED WHEN FIRST INSTALLED ON SITE. THE TEST SHALL BE CONDUCTED IN ACCORDANCE WITH INSTRUCTIONS THAT SHALL BE PROVIDED WITH THE EQUIPMENT. A WRITTEN RECORD OF THIS TEST SHALL BE MADE AND SHALL BE AVAILABLE TO THE AUTHORITY HAVING JURISDICTION PER 2011 NEC ARTICLE 230.95(c).

keynotes: (#)

1. UTILITY PAD MOUNT TRANSFORMER PER UTILITY COMPANY REQUIREMENTS. INSTALL PAD AND TRANSFORMER IN ACCORDANCE WITH THE UTILITY COMPANY.
2. INSTALL COPPER GROUNDING ELECTRODE CONDUCTOR SIZED AS INDICATED AND BOND TO BUILDING STRUCTURAL STEEL, STEEL GAS PIPING, COLD WATER PIPING, UFER, AND (2) 3/4" X 10'-0" COPPER CLAD GROUND RODS SEPARATED A MINIMUM OF 6'-0" PER ARTICLE 250 OF THE NEC.
3. METER PROVIDED AND INSTALLED BY THE UTILITY COMPANY. COORDINATE REQUIREMENTS WITH THE UTILITY COMPANY AND SUBMIT SWITCHBOARD METER & UNDERGROUND PULL SECTION TO UTILITY COMPANY METER SHOP FOR APPROVAL.
4. EATON MINI-POWER-CENTER #P48G28T21CUB OR EQUAL.
5. CIRCUIT BREAKER SHALL BE RATED AT 14,000 AIC. REFER TO SHEET ep703 CURRENT ANALYSIS AND LOAD CALCULATIONS.

wire & conduit schedule: (○)

1. (1) 4" EC W/ PULL CORD PER TEP REQUIREMENTS.
2. (11) PARALLEL SETS: (4) #500 KCMIL., 4" C EACH SET.
3. (2) PARALLEL SETS: (4) #600 KCMIL, #1/0 AWG GND., 4" C EACH SET.
4. (2) PARALLEL SETS: (4) #350 KCMIL, #1 AWG GND., 3" C EACH SET.
5. (3) #4/0 AWG, #4 AWG GND., 2-1/2" C.
6. (2) PARALLEL SETS: (4) #250 KCMIL, #1/0 AWG GND., 2-1/2" C EACH SET.
7. (4) #2 AWG, #8 AWG GND., 1-1/4" C.
8. (2) PARALLEL SETS: (4) #3/0 AWG, #2 AWG GND., 2-1/2" C EACH SET.
9. (4) #3/0 AWG, #6 AWG GND., 2" C.
10. NOT USED.
11. (2) PARALLEL SETS: (4) #600 KCMIL, #3/0 AWG GND., 3-1/2" C. EACH SET.
12. (4) #250 KCMIL, #2 AWG GND., 3" C.
13. (3) #1/0 AWG, #2 AWG GND., 3" C.
14. (3) #4 AWG, #8 AWG GND., 1-1/4" C.
15. (4) #1/0 AWG, #6 AWG GND., 2" C.
16. (2) #12 AWG, #12 AWG GND., 3/4" C. (START-STOP CONTROL).
17. (3) #1 AWG, #6 AWG GND., 2"C.
18. (3) #3/0 AWG, #6 AWG GND., 2"C.
19. 93) #2 AWG, #8 AWG GND., 1-1/4"C.

(1 / ep701) **single line diagram**

nts

AUTOMATIC TRANSFER SWITCH SCHEDULE

MARK	AMPERE RATING	NO. OF POLES	AIC RATING	SERVING BRANCH	MANUF.	NEMA-3R	BYPASS ISOLATION
ATS #3	100A	4	10K	OPTIONAL STANDBY	RUSS ELECTRIC OR APPROVED EQUAL	NO	NO

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ARIZONA U.S.A.
Expires: 03/31/20

job 1717

date 11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

single line diagram

ep701

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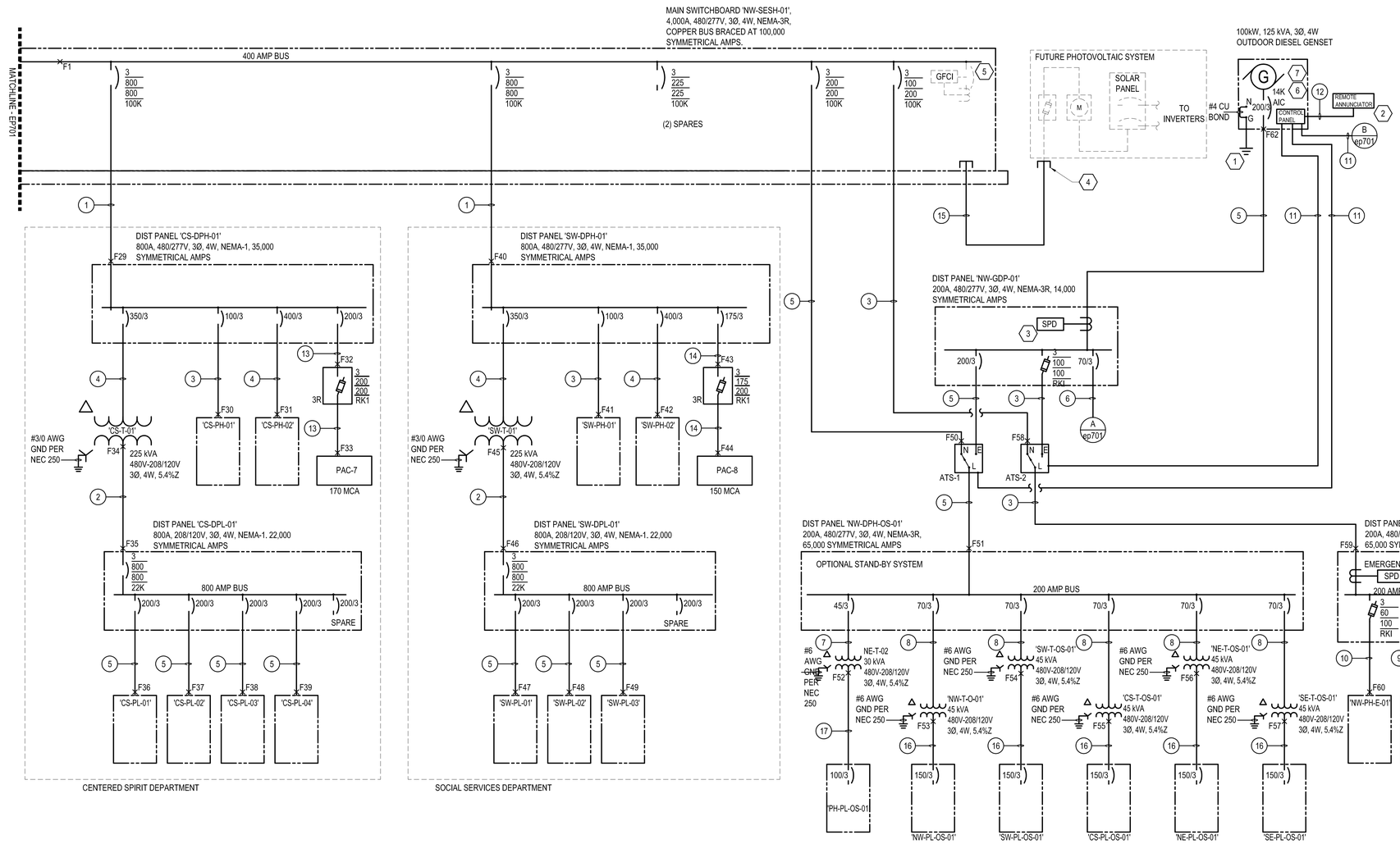

1 ep702 **single line diagram**
nts

AUTOMATIC TRANSFER SWITCH SCHEDULE

MARK	AMPERE RATING	NO. OF POLES	AIC RATING	SERVING BRANCH	MANUF.	NEMA-3R	BYPASS ISOLATION
ATS #1	200A	4	65K	OPTIONAL STANDBY	RUSS ELECTRIC OR APPROVED EQUAL	YES	NO
ATS #2	100A	4	65K	EMERGENCY	RUSS ELECTRIC OR APPROVED EQUAL	YES	YES

general notes:

1. A PERMANENT PLAQUE SHALL BE INSTALLED AT EACH SERVICE DISCONNECT LOCATION (EMERGENCY & NORMAL) DENOTING ALL OTHER SERVICES SUPPLYING THE BUILDING AND THE AREA SERVED BY EACH. PLAQUE SHALL BE IN COMPLIANCE WITH NEC ARTICLE 230.2(E).
2. ALL ELECTRICAL ROOMS SHALL BE IDENTIFIED WITH SIGNAGE THAT READS "ELECTRICAL ROOM". THE SIGN SHALL BE INSTALLED ON A 4"X8" ALUMINUM WITH WHITE REFLECTIVE LETTERS ON RED REFLECTIVE BACKGROUND.
3. COORDINATE REQUIREMENTS WITH UTILITY AND SUBMIT SWITCHBOARD METER AND UNDERGROUND PULL SECTIONS TO UTILITY METER SHOP FOR APPROVAL.
4. PROVIDE SIGNAGE AND LABELING IN ACCORDANCE WITH ARTICLES 230.2(E), 700.7, AND 705.10 OF THE NEC.
5. THE GROUND FAULT PROTECTION SYSTEM SHALL BE PERFORMANCE TESTED WHEN FIRST INSTALLED ON SITE. THE TEST SHALL BE CONDUCTED IN ACCORDANCE WITH INSTRUCTIONS THAT SHALL BE PROVIDED WITH THE EQUIPMENT. A WRITTEN RECORD OF THIS TEST SHALL BE MADE AND SHALL BE AVAILABLE TO THE AUTHORITY HAVING JURISDICTION PER 2011 NEC ARTICLE 230.95(c).

keynotes: (#)

1. INSTALL COPPER GROUNDING ELECTRODE CONDUCTOR SIZED AS INDICATED AND BOND TO BUILDING STRUCTURAL STEEL, STEEL GAS PIPING, COLD WATER PIPING, UFER, AND (2) 3/4" X 10'-0" COPPER CLAD GROUND RODS SEPARATED A MINIMUM OF 6'-0" PER ARTICLE 250 OF THE NEC.
2. COORDINATE WITH OWNER FOR EXACT LOCATION OF ANNUNCIATOR.
3. 200 KA SPD. W/ SURGE COUNTER AND INTEGRAL DISCONNECT. REFER TO SHEET ep703 FOR FAULT CURRENT ANALYSIS AND LOAD CALCULATIONS.
4. COORDINATE STUBOLT LOCATION W/ ARCHITECT.
5. PROVIDE SPACE TO ACCOMMODATE A BREAKER OF MAX 800 AMPS FOR FUTURE PHOTOVOLTAIC SYSTEM.
6. GENERATOR SHALL BE EQUIPPED WITH EXTERNAL "EPO" PUSH BUTTON FOR EMERGENCY GENERATOR SHUT OFF.
7. CONTROLS SHALL BE BACNET PROTOCOL.

wire & conduit schedule: ○

1. (2) PARALLEL SETS: (4) #600 KCMIL, #1/0 AWG GND., 4" C EACH SET.
2. (2) PARALLEL SETS: (4) #600 KCMIL, #3/0 AWG GND., 3-1/2" C EACH SET.
3. (4) #2 AWG, #8 AWG GND., 1-1/4" C.
4. (2) PARALLEL SETS: (4) #3/0 AWG, #2 AWG GND., 2-1/2" C EACH SET.
5. (4) #3/0 AWG, #6 AWG GND., 2" C.
6. (3) #1/0 AWG, #2 AWG GND., 3" C.
7. (3) #6 AWG, #10 AWG GND., 1" C.
8. (3) #1 AWG, #6 AWG GND., 1-1/4" C.
9. (4) #2 AWG, #8 AWG GND., 1-1/4" C.
10. (4) #4 AWG, #10 AWG GND., 1-1/4" C.
11. (2) #12 AWG, #12 AWG GND., 3/4" C. (START-STOP CONTROL)
12. 1" C WITH CONDUCTORS PER MANUFACTURER REQUIREMENTS.
13. (3) #3/0 AWG, #6 AWG GND., 2" C.
14. (3) #2/0 AWG, #6 AWG GND., 2" C.
15. (3) 4" EC W/ PULL STRING.
16. (4) # 1/0 AWG, #6 AWG GND., 1/1/4" C.
17. (4) #2 AWG, #8 AWG GND., 1-1/4" C.
18. (2) 1" EC WITH PULLSTRING ROUTED TO EMCS FOR GENERATOR MONITORING.

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single line diagram

ep702

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LOAD CALCULATIONS

MAIN SWITCHBOARD 'NW-SESH-01' 4000A, 277/480V, 3PH, 4W		
DIST PANEL 'NW-DPH-01'	389.70	kVA
DIST PANEL 'NE-DPH-01'	542.68	kVA
DIST PANEL 'SE-DPH-01'	311.90	kVA
DIST PANEL 'CS-DPH-01'	458.29	kVA
DIST PANEL 'SW-DPH-01'	390.03	kVA
PANEL 'WH-PH-01'	77.06	kVA
DIST PANEL 'NW-DPH-OS-01'	58.40	kVA
DIST PANEL 'NW-DPH-E-01'	8.30	kVA
TOTAL CODE LOAD	2236.36	kVA
2236.36 KVA/(480*1.732) = 2690 A		
DIST PANEL 'NW-DPH-01' 800A, 277/480V, 3PH, 4W		
DIST PANEL 'NW-DPL-01'	78.05	kVA
PANEL 'NW-PH-01'	21.93	kVA
PANEL 'NW-PH-02'	193.29	kVA
PAC-1 (116 MCA)	96.44	kVA
TOTAL CODE LOAD	389.70	kVA
389.70 KVA/(480*1.732) = 469 A		
DIST PANEL 'NE-DPH-01' 800A, 277/480V, 3PH, 4W		
DIST PANEL 'NE-DPL-01'	134.39	kVA
PANEL 'NE-PH-01'	12.03	kVA
PANEL 'NE-PH-02'	189.00	kVA
PAC-4 (170.1 MCA)	141.41	kVA
PAC-5 (79.2 MCA)	65.84	kVA
TOTAL CODE LOAD	542.68	kVA
542.68 KVA/(480*1.732) = 653 A		
DIST PANEL 'SE-DPH-01' 600A, 277/480V, 3PH, 4W		
DIST PANEL 'SE-DPL-01'	138.95	kVA
PANEL 'SE-PH-01'	9.04	kVA
PANEL 'SE-PH-02'	117.03	kVA
PAC-6 (56.4 MCA)	46.89	kVA
TOTAL CODE LOAD	311.90	kVA
311.90 KVA/(480*1.732) = 375 A		
DIST PANEL 'CS-DPH-01' 800A, 277/480V, 3PH, 4W		
DIST PANEL 'CS-DPL-01'	132.08	kVA
PANEL 'CS-PH-01'	10.86	kVA
PANEL 'CS-PH-02'	174.02	kVA
PAC-7 (170 MCA)	141.33	kVA
TOTAL CODE LOAD	458.29	kVA
458.29 KVA/(480*1.732) = 551 A		
DIST PANEL 'SW-DPH-01' 800A, 277/480V, 3PH, 4W		
DIST PANEL 'SW-DPL-01'	105.09	kVA
PANEL 'SW-PH-01'	11.76	kVA
PANEL 'SW-PH-02'	148.48	kVA
PAC-8 (150 MCA)	124.70	kVA
TOTAL CODE LOAD	390.03	kVA
390.03 KVA/(480*1.732) = 469 A		
DIST PANEL 'NW-DPH-OS-01' 200A, 277/480V, 3PH, 4W		
PANEL 'PH-PL-OS-01'	2.20	kVA
PANEL 'NW-PL-OS-01'	7.72	kVA
PANEL 'SW-PL-OS-01'	15.44	kVA
PANEL 'CS-PL-OS-01'	0.00	kVA
PANEL 'NE-PL-OS-01'	10.12	kVA
PANEL 'SE-PL-OS-01'	22.92	kVA
TOTAL CODE LOAD	58.40	kVA
58.40 KVA/(480*1.732) = 70.2 A		
DIST PANEL 'NW-DPH-E-01' 200A, 277/480V, 3PH, 4W		
PANEL 'NW-PH-E-01'	4.15	kVA
PANEL 'NE-PH-E-01'	4.15	kVA
TOTAL CODE LOAD	8.30	kVA
8.30 KVA/(480*1.732) = 9.99 A		
DIST PANEL 'NW-DPL-01' 600A, 120/208V, 3PH, 4W		
PANEL 'NW-PL-01'	38.92	kVA
PANEL 'NW-PL-02'	28.22	kVA
PANEL 'NW-PL-03'	10.91	kVA
TOTAL CODE LOAD	78.05	kVA
78.05 KVA/(208*1.732) = 217 A		
DIST PANEL 'NE-DPL-01' 800A, 120/208V, 3PH, 4W		
PANEL 'NE-PL-01'	36.24	kVA
PANEL 'NE-PL-02'	39.18	kVA
PANEL 'NE-PL-03'	20.64	kVA
PANEL 'PH-PL-01'	38.33	kVA
TOTAL CODE LOAD	134.39	kVA
134.39 KVA/(208*1.732) = 373 A		
DIST PANEL 'SE-DPL-01' 600A, 120/208V, 3PH, 4W		
PANEL 'SE-PL-01'	53.44	kVA
PANEL 'SE-PL-02'	27.94	kVA
PANEL 'SE-PL-03'	24.35	kVA
PANEL 'CF-PL-01'	33.22	kVA
TOTAL CODE LOAD	138.95	kVA
138.95 KVA/(208*1.732) = 386 A		
DIST PANEL 'CS-DPL-01' 800A, 120/208V, 3PH, 4W		
PANEL 'CS-PL-01'	45.68	kVA
PANEL 'CS-PL-02'	43.74	kVA
PANEL 'CS-PL-03'	16.12	kVA
PANEL 'CS-PL-04'	26.54	kVA
TOTAL CODE LOAD	132.08	kVA
132.08 KVA/(208*1.732) = 367 A		
DIST PANEL 'SW-DPL-01' 800A, 120/208V, 3PH, 4W		
PANEL 'SW-PL-01'	42.76	kVA
PANEL 'SW-PL-02'	47.00	kVA
PANEL 'SW-PL-03'	15.33	kVA
TOTAL CODE LOAD	105.09	kVA
105.09 KVA/(208*1.732) = 292 A		
DIST PANEL 'NW-GDP-E-01' 200A, 277/480V, 3PH, 4W (125kVA GENSET)		
DIST PANEL 'NW-DPH-OS-01'	58.40	kVA
DIST PANEL 'NW-DPH-E-01'	8.30	kVA
TOTAL CODE LOAD	66.70	kVA
66.70 KVA/(480*1.732) = 80.2 A		

FAULT CURRENT ANALYSIS

F0 = 52,300A PER TEP SR-510

FAULT POINT	FAULT LOCATION	SOURCE POINT	SOURCE AMPS	CABLE E(Volts)	CABLE NO. SETS	CABLE WIRE SIZE	CABLE MAG. DUCT	CABLE C VALUE	CABLE LENGTH	f	M	Isc	FAULT POINT
F0	TEP XFMR		52,300									52,300	F0
F1	NE-SESH-01	F0	52,300	480	11	500 KCMIL		26,706	15	0.01	0.990	51,801	F1
F2	NW-DPH-01	F1	51,801	480	2	600 KCMIL		28,033	120	0.40	0.714	36,999	F2
F3	NW-PH-01	F2	36,999	480	1	2 AWG	Y	5,907	6	0.14	0.881	32,581	F3
F4	NW-PH-02	F2	36,999	480	2	3/0 AWG	Y	12,844	8	0.04	0.960	35,522	F4
F5	200A DISCONNECT (PAC-1)	F2	36,999	480	1	1 AWG	Y	7,293	70	1.28	0.438	16,218	F5
F6	PAC-1	F5	16,218	480	1	1 AWG	Y	7,293	1	0.01	0.992	16,089	F6
F8	NE-DPH-01	F1	51,801	480	2	600 KCMIL		28,033	450	1.50	0.400	20,718	F8
F9	NE-PH-01	F8	20,718	480	1	2 AWG	Y	5,907	3	0.04	0.963	19,961	F9
F10	NE-PH-02	F8	20,718	480	2	3/0 AWG	Y	12,844	5	0.01	0.986	20,421	F10
F11	200A DISCONNECT (PAC-4)	F8	20,718	480	1	3/0 AWG	Y	12,844	75	0.44	0.696	14,422	F11
F12	PAC-4	F11	14,422	480	1	3/0 AWG	Y	12,844	1	0.00	0.996	14,364	F12
F13	100A DISCONNECT (PAC-5)	F8	20,718	480	1	2 AWG	Y	5,907	15	0.19	0.840	17,413	F13
F14	PAC-5	F13	17,413	480	1	2 AWG	Y	5,907	1	0.01	0.989	17,230	F14
F15	NE-T-01 (SECONDARY OF XFMR)		11,565					0				11,565	F15
F16	NE-DPL-01	F15	11,565	208	2	600 KCMIL	Y	22,965	5	0.01	0.990	11,445	F16
F17	NE-PL-01	F16	11,445	208	1	3/0 AWG	Y	12,844	4	0.03	0.971	11,115	F17
F18	NE-PL-02	F16	11,445	208	1	3/0 AWG	Y	12,844	8	0.06	0.944	10,804	F18
F19	NE-PL-03	F16	11,445	208	1	3/0 AWG	Y	12,844	12	0.09	0.918	10,509	F19
F20	PH-PL-01	F16	11,445	208	1	3/0 AWG		13,923	210	1.44	0.410	4,696	F20
F21	SE-DPH-01	F1	51,801	480	2	350 KCMIL		22,737	600	2.47	0.288	14,944	F21
F22	SE-PH-01	F21	14,944	480	1	2 AWG	Y	5,907	12	0.11	0.901	13,469	F22
F23	SE-PH-02	F21	14,944	480	1	3/0 AWG	Y	12,844	10	0.04	0.960	14,342	F23
F24	100A DISCONNECT (PAC -6)	F21	14,944	480	1	4/0 AWG	Y	15,082	65	0.23	0.811	12,126	F24
F25	PAC-6	F24	12,126	480	1	4/0 AWG	Y	15,082	1	0.00	0.997	12,091	F25
F27	WH-PH-01	F1	51,801	480	1	250 KCMIL	Y	16,483	700	7.94	0.112	5,796	F27
F29	CS-DPH-01	F1	51,801	480	2	600 KCMIL		28,033	300	1.00	0.500	25,898	F29
F30	CS-PH-01	F29	25,898	480	1	2 AWG	Y	5,907	10	0.16	0.863	22,361	F30
F31	CS-PH-02	F29	25,898	480	2	3/0 AWG	Y	12,844	3	0.01	0.989	25,619	F31
F32	200A DISCONNECT (PAC-7)	F29	25,898	480	1	3/0 AWG	Y	12,844	110	0.80	0.555	14,385	F32
F33	PAC-7	F32	14,385	480	1	3/0 AWG	Y	12,844	1	0.00	0.996	14,327	F33
F34	CS-T-01 (SECONDARY OF XFMR)		11,565					0				11,565	F34
F35	CS-DPL-01	F34	11,565	208	2	600 KCMIL	Y	22,965	3	0.01	0.994	11,493	F35
F36	CS-PL-01	F35	11,493	208	1	3/0 AWG	Y	12,844	3	0.02	0.978	11,241	F36
F37	CS-PL-02	F35	11,493	208	1	3/0 AWG	Y	12,844	5	0.04	0.964	11,080	F37
F38	CS-PL-03	F35	11,493	208	1	3/0 AWG	Y	12,844	7	0.05	0.950	10,923	F38
F39	CS-PL-04	F35	11,493	208	1	3/0 AWG	Y	12,844	9	0.07	0.937	10,770	F39
F40	SW-DPH-01	F1	51,801	480	2	600 KCMIL		28,033	185	0.62	0.619	32,040	F40
F41	SW-PH-01	F40	32,040	480	1	2 AWG	Y	5,907	10	0.20	0.836	26,796	F41
F42	SW-PH-02	F40	32,040	480	2	3/0 AWG	Y	12,844	8	0.04	0.965	30,926	F42
F43	200A DISCONNECT (PAC-8)	F40	32,040	480	1	2/0 AWG	Y	10,755	70	0.75	0.571	18,283	F43
F44	PAC-8	F43	18,283	480	1	2/0 AWG	Y	10,755	1	0.01	0.994	18,171	F44
F45	SW-T-01 (SECONDARY OF XFMR)		11,565			600		0				11,565	F45
F46	SW-DPL-01	F45	11,565	208	2	250 KCMIL	Y	16,483	6	0.02	0.983	11,366	F46
F47	SW-PL-01	F46	11,366	208	1	3/0 AWG	Y	12,844	12	0.09	0.919	10,442	F47
F48	SW-PL-02	F46	11,366	208	1	3/0 AWG	Y	12,844	10	0.07	0.931	10,586	F48
F49	SW-PL-03	F46	11,366	208	1	3/0 AWG	Y	12,844	8	0.06	0.944	10,733	F49
F50	ATS-1	F1	51,801	480	1	3/0 AWG		13,923	12	0.16	0.861	44,614	F50
F51	NW-DPH-OS-01	F50	44,614	480	1	3/0 AWG		13,923	7	0.08	0.925	41,273	F51
F58	ATS-2	F1	51,801	480	1	2 AWG		6,044	10	0.31	0.764	39,565	F58
F59	NW-DPH-E-01	F58	39,565	480	1	2 AWG		6,044	6	0.14	0.876	34,654	F59
F60	NW-PH-E-01	F59	34,654	480	1	4 AWG		3,826	10	0.33	0.754	26,118	F60
F61	NE-PH-E-01	F59	34,654	480	1	2 AWG		6,044	470	9.72	0.093	3,232	F61

Note: The above calculations are based on the "Point to Point" method.

C = Cable Conductance Factor
E = Line to Line Voltage
Vp = Transformer Primary Line to Line Voltage
Vs = Transformer Secondary Line to Line Voltage
Z = Transformer Impedance
Isc = Short circuit current

M = 1 / (1 + f) Isc = Isc x M Isc = Vp x M x Isc / Vs

Three Phase

f = 1.732 x L x Isc / (C x n x E)

f = I sc x Vp x 1.73 (% Z) / (100000 x kva)

XFMR FAULT CALCS

TRANSFORMER SIZE = 225 KVA

F15,F34,F45 = $\frac{225\ KVA}{1.732 * 208V * .054(Z)} = 11{,}565A$

TRANSFORMER SIZE = 150 KVA

F7,F26 = $\frac{150\ KVA}{1.732 * 208V * .05(Z)} = 8{,}327A$

∴ 10,000 AIC RATED PANELS ARE REQUIRED

TRANSFORMER SIZE = 45 KVA

F28,F53,F54,F55,F56,F57 = $\frac{45\ KVA}{1.732 * 208V * .054(Z)} = 2{,}313A$

∴ 10,000 AIC RATED PANELS ARE REQUIRED

TRANSFORMER SIZE = 30 KVA

F52 = $\frac{30\ KVA}{1.732 * 208V * .05(Z)} = 1{,}665A$

∴ 10,000 AIC RATED PANELS ARE REQUIRED

GENERATOR SHORT CIRCUIT CALC

GENERATOR SIZE = 100 KW

F62 = $\frac{100\ KW}{(.8PF)(1.732)(480)(.1X"d)} = 1{,}504A$

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fault current analysis, load calculations

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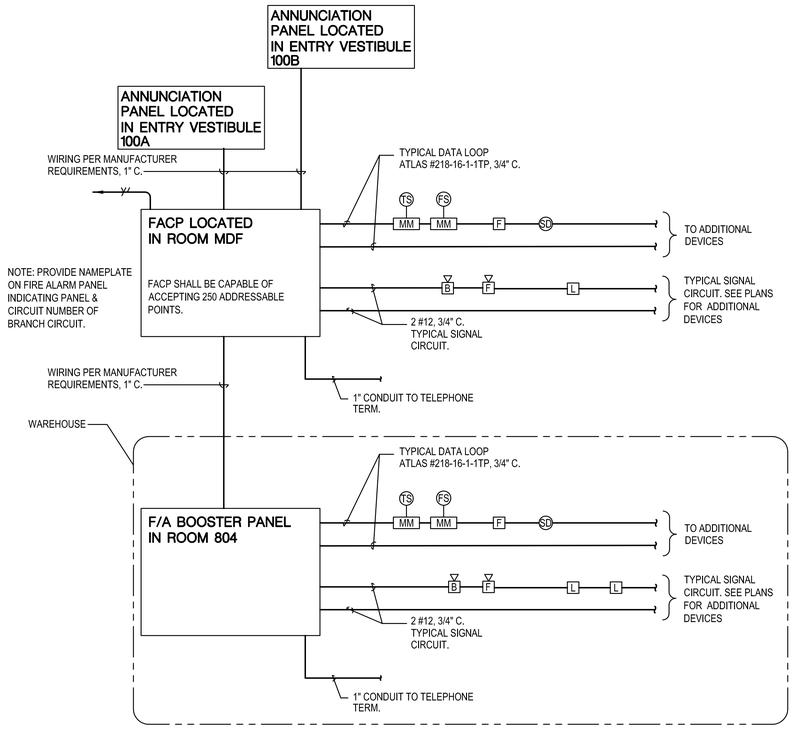
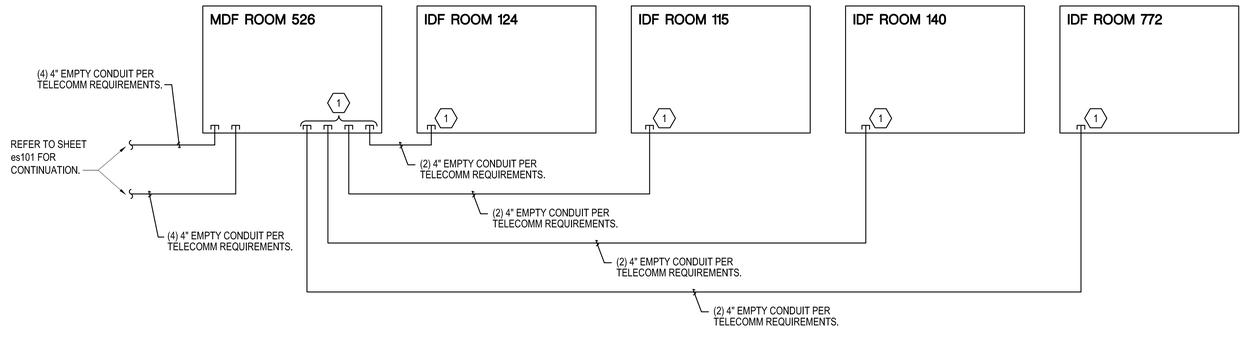


1 ep704 **fire alarm riser diagram**

nts

FIRE ALARM NOTES:

1. CONTRACTOR SHALL PROVIDE BOOSTER POWER SUPPLIES AS REQUIRED BY MANUFACTURER. COORDINATE LOCATIONS WITH OWNER. PROVIDE SMOKE DETECTOR WITHIN 2' OF EACH BOOSTER POWER SUPPLY.
2. SEE SYSTEMS PLANS FOR LOCATIONS AND NUMBER OF DEVICES.
3. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 IFC, 2012 IBC AND THE PASCUA YAQUI REQUIREMENTS.
4. ALL WORK SHALL BE IN ACCORDANCE WITH THE ARIZONA FIRE CODE.
5. SEE PLUMBING DRAWINGS FOR QUANTITY AND LOCATIONS OF FLOW AND TAMPER SWITCHES.
6. ALL FIRE ALARM WIRING SHALL BE PULLED SPLICE FREE. THE USE OF WIRE NUTS IS PROHIBITED.
7. ALL DEVICES SHALL BE ADA COMPLIANT AND SHALL BE INSTALLED/MOUNTED IN ACCORDANCE WITH ADA REQUIREMENTS.
8. PROVIDE 6' SEPARATION BETWEEN SUPPLY AND RETURN LOOPS. (TYP FOR ALL INITIATION LOOPS).
9. INSTALL NEW FIRE ALARM WIRING AS A CLASS 'A' SYSTEM. ALL OUTGOING AND RETURN CONDUCTORS, EXITING AND RETURNING TO THE FACP, SHALL BE IN SEPARATE CONDUITS. WIRING SHALL BE PER THE REQUIREMENTS OF NFPA 72.
10. FIRE ALARM DESIGN IS CONCEPTUAL ONLY. CONTRACTOR SHALL ADD ADDITIONAL DEVICES TO COMPLY WITH CODES LISTED ABOVE AT NO ADDITIONAL COST TO OWNER.



2 ep704 **MDF/IDF rooms conduit diagram**

nts

general note:

A. COORDINATE EXACT ROUTING WITH TELECOMMUNICATIONS DESIGNER PRIOR TO ROUGH-IN.

keynote: (#)

1. COORDINATE CONDUIT STUB LOCATION(S) W/ TELECOMMUNICATIONS DESIGNER PRIOR TO ROUGH-IN.

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fire alarm riser diagram, MDF/IDF conduit routing diagram

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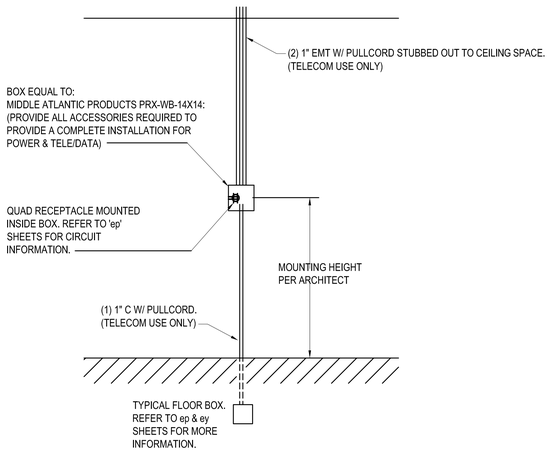
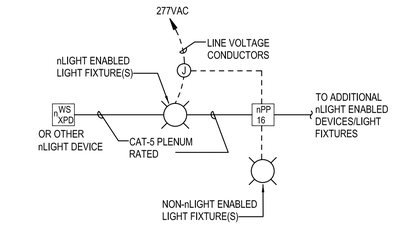
SELECTED INTERIOR LIGHTING CONTROL ZONE SCHEDULE			
ZONE	AREA	CONTROLS	
		AUX. CONTROLS	LOW VOLTAGE
A	SEWA U'USIM EAST HALL LTG	T(ON), T(OFF)	X
B	HALL 213 COPY AREA	T(ON), T(OFF)	X
C	WAIT 200 LTG	T(ON), T(OFF)	X
D	SEWA U'USIM WEST LTG	T(ON), T(OFF)	X
E	WAIT 230 LTG	T(ON), T(OFF)	X
F	NURSING + CLINICS EAST HALL LTG	T(ON), T(OFF)	X
G	NURSING + CLINICS WEST HALL LTG	T(ON), T(OFF)	X
H	NURSING + CLINICS WAIT 400 LTG	T(ON), T(OFF)	X
I	NURSING + CLINICS WAIT/ADMIN 310 LTG	T(ON), T(OFF)	X
J	NURSING + CLINICS WAITING 300 LTG	T(ON), T(OFF)	X
K	HEALTH / BILLING HALL LTG	T(ON), T(OFF)	X
L	HEALTH / BILLING HALLS LTG	T(ON), T(OFF)	X
M	HEALTH/BILLING WAITING 500 LTG	T(ON), T(OFF)	X
N	SOCIAL SERVICES HALL LTG	T(ON), T(OFF)	X
O	SOCIAL SERVICES WAIT 700 LTG	T(ON), T(OFF)	X
P	SOCIAL SERVICES HALL STATION RM 736	T(ON), T(OFF)	X
Q	CENTER SPIRIT HALL LTG	T(ON), T(OFF)	X
R	CENTER SPIRIT HALLWAY 618 LTG	T(ON), T(OFF)	X
S	CENTER SPIRIT HALL 634, 636 LTG	T(ON), T(OFF)	X
T	CENTER SPIRIT WAIT 600 LTG	T(ON), T(OFF)	X
U	MAIN LOBBY 100 LTG (CENTER)	T(ON), T(OFF)	X
V	MAIN LOBBY 100/HALLWAY 104 LTG	T(ON), T(OFF)	X
W	HALLWAY 112A LTG	T(ON), T(OFF)	X
X	HALLWAY 105 LTG	T(ON), T(OFF)	X
Y	HALLWAY 105 WALL WASH	T(ON), T(OFF)	X
Z	MAIN LOBBY 100 WALL WASH	T(ON), T(OFF)	X
AA	HALLWAY 106 LTG	T(ON), T(OFF)	X
BB	HALLWAYS 101, 102, 103 LTG	T(ON), T(OFF)	X
CC	HALLWAY 101 WALL WASH LTG	T(ON), T(OFF)	X
DD	HALLWAY 103 WALL WASH LTG	T(ON), T(OFF)	X
EE	PHARMACY 304 LTG	T(ON), T(OFF)	X
FF	HALLWAY 133/138 LTG	T(ON), T(OFF)	X
GG	HALLWAY 711 WALL WASH LTG	T(ON), T(OFF)	X

NOTES: (NETWORKED CONTROLLED BY ECLIPSE LTG CONTROLLER) (REFER TO DETAIL #5, THIS SHEET)
T = TIMECLOCK
PC = PHOTOCELL

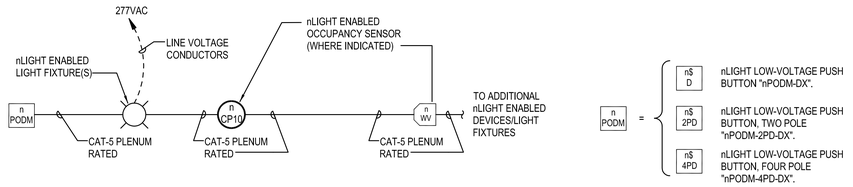
1 ep705 lighting zone schedule
n.t.s.



video wall detail
5 ep705 n.t.s.

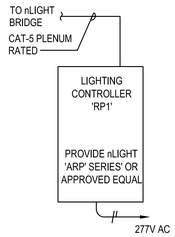


typical nlight wall occupancy sensor lighting control block diagram
2 ep705 n.t.s.



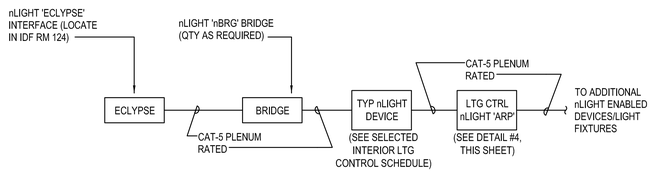
typical nlight wall-pod lighting control block diagram
3 ep705 n.t.s.

LIGHTING CONTROL PANEL 'RP1' (PROVIDE A 32 RELAY PANEL)								
RELAY #	CKT #/ SWITCH DESIGNATION	AREA	CONTROLS		RELAY #	CKT #/ SWITCH DESIGNATION	AREA	CONTROLS	
			AUX. CONTROLS	LOW VOLTAGE				AUX. CONTROLS	LOW VOLTAGE
1					2	'NW-PH-01'-2	BUILDING LIGHTING	PC(ON), T(OFF)	
3	'NW-PH-01-6,8,0	PARKING LOT LIGHTING	PC(ON), T(OFF)		4	'NW-PH-01'-4	BUILDING LIGHTING	PC(ON), T(OFF)	
5					6	'NW-PH-E-01'-4	EM BUILDING LIGHTING	PC(ON), T(OFF)	
7	'NW-PH-01'-12,14	BOLLARD LIGHTING	PC(ON), T(OFF)		8	SPARE			



NOTES:
T = TIMECLOCK, VIA 'ECLYPSE'
PC = PHOTOCELL

4 ep705 lighting control relay panel 'RP1'
n.t.s.



overall networked building lighting control block diagram
5 ep705 n.t.s.

nLIGHT SYSTEM NOTES

1. COORDINATE WITH nLIGHT FOR EXACT MATERIAL AND INSTALLATION REQUIREMENTS PRIOR TO ORDERING/INSTALLATION.
2. FOR NON n-LIGHT ENABLED FIXTURES, PROVIDE PROPER DEVICE INTERFACE. COORDINATE WITH MANUFACTURER FOR REQUIREMENTS.
3. ALL CABLING SHALL BE ROUTED IN FREE AIR ABOVE ACCESSIBLE CEILING SPACE (EXCEPT FOR THE SERVICE BAY AREA, WHICH SHALL BE IN 1" CONDUIT). CABLE SHALL BE ROUTED VIA J-HOOKS. BOXES, SIZED PER MANUFACTURERS RECOMMENDATIONS SHALL BE PROVIDED FOR ALL WALL DEVICES W/ 1" CONDUIT ROUTED 6" TO ABOVE ACCESSIBLE CEILING SPACE.
4. ALL CABLING SHALL BE PLENUM RATED.
5. PROVIDE ADDITIONAL J-BOXES WHERE REQUIRED BY MANUFACTURER.
6. PROVIDE SHOP DRAWINGS FOR REVIEW.
7. AS AN ALTERNATE BID: ALL nLIGHT DEVICES LOCATED THROUGH-OUT THE BUILDING SHALL BE INTERFACED TO THE MAIN ECLYPSE LIGHTING CONTROLLER. PROVIDE ALL REQUIRED COMPONENTS, BRIDGES, ADDITIONAL ECLYPSE LIGHTING CONTROLLERS. ETC. FOR A COMPLETE INSTALLATION. THE CONTROLLER SHALL ALSO PROVIDE SPACE UTILIZATION.

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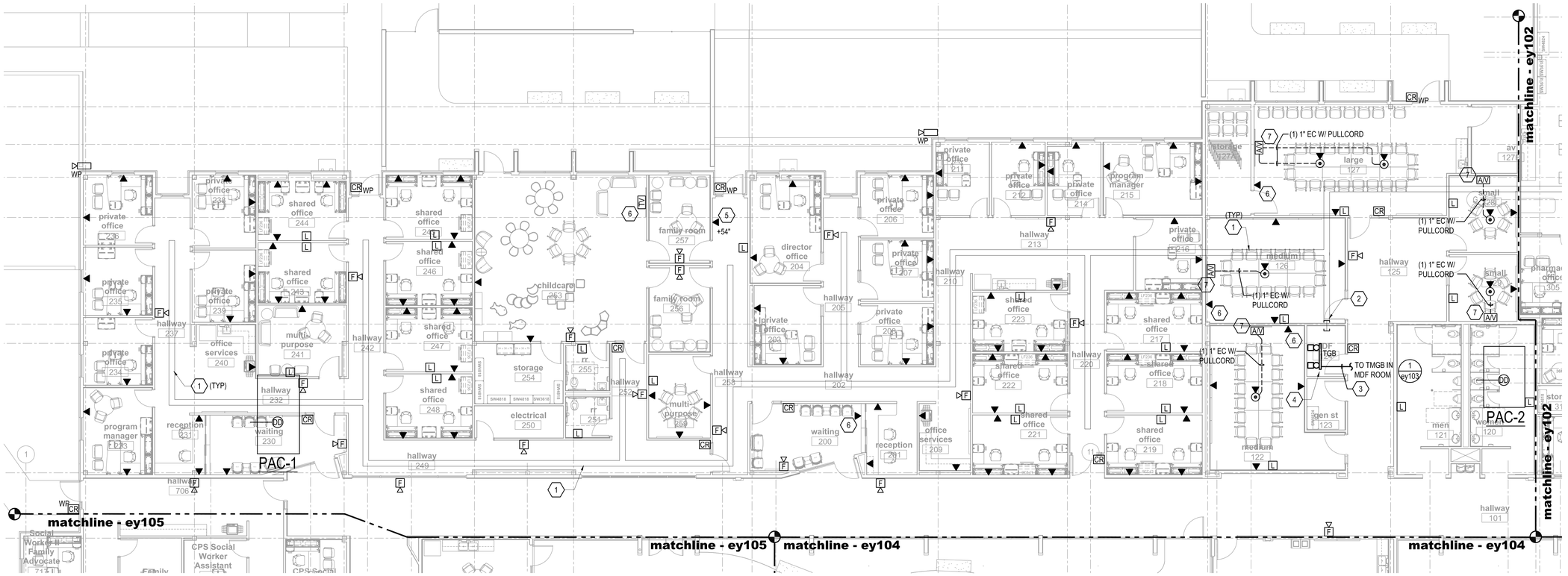


1 ey101 **special systems plan - Sewa U'usim**

1/8" = 1'-0"

0 4' 8' 16'

north

general notes:

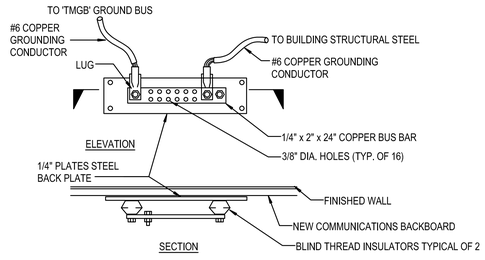
A. ALL EMPTY CONDUITS SHALL BE PROVIDED WITH PULLSTRINGS.

B. GROUND CABLE TRAY VIA #6 AWG BARE COPPER CONNECTOR TO THE RESPECTIVE IDF ROOM GROUND BUS BAR. PROVIDE BONDING JUMPERS ACROSS CABLE TRAY FITTINGS. PROVIDE ALL HARDWARE AND FITTINGS REQUIRED TO ACHIEVE CABLE TRAY LAYOUT/ROUTING SHOWN ON DRAWINGS (I.E. BENDS, TRAY BRACKETS/HANGERS, ECT.).

C. REFER TO TELECOMMUNICATION & AV DRAWINGS FOR CABLING & ADDITIONAL EQUIPMENT INFORMATION.

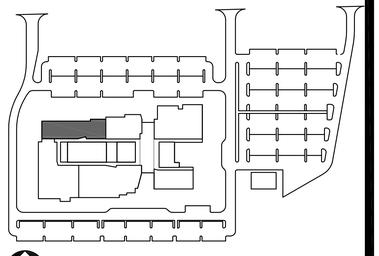
keynotes: (#)

1. 4" x 18" WIRE BASKET CABLE TRAY EQUAL TO 'B-LINE FLEXTRAY' SERIES.
2. (3) 4" x 4" GANGED STI EZ-PATHWAY THROUGH WALL, SEAL OPENING IN ACCORDANCE WITH SPECIFICATIONS. PROVIDE ALL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
3. #6 AWG INSULATED GROUND CONDUCTOR, 3/4" PVC-40 C.
4. COMMUNICATION GROUND BUS BAR. REFER TO DETAIL #2 , THIS SHEET.
5. DEVICE PROVIDED FOR TIMECLOCK. COORDINATE EXACT LOCATION WITH OWNER PRIOR TO ROUGH-IN.
6. COORDINATE EXACT MOUNTING HEIGHT/LOCATION W/ ARCHITECT PRIOR TO ROUGH-IN.
7. REFER TO BOX DESCRIPTION ON SHEET e001 FOR ADDITIONAL INFORMATION.



2 ey101 **communications ground bus TGB**

n.t.s.



north **keyplan**

n.t.s.

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job **1717**

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Pascua Yaqui Tribe
Health Services Center II
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special systems plan - Sewa U'usim

ey101

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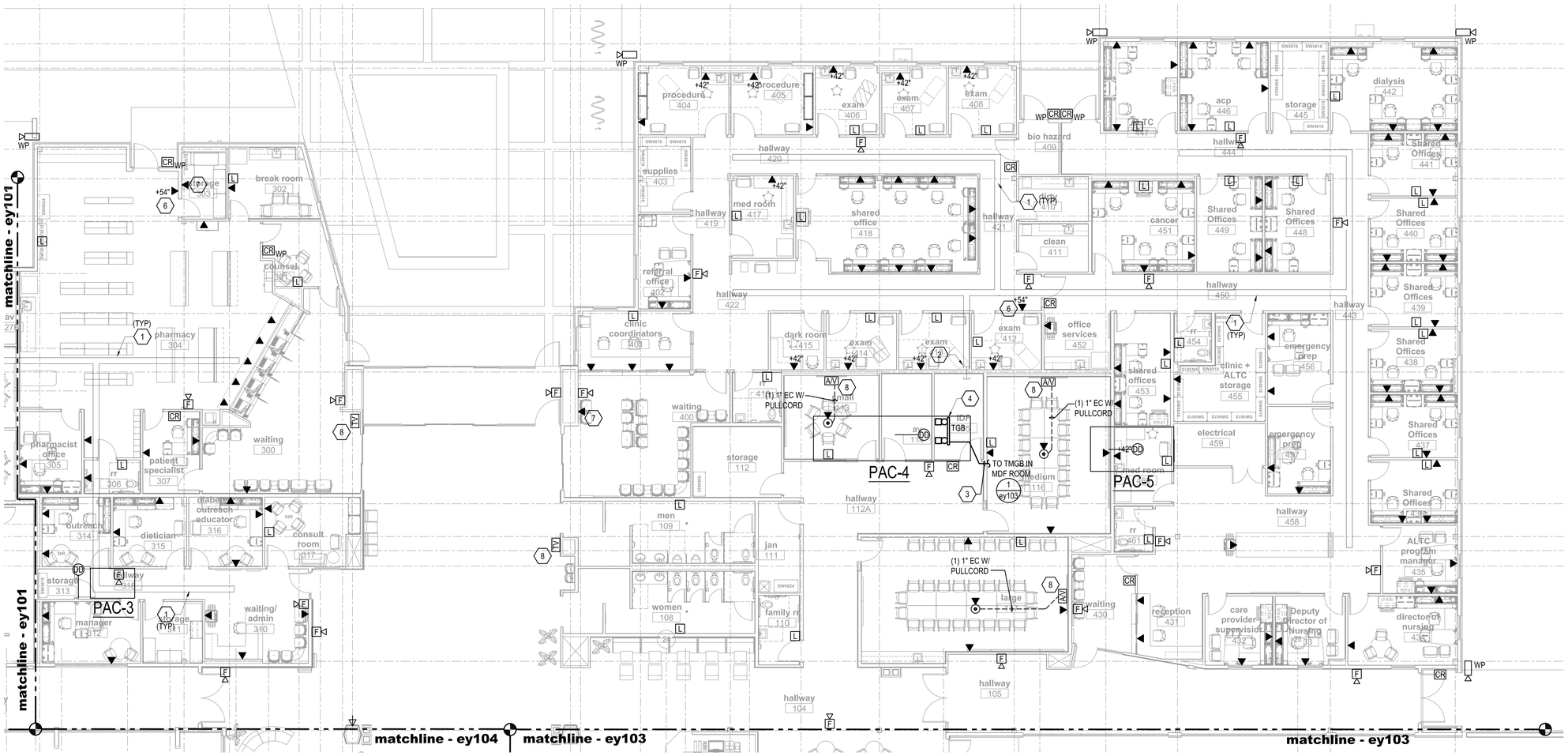


1 ey102 **power plan - Nursing + Clinics**
1/8" = 1'-0"

general notes:

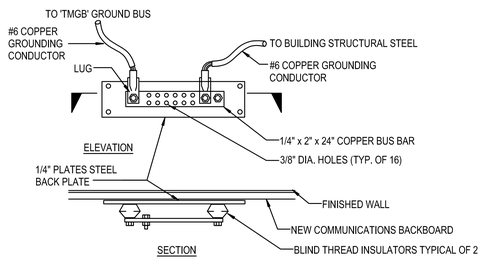
A. ALL EMPTY CONDUITS SHALL BE PROVIDED WITH PULLSTRINGS.

B. GROUND CABLE TRAY VIA #6 AWG BARE COPPER CONNECTOR TO THE RESPECTIVE IDF ROOM GROUND BUS BAR. PROVIDE BONDING JUMPERS ACROSS CABLE TRAY FITTINGS. PROVIDE ALL HARDWARE AND FITTINGS REQUIRED TO ACHIEVE CABLE TRAY LAYOUT/ROUTING SHOWN ON DRAWINGS (I.E. BENDS, TRAY BRACKETS/HANGERS, ECT.).

C. REFER TO TELECOMMUNICATION & AV DRAWINGS FOR CABLING & ADDITIONAL EQUIPMENT INFORMATION.

keynotes: (#)

1. 4" x 18" WIRE BASKET CABLE TRAY EQUAL TO 'B-LINE FLEXTRAY' SERIES.
2. (3) 4" x 4" GANGED STI EZ-PATHWAY THROUGH WALL. SEAL OPENING IN ACCORDANCE WITH SPECIFICATIONS. PROVIDE ALL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
3. #6 AWG INSULATED GROUND CONDUCTOR, 3/4" PVC-40 C.
4. COMMUNICATION GROUND BUS BAR. REFER TO DETAIL #2 , THIS SHEET.
5. NOT USED.
6. DEVICE PROVIDED FOR TIMECLOCK. COORDINATE EXACT LOCATION WITH OWNER PRIOR TO ROUGH-IN.
7. COORDINATE EXACT MOUNTING HEIGHT/LOCATION W/ ARCHITECT PRIOR TO ROUGH-IN.
8. REFER TO BOX DESCRIPTION ON SHEET e001 FOR ADDITIONAL INFORMATION.



2 ey102 **communications ground bus TGB**
n.t.s.

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special systems plan - nursing + clinics

ey102

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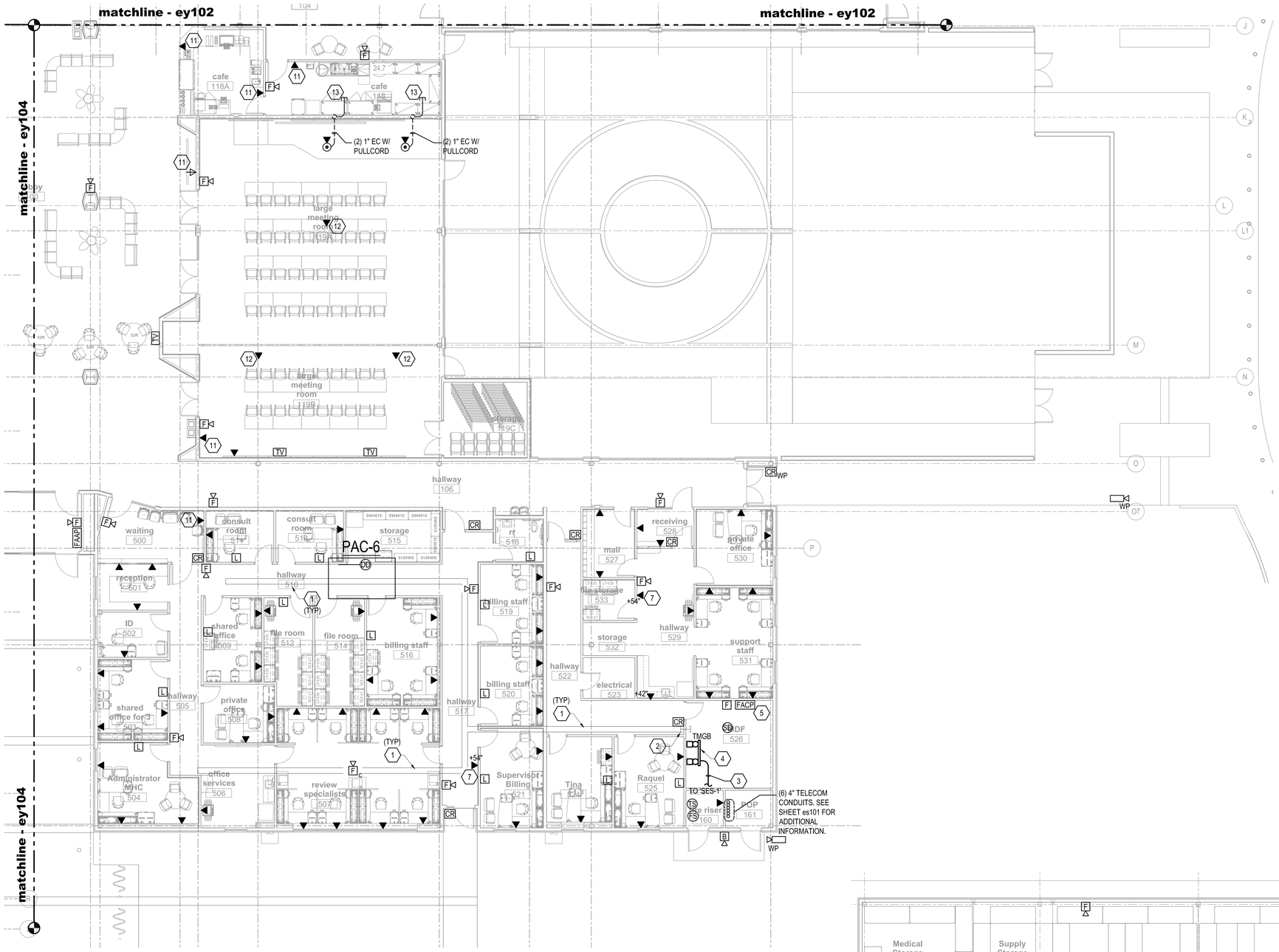
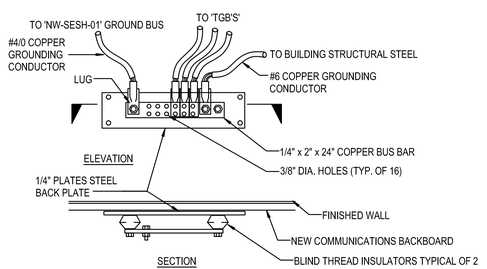
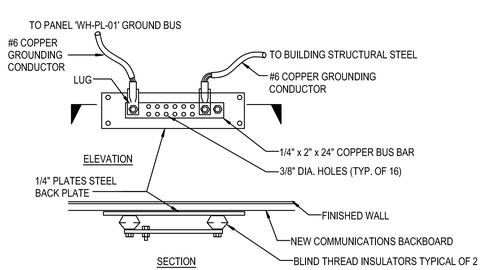


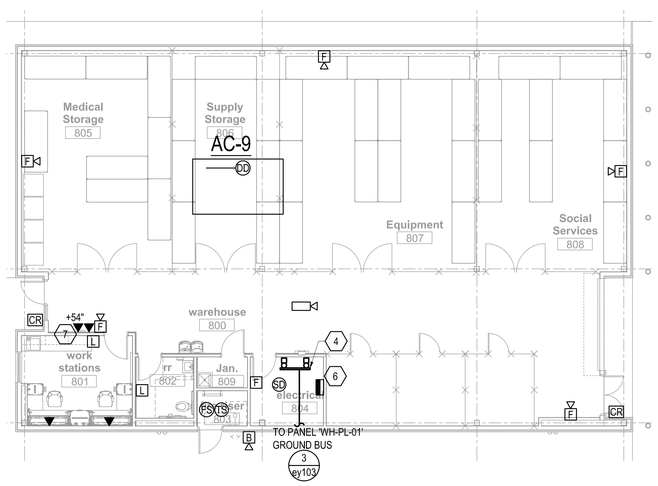
1 ey103 **special systems plan - Health Budget + Managed Health / Billing**
1/8" = 1'-0"



2 ey103 **tele communications main ground bus TMCB**
n.t.s.



3 ey103 **warehouse communications ground bus TGB**
n.t.s.



4 ey103 **special systems plan - Warehouse**
1/8" = 1'-0"

general notes:

A. ALL EMPTY CONDUITS SHALL BE PROVIDED WITH PULLSTRINGS.

B. GROUND CABLE TRAY VIA #6 AWG BARE COPPER CONNECTOR TO THE RESPECTIVE IDF ROOM GROUND BUS BAR. PROVIDE BONDING JUMPERS ACROSS CABLE TRAY FITTINGS. PROVIDE ALL HARDWARE AND FITTINGS REQUIRED TO ACHIEVE CABLE TRAY LAYOUT/ROUTING SHOWN ON DRAWINGS (I.E. BENDS, TRAY BRACKETS/HANGERS, ECT.).

C. REFER TO TELECOMMUNICATION & AV DRAWINGS FOR CABLING & ADDITIONAL EQUIPMENT INFORMATION.

keynotes: (#)

1. 4" x 18" WIRE BASKET CABLE TRAY EQUAL TO 'B-LINE FLEXTRAY' SERIES.
2. (3) 4" x 4" GANGED STI EZ-PATHWAY THROUGH WALL, SEAL OPENING IN ACCORDANCE WITH SPECIFICATIONS. PROVIDE ALL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
3. #4/0 AWG INSULATED GROUND CONDUCTOR, 3/4" PVC-40 C.
4. COMMUNICATION GROUND BUS BAR. REFER TO DETAIL #2 , THIS SHEET.
5. FACP.
6. F/A BOOSTER PANEL.
7. DEVICE PROVIDED FOR TIMECLOCK. COORDINATE EXACT MOUNTING LOCATION WITH OWNER PRIOR TO ROUGH-IN.
8. WAREHOUSE COMMUNICATION GROUND BUS BAR. REFER TO DETAIL #4, THIS SHEET.
9. DEVICE PROVIDED FOR TIMECLOCK. COORDINATE EXACT LOCATION WITH OWNER PRIOR TO ROUGH-IN.
10. NOT USED.
11. COORDINATE EXACT MOUNTING HEIGHT/LOCATION W/ ARCHITECT PRIOR TO ROUGH-IN.
12. DEVICE FOR PROJECTOR. COORDINATE EXACT MOUNTING LOCATION W/ TELECOMMUNICATION DRAWINGS.
13. STUB CONDUIT(S) TO 6" ABOVE ACCESSIBLE CEILING SPACE.
14. REFER TO BOX DESCRIPTION ON SHEET e001 FOR ADDITIONAL INFORMATION.

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special systems plan - health budget + managed health/billing, warehouse

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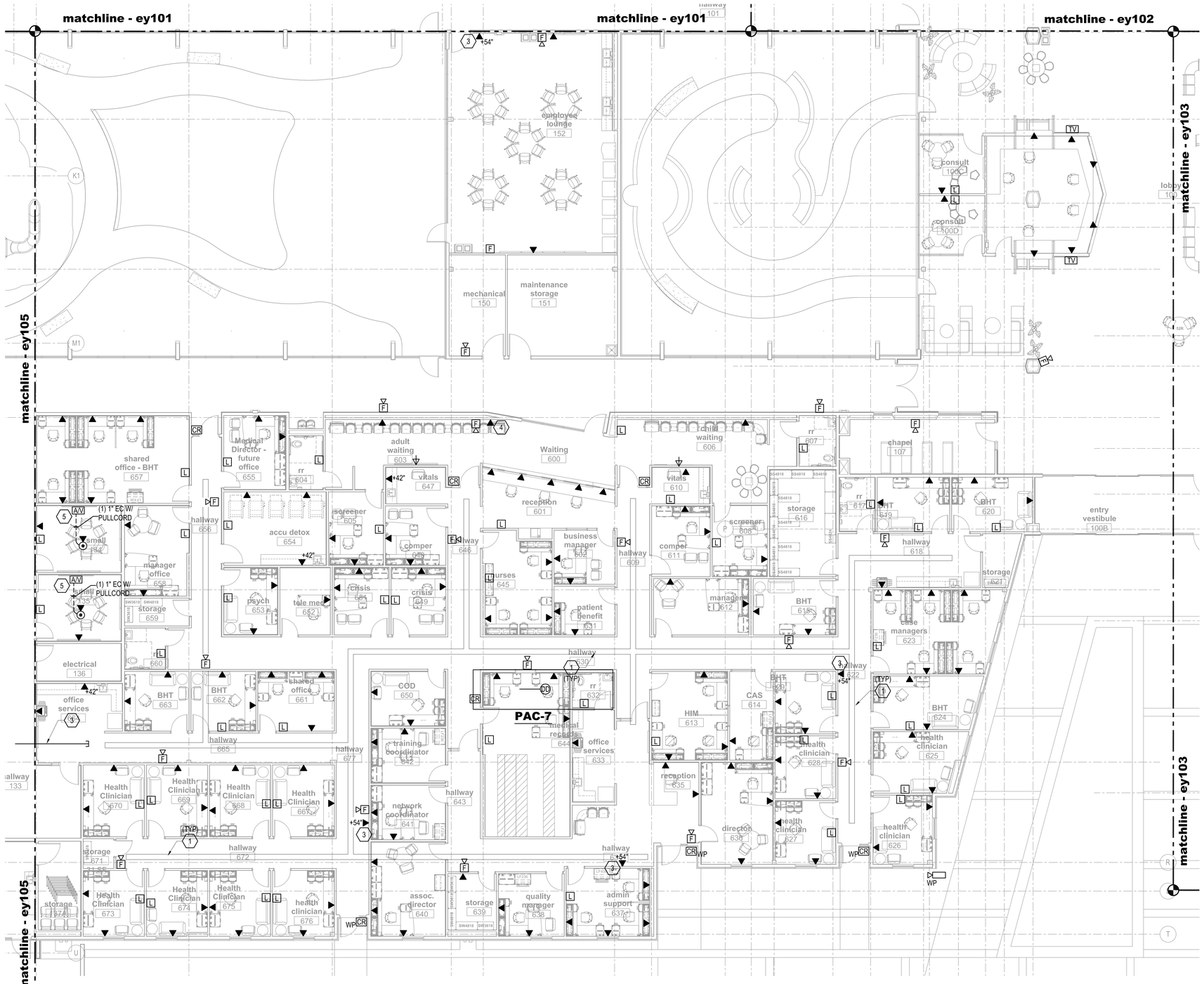

1 ey104 **special systems plan - Center Spirit**

1/8" = 1'-0"

0' 4' 8' 16'

north

general notes:

A. ALL EMPTY CONDUITS SHALL BE PROVIDED WITH PULLSTRINGS.

B. GROUND CABLE TRAY VIA #6 AWG BARE COPPER CONNECTOR TO THE RESPECTIVE IDF ROOM GROUND BUS BAR. PROVIDE BONDING JUMPERS ACROSS CABLE TRAY FITTINGS. PROVIDE ALL HARDWARE AND FITTINGS REQUIRED TO ACHIEVE CABLE TRAY LAYOUT/ROUTING SHOWN ON DRAWINGS (I.E. BENDS, TRAY BRACKETS/HANGERS, ECT.).

C. REFER TO TELECOMMUNICATION & AV DRAWINGS FOR CABLING & ADDITIONAL EQUIPMENT INFORMATION.

keynotes: (#)

1. 4" x 18" WIRE BASKET CABLE TRAY EQUAL TO 'B-LINE FLEXTRAY' SERIES.
2. (2) 4" EC ROUTED ABOVE CEILING.
3. DEVICE PROVIDED FOR TIMECLOCK. COORDINATE EXACT LOCATION WITH OWNER PRIOR TO ROUGH-IN.
4. COORDINATE EXACT MOUNTING HEIGHT/LOCATION W/ ARCHITECT PRIOR TO ROUGH-IN.
5. REFER TO BOX DESCRIPTION ON SHEET e001 FOR ADDITIONAL INFORMATION.

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special systems plan - center spirit

ey104

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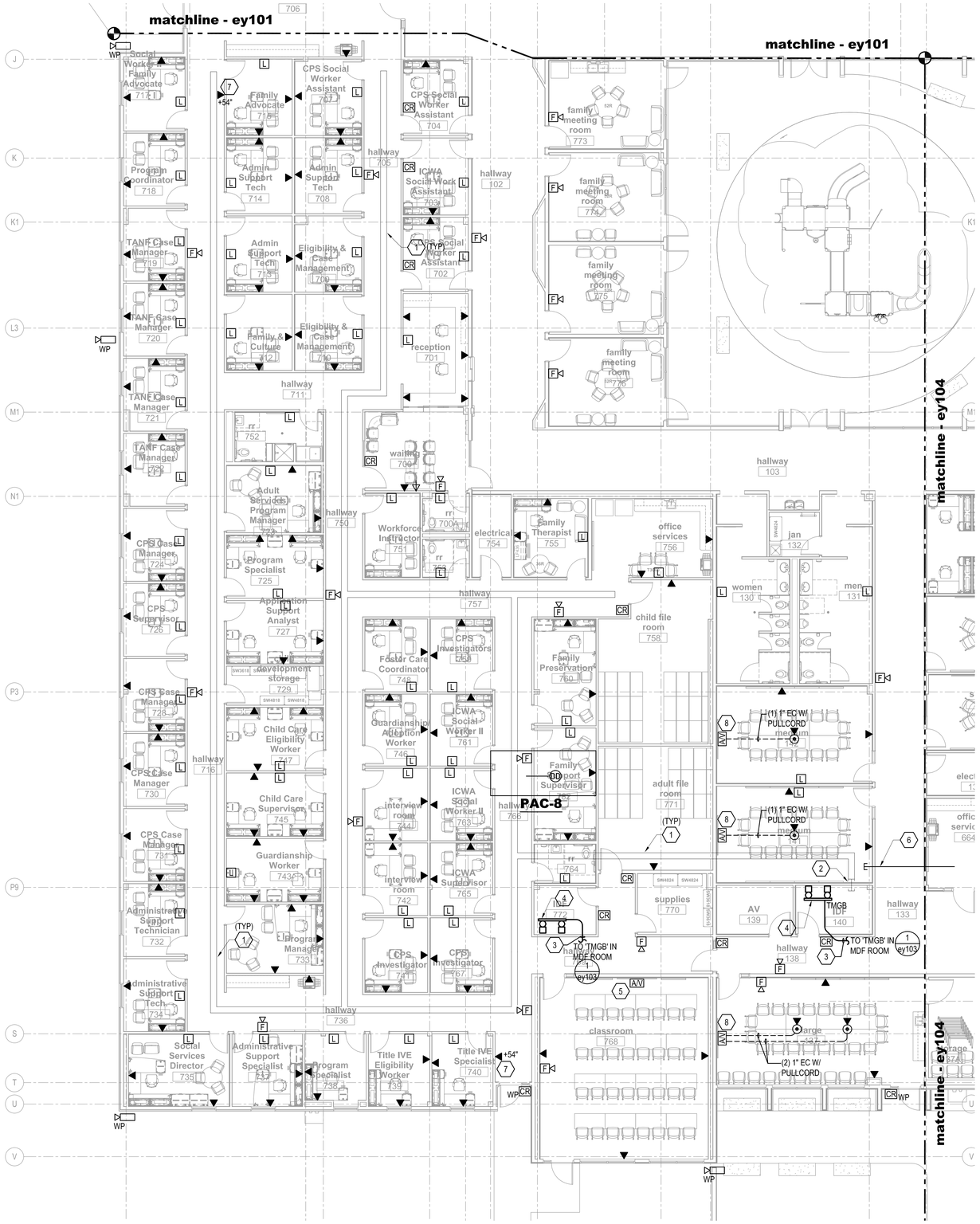


1 ey105 **special systems plan - Social Services**

1/8" = 1'-0"

0 4' 8' 16'

north

general notes:

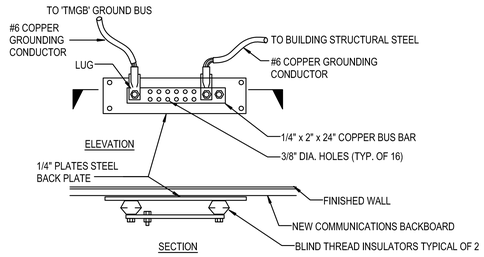
A. ALL EMPTY CONDUITS SHALL BE PROVIDED WITH PULLSTRINGS.

B. GROUND CABLE TRAY VIA #6 AWG BARE COPPER CONNECTOR TO THE RESPECTIVE IDF ROOM GROUND BUS BAR. PROVIDE BONDING JUMPERS ACROSS CABLE TRAY FITTINGS. PROVIDE ALL HARDWARE AND FITTINGS REQUIRED TO ACHIEVE CABLE TRAY LAYOUT/ROUTING SHOWN ON DRAWINGS (I.E. BENDS, TRAY BRACKETS/HANGERS, ECT.).

C. REFER TO TELECOMMUNICATION & AV DRAWINGS FOR CABLING & ADDITIONAL EQUIPMENT INFORMATION.

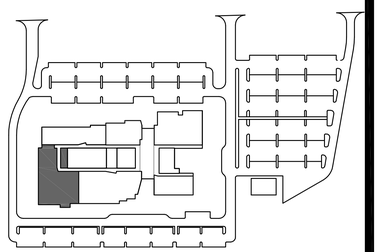
keynotes: (#)

1. 4" x 18" WIRE BASKET CABLE TRAY EQUAL TO 'B-LINE FLEXTRAY' SERIES.
2. (3) 4" x 4" GANGED STI EZ-PATHWAY THROUGH WALL. SEAL OPENING IN ACCORDANCE WITH SPECIFICATIONS. PROVIDE ALL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
3. #6 AWG INSULATED GROUND CONDUCTOR, 3/4" PVC-40 C.
4. COMMUNICATION GROUND BUS BAR. REFER TO DETAIL #2 , THIS SHEET.
5. REFER TO BOX DESCRIPTION, SHEET e001 FOR ADDITIONAL INFORMATION.
6. (3) 4" EC ROUTED ABOVE CEILING SPACE.
7. DEVICE PROVIDED FOR TIMECLOCK. COORDINATE EXACT LOCATION WITH OWNER PRIOR TO ROUGH-IN.



2 ey105 **communications ground bus TGB**

n.t.s.



north **keyplan**

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special systems plan - social services

ey105

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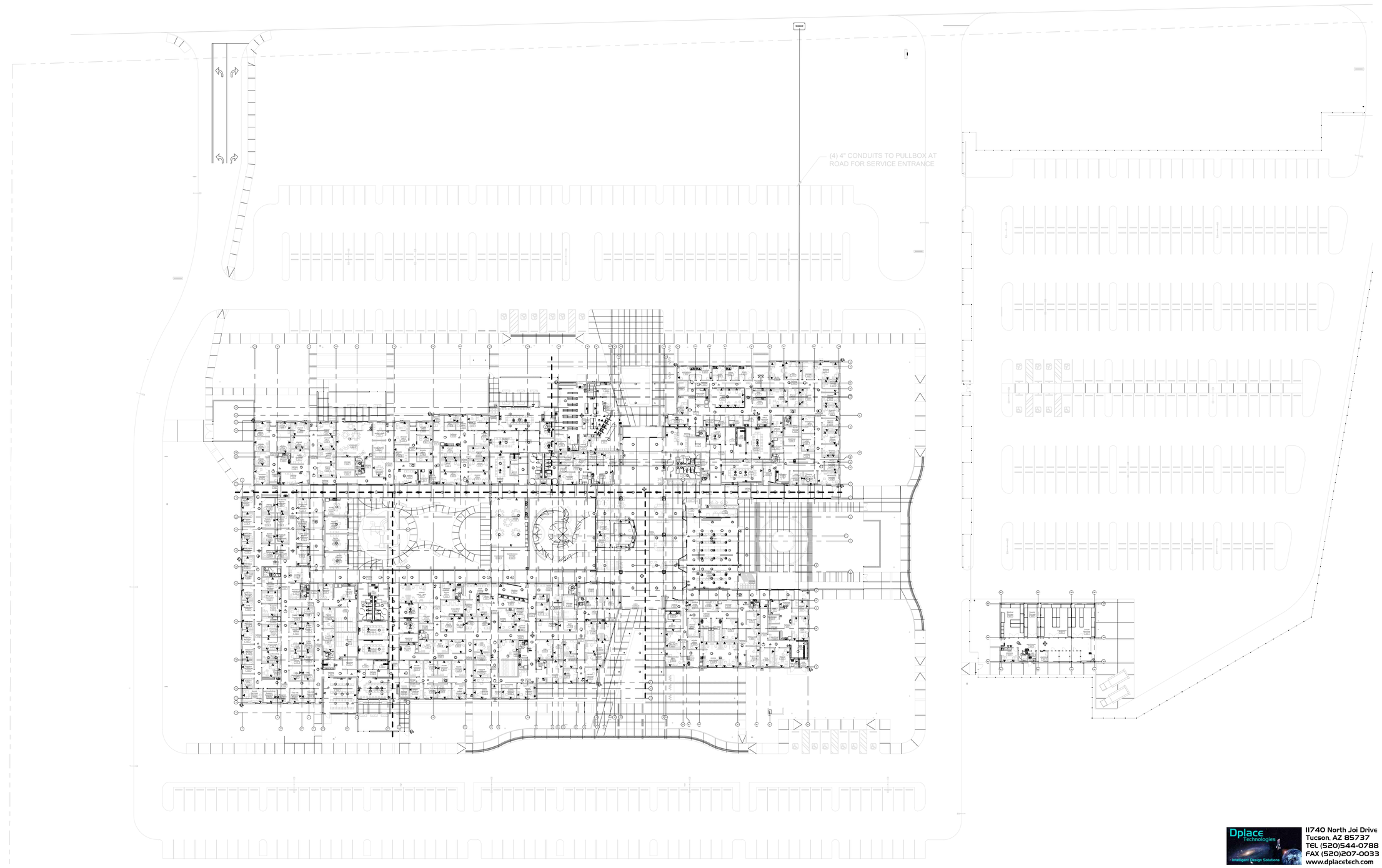

1 t1.0 **ITS site plan - overall ITS**
1/32" = 1'-0"

north

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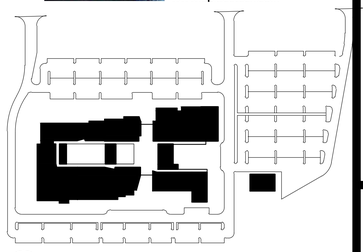
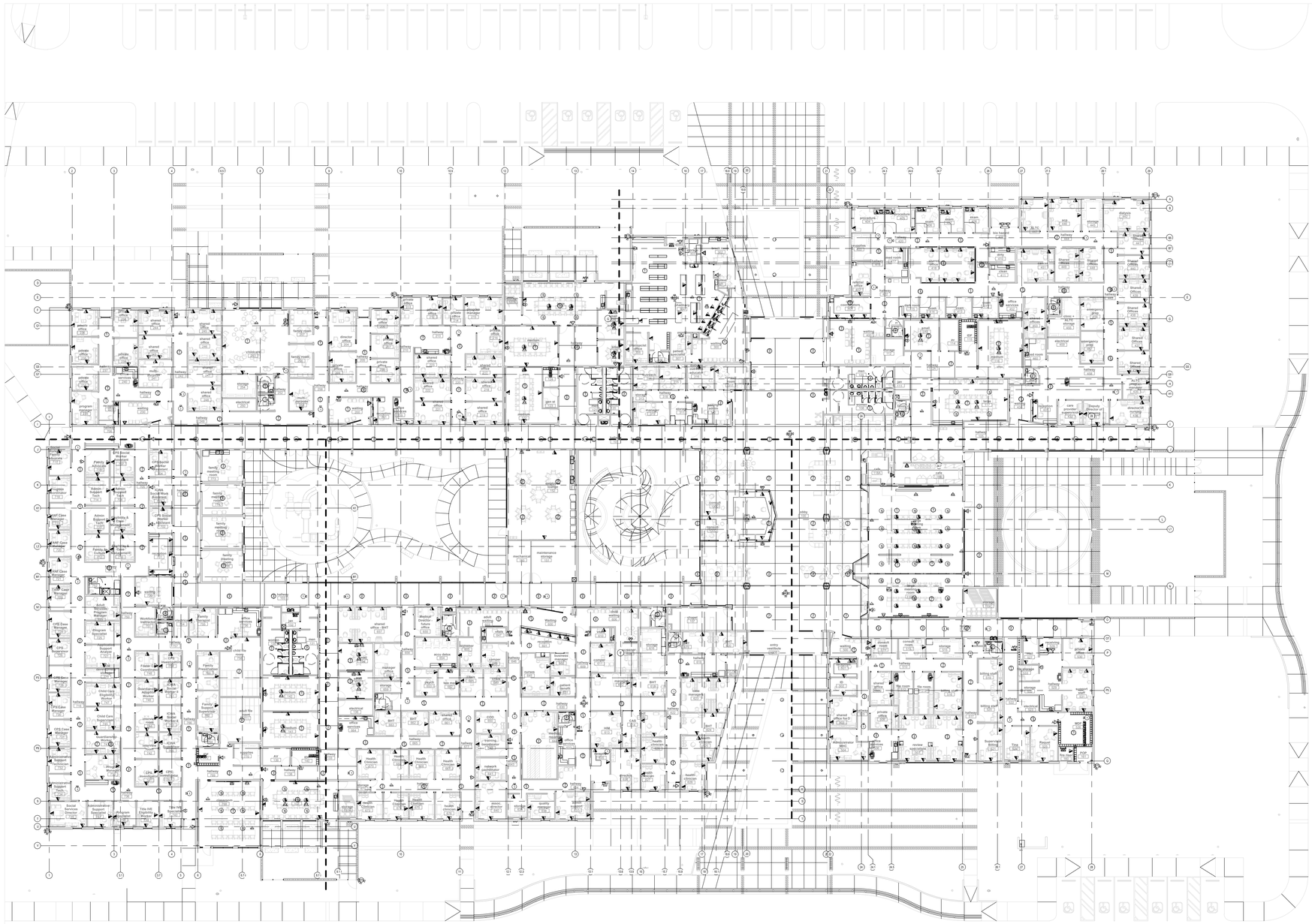
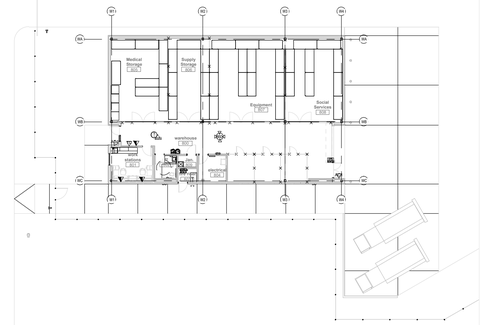


north keyplan

ITS site plan

t1.0





ITS floor plan - overall low voltage plan

1 / t2.0 NTS

north

general notes

Symbols - Legend

#X#	EZPATH SLEEVE THRU WALL - SIZE
J-HOOK	ITS DISTRIBUTION PATH
	INFORMATION OUTLET - WALL - DUPLEX DATA (2) CAT 6 UTP
	INFORMATION OUTLET - MODULAR FURNITURE - DUPLEX DATA (2) CAT6 UTP
	INFORMATION OUTLET - FLOOR BOX (2) CAT6 UTP & AV SUPPORT SYSTEM
WP	INFORMATION OUTLET - WALL PHONE - (1) CAT6 UTP
WIFI	WiFi OUTLET - WiFi APPLICATION. 12" ABOVE ACCESSIBLE FINISHED CEILING (1) CAT 6 UNO
TC	INFORMATION OUTLET - TIME CLOCK (1) CAT6 UTP
S / #	SPEAKER PA - # = ZONE / I = INFORMACAST IP SPEAKER
UNO	UNLESS NOTED OTHERWISE
# / ##	SHEET REFERENCE DRAWING NUMBER
ABC-123	PATCH PANEL ID/ PORT NUMBER IDF IDENTIFIER

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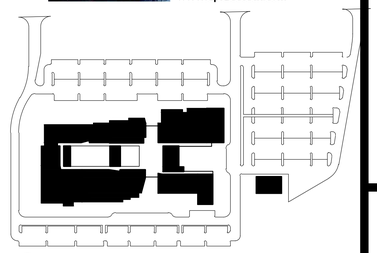

north keyplan n.t.s.

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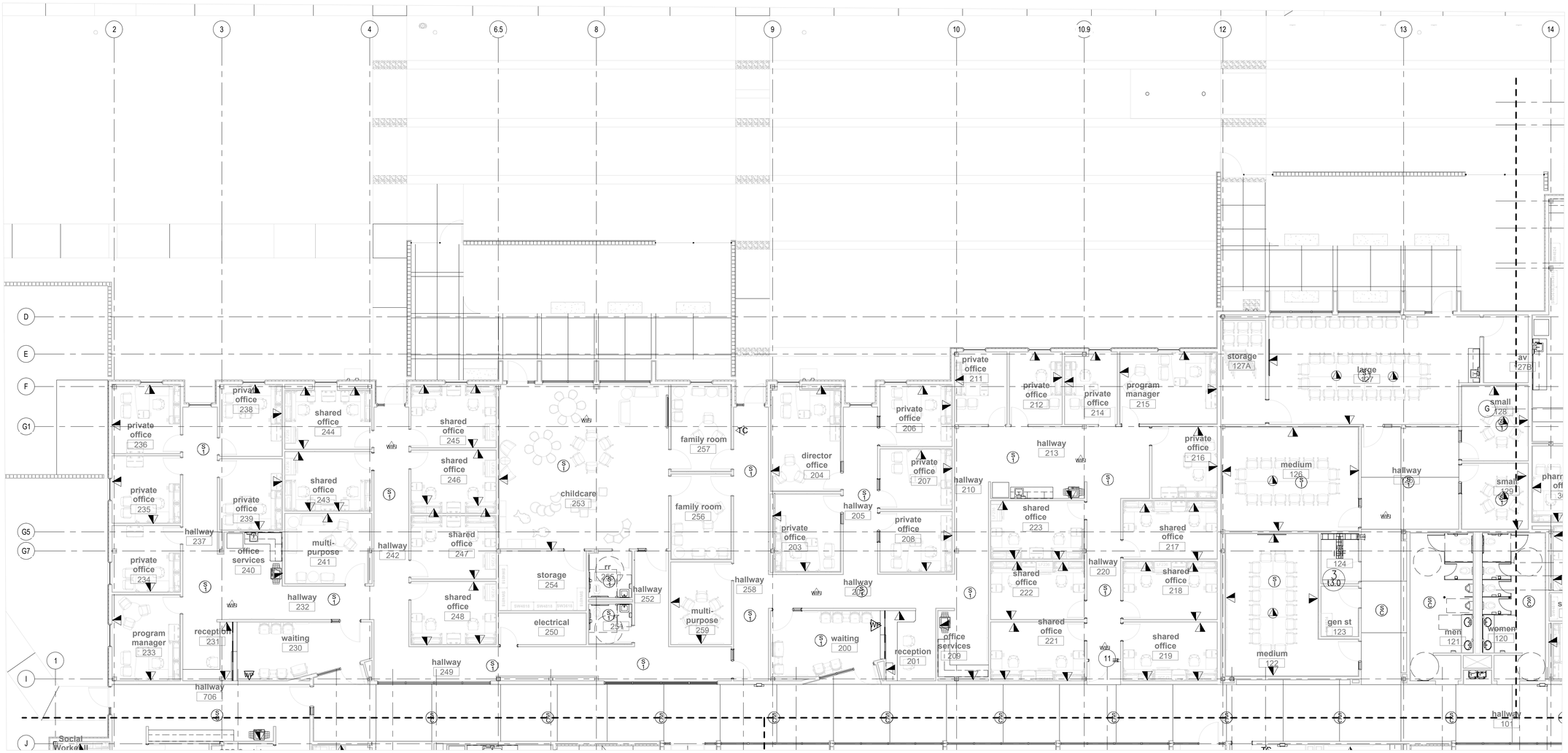
PASCUA YAQUI TRIBE

ITS floor plan - overall ITS

t2.0



1 / t2.1 **ITS floor plan - Sewa U'usuim**

1/8" = 1'-0"

north

general notes

1. COORDINATE WITH OTHER DISCIPLINES TO ENSURE ALL ITS SUPPORT SYSTEMS ARE PLACED.
2. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH PLANS AND SPECIFICATIONS BY A PYT-IT PRE-APPROVED CONTRACTOR.
3. COORDINATE WITH GENERAL CONTRACTOR SCHEDULE
4. PROVIDE AND INSTALL (1) CAT6 JUMPER CABLE FROM DATA PORT THROUGH FURNITURE TO DESKTOP NETWORK DEVICE.

keynotes

Symbols - Legend

#X#	EZPATH SLEEVE THRU WALL - SIZE
J-HOOK	ITS DISTRIBUTION PATH
	INFORMATION OUTLET - WALL - DUPLEX DATA (2) CAT 6 UTP
	INFORMATION OUTLET - MODULAR FURNITURE - DUPLEX DATA (2) CAT6 UTP
	INFORMATION OUTLET - FLOOR BOX (2) CAT6 UTP & AV SUPPORT SYSTEM
WP	INFORMATION OUTLET - WALL PHONE - (1) CAT6 UTP
WiFi	WiFi OUTLET - WiFi APPLICATION. 12" ABOVE ACCESSIBLE FINISHED CEILING (1) CAT 6 UNO
TC	INFORMATION OUTLET - TIME CLOCK (1) CAT6 UTP
S #	SPEAKER PA - # = ZONE / I = INFORMACAST IP SPEAKER
UNO	UNLESS NOTED OTHERWISE
## / XX	SHEET REFERENCE / DRAWING NUMBER
ABC-123	PATCH PANEL ID/ PORT NUMBER
	IDF IDENTIFIER

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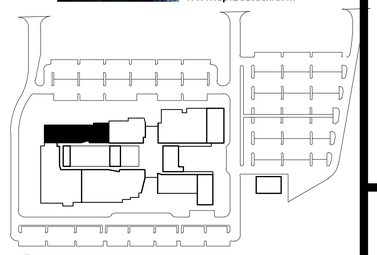

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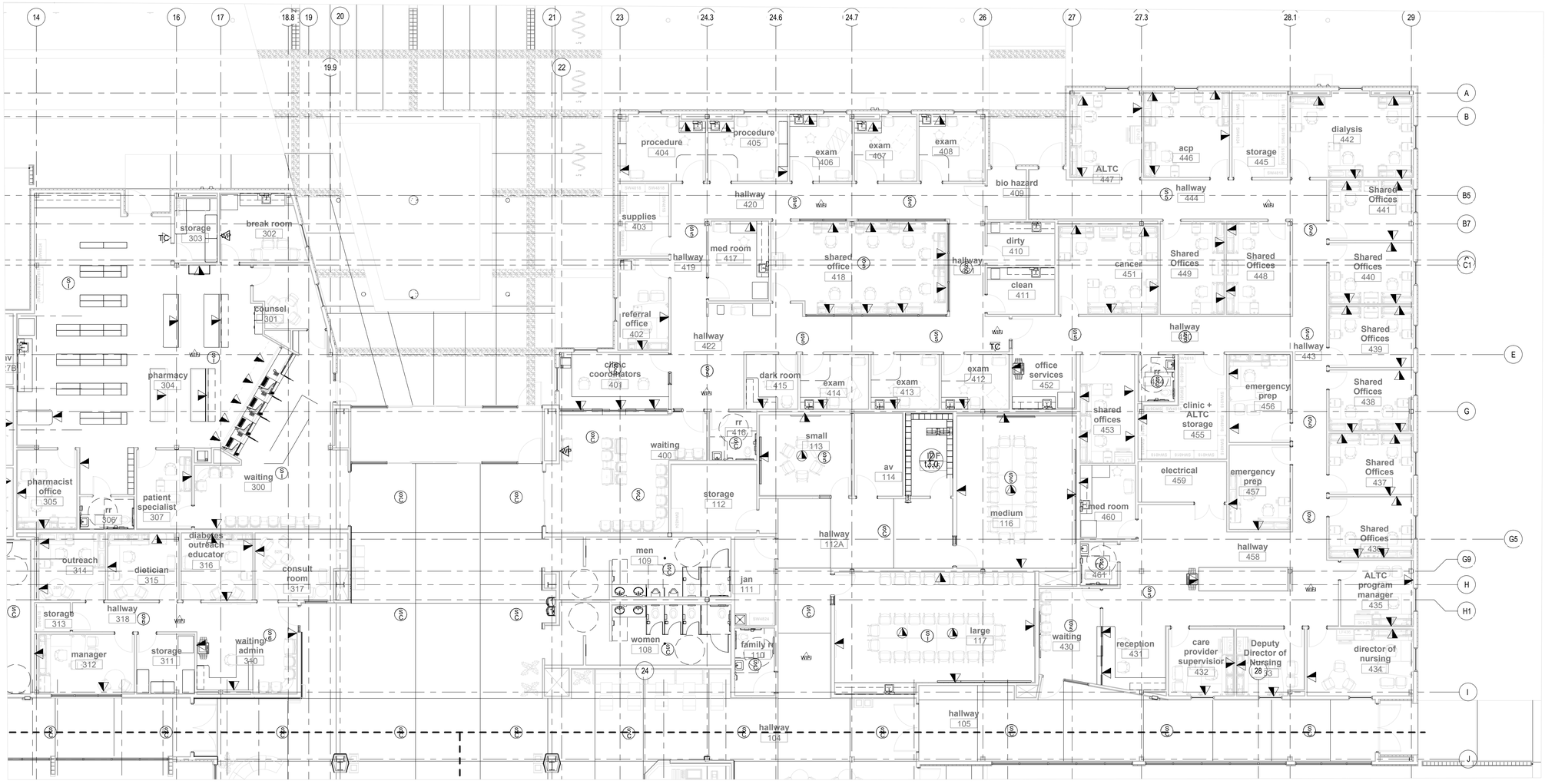
ITS floor plan - Sewa U'Usim

t2.1



1 / t2.2 **ITS floor plan - Nursing + Clinics**
1/8" = 1'-0"

north

general notes

1. COORDINATE WITH OTHER DISCIPLINES TO ENSURE ALL ITS SUPPORT SYSTEMS ARE PLACED.
2. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH PLANS AND SPECIFICATIONS BY A PYT-IT PRE-APPROVED CONTRACTOR.
3. COORDINATE WITH GENERAL CONTRACTOR SCHEDULE
4. PROVIDE AND INSTALL (1) CAT6 JUMPER CABLE FROM DATA PORT THROUGH FURNITURE TO DESKTOP NETWORK DEVICE.

keynotes

Symbols - Legend

#X#	EZPATH SLEEVE THRU WALL - SIZE
J-HOOK	ITS DISTRIBUTION PATH
	INFORMATION OUTLET - WALL - DUPLEX DATA (2) CAT 6 UTP
	INFORMATION OUTLET - MODULAR FURNITURE - DUPLEX DATA (2) CAT6 UTP
	INFORMATION OUTLET - FLOOR BOX (2) CAT6 UTP & AV SUPPORT SYSTEM
WP	INFORMATION OUTLET - WALL PHONE - (1) CAT6 UTP
WIFI	WiFi OUTLET - WiFi APPLICATION. 12" ABOVE ACCESSIBLE FINISHED CEILING (1) CAT 6 UNO
TC	INFORMATION OUTLET - TIME CLOCK (1) CAT6 UTP
S #	SPEAKER PA - # = ZONE / I = INFORMACAST IP SPEAKER
UNO	UNLESS NOTED OTHERWISE
	SHEET REFERENCE
	DRAWING NUMBER
ABC-123	PATCH PANEL ID/ PORT NUMBER
	IDF IDENTIFIER

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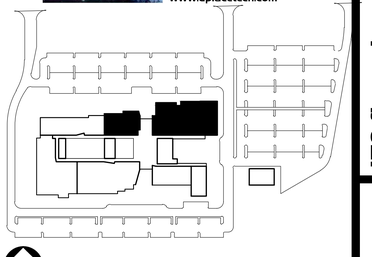

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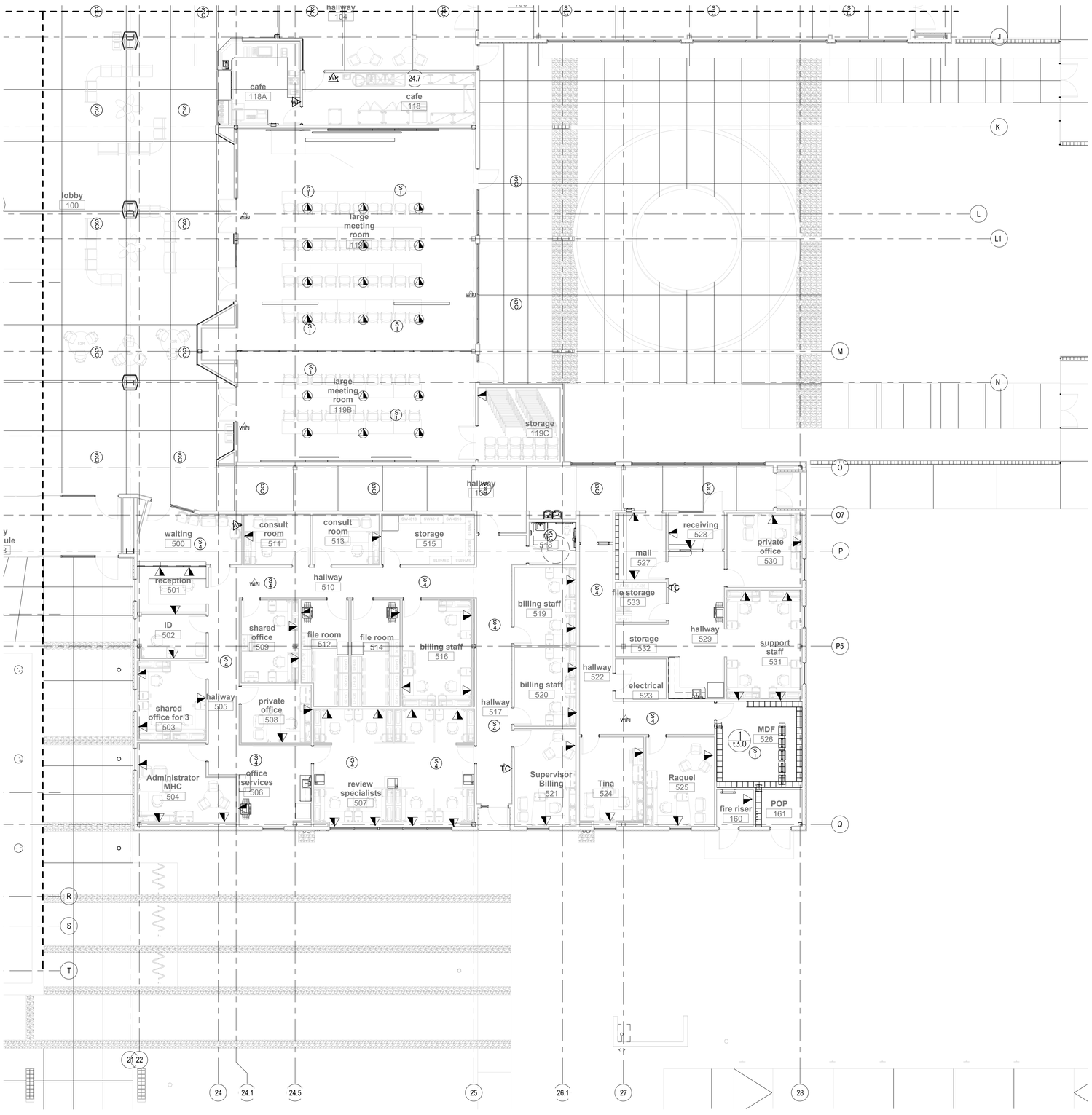
ITS floor plan - Nursing + Clinics

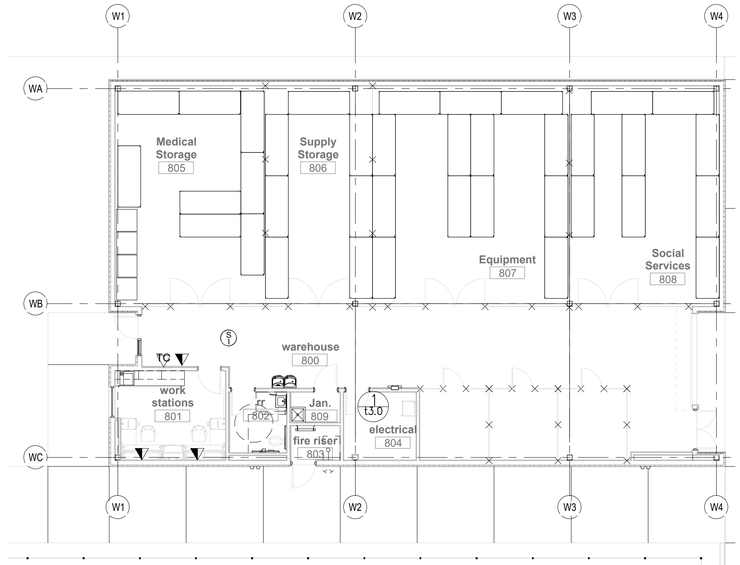
t2.2



ITS floor plan - Health Budget + Managed Care / Billing

1 / t2.3 — 1/8" = 1'-0"

north



ITS floor plan - Warehouse

2 / t2.3 — 1/8" = 1'-0"

north

general notes

1. COORDINATE WITH OTHER DISCIPLINES TO ENSURE ALL ITS SUPPORT SYSTEMS ARE PLACED.
2. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH PLANS AND SPECIFICATIONS BY A PYT-IT PRE-APPROVED CONTRACTOR.
3. COORDINATE WITH GENERAL CONTRACTOR SCHEDULE
4. PROVIDE AND INSTALL (1) CAT6 JUMPER CABLE FROM DATA PORT THROUGH FURNITURE TO DESKTOP NETWORK DEVICE.

keynotes

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# / W	SHEET REFERENCE / DRAWING NUMBER
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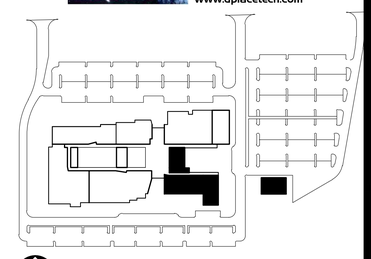

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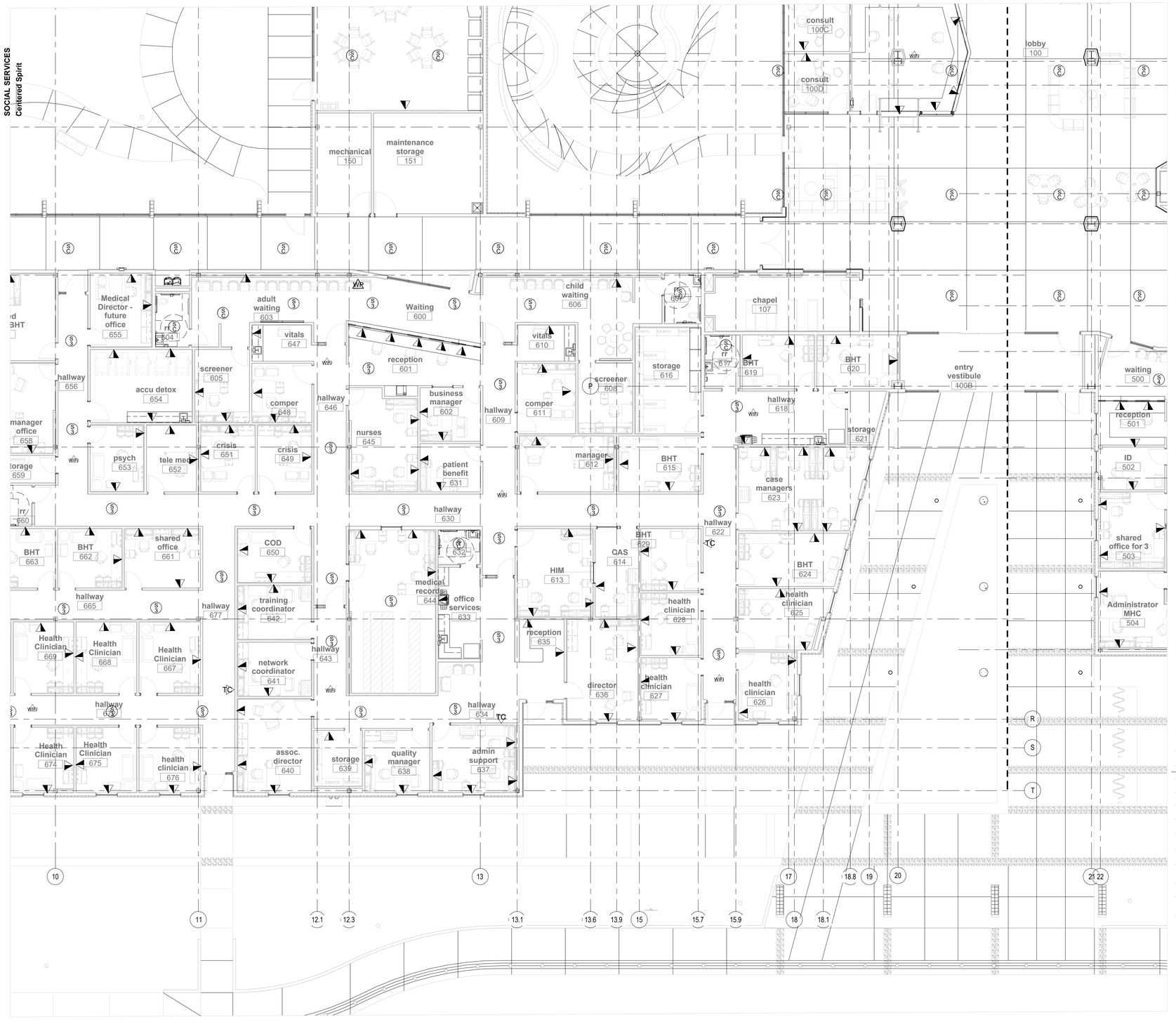
its floor plan - Health Budget + Managed Care / Billing Warehouse

t2.3



1 T2.4 **ITS floor plan - Centered Spirit**
1/8" = 1'-0"

north

general notes

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keynotes

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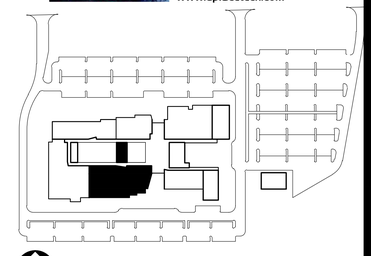

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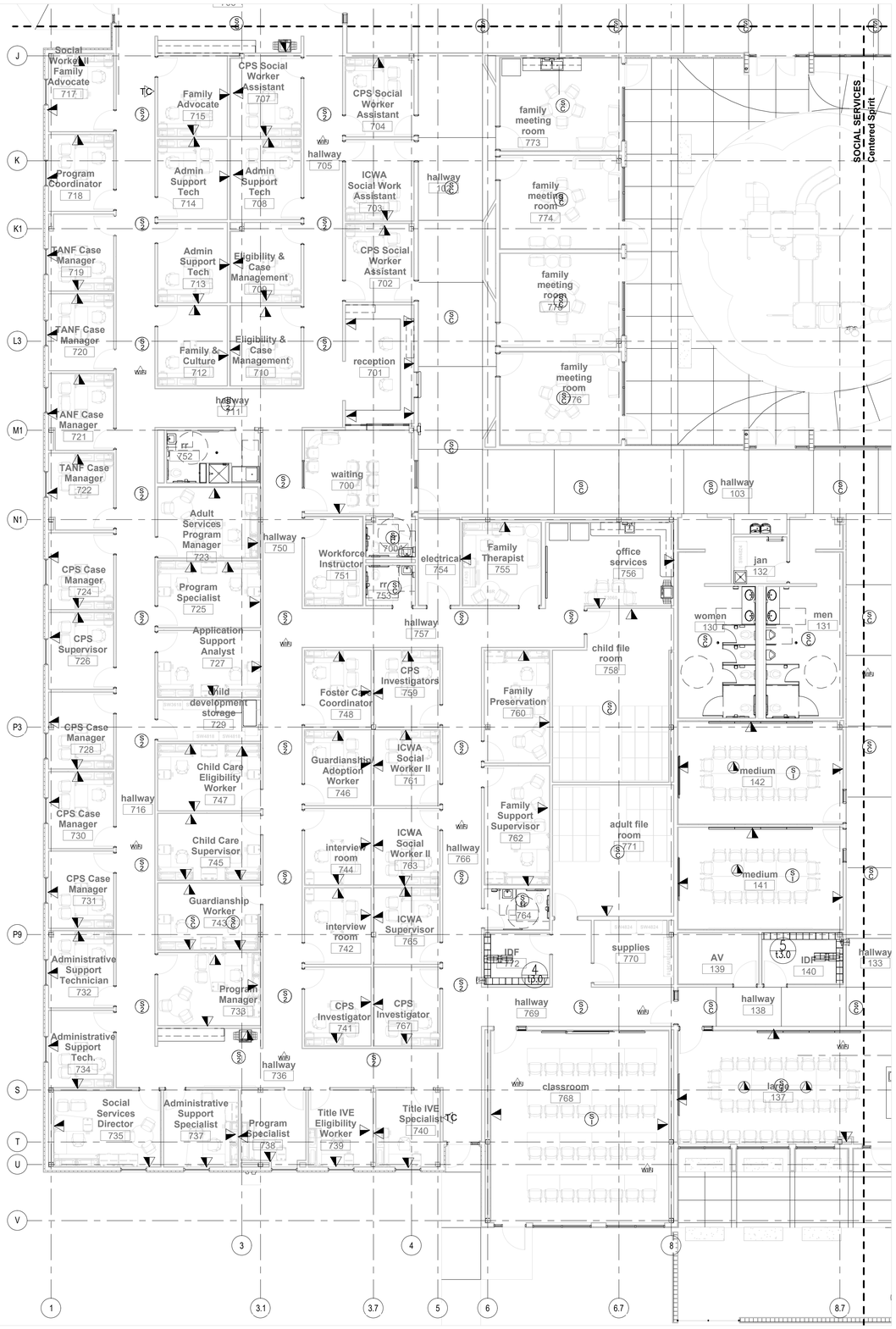
its floor plan - Centered Spirit

t2.4

SEWA U'USIM
SOCIAL SERVICES



ITS floor plan - social services

1/8" = 1'-0"

north

general notes

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keynotes

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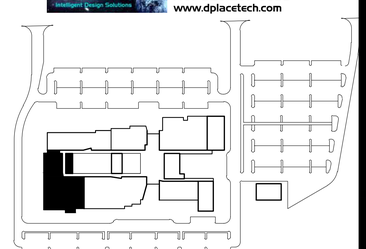

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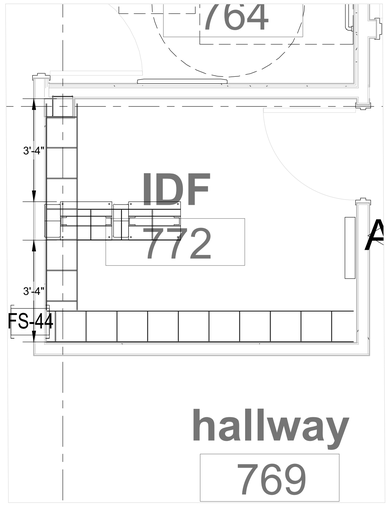
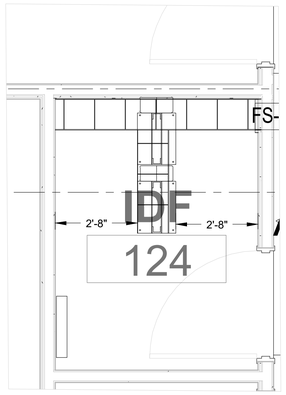
ITS floor plan - social services

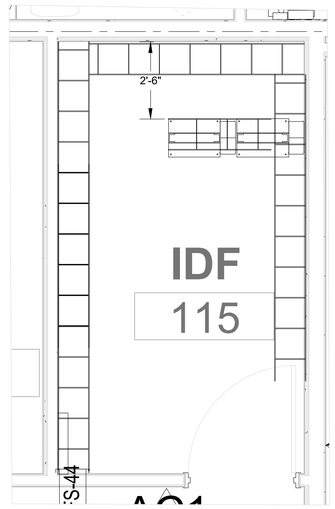
t2.5



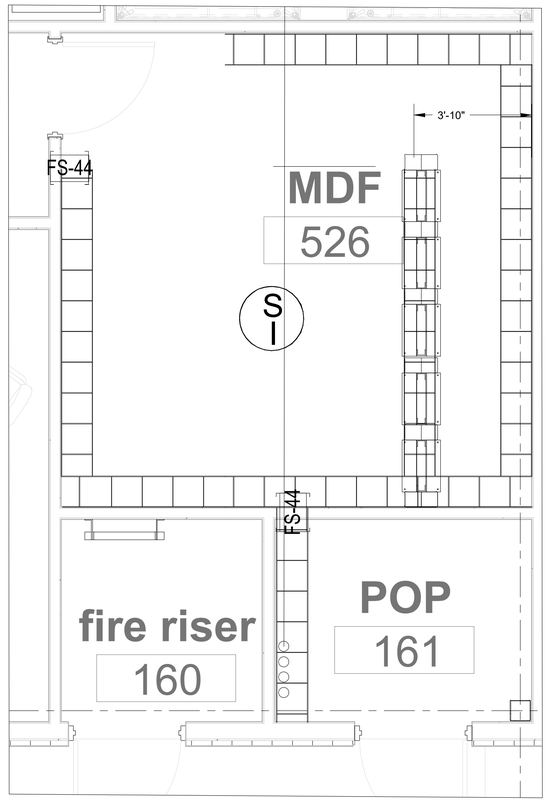
4 t2.5 **ITS floor plan - IDF 772**
1/2" = 1'-0"



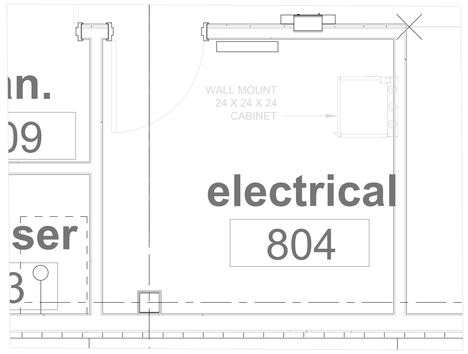
3 t2.1 **ITS floor plan - IDF 124**
1/2" = 1'-0"



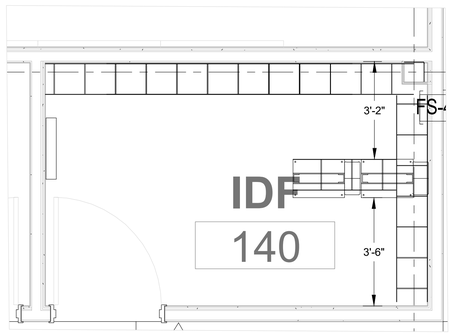
2 t2.2 **ITS floor plan - IDF 115**
1/2" = 1'-0"



1 t2.3 **ITS floor plan - MDF 526**
1/2" = 1'-0"



5 t2.5 **ITS floor plan - IDF warehouse**
1/2" = 1'-0"



5 t2.5 **ITS floor plan - IDF 148**
1/2" = 1'-0"

general notes

keynotes

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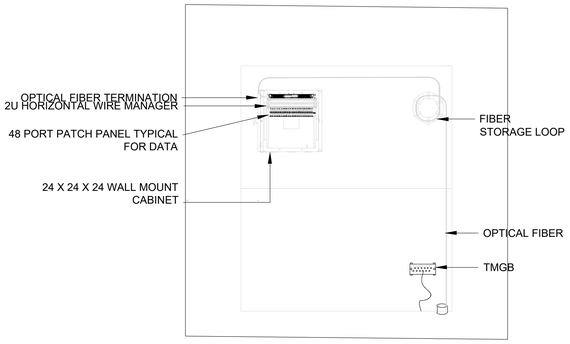
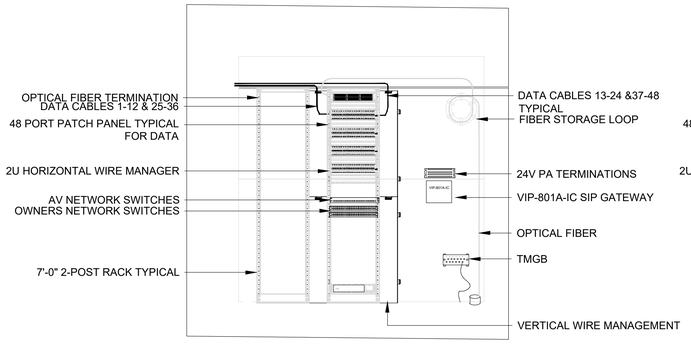
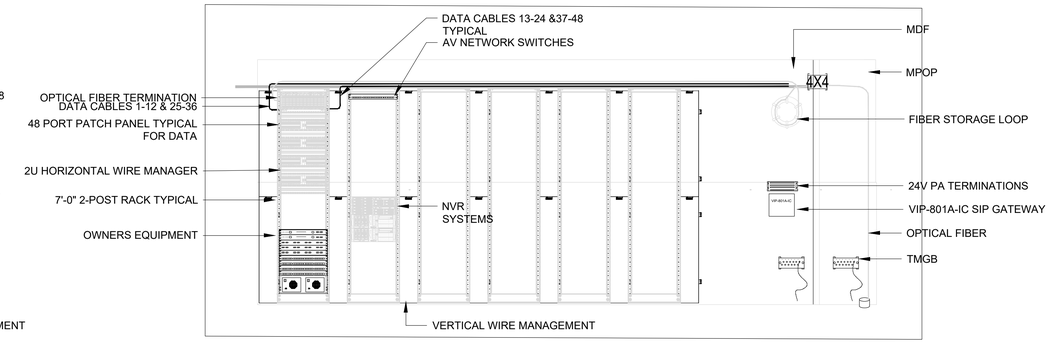


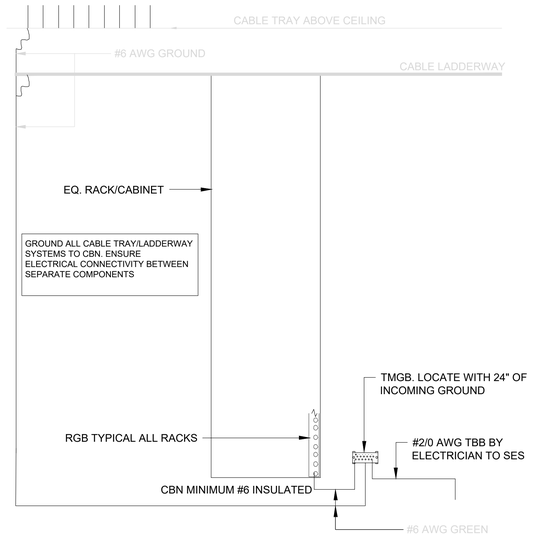
1 / t2.3 **WAREHOUSE ELEVATION - IDF**
1/2" = 1'-0"



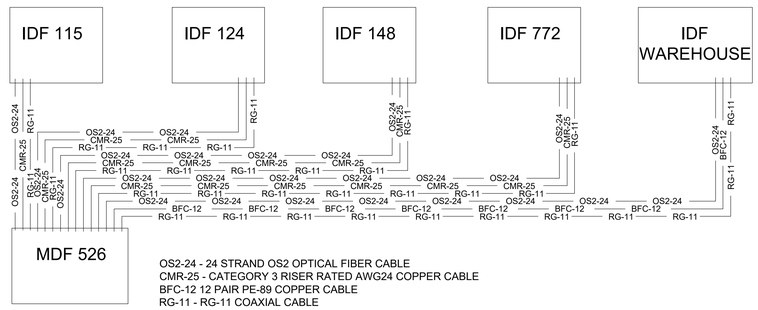
1 / t2.3 **TYPICAL ELEVATION - IDF**
1/2" = 1'-0"



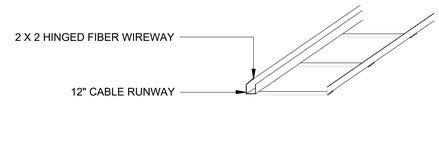
1 / t2.3 **TYPICAL ELEVATION - MDF**
1/2" = 1'-0"



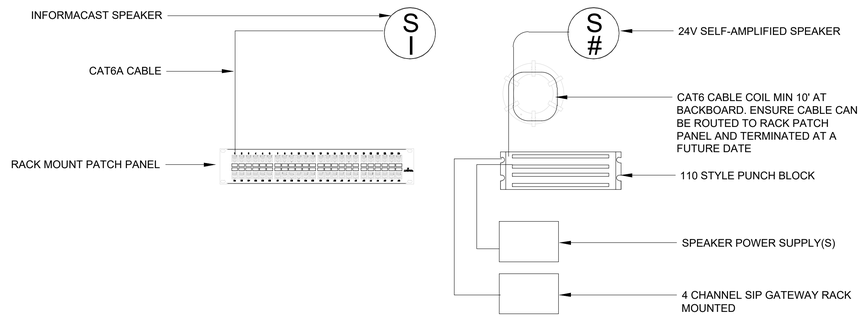
1 / t2.3 **COMMUNICATIONS BONDING NETWORK**
nts



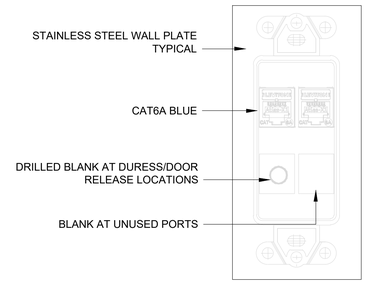
1 / t2.3 **COMMUNICATIONS RISER DIAGRAM**
nts



1 / t2.3 **TYPICAL ELEVATION - CABLE RUNWAY**
1" = 1'-0"



1 / t2.3 **PA RISER TYPICAL**
nts



1 / t2.3 **COMMUNICATIONS OUTLET TYPICAL**
nts

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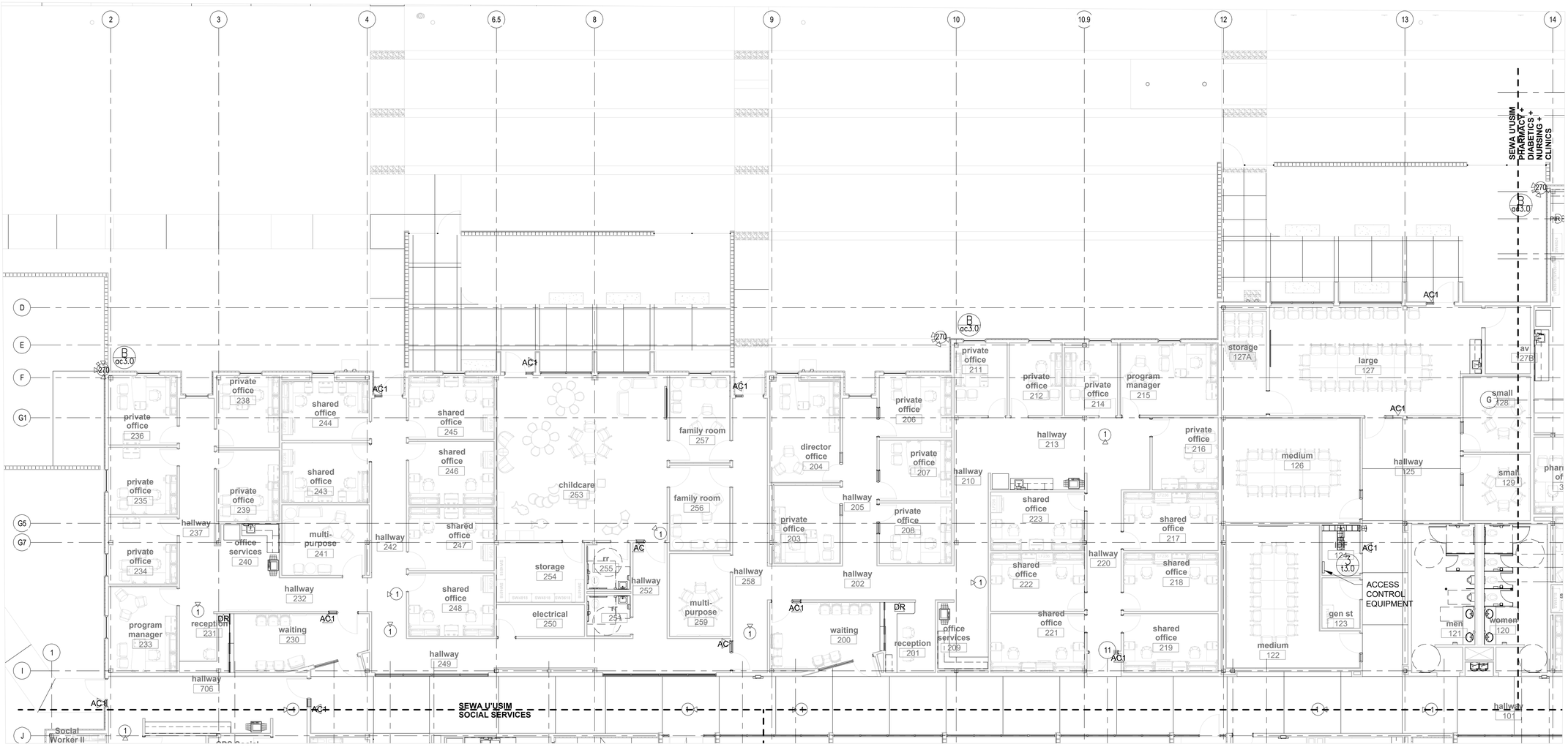

1 ac2.1 **ITS floor plan - Sewa U'usuim**
1/8" = 1'-0"

north

general notes

1. COORDINATE WITH ARCHITECT FOR MOST APPROPRIATE LENSES TO UTILIZE
2. ADJUST CAMERA VIEWS TO MEET OWNERS/ARCHITECT REQUIREMENTS
3. COORDINATE IP MAPPING WITH OWNERS REPRESENTATIVE. PRE PROGRAM ALL CAMERAS
4. SUPPLY ALL MOUNTING HARDWARE FOR CCTV INCLUDING CEILING TRIM RINGE, ARMATURES AND SUPPORTS REQUIRED FOR A COMPLETE FINISHED INSTALLATION..
5. SECURE WEATHERTIGHT ALL EXTERIOR COMPONENTS.
6. PROVIDE DRIP LOOP FOR ALL EXTERIOR CONDUITS.

keynotes

Symbols - Legend

#	IP CEILING DOME CAMERA VIEW (1) CAT 6
270	IP CAMERA 270 DEGREE VIEW (1) CAT 6
360	IP CAMERA 360 DEGREE VIEW (1) CAT 6
AC1	ACCESS CONTROL POINT - (1) BELDEN 558AFS - LEVEL 1 PROX
AC2	ACCESS CONTROL POINT - (1) BELDEN 558AFS - LEVEL 2 PROX
DR	ACCESS CONTROL POINT - DOOR RELEASE BUTTON (1) AWG 22/2
IDS NC	INTRUSION DETECTION - DOOR SWITCH - (1) AWG 22/2
KPD	INTRUSION DETECTION - KEYPAD - (1) AWG 22/6
PIR	INTRUSION DETECTION - DUAL TECH MOTION DETECTOR - (1) AWG 22/4
IDS BMS	INTRUSION DETECTION - BALANCED MAGNETIC SWITCH - (1) AWG 22/2
##	INTRUSION DETECTION - DURESS SWITCH- ##=WALL OR UNDER DESK - (1) AWG 22/2
UNO	UNLESS NOTED OTHERWISE
## / ##	SHEET REFERENCE / DRAWING NUMBER
ABC-123	PATCH PANEL ID/ PORT NUMBER / IDF IDENTIFIER

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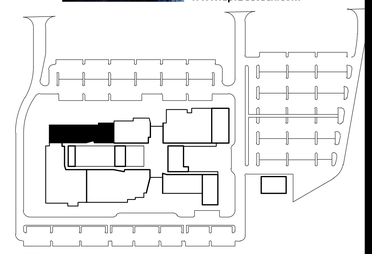

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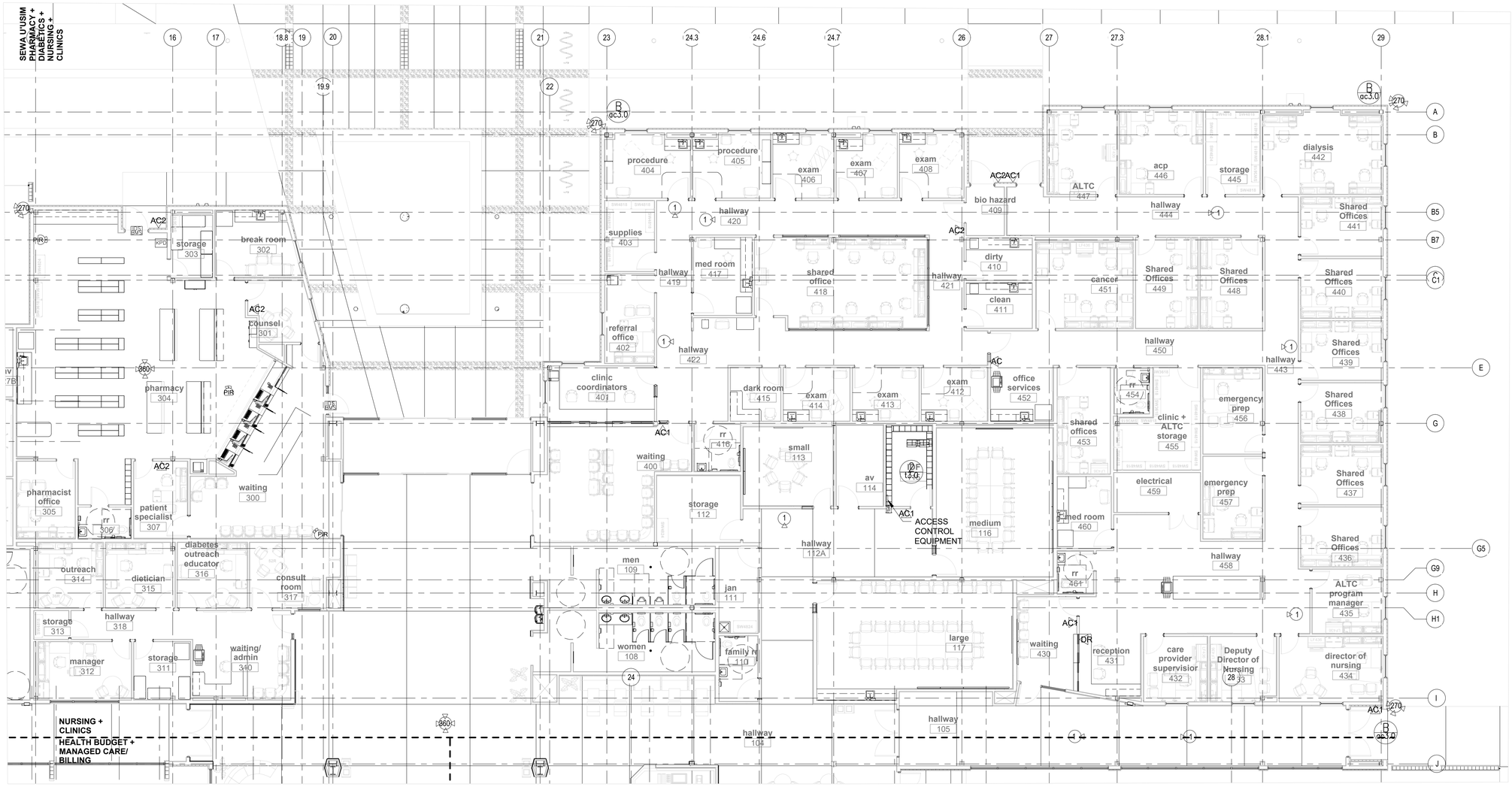
cctv, access control & IDS floor plan - Sewa U'Usim

ac2.1



ITS floor plan - Nursing + Clinics

1/8" = 1'-0"

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keynotes

Symbols - Legend

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360	IP CAMERA 360 DEGREE VIEW (1) CAT 6
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AC2	ACCESS CONTROL POINT - (1) BELDEN 558AFS - LEVEL 2 PROX
DR	ACCESS CONTROL POINT - DOOR RELEASE BUTTON (1) AWG 22/2
NO NC	INTRUSION DETECTION - DOOR SWITCH - (1) AWG 22/2
KPD	INTRUSION DETECTION - KEYPAD - (1) AWG 22/6
PIR	INTRUSION DETECTION - DUAL TECH MOTION DETECTOR - (1) AWG 22/4
IDS BMS	INTRUSION DETECTION - BALANCED MAGNETIC SWITCH - (1) AWG 22/2
##	INTRUSION DETECTION - DURESS SWITCH- ##=WALL OR UNDER DESK - (1) AWG 22/2
UNO	UNLESS NOTED OTHERWISE
	SHEET REFERENCE / DRAWING NUMBER
ABC-123	PATCH PANEL ID/ PORT NUMBER
	IDF IDENTIFIER

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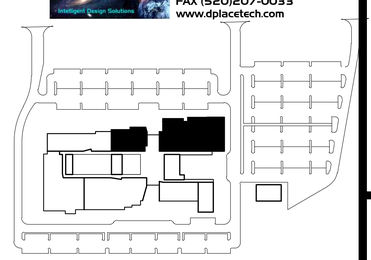

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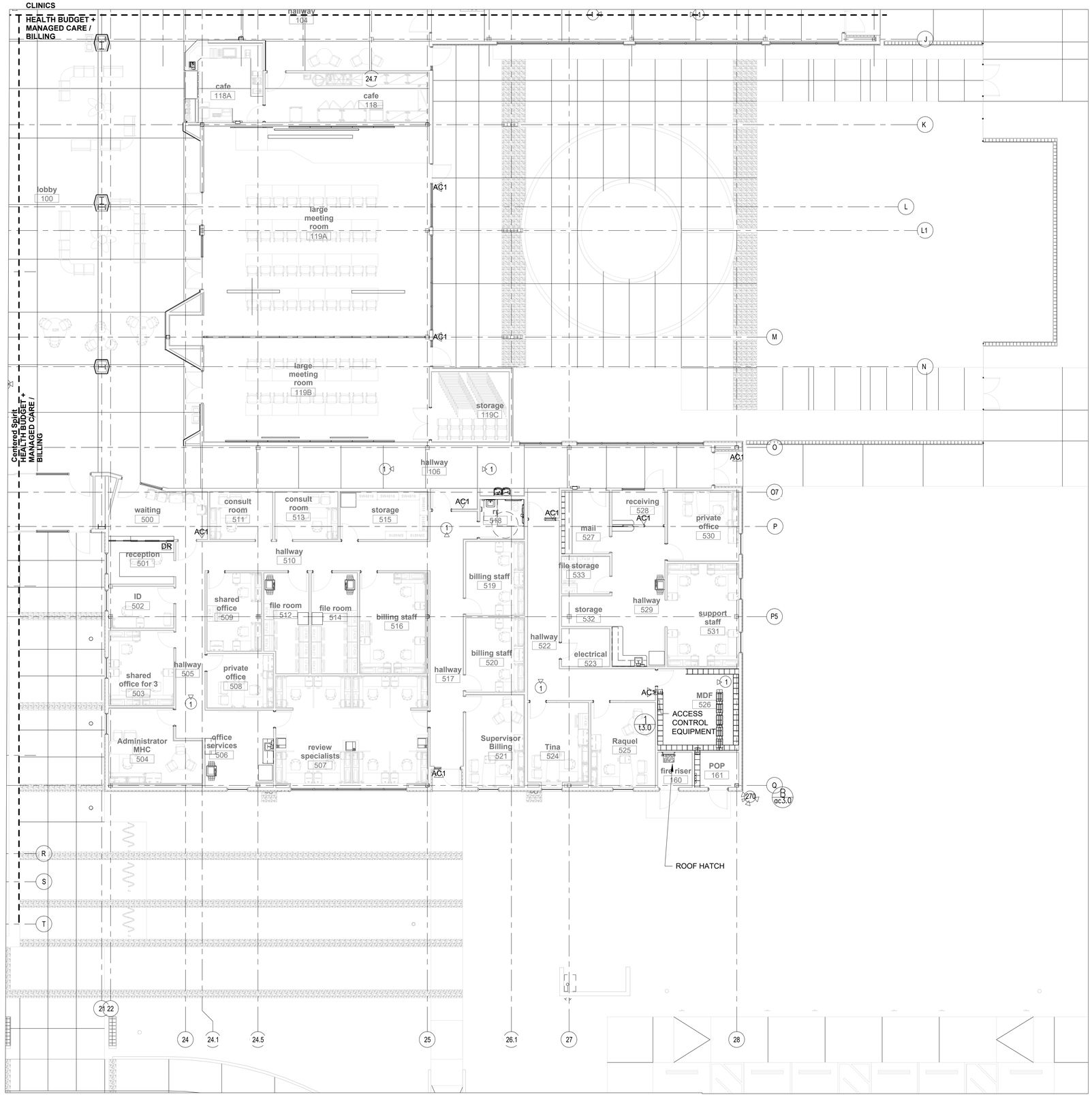
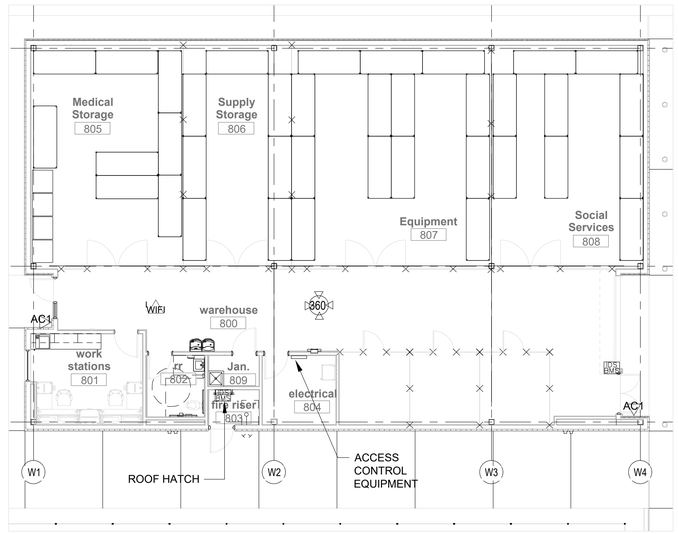
cctv, access control & IDS
floor plan - Nursing + Clinics

ac.2



ITS floor plan - Health Budget + Managed Care / Billing

1/8" = 1'-0"



ITS floor plan - Warehouse

1/8" = 1'-0"

north

general notes

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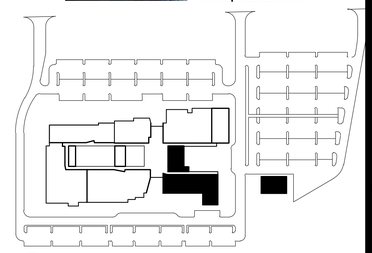

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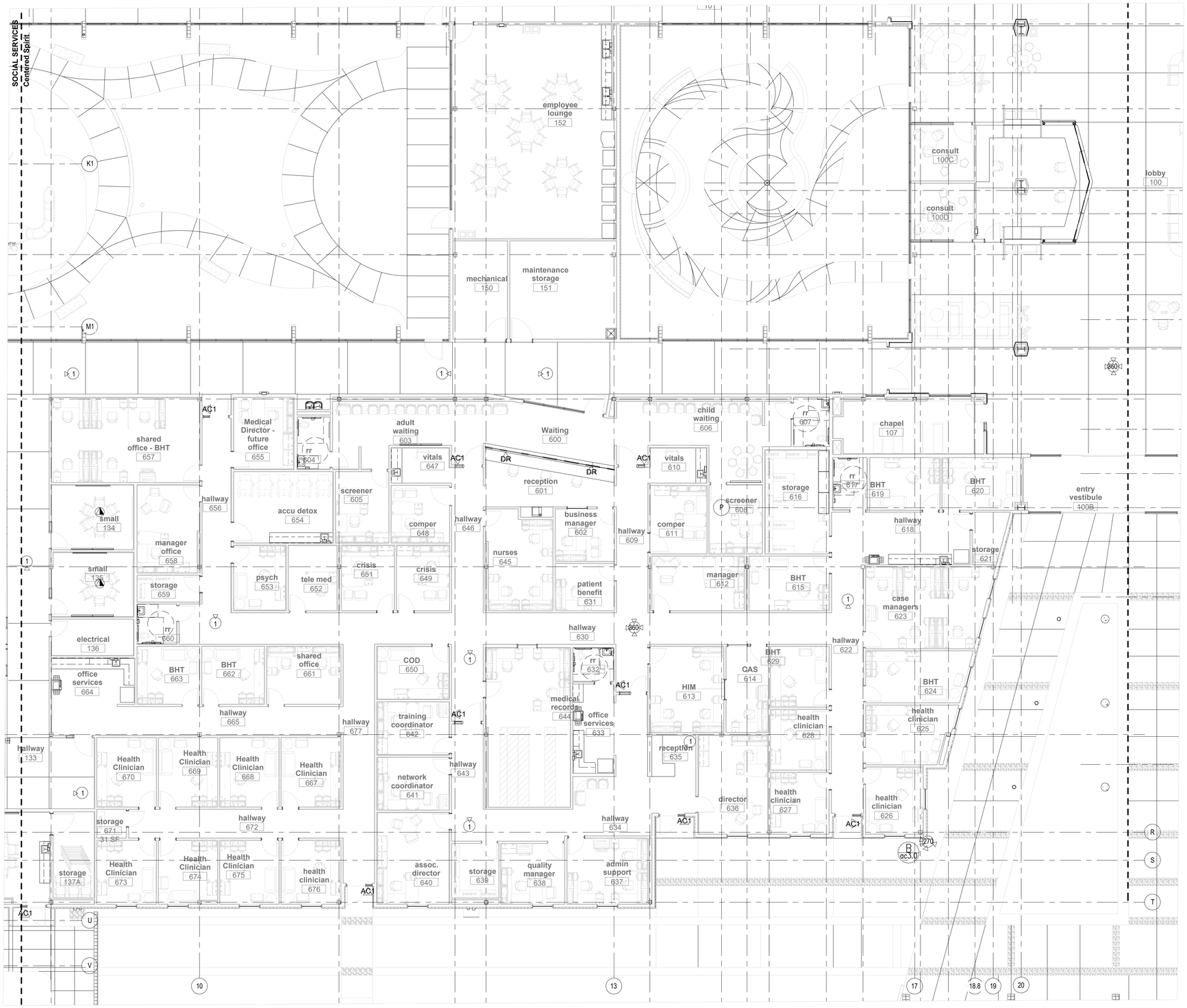
ac2.3



ITS floor plan - Centered Spirit

1 / ac2.4 — 1/8" = 1'-0"

north

general notes

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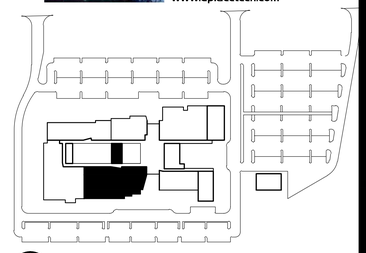

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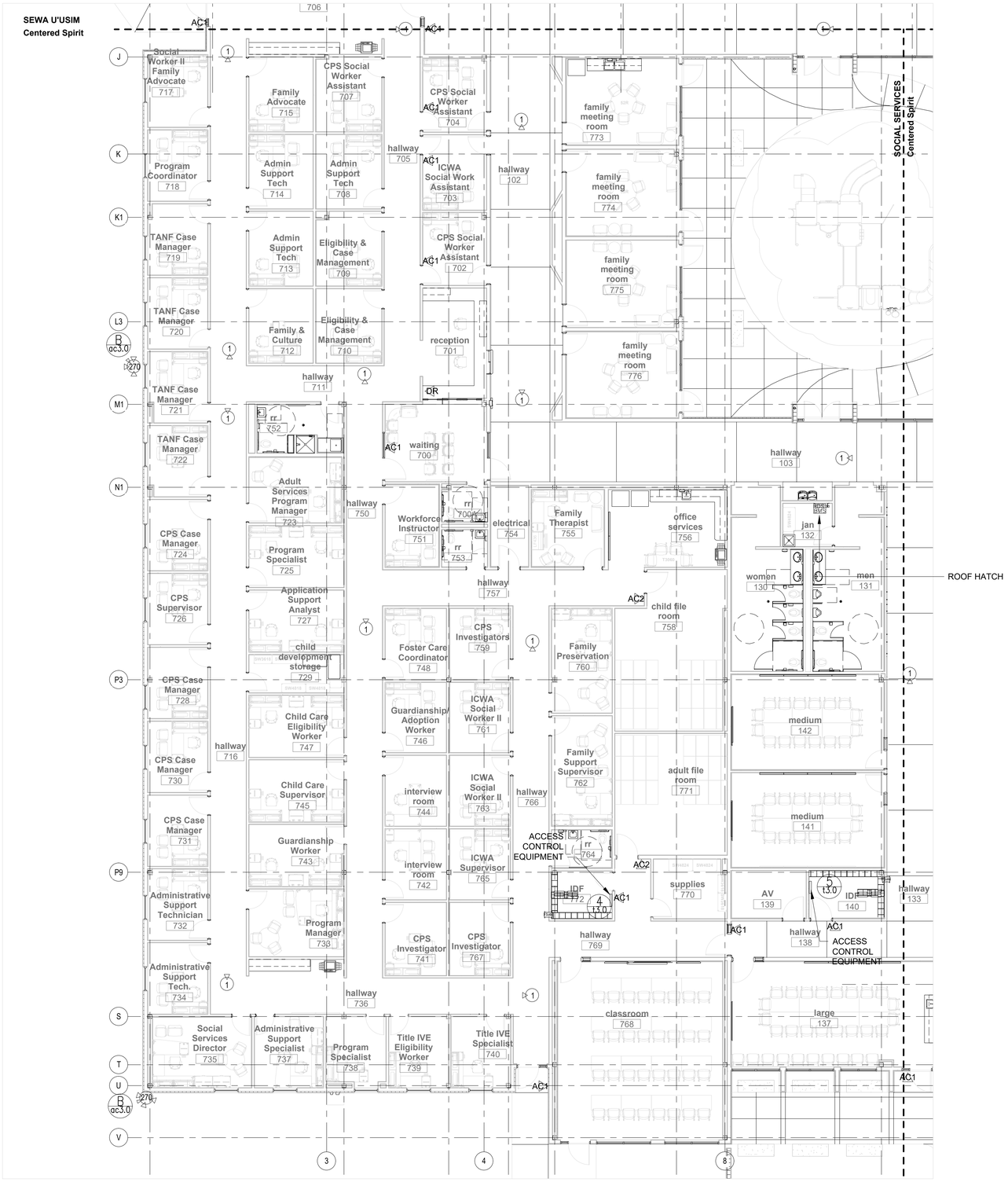

1 ac2.5 **ITS floor plan - social services**
1/8" = 1'-0"

north

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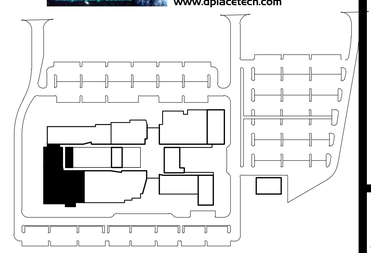

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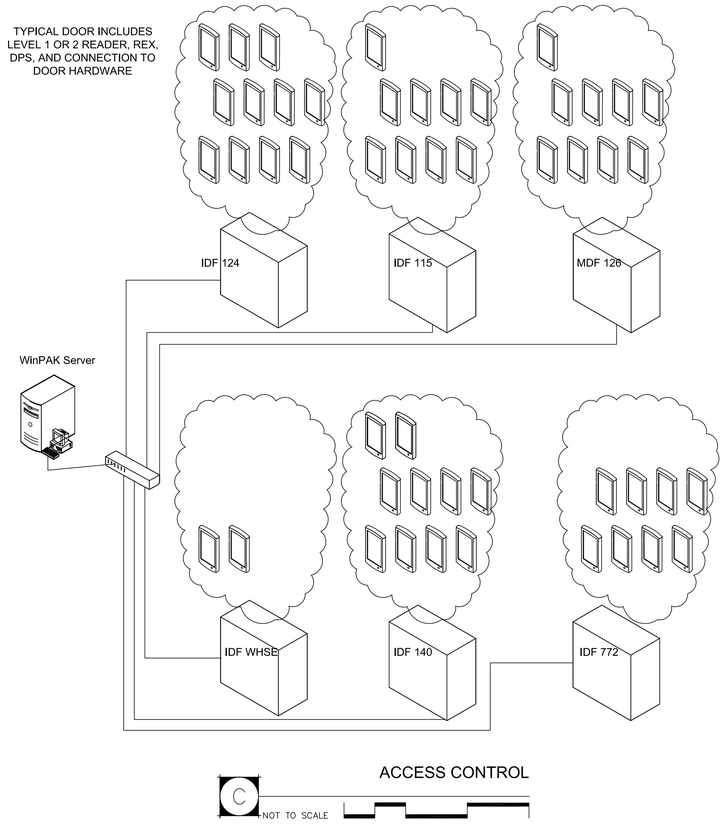
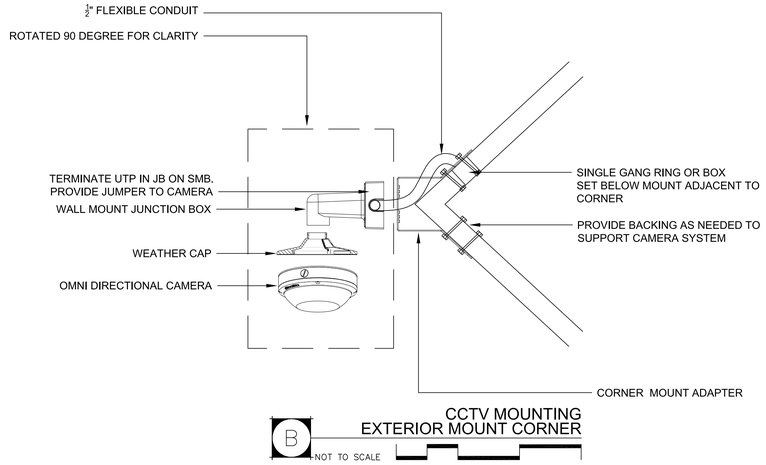
cctv, access control & IDS social services

ac2.5



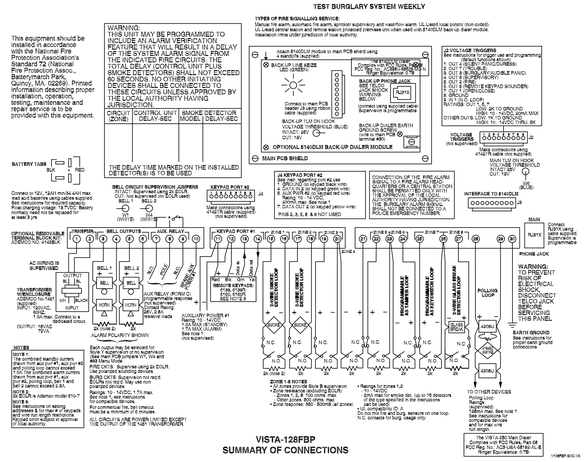
C NOT TO SCALE

ACCESS CONTROL



B NOT TO SCALE

CCTV MOUNTING
EXTERIOR MOUNT CORNER



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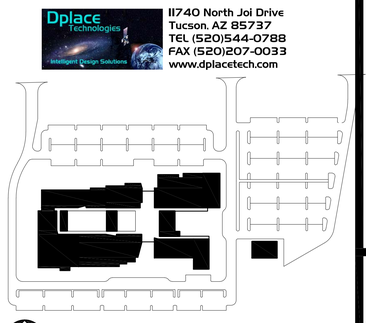
IDS PANEL TYPICAL

general notes

keynotes



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access control, CCTV, IDS Details

ac3.0

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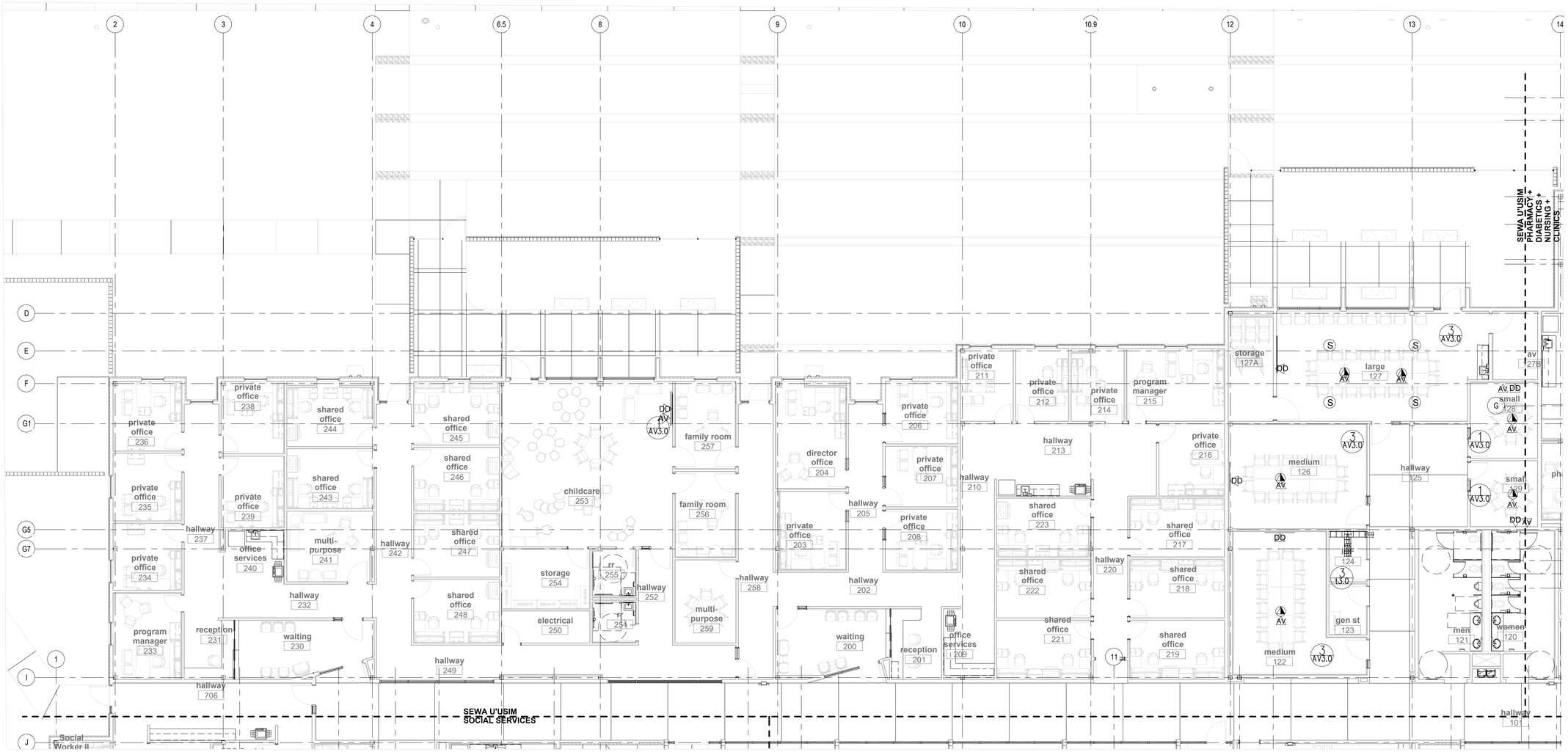

AV floor plan - Sewa U'usuim

1 AV2.1 1/8" = 1'-0"

north

general notes

keynotes

Symbols - Legend

AV	AV SYSTEM INPUT PLATE - (1) CAT6 - STP
AVC	AV SYSTEM ROOM CONTROL - (1) CAT6 - STP
DD	INFORMATION OUTLET - DIGITAL DISPLAY (1) CAT6 - STP & (1) RG-6
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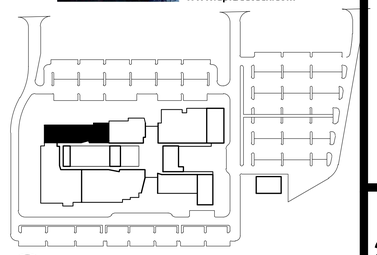

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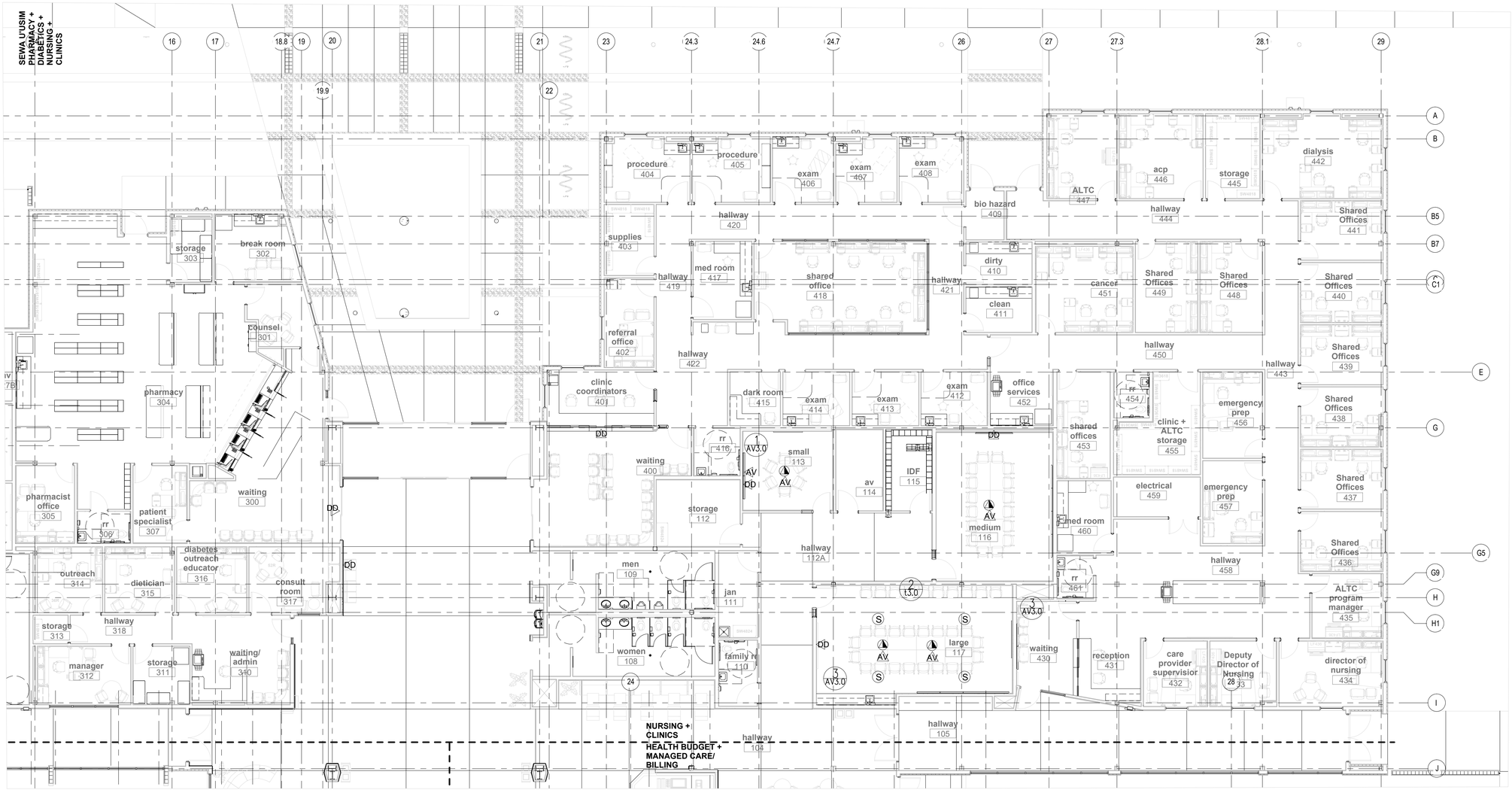
AV floor plan - Sewa U'Usim

av2.1



AV floor plan - Nursing + Clinics

1 AV2.2 — 1/8" = 1'-0"

north

general notes

keynotes

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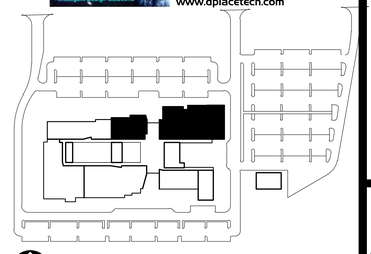

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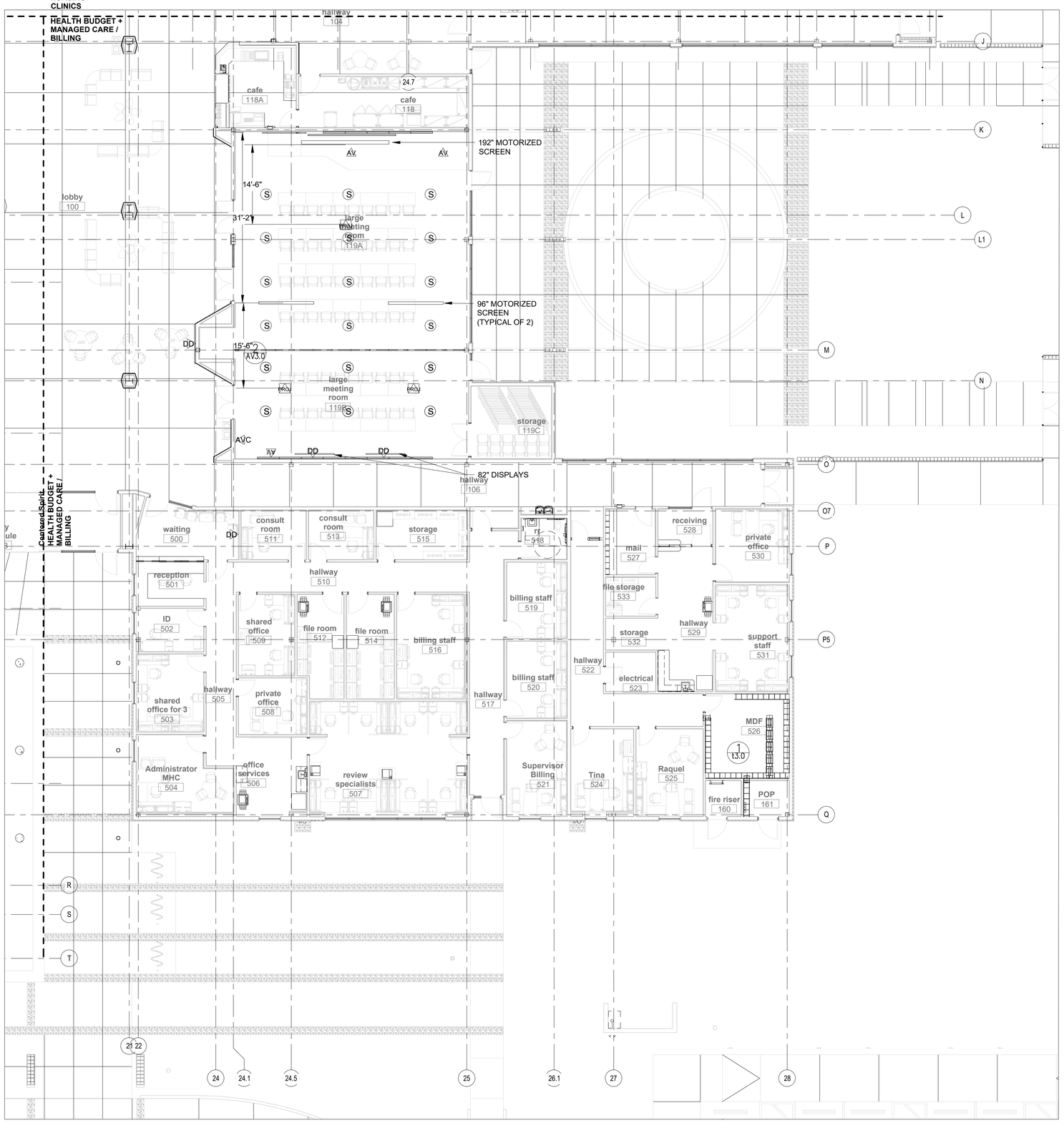
AV floor plan - Nursing + Clinics

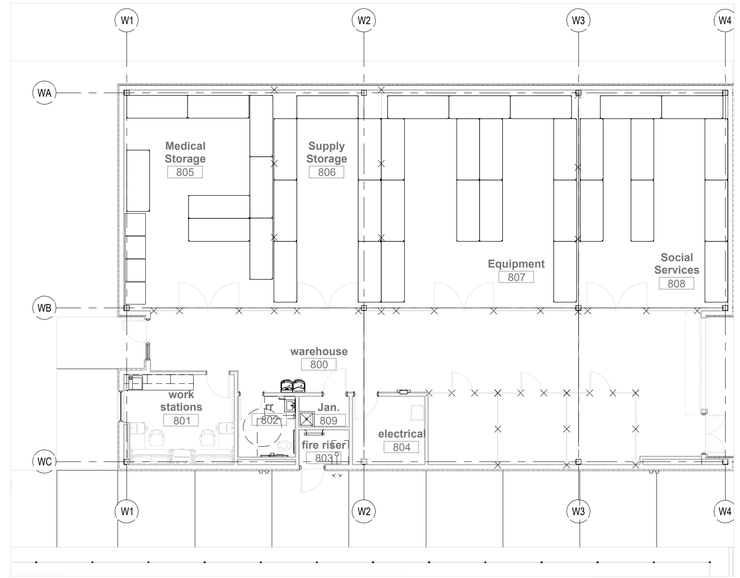
av2.2



AV floor plan - Health Budget + Managed Care / Billing

1 AV2.3 1/8" = 1'-0"

north



AV floor plan - Warehouse

2 AV2.3 1/8" = 1'-0"

north

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AV floor plan - Health Budget + Managed Care / Billing Warehouse

av2.3

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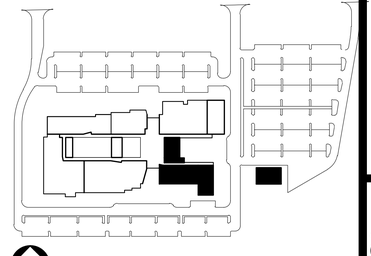

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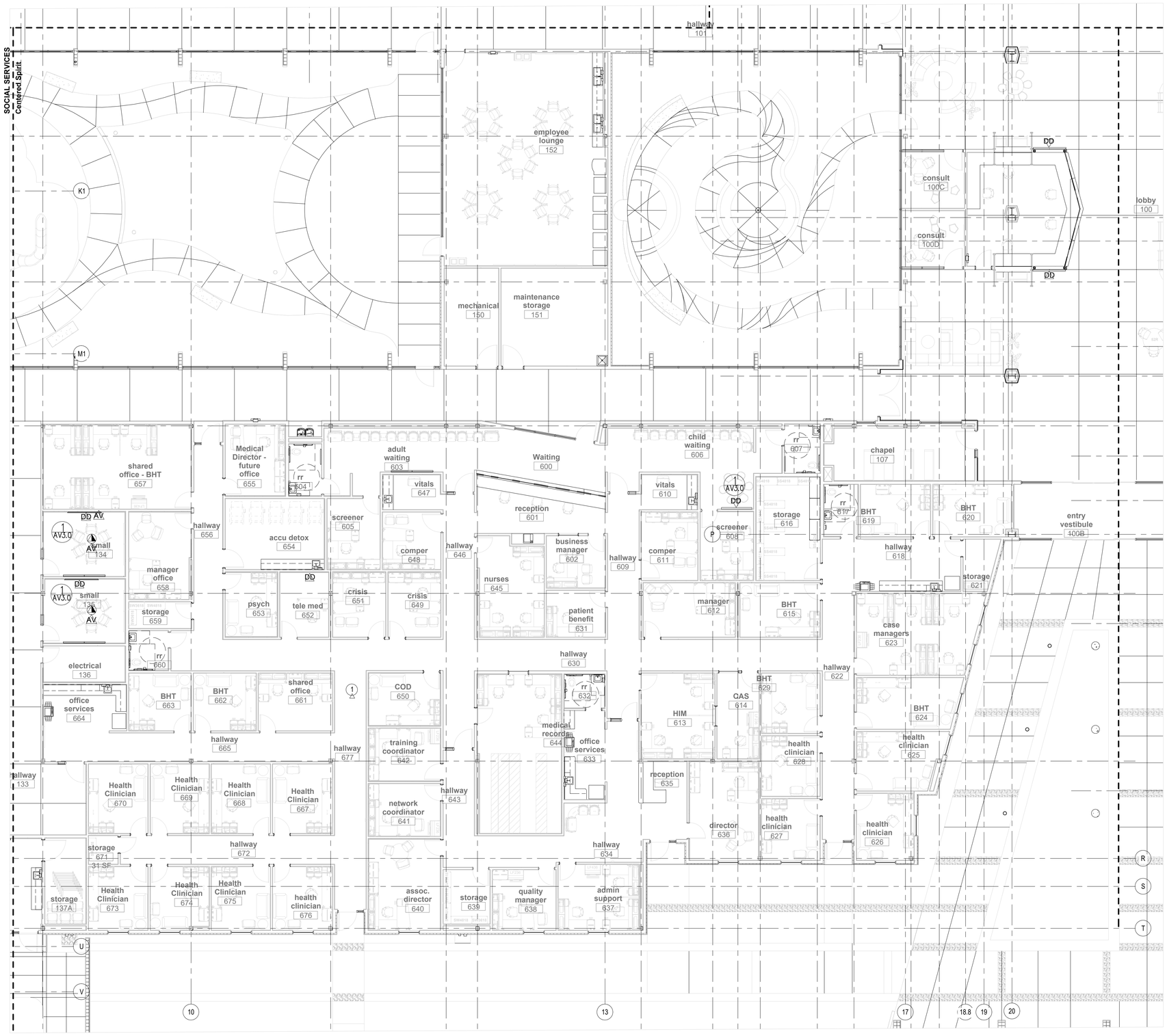

AV floor plan - Centered Spirit

1 AV2.4 — 1/8" = 1'-0"

north

general notes

keynotes

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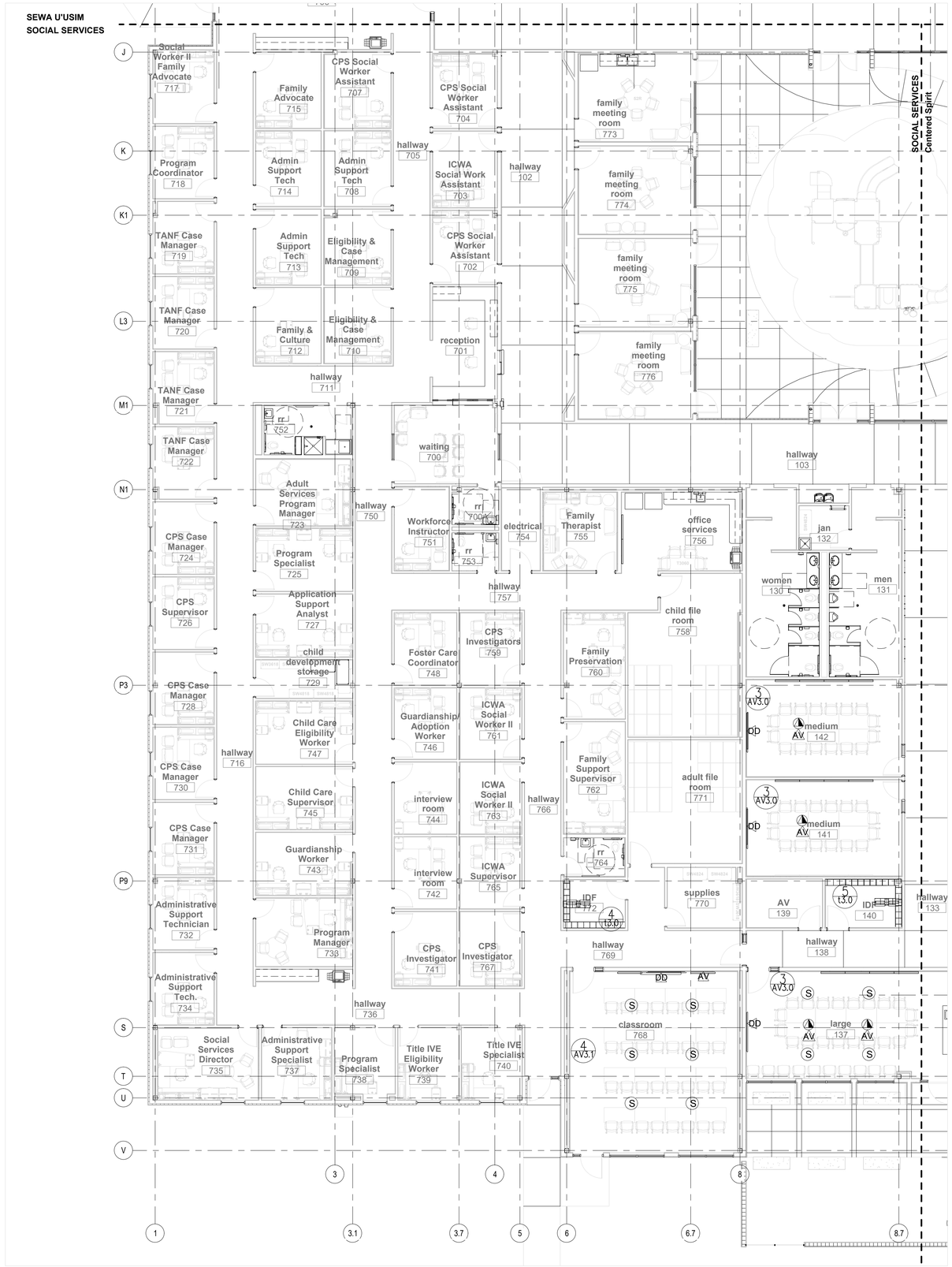
AV floor plan - Centered Spirit

av2.4



1 AV2.5 **AV floor plan - social services**

1/8" = 1'-0"

north

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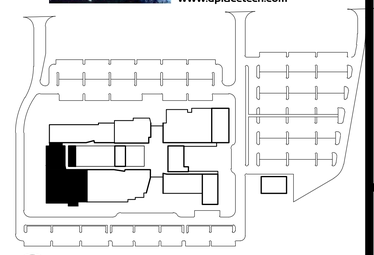
AV	AV SYSTEM INPUT PLATE - (1) CAT6 - STP
AVC	AV SYSTEM ROOM CONTROL - (1) CAT6 - STP
DD	INFORMATION OUTLET - DIGITAL DISPLAY (1) CAT6 - STP & (1) RG-6
S	AV SYSTEMS SOUND REINFORCEMENT SPEAKER
UNO	UNLESS NOTED OTHERWISE
## / ##	SHEET REFERENCE / DRAWING NUMBER
ABC-123	PATCH PANEL ID/ PORT NUMBER
	IDF IDENTIFIER

Dplace Technologies
Intelligent Design Solutions
11740 North Joi Drive
Tucson, AZ 85737
TEL (520)544-0788
FAX (520)207-0033
www.dplacetech.com



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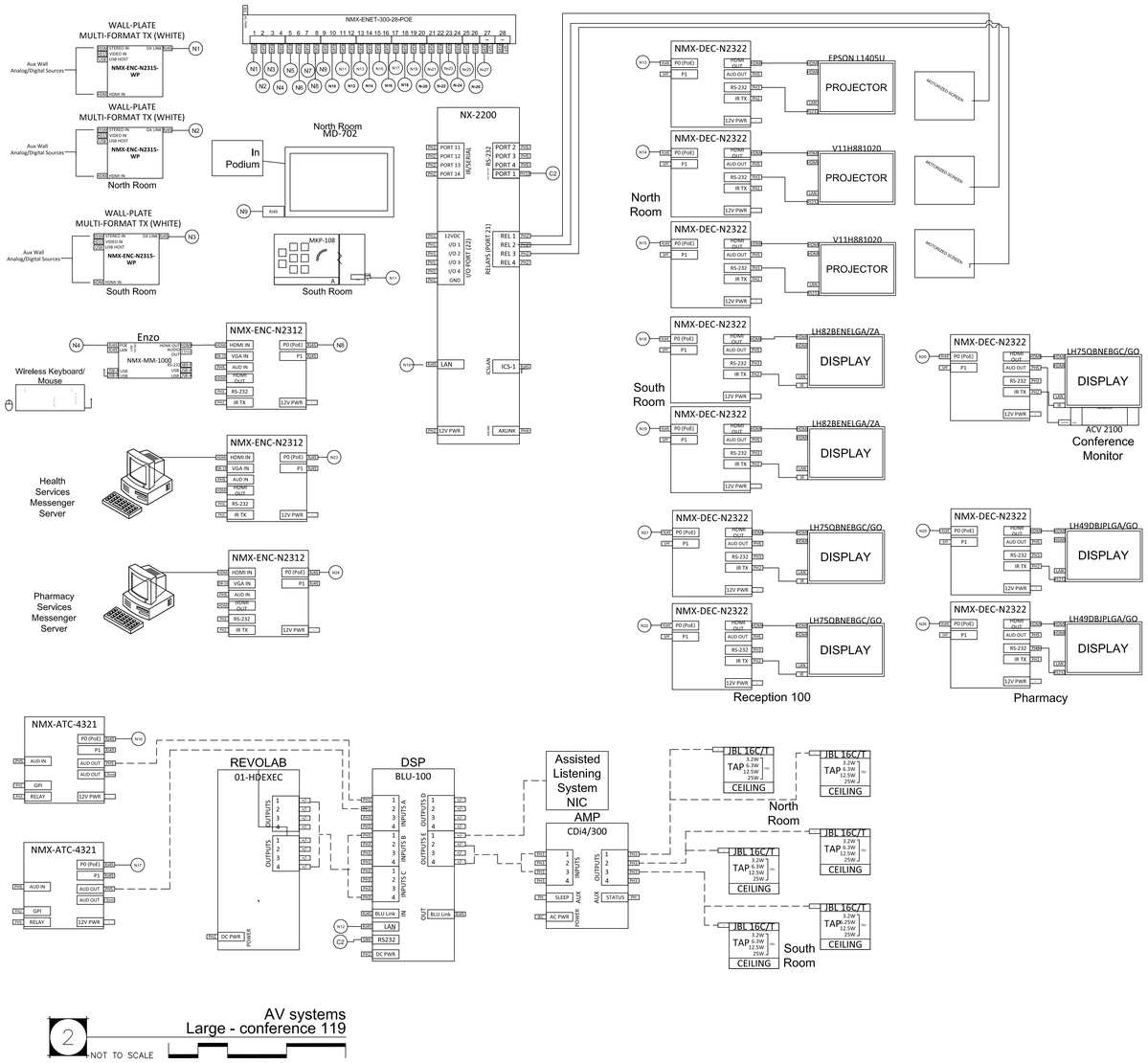
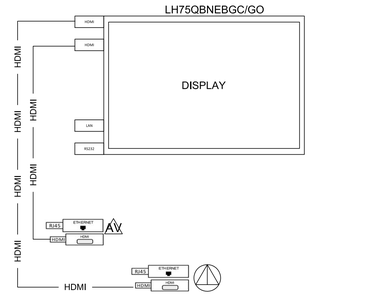
AV floor plan - social services

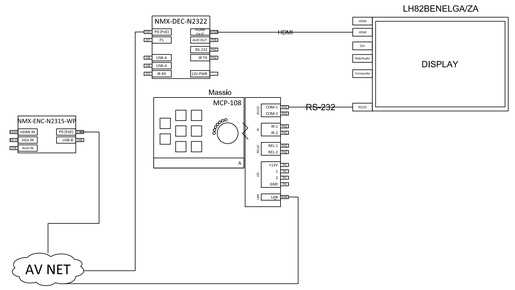
av2.5



2 AV systems Large - conference 119
NOT TO SCALE



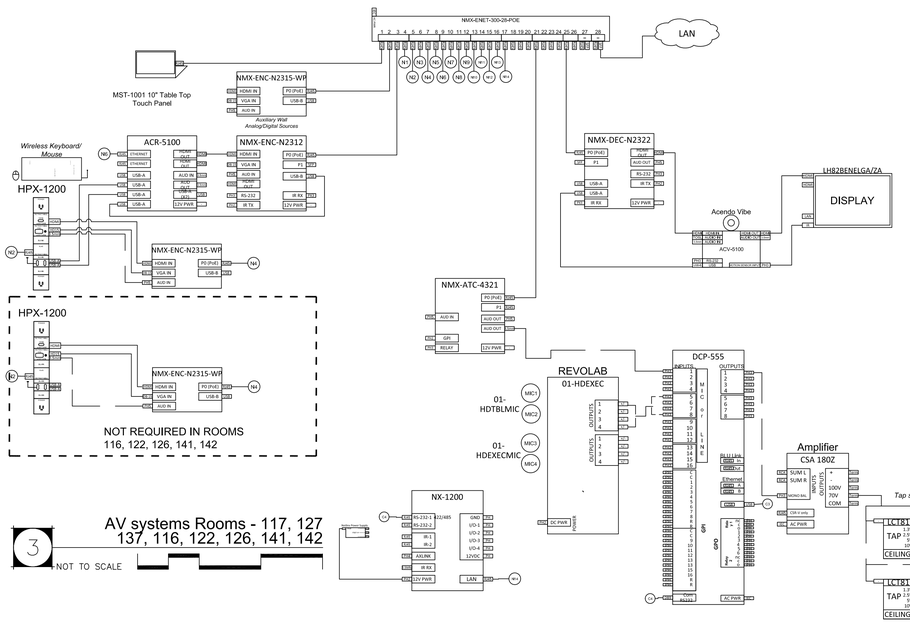
1 AV systems typical - huddle spaces
NOT TO SCALE



4 AV systems Classroom 768
NOT TO SCALE

general notes

keynotes



3 AV systems Rooms - 117, 127 137, 116, 122, 126, 141, 142
NOT TO SCALE

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Audio Visual Details

AV3.0

FURNITURE PLANS

PASCUA YAQUI TRIBE

HEALTH SERVICE CENTER II
4567 W TETAKUSIM RD
TUCSON, ARIZONA 85746

GENERAL FURNITURE NOTES

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4. ALL FURNITURE SPECIFICATIONS AND ASSOCIATED CAD DRAWINGS, EXCEL SPREAD SHEETS (EXCEL FORMULAS ARE THE RESPONSIBILITY OF THE BIDDING VENDOR) PLANS AND BID TERMS AND CONDITIONS AS TRANSMITTED MUST BE FOLLOWED BY ALL VENDORS WITHOUT CHANGES TO THE SPECIFICATION. ANY CHANGES TO THE FURNITURE SPECIFICATIONS AND ASSOCIATED FABRICS, UPHOLSTERY, FINISHES ETC. HAVE TO BE APPROVED IN WRITING BY THE DESIGNER OR THE VENDOR WILL FORFEIT THE RIGHT OT BID THE PROJECT.

5. ALL ELECTRICAL LAYOUTS ARE TO BE REVIEWED BY THE SELECTED FURNITURE VENDOR AND PDFS AND CAD DRAWINGS MUST BE SUBMITTED IF ANY CHANGES OR MOVEMENT OF ELECTRICAL WHIPS, J-BOXES, OUTLETS / DATA ETC. ARE REQUIRED. THE SUBMISSION OF ELECTRICAL REVISIONS BY THE FURNITURE VENDOR MUST MEET THE FOLLOWING REQUIREMENTS:
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   b. THE SUBMITTAL MUST INDICATE BY A KEY OR A RED REVISION CLOUD THE LOCATION ON PLAN OF THE CHANGE.
   c. THE SUBMISSION IS TO BE PROVIDED TO BHIDP AND THE ARCHITECT NO LATER THAN 30 DAYS FROM THE DATE OF THE PROJECT AWARD. NO EXCEPTIONS.

DRAWING & INTERIOR DESIGN OWNERSHIP

THE DRAWINGS (CAD FILES OR OTHER WISE) AND ALL ASPECTS OF THE INTERIOR DESIGN, INCLUSIVE OF ALL FINISH SELECTION, SCHEMATIC DESIGN, DESIGN DEVELOPMENT AND FURNITURE DESIGN ARE AN INSTRUMENT OF SERVICE AND THE PROPERTY OF BHIDP AKA BENE HARRISON INTERIOR DESIGN & PLANNING AND SHALL REMAIN THEIR PROPERTY. THE USE OF THESE DRAWINGS AND INTERIOR FURNITURE PACKAGE SHALL BE RESTRICTED TO THE ORIGINAL SITE FOR WHICH IT WAS PREPARED AND PUBLICATION THERE OF IS EXPRESSLY LIMITED TO SUCH USE. REUSE, REPRODUCTION OR PUBLICATION BY ANY METHOD IN WHOLE OR IN PART IS PROHIBITED WITHOUT WRITTEN CONSENT OF BHIDP AKA BENE HARRISON INTERIOR DESIGN & PLANNING.

KEY NOTES:

xxxx — **ROOM NAME**
xxx — **ROOM NUMBER**

CDIM CRITICAL DIMENSION

CODE	DESCRIPTION & SIZE / MOUNTING HEIGHT
WB	WHITEBOARD: MOUNT AT 36" HIGH FROM FINISHED FLOOR
TB	TACK-BOARD: MOUNT AT 36" HIGH FROM FINISH FLOOR
LR	LITERATURE RACK (LR): MOUNT AT 36" HIGH FROM FINISH FLOOR
LI	LITERATURE RACK (LI): MOUNT AT 36" HIGH FROM FINISH FLOOR

ABOVE ITEMS ARE ACCESSORIES, MOUNTED ABOVE FINISH FLOOR.

FURNITURE IS CODED INDIVIDUALLY ON FURNITURE PLANS.

SHEET INDEX

11.16.18 _ 100% CONSTRUCTION DOCUMENTS — NEW OR REVISED ISSUE ●

SHEET NUMBER	SHEET NAME	
ID-F-A	FURNITURE DRAWINGS TITLE SHEET	●
ID-F-B	FURNITURE DEPARTMENTAL PLAN	●
I-F-0.0	FURNITURE FLOOR PLAN - OVERALL	●
I-F-0.1	FURNITURE FLOOR PLAN - LOBBY	●
I-F-1.0	FURNITURE FLOOR PLAN - SEWA U'USIM	●
I-F-1.1	FURNITURE FLOOR PLAN - PHARMACY, DIABETES, NURSING & CLINICS	●
I-F-1.2	FURNITURE FLOOR PLAN - HEALTH BUDGET, MANAGED HEALTH, BILLING & WAREHOUSE	●
I-F-1.3	FURNITURE FLOOR PLAN - CENTERED SPIRIT	●
I-F-1.4	FURNITURE FLOOR PLAN - SOCIAL SERVICES	●
I-F-1.5	OFFICE FURNITURE TYPICALS INDEX	●

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FURNITURE PLANS
TITLE SHEET & NOTES

ID-FP-A

SEWA U'USIM

PHARAMACY, DIABETES, NURSING & CLINICS

SOCIAL SERVICES

CENTERED SPIRIT

HEALTH BUDGET, MANAGED HEALTH, BILLING & WAREHOUSE

1 ID-FP-B FURNITURE PLAN-DEPARTMENT DIVISIONS

SCALE: 1/16"= 1'-0"

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FURNITURE DEPARTMENTAL PLAN

ID-FP-B

NOTE: SEE SPECIFICATION IN FURNITURE SPECIFICATION BOOK - FOR ALL FURNITURE ITEMS.

1 I-FP-0.0 FURNITURE PLAN - MAIN BUILDING
SCALE: 1/16"= 1'-0"

north

2 I-FP-0.0 FURNITURE PLAN - WAREHOUSE
SCALE: 1/16"= 1'-0"

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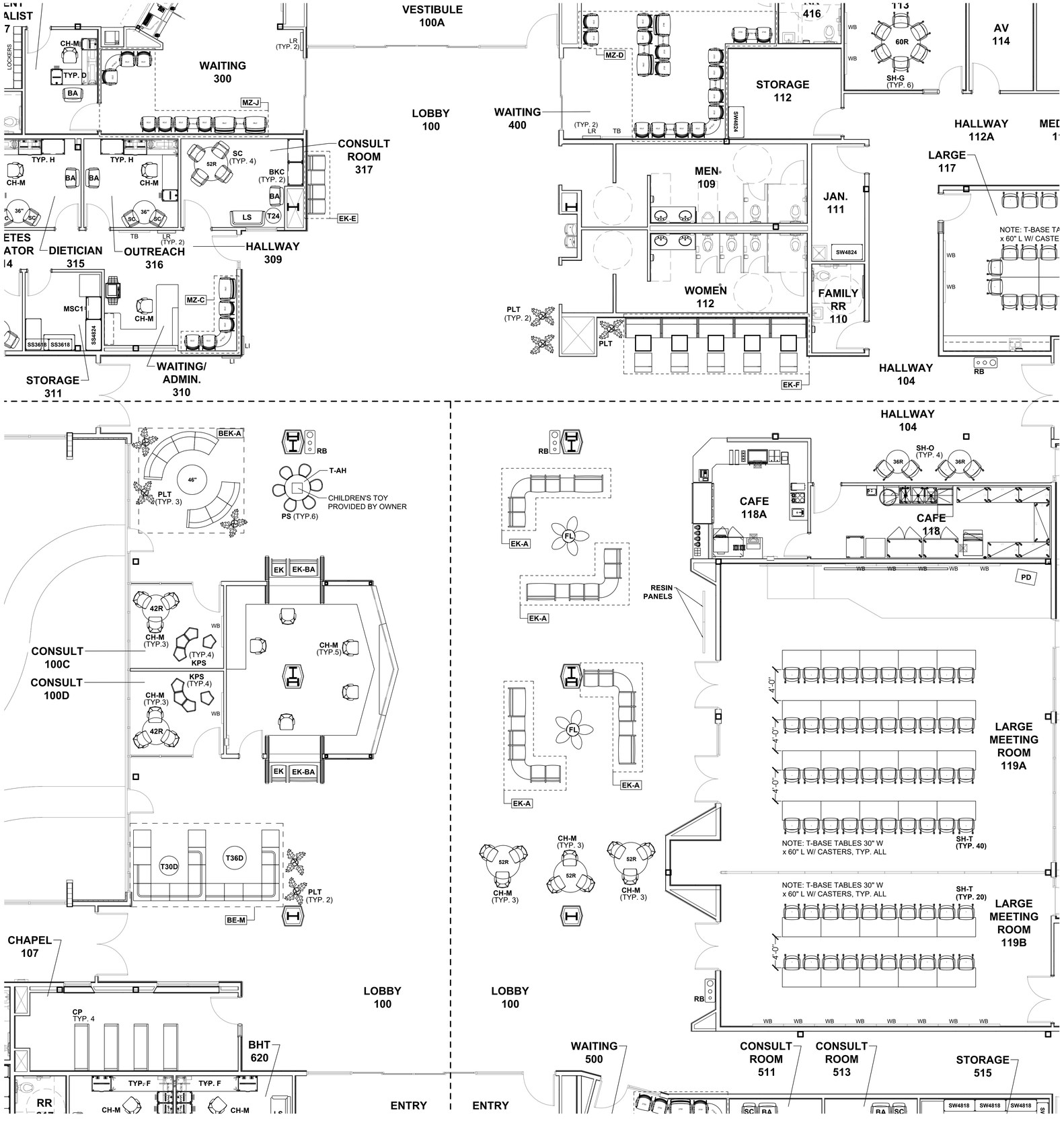
FURNITURE PLAN - OVERALL

I-FP-0.0



1 I-FP-0.1 FURNITURE PLAN - LOBBY
SCALE: 3/16"= 1'-0"

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NOTE: SEE SPECIFICATION IN FURNITURE SPECIFICATION BOOK - FOR ALL FURNITURE ITEMS.

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FURNITURE PLAN - LOBBY

I-FP-0.1

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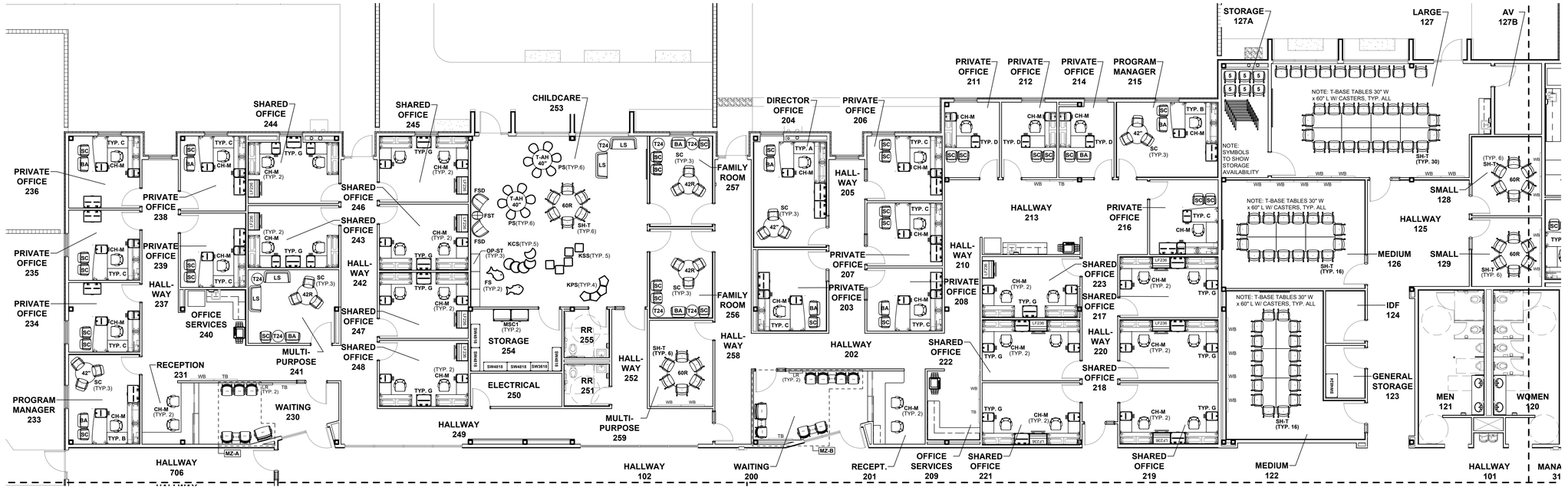
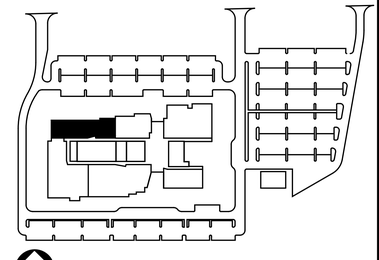


1 / I-FP-1.0 FURNITURE PLAN-SEWA U'USIM

SCALE: 1/8"= 1'-0"

north



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FURNITURE PLAN

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EXISTING FURNITURE INDEX

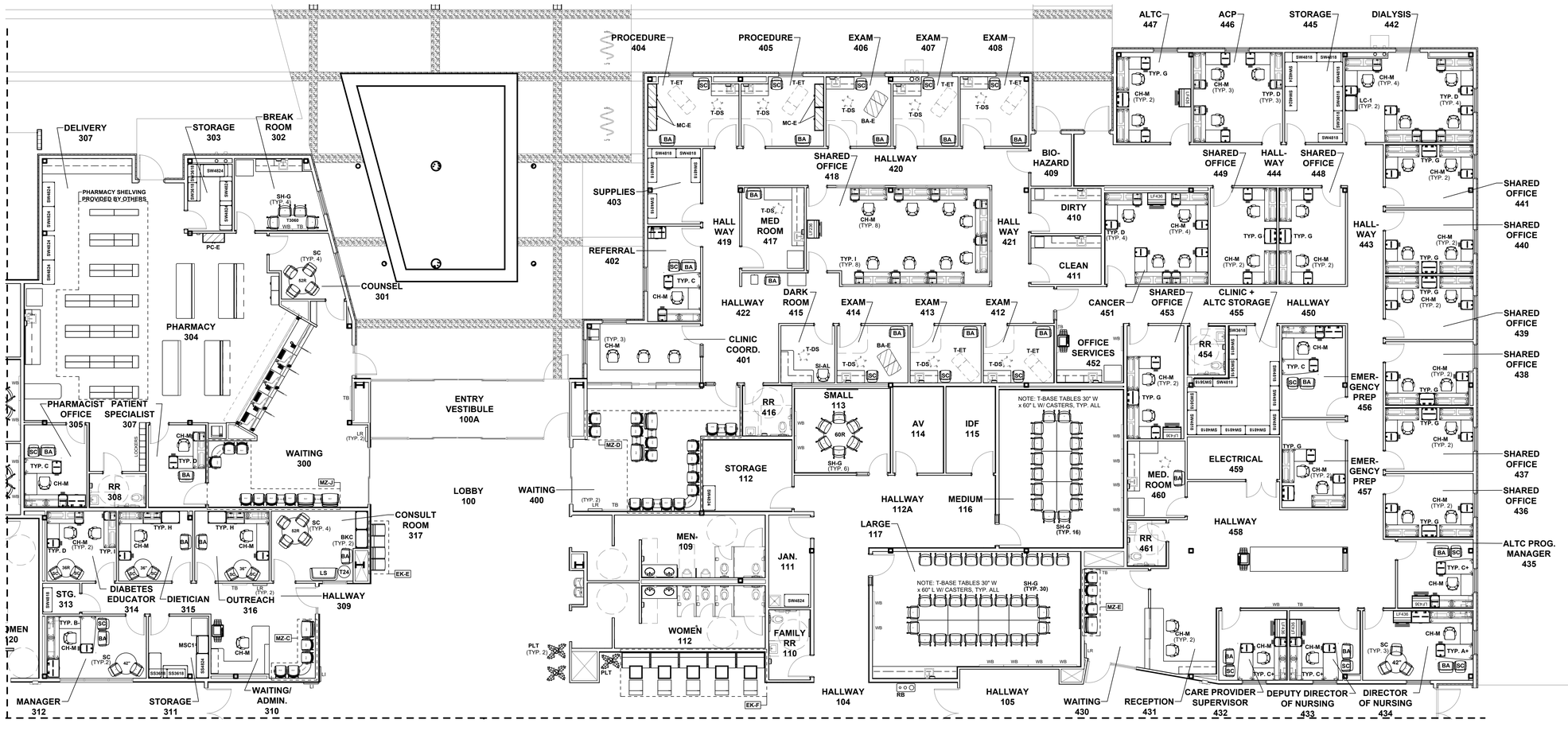
CODE	QTY.	DESCRIPTION + SIZE	ROOM #	DEPARTMENT
MC-E	4 EA.	MEDICAL CASES SIZE: 46"W x 18"D	PROCEDURE ROOMS 404 + 405	NURSING & SPECIALTY CLINICS
RF-E	1 - TO BE REFACED	ROLLING FILES SIZE: 91" x 183" OVERALL DIMS.	MEDICAL RECORDS 644	CENTERED SPIRIT
ST-E	3 EA.	TASK SEATING (BLACK) LORELLFURNITURE.COM LARGE MANAGEMENT CHAIR	HIM & CAS: 613 + 614	CENTERED SPIRIT
BA-E	2 EA.	BARIATRIC EXAM TABLE	PROCEDURE ROOMS: 406 + 414	NURSING & SPECIALTY CLINICS
PC-E	1 EA.	PHARMACY STORAGE CABINET	PHARMACY: 304	PHARMACY

FURNITURE KEY

NEW

EXISTING

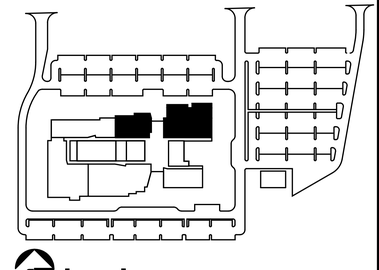
TRIBE-SUPPLIED EQP. ITEMS/FURN.



1 I-FP-1.1 FURNITURE PLAN-DIABETES, PHARMACY, NURSING & CLINICS

SCALE: 1/8"= 1'-0"

north



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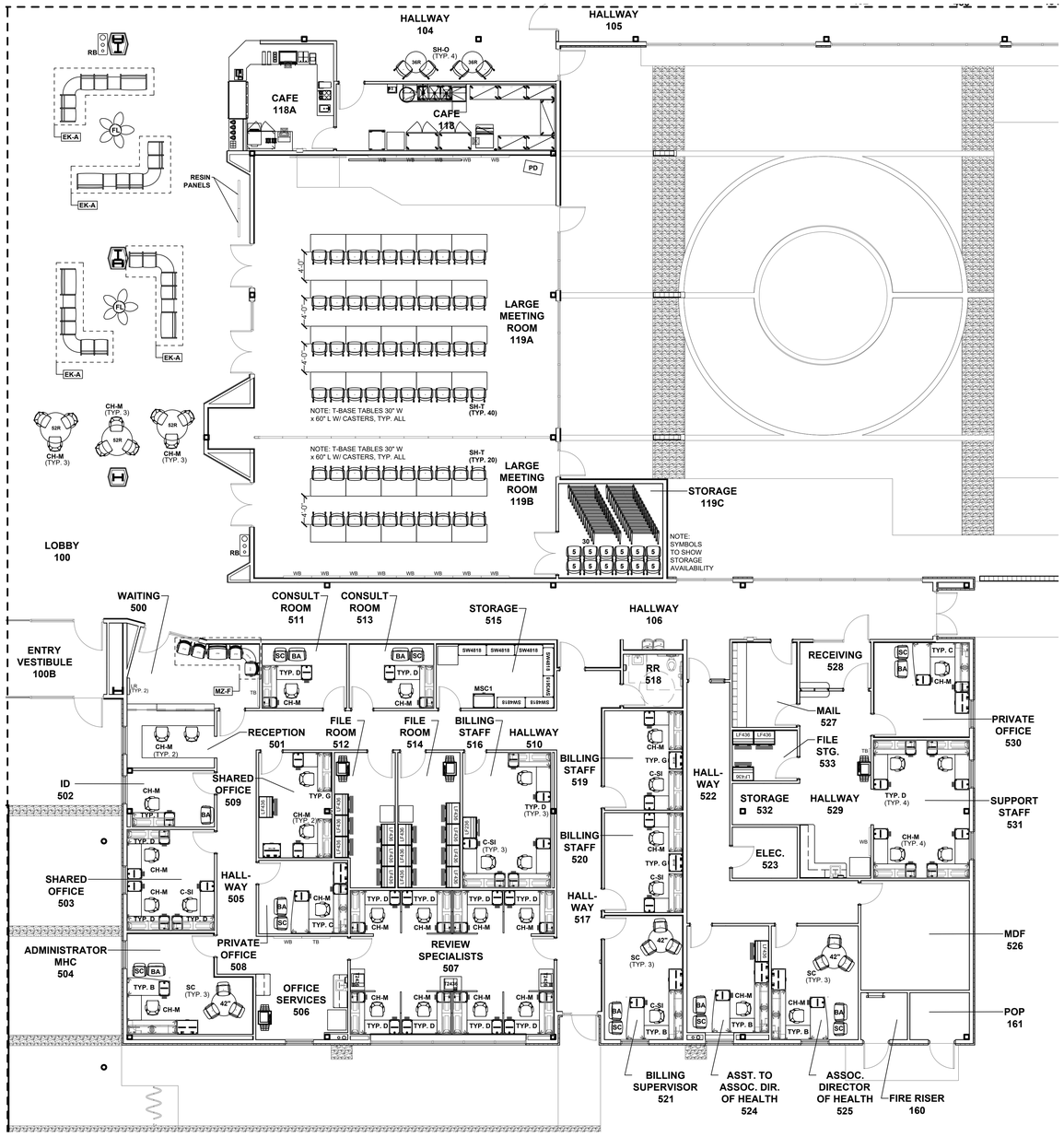
TUCSON, AZ 85710
t: (520) 850-7714
e: bene_id@msn.com
@ BHIDP

bhidp.com

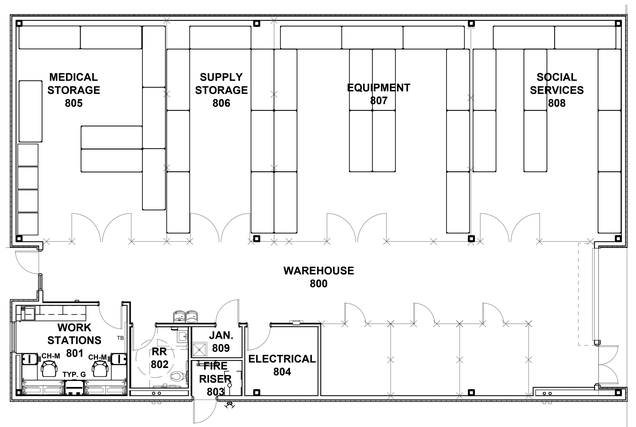
FURNITURE PLAN

I-FP-1.1



1 I-FP-1.2 FURNITURE PLAN-HEALTH BUDGET, MANAGED HEALTH & BILLING

SCALE: 1/8"= 1'-0"



2 I-FP-1.2 FURNITURE PLAN-WAREHOUSE

SCALE: 1/8"= 1'-0"

GENERAL FURNITURE NOTES

1. ANY CONFLICTS BETWEEN ARCHITECTURAL DRAWINGS AND INTERIOR DESIGN DRAWINGS ARE REQUIRED TO BE REPORTED IN WRITING TO THE ARCHITECT AND THE INTERIOR DESIGNER DURING BIDDING OR NEGOTIATION AND A REQUEST FOR CLARIFICATION WILL BE PUBLISHED. THE INTERIOR DESIGNER IS TO BE CONSULTED BEFORE PROCEEDING. THE INTERIOR DESIGNER IS NOT RESPONSIBLE FOR DISCREPANCIES THAT ARISE DUE TO CHANGES BY THE ARCHITECT, CONTRACTORS, CONSULTANTS AND TENANTS OR OWNERS AFTER THE INITIAL PUBLISHED DATE OF THESE DRAWINGS.

2. THE SELECTED FURNITURE VENDOR IS REQUIRED TO SITE VERIFY ALL CRITICAL DIMENSION AND NOTIFY BOTH BHIDP AND THE GENERAL CONTRACTOR OR THEIR AGENT WITH A REQUEST FOR CLARIFICATION AND AN AMENDMENT TO THE WALL, MILLWORK ETC. IF NECESSARY, WITH NO EXCEPTIONS. ALL COMMUNICATION ON SITE VERIFY IS TO BE IN WRITING.

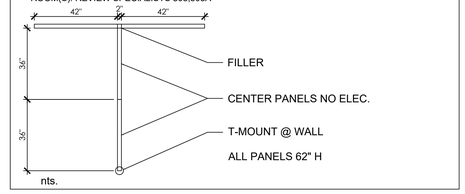
3. THE BIDDING AND SELECTED FURNITURE VENDORS ARE TO DOUBLE CHECK ALL FURNITURE COUNTS AND ARE; WITH NO EXCEPTIONS TO BE RESPONSIBLE FOR ALL FURNITURE AS SHOWN ON THE PLANS. ALL THE FURNITURE SHOWN ON THE PLANS IS TO INCLUDE PRICING FOR ALL FURNITURE ITEMS AND ACCESSORIES, INSTALLATION AND FINAL PUNCH LISTS. ANY AND ALL PLAN DISCREPANCIES REPORTED TO THE DESIGNER WILL BE TRANSMITTED TO ALL FURNITURE VENDORS WITH NO EXCEPTIONS AND ARE TO BE NOTED BY CLARIFICATION NUMBER IN THE BID DOCUMENTS.

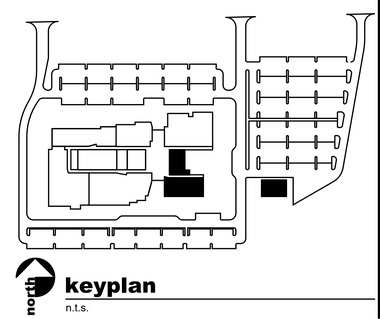
4. ALL FURNITURE SPECIFICATIONS AND ASSOCIATED CAD DRAWINGS, EXCEL SPREAD SHEETS (EXCEL FORMULAS ARE THE RESPONSIBILITY OF THE BIDDING VENDOR) PLANS AND BID TERMS AND CONDITIONS AS TRANSMITTED MUST BE FOLLOWED BY ALL VENDORS WITHOUT CHANGES TO THE SPECIFICATION. ANY CHANGES TO THE FURNITURE SPECIFICATIONS AND ASSOCIATED FABRICS, UPHOLSTERY, FINISHES ETC. HAVE TO BE APPROVED IN WRITING BY THE DESIGNER OR THE VENDOR WILL FORFEIT THE RIGHT OT BID THE PROJECT.

5. ALL ELECTRICAL LAYOUTS ARE TO BE REVIEWED BY THE SELECTED FURNITURE VENDOR AND PDFS AND CAD DRAWINGS MUST BE SUBMITTED IF ANY CHANGES OR MOVEMENT OF ELECTRICAL WHIPS, J-BOXES, OUTLETS / DATA ETC. ARE REQUIRED. THE SUBMISSION OF ELECTRICAL REVISIONS BY THE FURNITURE VENDOR MUST MEET THE FOLLOWING REQUIREMENTS:
   a. THE SUBMITTAL MUST SHOW THE DIMENSION OF THE CHANGE FROM THE ORIGINAL LOCATION.
   b. THE SUBMITTAL MUST INDICATE BY A KEY OR A RED REVISION CLOUD THE LOCATION ON PLAN OF THE CHANGE.
   c. THE SUBMISSION IS TO BE PROVIDED TO BHIDP AND THE ARCHITECT NO LATER THAN 30 DAYS FROM THE DATE OF THE PROJECT AWARD. NO EXCEPTIONS.

GENERIC PANEL

ROOM(S): REVIEW SPECIALISTS 508,508A





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FURNITURE PLAN

I-FP-1.2

EXISTING FURNITURE INDEX

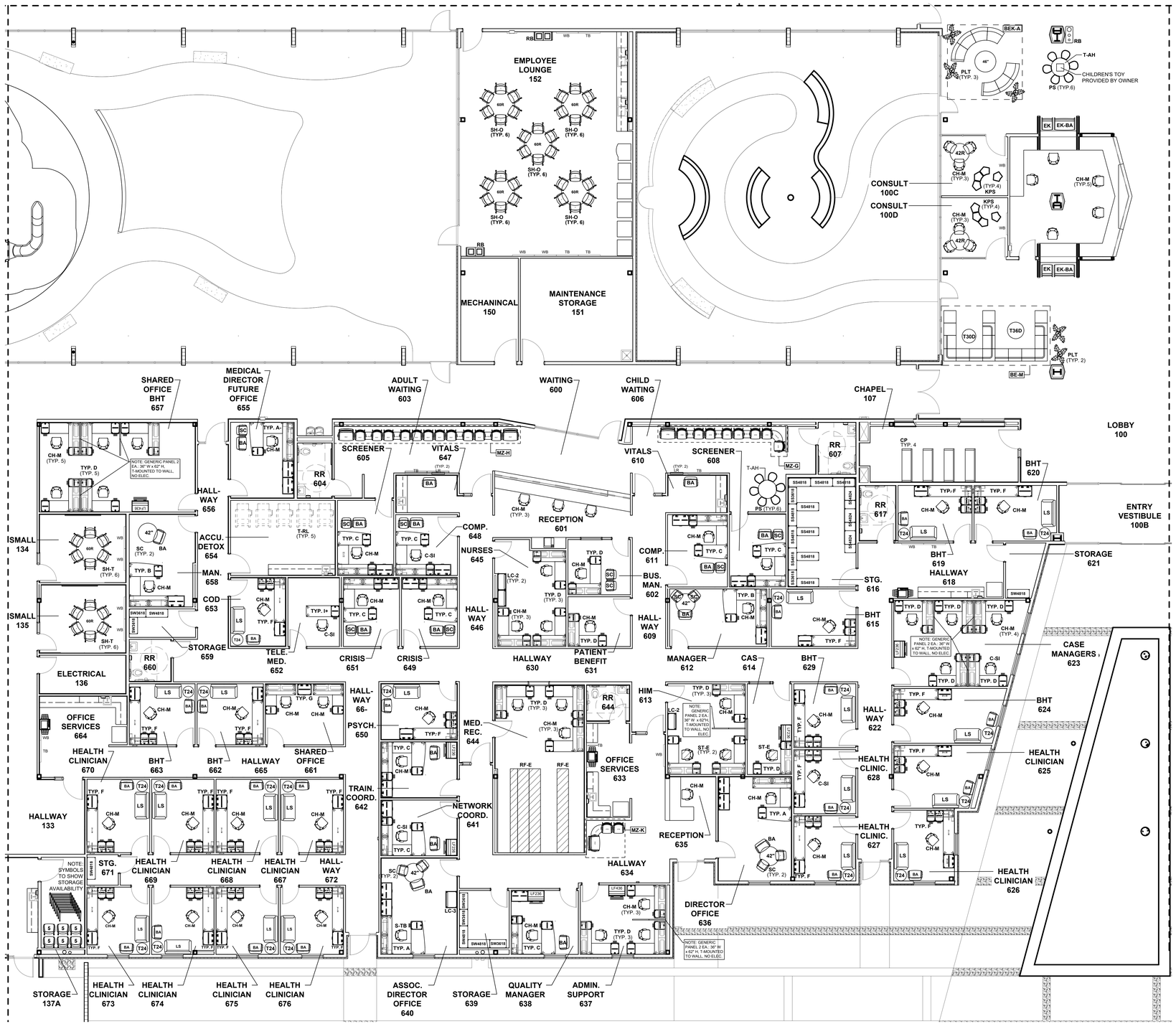
CODE	QTY.	DESCRIPTION + SIZE	ROOM #	DEPARTMENT
MC-E	4 EA.	MEDICAL CASES SIZE: 46"W x 18"D	PROCEDURE ROOMS 404 + 405	NURSING & SPECIALTY CLINICS
RF-E	1 - TO BE REFACED	ROLLING FILES SIZE: 91" x 183" OVERALL DIMS.	MEDICAL RECORDS 644	CENTERED SPIRIT
ST-E	3 EA.	TASK SEATING (BLACK) LORELLFURNITURE.COM LARGE MANAGEMENT CHAIR	HIM & CAS: 613 + 614	CENTERED SPIRIT
BA-E	2 EA.	BARIATRIC EXAM TABLE	PROCEDURE ROOMS: 406 + 414	NURSING & SPECIALTY CLINICS
PC-E	1 EA.	PHARMACY STORAGE CABINET	PHARMACY: 304	PHARMACY

FURNITURE KEY

NEW

EXISTING

TRIBE-SUPPLIED EQP. ITEMS/FURN.



1 I-FP-1.3 FURNITURE PLAN-CENTERED SPIRIT

SCALE: 1/8"= 1'-0"

north

GENERAL FURNITURE NOTES

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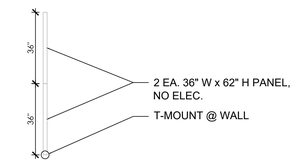
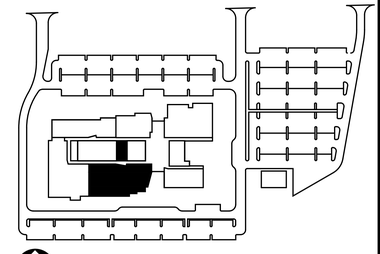
GENERIC PANEL

ROOM(S): HIM 613, CASE MANAGERS 623, ADMIN. SUPPORT 637, SHARED OFFICE BHT 657



nts.



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job **1717**

date **11.16.18**

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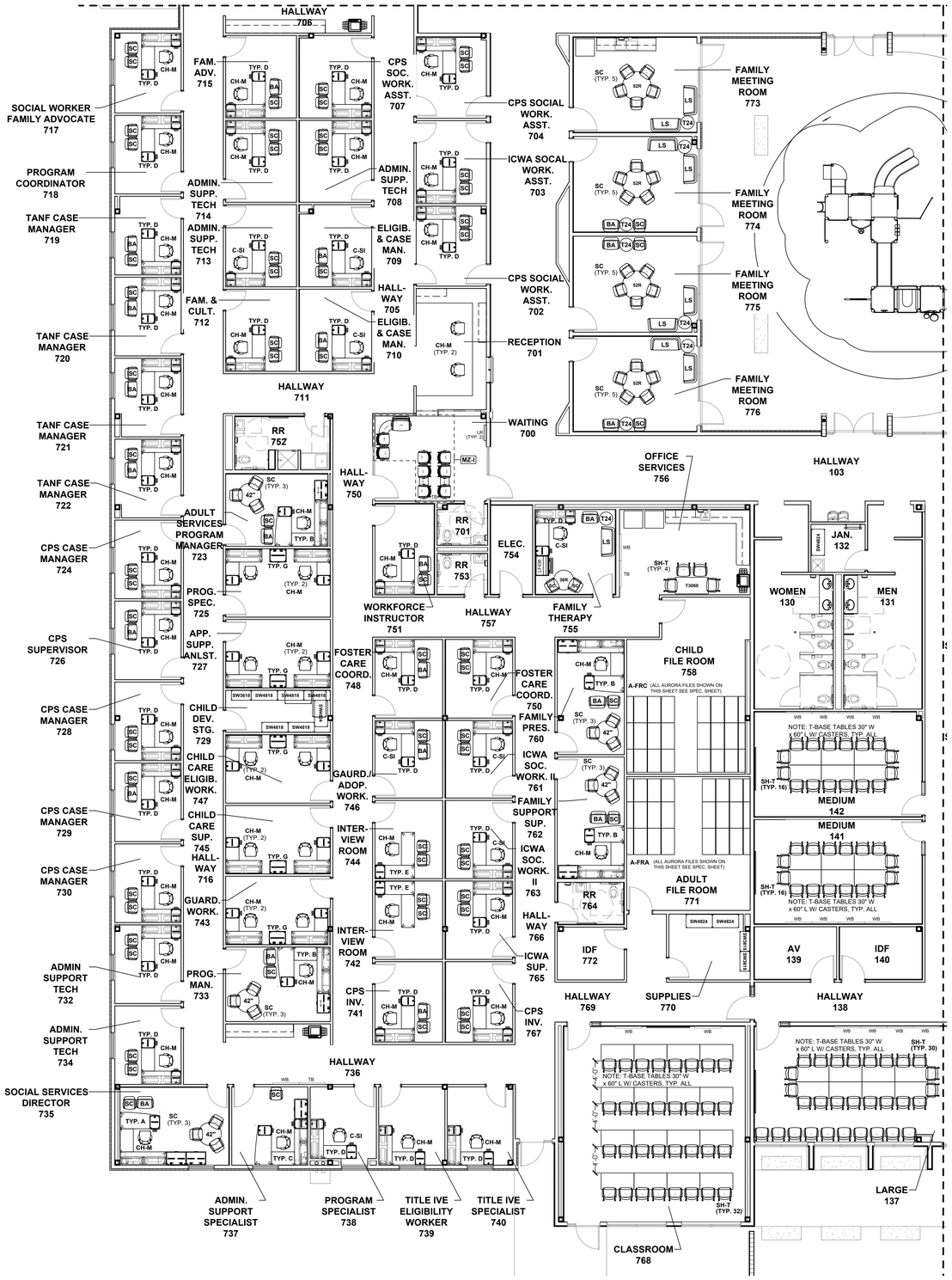
FURNITURE PLAN

I-FP-1.3



1 / I-FP-1.4 FURNITURE PLAN-SOCIAL SERVICES

SCALE: 1/8"= 1'-0"

north

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FURNITURE PLAN

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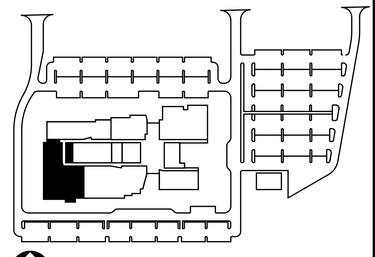

north keyplan
n.t.s.

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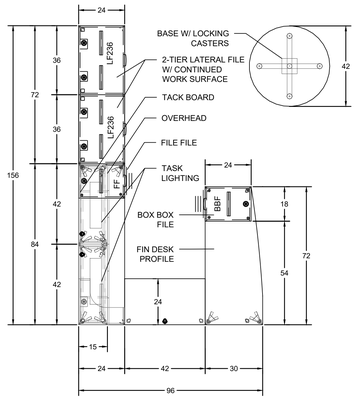
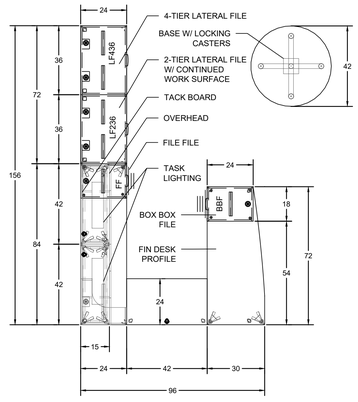


1 TYP. A
I-FP-1.5 SCALE: 3/8"= 1'-0"



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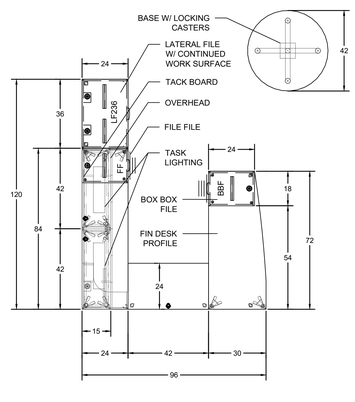

3 TYP. B
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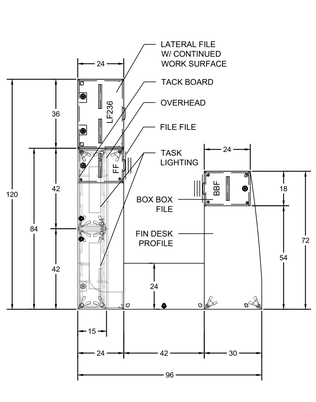

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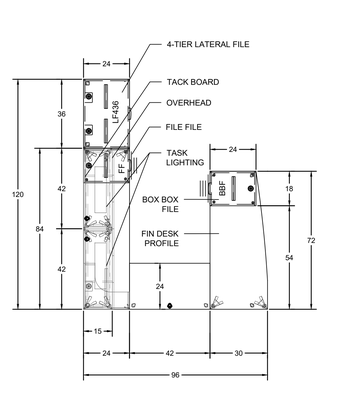

5 TYP. C+
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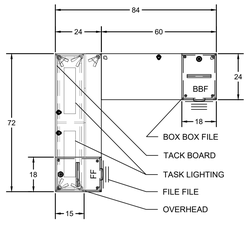

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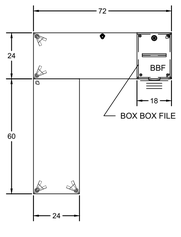

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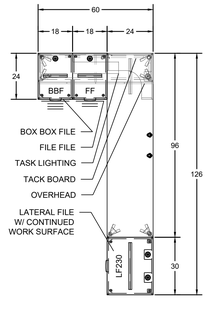

8 TYP. F
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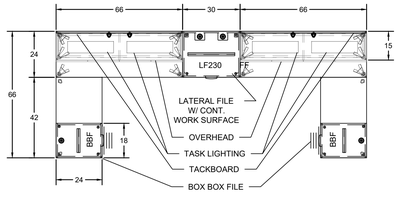

9 TYP. G
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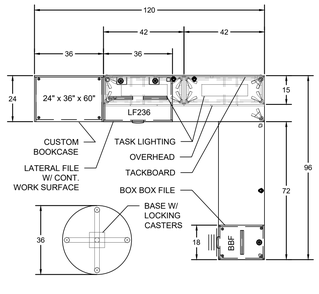

10 TYP. H
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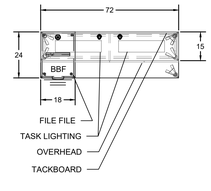
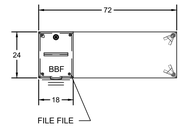


11 TYP. I
I-FP-1.5 SCALE: 3/8"= 1'-0"



12 TYP. I+
I-FP-1.5 SCALE: 3/8"= 1'-0"

NOTES:

1. ALL TYPICALS ARE JSI, SWISH COMPONENTS.
2. REFERENCE FURNITURE SPECIFICATION FOR FINISH SELECTIONS.
3. REFERENCE FURNITURE SPECIFICATION FOR LOCATIONS LISTS FOR EACH TYPICAL.
4. ALL COMPONENTS TO BE SELF-SUPPORTED.

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@ BHIDP
bhidp.com

FURNITURE TYPICALS INDEX

I-FP-1.5

INTERIOR FINISH PLANS

PASCUA YAQUI TRIBE

HEALTH SERVICE CENTER II
4567 W TETAKUSIM RD
TUCSON, ARIZONA 85746

GENERAL NOTES

1. ANY CONFLICTS BETWEEN ARCHITECTURAL DRAWINGS AND INTERIOR DESIGN DRAWINGS ARE REQUIRED TO BE REPORTED IN WRITING TO THE ARCHITECT AND THE INTERIOR DESIGNER DURING BIDDING OR NEGOTIATION AND A REQUEST FOR CLARIFICATION WILL BE PUBLISHED. THE INTERIOR DESIGNER IS TO BE CONSULTED BEFORE PROCEEDING. THE INTERIOR DESIGNER IS NOT RESPONSIBLE FOR DISCREPANCIES THAT ARISE DUE TO CHANGES BY THE ARCHITECT, CONTRACTORS, CONSULTANTS AND TENANTS OR OWNERS AFTER THE INITIAL PUBLISHED DATE OF THESE DRAWINGS.

2. THE SELECTED FURNITURE VENDOR IS REQUIRED TO SITE VERIFY ALL CRITICAL DIMENSION AND NOTIFY BOTH BHIDP AND THE GENERAL CONTRACTOR OR THEIR AGENT WITH A REQUEST FOR CLARIFICATION AND AN AMENDMENT TO THE WALL, MILLWORK ETC. IF NECESSARY, WITH NO EXCEPTIONS. ALL COMMUNICATION ON SITE VERIFY IS TO BE IN WRITING.

3. ALL INTERIOR FINISH SECTIONS AND LEGENDS ARE FOUND ON THE APPROPRIATE PAGES, EX. WALL FINISHES ON WALL FINISH PLANS ETC. WINDOW COVERING WILL BE LOCATED ON THE REFLECTED CEILING FINISH PLAN AND SO ON. FLOORING FINISHES ARE EXHIBITED BY HATCH PATTERNS AND CODES.

4. ALL ELECTRICAL LAYOUTS ARE TO BE REVIEWED BY THE SELECTED FURNITURE VENDOR AND PDFS AND CAD DRAWINGS MUST BE SUBMITTED IF ANY CHANGES OR MOVEMENT OF ELECTRICAL WHIPS, J-BOXES, OUTLETS / DATA ETC. ARE REQUIRED. THE SUBMISSION OF ELECTRICAL REVISIONS BY THE FURNITURE VENDOR MUST MEET THE FOLLOWING REQUIREMENTS:
   a. THE SUBMITTAL MUST SHOW THE DIMENSION OF THE CHANGE FROM THE ORIGINAL LOCATION.
   b. THE SUBMITTAL MUST INDICATE BY A KEY OR A RED REVISION CLOUD THE LOCATION ON PLAN OF THE CHANGE.
   c. THE SUBMISSION IS TO BE PROVIDED TO BHIDP AND THE ARCHITECT NO LATER THAN 30 DAYS FROM THE DATE OF THE PROJECT AWARD. NO EXCEPTIONS.

DRAWING & INTERIOR DESIGN OWNERSHIP

THE DRAWINGS (CAD FILES OR OTHER WISE) AND ALL ASPECTS OF THE INTERIOR DESIGN, INCLUSIVE OF ALL FINISH SELECTION, SCHEMATIC DESIGN, DESIGN DEVELOPMENT AND FURNITURE DESIGN ARE AN INSTRUMENT OF SERVICE AND THE PROPERTY OF BHIDP AKA BENE HARRISON INTERIOR DESIGN & PLANNING AND SHALL REMAIN THEIR PROPERTY. THE USE OF THESE DRAWINGS AND INTERIOR FURNITURE PACKAGE SHALL BE RESTRICTED TO THE ORIGINAL SITE FOR WHICH IT WAS PREPARED AND PUBLICATION THERE OF IS EXPRESSLY LIMITED TO SUCH USE. REUSE, REPRODUCTION OR PUBLICATION BY ANY METHOD IN WHOLE OR IN PART IS PROHIBITED WITHOUT WRITTEN CONSENT OF BHIDP AKA BENE HARRISON INTERIOR DESIGN & PLANNING.

KEY NOTES:

SHEET INDEX

11.16.18 100% CONSTRUCTION DOCUMENTS SUBMITTAL — NEW OR REVISED ISSUE ●

SHEET NUMBER	SHEET NAME	
FINISH PLANS:		
id-f-a	title sheet and notes	●
id-f-a2	interior finish information sheet	●
id-f-a3	departmental plan	●
FLOOR FINISH PLANS:		
i-f-0.0	floor finish plan/ overall	●
i-f-0.1	floor finish plan/ lobby	●
i-f-1.0	floor finish plan/ sewa u'usim	●
i-f-1.1	floor finish plan/ pharmacy, diabetes, nursing & clinics	●
i-f-1.2	floor finish plan/ health budget, managed health, billing & warehouse	●
i-f-1.3	floor finish plan/ centered spirit	●
i-f-1.4	floor finish plan/ social services	●
i-f-1.5	floor finish notes & details	●
WALL FINISH PLANS:		
i-w-0.1	wall finish plan/ lobby	●
i-w-1.0	wall finish plan/ sewa u'usim	●
i-w-1.1	wall finish plan/ pharmacy, diabetes, nursing & clinics	●
i-w-1.2	wall finish plan/ health budget, managed health, billing & warehouse	●
i-w-1.3	wall finish plan/ centered spirit	●
i-w-1.4	wall finish plan/ social services	●
i-w-1.5	wall finish elevations & details	●
REFLECTED CEILING PLANS:		
i-rcp-0.1	ceiling finish plan/ lobby	●
i-rcp-1.0	ceiling finish plan/ sewa u'usim	●
i-rcp-1.1	ceiling finish plan/ pharmacy, diabetes, nursing & clinics	●
i-rcp-1.2	ceiling finish plan/ health budget, managed health, billing & warehouse	●
i-rcp-1.3	ceiling finish plan/ centered spirit	●
i-rcp-1.4	ceiling finish plan/ social services	●
MILLWORK PLANS:		
i-mw-0.1	millwork finish plan/ lobby	●
i-mw-1.0	millwork finish plan/ sewa u'usim	●
i-mw-1.1	millworkfinish plan/ pharmacy, diabetes, nursing & clinics	●
i-mw-1.2	millwork finish plan/ health budget, managed health, billing & warehouse	●
i-mw-1.3	millwork finish plan/ centered spirit	●
i-mw-1.4	millwork finish plan/ social services	●
i-mw-1.5	millwork elevations & details	●
i-mw-1.6	millwork elevations & details	●

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INTERIOR FINISHES
TITLE SHEET AND NOTES

id-f-a

GENERAL DESIGNER NOTES: REFERENCE INTERIOR FINISHES

1. THE DESIGNER IS NOT RESPONSIBLE FOR THE MEANS AND METHODS EMPLOYED BY THE GENERAL CONTRACTOR OR SUBCONTRACTOR FOR THE FABRICATION OR INSTALLATION OF A SPECIFIC ITEM OR MATERIAL.
2. SUBSTITUTIONS ARE NOT ALLOWED FOR ANY MATERIAL WITHOUT PRIOR WRITTEN APPROVAL.
3. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND REPORT ANY CONDITIONS THAT ARE IN CONFLICT WITH THE DRAWINGS AND SPECIFICATIONS TO THE DESIGNER. CONSTRUCTION IS NOT TO PROCEED UNTIL ALL DISCREPANCIES AND CONFLICTS HAVE BEEN RESOLVED.
4. ALL CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS AND GOVERNING FEDERAL, STATE AND LOCAL BUILDING CODES AND REQUIREMENTS.
5. DIMENSIONS INDICATED ON THE PARTITION PLAN ARE TO THE FINISHED FACE OF THE PARTITION. WHERE CLEAR DIMENSIONS ARE NOTED, THEY ARE CRITICAL FOR CLEARANCE OF FURNITURE OR EQUIPMENT AND MUST BE MAINTAINED.
6. ALL INTERIOR FINISH SPECIFICATIONS ARE INCLUDED HEREIN.
7. ANY CONFLICTS BETWEEN ARCHITECTURAL AND INTERIOR FINISH SPECIFICATIONS ARE REQUIRED TO BE REPORTED IN WRITING TO THE ARCHITECT AND THE INTERIOR DESIGNER DURING BIDDING OR NEGOTIATION AND A REQUEST FOR CLARIFICATION WILL BE PUBLISHED. THE INTERIOR DESIGNER IS TO BE CONSULTED BEFORE PROCEEDING.
8. THE INTERIOR DESIGNER IS NOT RESPONSIBLE FOR DISCREPANCIES THAT ARISE DUE TO CHANGES BY THE ARCHITECT, CONTRACTORS, CONSULTANTS AND TENANTS OR OWNERS AFTER THE INITIAL PUBLISHED DATE OF THESE DRAWINGS.
9. NO ALTERNATES WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL BY THE DESIGNER.

INTERIOR FINISH SUBMITTAL REQUIREMENTS

1. ALL INTERIOR FINISHES CARRY SUBMITTAL REQUIREMENTS.
2. NO ALTERNATE SUBMITTAL SAMPLES WILL BE ACCEPTED WITHOUT PRIOR WRITTEN APPROVAL.
3. SUBMITTALS SAMPLES ARE TO BE PROVIDED AS FOLLOWS:
   a. ALL INDIVIDUAL SAMPLES OF ALL PRODUCTS ARE TO BE SUBMITTED IN DUPLICATE WITH TWO (2) ACTUAL COLOR / FINISH SAMPLES IN THE COLOR AND FINISH SPECIFIED.
   b. ALL TRIM PIECES CARRY THE SAME REQUIREMENTS AS OUTLINED HEREIN.
   c. ALL SAMPLES ARE TO BE ACTUAL PRODUCT SAMPLES.
   d. ALL SAMPLES TO BE ACCOMPANIED BY CUT SHEETS / SPECIFICATION SHEETS.
   e. PHOTOGRAPHIC CUT SHEETS SHOWING COLOR SAMPLES WILL NOT BE ACCEPTED.

INTERIOR FINISH NOTES

1. REFER TO ARCHITECTURAL SPECIFICATIONS FOR DETAILED INFORMATION ON INTERIOR PRODUCTS/FINISHES.
2. ALL INTERIOR FINISH SPECIFICATIONS AND DESIGNATIONS ARE INCLUDED HERE IN.
3. ANY CONFLICTS BETWEEN ARCHITECTURAL FINISH SPECIFICATIONS ARE REQUIRED TO BE REPORTED IN WRITING TO THE ARCHITECT AND THE INTERIOR DESIGNER DURING BIDDING OR NEGOTIATION AND A REQUEST FOR CLARIFICATION WILL BE PUBLISHED. THE INTERIOR DESIGNER IS TO BE CONSULTED BEFORE PROCEEDING. THE INTERIOR DESIGNER IS NOT RESPONSIBLE FOR DISCREPANCIES THAT ARISE DUE TO CHANGES BY THE ARCHITECT, CONTRACTORS, CONSULTANTS AND TENANTS OR OWNERS AFTER THE INITIAL PUBLISHED DATE OF THESE DRAWINGS.
4. ALL FINISHES AND MATERIALS ARE INDICATED ON THE FINISH LEGEND IN DETAIL. NO SUBSTITUTIONS WILL BE ACCEPTED BY THE DESIGNER WITHOUT PRIOR APPROVAL
5. FOR CLARIFICATION OF MILLWORK OR CASE GOODS BUILT-INS OR SPECIAL TREATMENTS REFER TO MILLWORK FINISH PAGES AND ELEVATIONS.
6. UNLESS OTHERWISE STATED IN THE SPECIFICATIONS, ALL PAINTED SURFACES ARE TO RECEIVE ONE PRIMER COAT AND TWO FINISH COATS. PRIME ALL SURFACES ACCORDING TO THE MANUFACTURE'S SPECIFICATIONS PRIOR TO THE APPLICATION OF THE PAINT. THE NUMBER OF COATS STATED ABOVE IS THE MINIMUM REQUIREMENT. APPLY ADDITIONAL COATS WHEN UNDERCOATS, STAINS OR OTHER CONDITIONS DO NOT PROVIDE APPROPRIATE COVERAGE FOR A CONSISTENT, UNIFORM FINISH.
7. ALL FINISH APPLICATIONS INCLUDING WALL COVERING TO BE FREE OF ALL IMPERFECTIONS AND DEFECTS.
8. ALL CASEWORK WHICH IS TO BE PAINTED SHALL BE SANDED SMOOTH, CLEANED, AND DEFECTS CORRECTED PRIOR TO PAINTING. WOOD SHALL BE PRIMED AS RECOMMENDED BY THE PAINT MANUFACTURER AND PAINTED WITH TWO COATS OF PAINT OF THE TYPE, COLOR, AND FINISH INDICATED.
9. CONTRACTOR SHALL PREPARE SAMPLES (2) TWO EACH FINISH OF THE APPROPRIATE MATERIAL AND SUBMIT THAT SAMPLE TO THE DESIGNER FOR APPROVAL PRIOR TO PROCEEDING WITH STAINING AND FINISHING OF ANY SURFACE. COLOR, FINISH. AND MATERIAL OF COMPLETED WORK SHALL MATCH THAT OF THE APPROVED SAMPLE.
10. ALL TILE TO HAVE MINIMAL GROUT LINES RECOMMENDED BY MANUFACTURER. GROUT, TILE AND STONE TO BE SEALED WITH PENETRATING SEALER. GROUT TO INCLUDE MOLD GUARD OR EQUIVALENT TECHNOLOGY.
11. CONTRACTOR TO PROVIDE APPROPRIATE TRANSITION STRIPS AT ALL CHANGE OF FLOORING MATERIAL. IF COLOR OR FINISH CHOICES REQUIRED, CONTACT INTERIOR DESIGNER, IN WRITING.
12. ALL SUBMITTAL SAMPLES ARE TO BE PROV IDED TO THE GENERAL CONTRACTOR / ARCHITECT FOR DELIVERY TO THE DESIGNER.

INTERIOR MAINTENANCE FINISH NOTES

1. ALL INTERIOR FINISH PRODUCTS REQUIRE MAINTENANCE.
2. ALL PRODUCTS AND INTERIOR FINISHES HAVE MAINTENANCE INSTRUCTIONS FOR CLEANING PURPOSES AND ALL SAID INSTRUCTIONS SHALL BE PROV IDED TO THE OWNER AND DESIGNER IN A FORMATTED BINDER.
3. ALL INTERIOR FINISH PRODUCTS SHOULD BE MAINTAINED ACCORDING TO THE MANUFACTURERS' REQUIREMENTS.
4. PLEASE NOTE THAT WARRANTIES MAY BE VOIDED IF MAINTENANCE IN NOT PROPERLY EXECUTED ACCORDING TO THE MANUFACTURES' RECOMMENDED INSTRUCTIONS.
5. IMPROPER MAINTENANCE COULD POSSIBLY VOID MANUFACTURERS' WARRANTIES AND LESSEN THE LIFE OF THE PRODUCT AS WELL AS DIMINISH THE APPEARANCE OF THE FACILITY.
6. CONTRACTOR TO PROVIDE MAINTENANCE AND CLEANING INSTRUCTIONS AND WARRANTY INFORMATION ON ALL INTERIOR FINISH PRODUCTS IN A FORMATTED BINDER.

SYMBOLS: IF USED

ROOM / 250 — ROOM NAME / ROOM NUMBER

– – – – – HIDDEN ABOVE OR BELOW

##-# FINISH TAG

/ ##-##.## ELEVATION REFERENCE DWG #/SHEET

1 / IFF 3.0 — DRAWING NUMBER / SHEET NUMBER

FLOOR FINISH SYMBOLS:

##-# / ##-# — FIRST TAG INDICATES MAIN FLOOR FINISH; SECOND TAG INDICATES COVE BASE

WALL FINISH SYMBOLS:

P#-## TAG INDICATES WALL PAINT COLOR & FINISH

P#-## INDICATES WALL ACCENT PAINT LOCATION

TILE TERMINATES — INDICATES POINT ALONG WALL TO TERMINATE TILE

RCP FINISH SYMBOLS:

P#-## TAG INDICATES CEILING PAINT COLOR & FINISH

MILLWORK FINISH SYMBOLS:

INDICATES MILLWORK LOCATION

*P#-## FIRST TAG INDICATES UPPER CABINET FINISH
P#-## SECOND TAG INDICATES TRANSACTION TOP
P#-## THIRD TAG INDICATES COUNTERTOP
P#-## FOURTH TAG INDICATES BASE CABINET FINISH
P#-## FIFTH TAG INDICATES COVE BASE OR TOE-KICK FINISH

*UNLESS OTHERWISE NOTED ON PLAN

P#-## TAG INDICATES PAINT COLOR ON WALL SURFACE.

PL-# TAG INDICATES TEXTURED PLASTIC LAMINATE ONLY ON MILLWORK SURFACE TAGGED. SEE ALSO INTERIOR MILLWORK FINISH KEY AND LEGEND BELOW.

SCT-# TAG INDICATES STONE COUNTER/TRANSACTION TOP AT MILLWORK LOCATIONS.

SS-# TAG INDICATES SOLID SURFACE COUNTERTOP/TRANSACTION TOP AT MILLWORK LOCATIONS.

NOTE:
THIS IS A "GENERIC" LIST IN THAT ALL MATERIALS SHOWN MAY NOT APPEAR ON THE FOLLOWING DRAWINGS. ADDITIONAL ARCHITECTURAL ABBREVIATIONS MAY BE USED. CONTACT ARCHITECT FOR CLARIFICATIONS.

ABBREVIATION CODES

FLOOR FINISH CODES / LEGEND

FT-GP-1	12" X 24" CERAMIC TILE RECTIFIED
FT-2	2" X 2" CERAMIC TILE RECTIFIED
TH-MTL	METAL TRANSITION STRIP
RB-2	COVE BASE
TRA-S-2	TRANSITION STRIPS
ST-CO-1	STAINED/COLORED CONCRETE
SC	SEALED CONCRETE
SH-F1 & SH-A1	SHEET VINYL WITH FLASH COVE
WD-PL	LVT WOOD VINYL PLANKING
SD-VCT	STATIC DISSIPATIVE VCT
EPX	EPOXY SEAMLESS FLOORING
CPT-WO	CARPET TILE WALK-OFF MAT

WALL PAINT FINISH CODES / LEGEND

PR	PRIMER
SG	SEMI-GLOSS
ES	EGGSHELL
V	VELVET
MET	METALLIC PAINT
UNO	UNLESS NOTED OTHERWISE
P1-UNO-ES	PAINTED WALL FINISH
P4- P17	PAINTED WALL FINISH - ACCENT
P12-MET	METALLIC PAINT

WALL FINISH CODES

WT-1	WALL TILE RECTIFIED
WT-1A - WT-5A	WALL TILE - ACCENT
MDR-1	MODULAR DOORS
CC-1	CUBICLE CURTAINS
CG-4	CORNER GUARD 48"
CG-8	CORNER GUARD 96"
WP	WALL PROTECTION
T-PA	TOILET PARTITIONS
DF-P	DOOR FRAMES (PAINTED)
WCX-1	XOREL WALL COVERING
WCX-2S	XOREL WALL COVERING

MILLWORK FINISH LEGEND

PL-1 - PL-3	PLASTIC LAMINATE
ML	WHITE MELAMINE CABINET
SCT-2	QUARTZ /STONE
SS-1	SOLID SURFACE
SS-2D	SOLID SURFACE
WD	WOOD DOOR
LK	LOCKERS
RP-IM	RESIN PANELS WITH IMAGE
G1-PL	BIRCH GLASS PANELS
WCX-1	XOREL WALL COVERING
WCX-2S	XOREL WALL COVERING
RB-2	COVE BASE

CEILING PAINT FINISH CODES / LEGEND

PR	PRIMER
SG	SEMI-GLOSS
ES	EGGSHELL
V	VELVET
MET	METALLIC PAINT
UNO	UNLESS NOTED OTHERWISE
PC-SG-UNO	PAINTED CEILING FINISH
PC-V	PAINTED CEILING FINISH
P4-P17	PAINTED CEILING FINISH
P12-MET	METALLIC PAINT

CEILING FINISH CODES / LEGEND

ACT-1	2 X 2 CEILING TILE & GRID
ACT-2	2 X 4 CEILING TILE & GRID
ACT-K	2 X 2 KITCHEN CEILING TILE
CC-1	CUBICLE CURTAIN

FILZFELT HANGING PANELS

FFZ-1	FILZFELT HANGING PANELS
FFZ-2	FILZFELT HANGING PANELS
FFZ-3A	FILZFELT HANGING PANELS
FFZ-3B	FILZFELT HANGING PANELS
FFZ-4	FILZFELT HANGING PANELS

WINDOW COVERINGS

MTL-B	METAL BLINDS
RS-1	ROLLER SHADE - 5% SHEER SCREEN
RS-2B	ROLLER SHADE - BLACKOUT SCREEN
RS-1 + RS-2B	BOTH 5% & BLACKOUT ROLLER SHADES

NOTE:
1. SEE SPECIFIC FINISH LEGENDS ON APPROPRIATE PAGES FOR INSTALLATION DETAILS ETC.
2. ALWAYS FOLLOW MANUFACTURE'S INSTALLATION DIRECTIONS FOR ALL PRODUCTS AS WELL AS BHIDP INSTRUCTIONS FOR ALL INTERIOR PRODUCT REQUIRE "ACTUAL" SUBMITTAL SAMPLES FOR APPROVAL.

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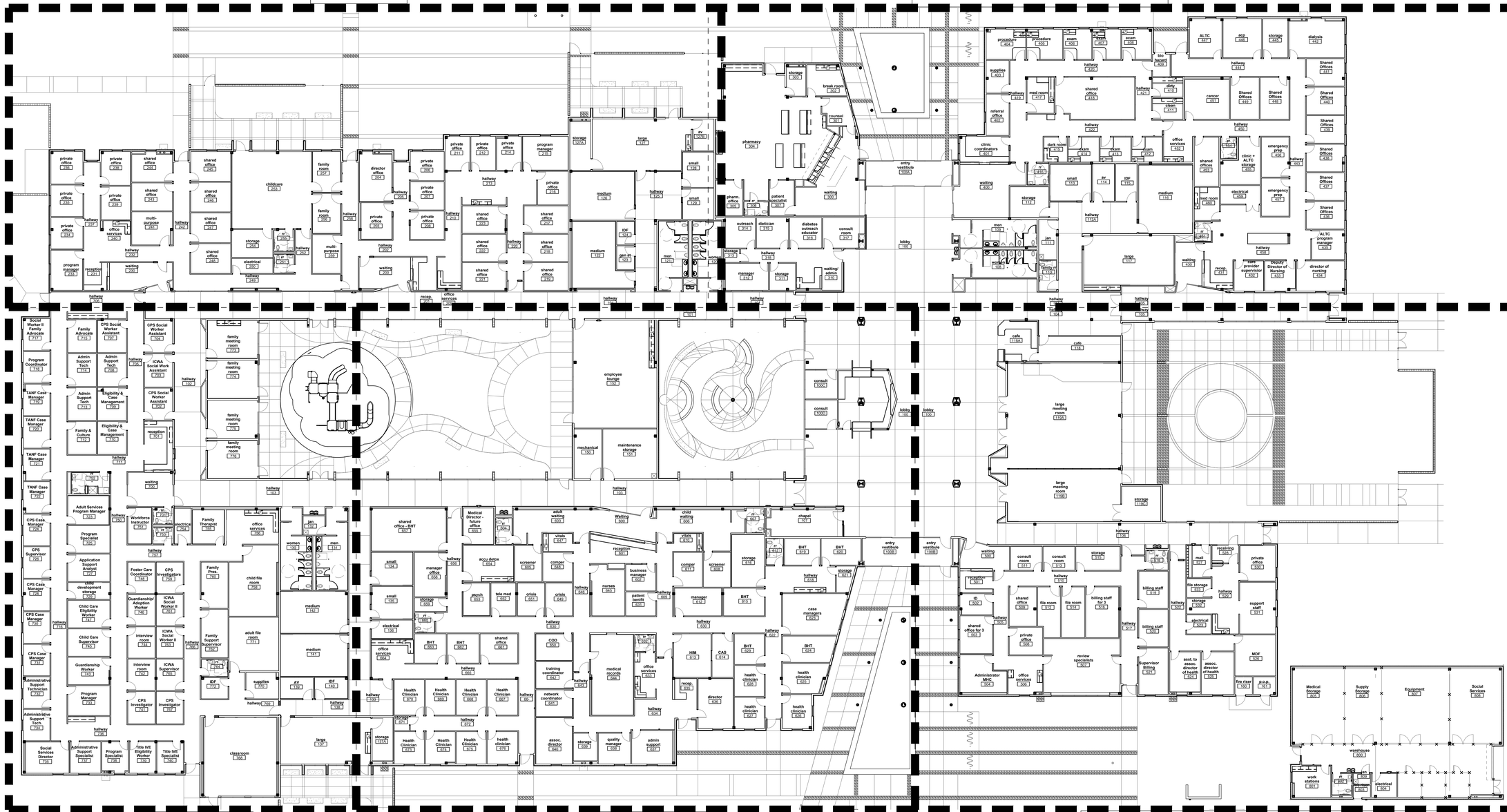
INTERIOR FINISH INFORMATION SHEET

id-f-a2

SEWA
U'USIM

PHARAMACY, DIABETES,
NURSING & CLINICS



SOCIAL
SERVICES

CENTERED
SPIRIT

HEALTH BUDGET, MANAGED
HEALTH, BILLING & WAREHOUSE

1 id-f-a3 DEPARTMENTAL PLAN-OVERALL
SCALE: 1/16"= 1'-0"

north

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DEPARTMENTAL
PLAN

id-f-a3

SEE SHEET: i-f-1.0 FOR ALL FLOOR FINISH LEGENDS

INTERIOR FLOOR FINISH KEY

- SH-F1 — SHEET VINYL
- SH-A1 — SHEET VINYL
- EPX — EPOXY SEAMLESS FLOORING
- FT-GP-1 — FLOOR TILE
- SC — SEALED CONCRETE
- WD-PL — LVT VINYL PLANKING
- SD-VCT — STATIC DISSIPATIVE VCT
- FT-2 — FLOOR TILE
- ST-CO-1 — STAINED/COLORED CONCRETE
- CPT-WO — CARPET TILE WALK-OFF MAT

FLOOR FINISH SYMBOL LEGEND

###
###
FIRST TAG INDICATES MAIN FLOOR FINISH
BOTTOM TAG INDICATES COVE BASE

INTERIOR FLOOR FINISH CODES / LEGEND

FT-GP-1	12" X 24" CERAMIC TILE RECTIFIED
FT-2	2" X 2" CERAMIC TILE RECTIFIED
TH-MTL	METAL TRANSITION STRIP
RB-2	COVE BASE
TRA-S-2	TRANSITION STRIPS
ST-CO-1	STAINED/COLORED CONCRETE
SC	SEALED CONCRETE
SH-F1 & SH-A1	SHEET VINYL WITH FLASH COVE
WD-PL	LVT WOOD VINYL PLANKING
SD-VCT	STATIC DISSIPATIVE VCT
EPX	EPOXY SEAMLESS FLOORING
CPT-WO	CARPET TILE WALK-OFF MAT

1 i-f-0.0 FINISH FLOOR PLAN-MAIN BUILDING
SCALE: 1/16"= 1'-0"

north

2 i-f-0.0 FINISH FLOOR PLAN-WAREHOUSE
SCALE: 1/16"= 1'-0"

north

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FINISH FLOOR PLAN - OVERALL

i-f-0.0

SEE SHEET: i-f-1.0 FOR ALL FLOOR FINISH LEGENDS

INTERIOR FLOOR FINISH KEY

- SH-F1 — SHEET VINYL
- SH-A1 — SHEET VINYL
- WD-PL — LVT VINYL PLANKING
- SD-VCT — STATIC DISSIPATIVE VCT
- EPX — EPOXY SEAMLESS FLOORING
- FT-GP-1 — FLOOR TILE
- FT-2 — FLOOR TILE
- ST-CO-1 — STAINED/COLORED CONCRETE
- SC — SEALED CONCRETE
- CPT-WO — CARPET TILE WALK-OFF MAT

FLOOR FINISH SYMBOL LEGEND

##-# — FIRST TAG INDICATES MAIN FLOOR FINISH
##-# — BOTTOM TAG INDICATES COVE BASE

INTERIOR FLOOR FINISH CODES / LEGEND

FT-GP-1	12" X 24" CERAMIC TILE RECTIFIED
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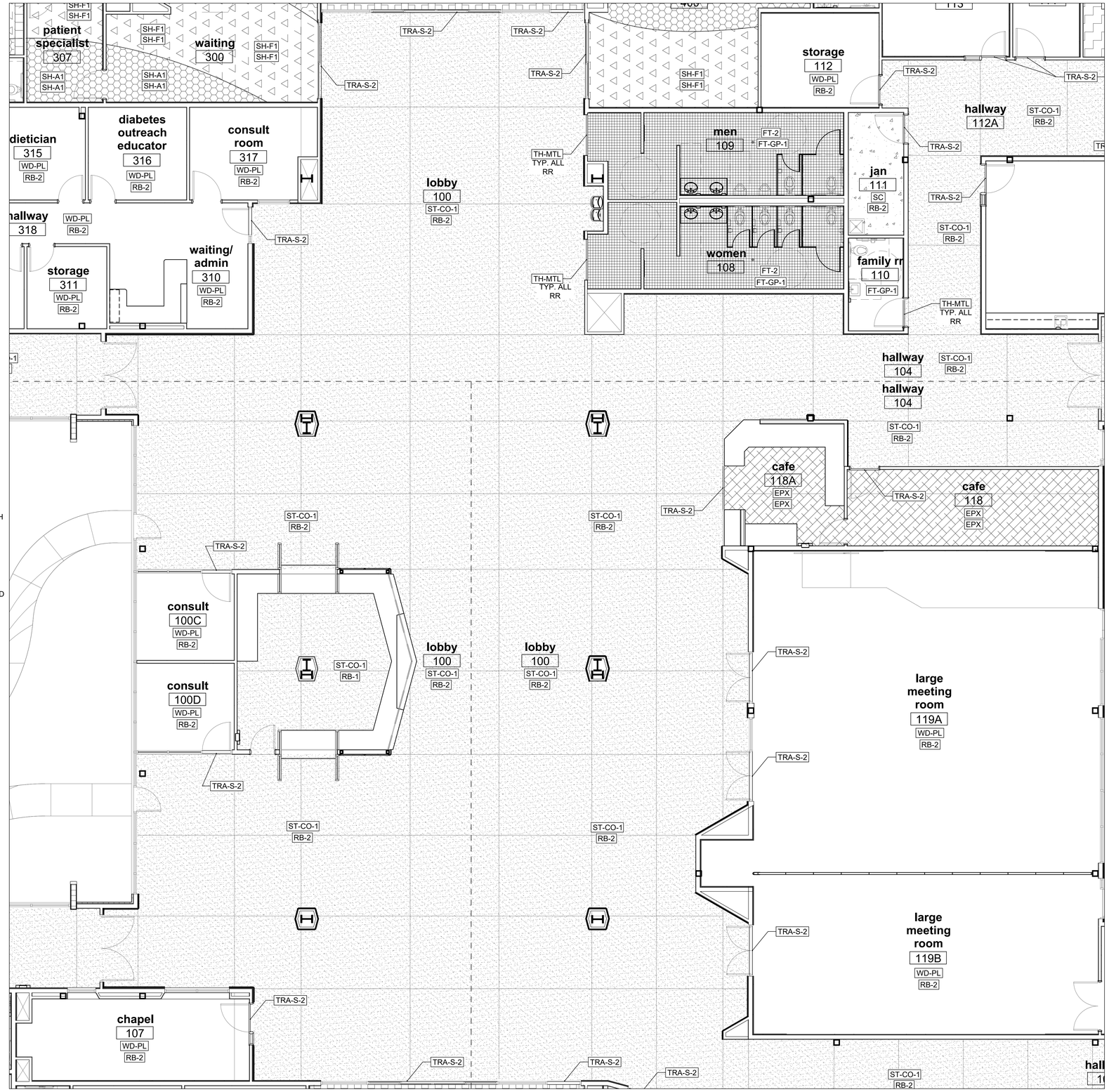
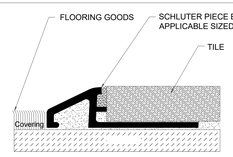
SD-VCT	STATIC DISSIPATIVE VCT
EPX	EPOXY SEAMLESS FLOORING
CPT-WO	CARPET TILE WALK-OFF MAT

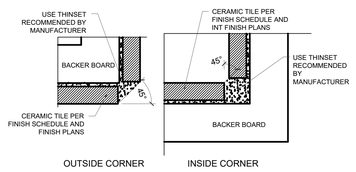


1 i-f-0.1 — FLOOR FINISH PLAN - LOBBY
SCALE: 3/16"= 1'-0"

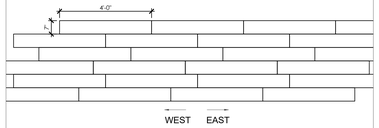
north



TH-MTL: SCHLUTER METAL TRANSITION STRIP DETAIL AT ALL BATHROOMS
SCALE: NTS

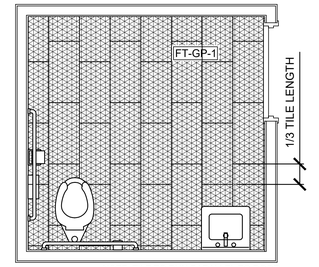


TILE CORNER DETAILS
SCALE: NTS



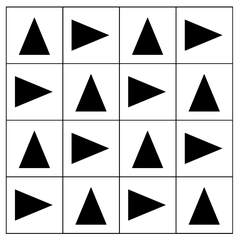
NOTE: ALL WOOD VINYL PLANKING WD-PL TO RUN WEST EAST

WD-PL: WOOD VINYL PLANKING LAYOUT DETAIL AT ALL LOCATIONS
SCALE: 3/8" = 1'-0"

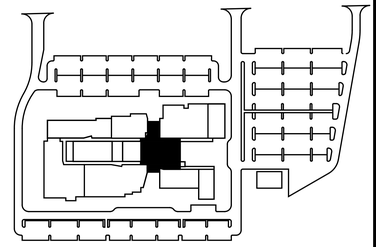


NOTE: TILE TO RUN PARALLEL TO DOOR

FT-GP-1: FLOOR TILE LAYOUT AT ALL SINGLE RR LOCATIONS
SCALE: 1/2" = 1'-0"



CPT-WO: CARPET TILE PLANK QUARTER TURN PATTERN
nts



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job 1717

date 11.16.18

revisions

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FLOOR FINISH PLAN

i-f-0.1

PASCUA YAQUI TRIBE . HEALTH CENTER II - INTERIOR FLOOR FINISH KEY

CERAMIC FLOOR TILE

CODE	STOCK NO.	MANUFACTURER	DESCRIPTION / NOTES / LOCATION
FT-GP-1	DALTILE, KONCRETE COLOR: WHITE KC01 12" X 24" WALL TILE COLOR: ME07 COOL BEIGE RECOMMENDED GROUT JOIN 3/16" GROUT: MAPEI 100% SOLID EPOXY KERAPOXY CQ COLOR: 94 STRAW	DALTILE	1. RECOMMENDED GROUT WIDTH: 3/16" 2. SIZE: 12" X 24" 3. TILE THICKNESS: 3/8" 4. OVERLAP SHOULD NOT EXCEED 33% WHEN INSTALLING TILE WITH A LENGTH 15" OR GREATER IN A STAGGERED BRICK JOINT PATTERN. 5. CERAMIC FLOOR AND WALL TILE 6. RECOMMENDED GROUT JOINT 3/16" 7. SEE PLAN FOR TILE PATTERN
FT-2	DALTILE, KONCRETE COLOR: WHITE KC01 2" X 2" FLOOR TILE RECOMMENDED GROUT JOIN 3/16" GROUT: MAPEI 100% SOLID EPOXY KERAPOXY CQ COLOR: 94 STRAW	DALTILE	1. RECOMMENDED GROUT WIDTH: 3/16" 2. SIZE: 2" X 2" 3. TILE THICKNESS: 3/8" 4. CERAMIC FLOOR AND WALL TILE 5. RECOMMENDED GROUT JOINT 3/16" 6. SEE PLAN FOR TILE PATTERN

THRESHOLDS & TRANSITION STRIPS

TH-MTL	PORCELAIN TILE TO VINYL & / OR PLANKING METAL TRANSITION STRIP BRUSHED STAINLESS "F8" # EU 80 / 3/8" - 10 MM	SCHLUTER 1-800-472-4588	1. LOCATION: AT ALL BATHROOM THRESHOLDS 2. ADJUST SPECIFICATION WITH THE HEIGHT OF 3. ASSOCIATED GOODS IF NECESSARY 4. ORDER LENGTH TO ASSOCIATE WITH OPENING 5. FINISH: EB BRUSHED STAINLESS STEEL 6. REVISED TO TILE SIZE AS IS APPROPRIATE 7. NOTE: MODIFY TRIM PIECE TO FIT THE SPECIFIC FLOOR CONDITION AND INSTALLATION
TRA-S-2	WHEELED TRAFFIC TRANSITION STRIP AS NEED WHERE CARPET TILE AND OR VINYL PLANKING MEETS COLORED CONCRETE OR OTHER SUBSTRATES. TO BE SPECIFIED BY FLOORING SUBCONTRACTOR / VENDOR	JOHNSONITE	TRANSITION STRIPS SPECIFICATIONS AND SAMPLES TO MATCH COVE BASE TO BE SUPPLIED TO BHIDP AS SUBMITTALS, WITH SPECIFIC LOCATION

CARPET TILE - WALK-OFF MATT

CPT-WO QUARTER TURN INSTALL PATTERN	SHAW CONTRACT CARPET TILE-WALK OFF MAT STYLE: BON JOUR II TILE ST032 COLOR: BLACK CHOCOLATE 31751 SIZE: 24" X 24"	SHAW CONTRACT	1. STYLE: BON JOUR II TILE ST032 2. COLLECTION: STEPPIN OUT 3. SIZE: 24" X 24" 4. CONSTRUCTION: NEEDLEBOND RIB 5. TYPE: TILE 6. BACKING: ECOWORX® TILE 7. FIBER: PET POLYESTER 8. DYE METHOD: 100% SOLUTION DYED 9. TUFTED WEIGHT: 50.5 10. WARRANTY: LIFETIVE COMMERCIAL LIMITED

INSTALLATION INSTRUCTIONS:
TEMPERATURE OF THE JOB SITE MUST STAY WITHIN 60 F AND 85 F 72 HOURS BEFORE AND 72 HOURS AFTER INSTALLATION. THE HEATING AND COOLING SYSTEM MUST BE ON DURING THIS PROCESS. MOISTURE AND ALKALINITY MUST BE TESTED PRIOR TO CARPET INSTALLATION. THE BUILDING MUST BE ACCLIMATED (SEE ABOVE) BEFORE ACCURATE READING CAN BE MEASURED. ALL TESTS MUST BE CONDUCTED TO THE ASTM GUIDELINE (ASTM F 1869); ASTM F 1869 STATES THAT AN ANHYDROUS CALCIUM CHLORIDE TEST SHOULD BE ADMINISTERED AS FOLLOWS: THREE TESTS PER FIRST 1,000 FEET, 1 TEST PER 1,000; FEET THEREAFTER, THE MOISTURE SHOULD NOT EXCEED 3.0. IF A READING OF 3.0 OR HIGHER IS ACHIEVED, CONTACT THE MANUFACTURER'S REPRESENTATIVE FOR INSTRUCTION. A PH TEST IS ALSO REQUIRED PER CRI 104. THE TEST SHOULD BE PREFORMED EVERY 1,000 FEET. A RANGE OF 7-9 PH IS ACCEPTABLE. A READING OUTSIDE OF THIS RANGE MUST BE DISCUSSED WITH THE MANUFACTURER'S REPRESENTATIVE BEFORE PROCEEDING. ALL MOISTURE BARRIERS AND ADHESIVE / GLUE MUST BE PER MANUFACTURER'S RECOMMENDED PRODUCTS.

PASCUA YAQUI TRIBE . HEALTH CENTER II - INTERIOR FLOOR FINISH KEY

RESILIENT FLOOR PRODUCTS AND ACCESSORIES

CODE	STOCK NO.	MANUFACTURER	DESCRIPTION / NOTES / LOCATION
RB-1	NOT USED		NOT USED
RB-2	TRADITIONAL VINYL WALL BASE COLOR: 107 FUDGE 4" HIGH USED THROUGHOUT	JOHNSONITE	1. TRADITIONAL 1/8" VINYL WALL BASE 2. LOCATION PER PLANS 3. 4" HIGH WITH TOE, NO PREFORMED CORNERS 4. INSTALL PER MANUFACTURERS INSTRUCTIONS

HARD FLOOR FINISHING PRODUCTS

FLOOR COATING PRODUCTS

EPX	EPOXY SEAMLESS FLOORING COLOR: Q-28-29 DUR-A-GLAZE 86 GROUT COAT ARMOR TOP GLOSS WITH GRIT	DUR-A-QUARTZ www.dur-a-flex.com	1. LOCATION: SNACK BAR – BACK OF HOUSE 2. EPOXY BASED SEAMLESS FLOORING SYSTEM BY DUR-A-FLEX 3. 6" COVE BASE FROM SAME FLOORING MATERIAL 4. INSTALL PER MANUFACTURE'S INSTRUCTIONS 5. SEE ARCHITECTURAL PACKAGE FOR SPECIFICATIONS

HARD FLOOR FINISHES

CO-S	STAINED / COLORED CONCRETE CLOSE TO DUNN EDWARDS PAINT COLOR DEC750 BISON BEIGE	TO BE DETERMINED	1. COLOR: TO BE DETERMINED 2. COLORED STAIN: GEMTONE 3. SUBMITTAL SAMPLES REQUIRES – COLOR CHANGE MAY BE REQUIRED AFTER SUBMITTALS RECEIVED 4. EXACT COLOR TO BE REVISED AT SITE DUE TO CONDITIONS OF THE SLAB. 5. ONSITE SAMPLING OF COLORS REQUIRED

COLOR & SAMPLE FOR APPROVAL TO BE DETERMINED AT SITE

PASCUA YAQUI TRIBE . HEALTH CENTER II - INTERIOR FLOOR FINISH KEY

NOTE: LOW EMITTING MATERIALS / ADHESIVES & SEALANTS REQUIRED: LEED CREDIT EQ 4.5 (INDOOR ENVIRONMENTAL QUALITY) LOW-EMITTING MATERIALS A COMPREHENSIVE LIST WITH ASSOCIATED VOC LEVELS IS TO BE PROVIDED FOR, BUT NOT LIMITED TO ALL MULTIPURPOSE CONSTRUCTION, COUNTERTOP, CAULKING, GLAZING, DUCTWORK, FIRE AND GENERAL CAULKING, ACOUSTICAL AND PLUMBING ADHESIVE SEALANTS ALL ARCHITECTURAL SEALANT, ARCHITECTURAL PRIMER, ALL ADHESIVES, CAULKS, GROUTS AND MASTICS.

RESILIENT FLOOR PRODUCTS

CODE	STOCK NO.	MANUFACTURER	DESCRIPTION / NOTES / LOCATION
SH-F1	GERFLOR MIPOLAM SYMBIOZ COLOR: 6027 ACACIA (YELLOW GREEN) 5 " FLASH COVE	GERFLOR MANUF. REP.: LD COMMERCIAL SOLUTIONS DAVE WILSON (248) 515-9358	1. LOCATION: PER PLAN 2. SIZE: WIDTH: 6' 6" X LENGTH: 66' 3. THICKNESS: 0.08" 4. WEAR LAYER: 0.08" 5. WEIGHT: LBS. SF.: 0.68 6. WARRANTY: 10 YEARS 7. ASTM F 1913-04 8. FIRE RATING: CAL/ULC S102.2 9. SURFACE TREATMENT: PUR 10. SURFACE RESISTANCE: ASTM D 2047 11. COEFFICIENT OF FRICTION: ASTM D 2047 / C1028 12. CHEMICAL AND STAIN RESISTANCE: ASTM F925 13. CERTIFICATION: FLORSCORE ™ 14. 10 % ATTIC STOCK REQUIRED
SH-A1	GERFLOR MIPOLAM SYMBIOZ COLOR: 60371 LAGOON (MED. TEAL) 5 " FLASH COVE		
WD-PL	WOOD VINYL PLANKING SURFACELINX / LVT "QUITE COMFORT BINDER" NAME: TRADE ZONE COLOR: DRT42 DRIFTWOOD	SURFACELINX MANUF. REP.: LD COMMERCIAL SOLUTIONS DAVE WILSON (248) 515-9358	1. LOCATION: PER PLAN 2. THICKNESS: 3MM 3. WEAR LAYER: 0.51 MM/20 MIL 4. STYLE SIZE: 7" X 48" 5. PATTERN REPEAT: WOOD PATTERN 6. MICRO-BEVELED NO GLASS/ASTM F1700 CLASS III PRINTED FILM VINYL PLANK 7. TYPE B (EMBOSSED) 8. BACKING GLASS COMMERCIAL 9. GRADE GLOSS LEVEL 7-10 10. TRAFFIC USE: HEAVY COMMERCIAL 11. PRODUCT WARRANTY 10 YEAR COMMERCIAL WEAR-THROUGH / MANUFACTURE DEFECTS 12. COMPOSITION COATING ENHANCED UV URETHANE W/ CERAMIC BEAD GLASS 13. ADDED ANTI MICROBIAL: YES 14. NANO-SILVER ADDITIVE TO PROTECT AGAINST BACTERIA 15. ASTM F 2055 SIZE AND TOLERANCE PASS AS SPECIFIED 0.016 IN / LIN FT 16. ASTM F 386 THICKNESS PASS AS SPECIFIED 0.005 IN / LIN FT 17. ASTM F 2055 SQUARE-NESS PASS MAXIMUM 0.010 IN 18. ASTM F 1914 RESIDUAL INDENTATION PASS AVERAGE < 8% 19. ASTM F 137 FLEXIBILITY PASSES 6MM MANDREL / NO CRACK OR BREAK 20. ASTM F 2199 DIMENSIONAL STABILITY PASS 0.011 IN / FT < 0.020 IN / FT 21. ASTM F 1514 RESISTANCE TO HEAT PASS < 8 (DELTA E) AVERAGE 22. ASTM E 648 CRITICAL RADIANT FLUX CLASS 1 (< 0.45 W/CM2) 23. ASTM E662 OPTICAL SMOKE DENSITY PASSES < 450 ASTM C1028 SLIP RESISTANCE PASS ADA COMPLIANT (> 0.50) ASTM F970 STATIC LOAD PASS 1000 PSI / 250 PSI (< 0.005 IN)
SD-VCT	STATIC DISSIPATIVE VCT COLOR: #51950 MARBLE BEIGE	ARMSTRONG	1. LOCATION: PER PLAN 2. STATIC DISSIPATIVE TILE 3. SIZE: 12" X 12" 4. INSTALL PER MANUFACTURE'S INSTRUCTIONS 5. INCLUDING STATIC DISSIPATIVE WAX

INTERIOR FLOOR FINISH KEY

SH-F1
SHEET VINYL

SH-A1
SHEET VINYL

WD-PL
LVT VINYL PLANKING

SD-VCT
STATIC DISSIPATIVE VCT

EPX
EPOXY SEAMLESS FLOORING

FT-GP-1
FLOOR TILE

FT-2
FLOOR TILE

ST-CO-1
STAINED/COLORED CONCRETE

SC
SEALED CONCRETE

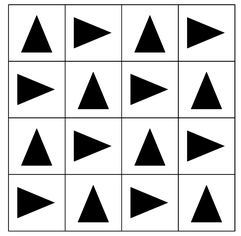
CPT-WO
CARPET TILE WALK-OFF MAT

INTERIOR FLOOR FINISH CODES / LEGEND

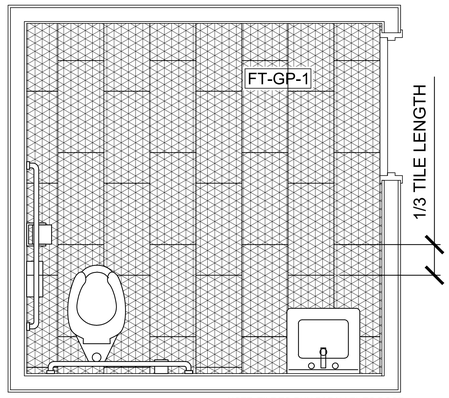
FT-GP-1	12" X 24" CERAMIC TILE RECTIFIED
FT-2	2" X 2" CERAMIC TILE RECTIFIED
TH-MTL	METAL TRANSITION STRIP
RB-2	COVE BASE
TRA-S-2	TRANSITION STRIPS
ST-CO-1	STAINED/COLORED CONCRETE
SC	SEALED CONCRETE
SH-F1 & SH-A1	SHEET VINYL WITH FLASH COVE
WD-PL	LVT WOOD VINYL PLANKING
SD-VCT	STATIC DISSIPATIVE VCT
EPX	EPOXY SEAMLESS FLOORING
CPT-WO	CARPET TILE WALK-OFF MAT

FLOOR FINISH SYMBOL LEGEND

##-#	FIRST TAG INDICATES MAIN FLOOR FINISH
##-#	BOTTOM TAG INDICATES COVE BASE

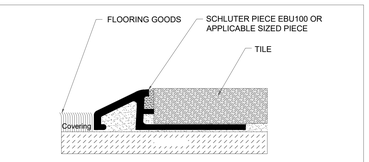


CPT-WO: CARPET TILE PLANK QUARTER TURN PATTERN
nts

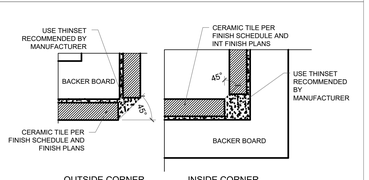


NOTE: TILE TO RUN PARALLEL TO DOOR

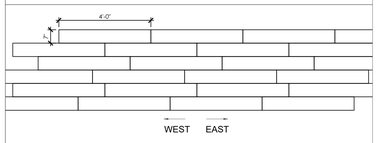
FT-GP-1: FLOOR TILE LAYOUT AT ALL SINGLE RR LOCATIONS
SCALE: 3/4" = 1'-0"



TH-MTL: SCHLUTER METAL TRANSITION STRIP DETAIL AT ALL BATHROOMS
SCALE: NTS

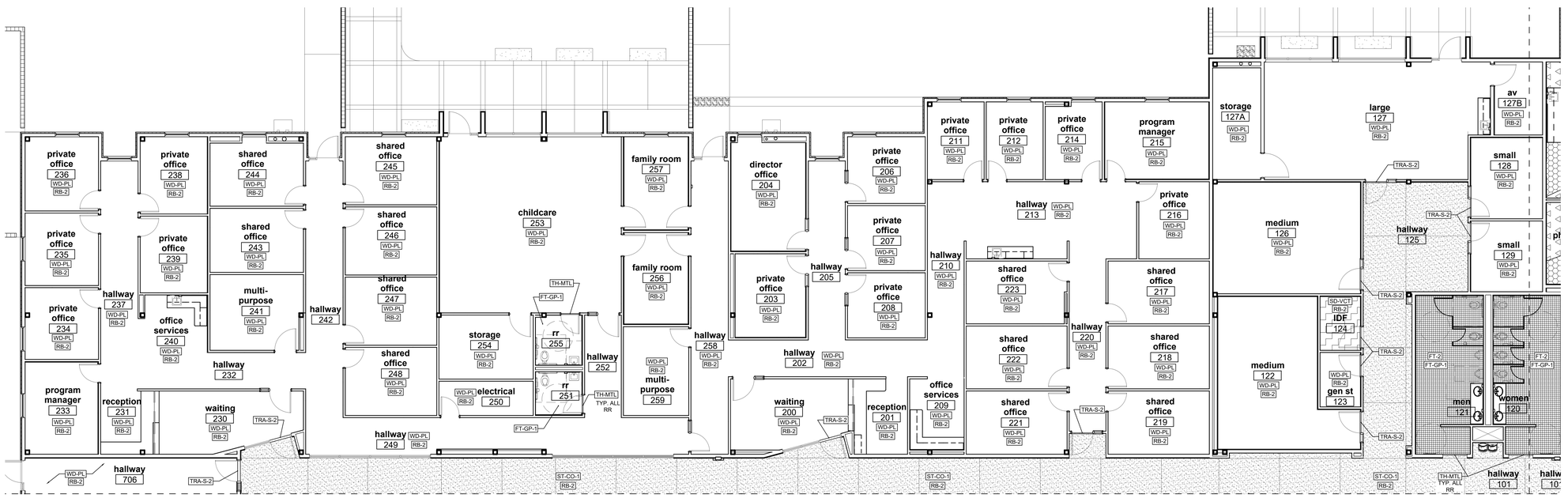


TILE CORNER DETAILS
SCALE: NTS



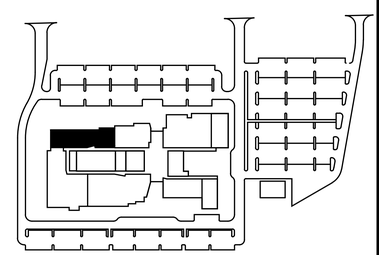
NOTE: ALL WOOD VINYL PLANKING WD-PL TO RUN WEST EAST

WD-PL: WOOD VINYL PLANKING LAYOUT DETAIL AT ALL LOCATIONS
SCALE: 3/8" = 1'-0"



1 i-f-1.0 FLOOR FINISH PLAN - SEWA U'USIM
SCALE: 1/8"= 1'-0"

north



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FLOOR FINISH PLAN

i-f-1.0

SEE SHEET: i-f-1.0 FOR ALL FLOOR FINISH LEGENDS

FLOOR FINISH SYMBOL LEGEND

##-#	FIRST TAG INDICATES MAIN FLOOR FINISH
##-#	BOTTOM TAG INDICATES COVE BASE

INTERIOR FLOOR FINISH CODES / LEGEND

FT-GP-1	12" X 24" CERAMIC TILE RECTIFIED
FT-2	2" X 2" CERAMIC TILE RECTIFIED
TH-MTL	METAL TRANSITION STRIP
RB-2	COVE BASE
TRA-S-2	TRANSITION STRIPS
ST-CO-1	STAINED/COLORED CONCRETE
SC	SEALED CONCRETE
SH-F1 & SH-A1	SHEET VINYL WITH FLASH COVE
WD-PL	LVT WOOD VINYL PLANKING
SD-VCT	STATIC DISSIPATIVE VCT
EPX	EPOXY SEAMLESS FLOORING
CPT-WO	CARPET TILE WALK-OFF MAT

INTERIOR FLOOR FINISH KEY

SH-F1
SHEET VINYL

FT-GP-1
FLOOR TILE

SH-A1
SHEET VINYL

FT-2
FLOOR TILE

WD-PL
LVT VINYL PLANKING

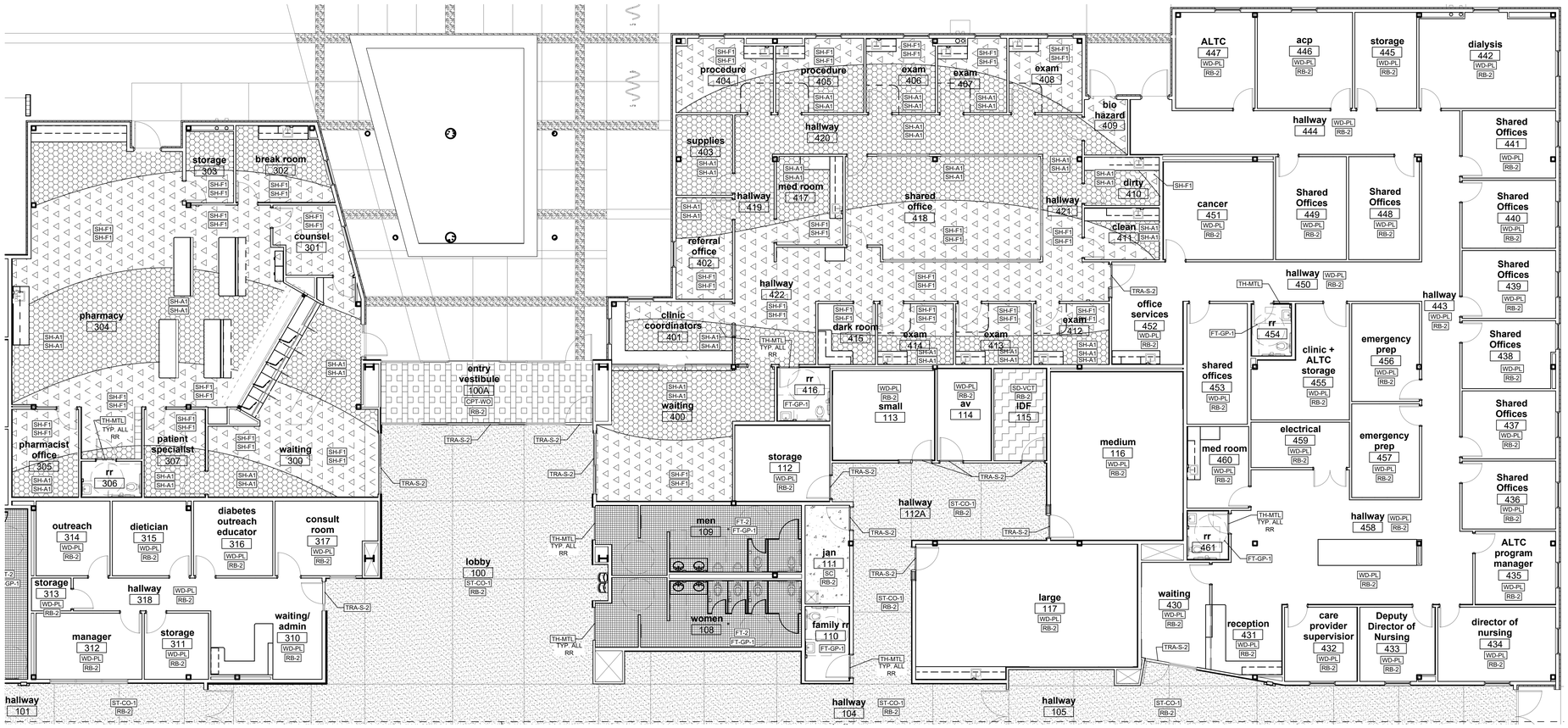
ST-CO-1
STAINED/COLORED CONCRETE

SD-VCT
STATIC DISSIPATIVE VCT

SC
SEALED CONCRETE

EPX
EPOXY SEAMLESS FLOORING

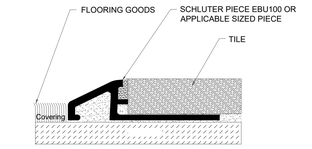
CPT-WO
CARPET TILE WALK-OFF MAT



1 i-f-1.1 FLOOR FINISH PLAN - PHARMACY, DIABETES, NURSING, & CLINICS

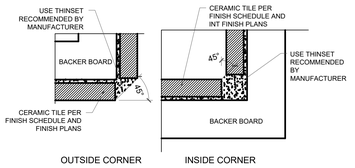
SCALE: 1/8"= 1'-0"

north



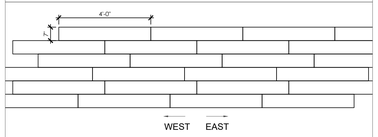
TH-MTL: SCHLUTER METAL TRANSITION STRIP DETAIL AT ALL BATHROOMS

SCALE: NTS



TILE CORNER DETAILS

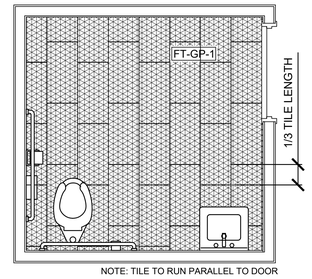
SCALE: NTS



NOTE: ALL WOOD VINYL PLANKING WD-PL TO RUN WEST EAST

WD-PL: WOOD VINYL PLANKING LAYOUT DETAIL AT ALL LOCATIONS

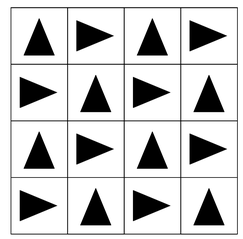
SCALE: 3/8" = 1'-0"



NOTE: TILE TO RUN PARALLEL TO DOOR

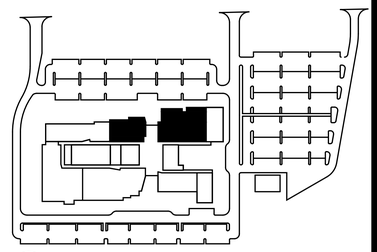
FT-GP-1: FLOOR TILE LAYOUT AT ALL SINGLE RR LOCATIONS

SCALE: 1/2" = 1'-0"



CPT-WO: CARPET TILE PLANK QUARTER TURN PATTERN

nts



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FLOOR FINISH PLAN

i-f-1.1

SEE SHEET: i-f-1.0 FOR ALL FLOOR FINISH LEGENDS

INTERIOR FLOOR FINISH CODES / LEGEND

FT-GP-1	12" X 24" CERAMIC TILE RECTIFIED
FT-2	2" X 2" CERAMIC TILE RECTIFIED
TH-MTL	METAL TRANSITION STRIP
RB-2	COVE BASE
TRA-S-2	TRANSITION STRIPS
ST-CO-1	STAINED/COLORED CONCRETE
SC	SEALED CONCRETE
SH-F1 & SH-A1	SHEET VINYL WITH FLASH COVE
WD-PL	LVT WOOD VINYL PLANKING
SD-VCT	STATIC DISSIPATIVE VCT
EPX	EPOXY SEAMLESS FLOORING
CPT-WO	CARPET TILE WALK-OFF MAT

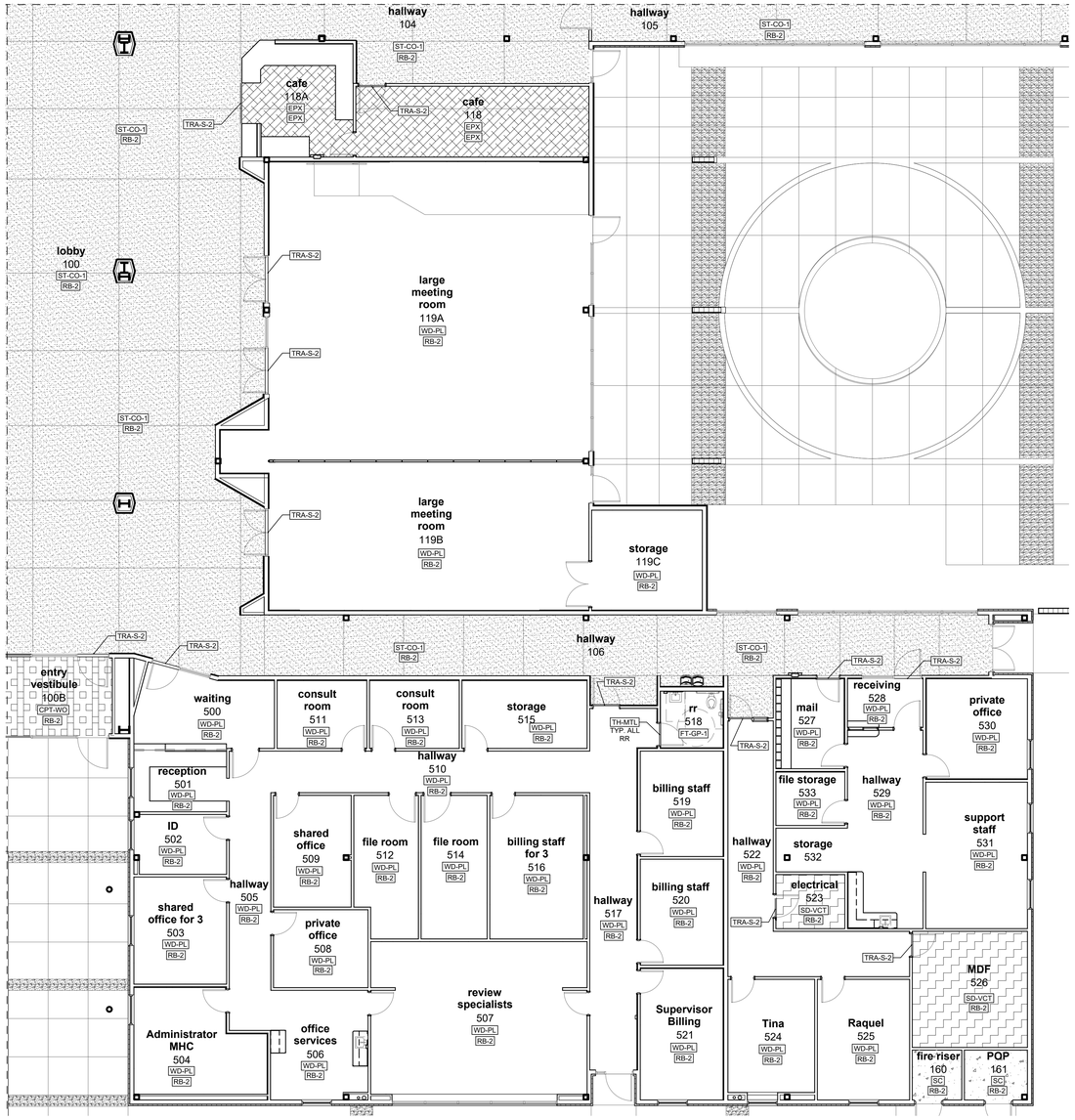
FLOOR FINISH SYMBOL LEGEND

##-#	FIRST TAG INDICATES MAIN FLOOR FINISH
##-#	BOTTOM TAG INDICATES COVE BASE

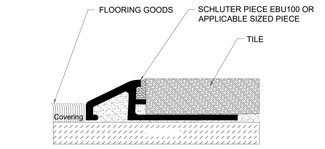
INTERIOR FLOOR FINISH KEY

- **SH-F1 SHEET VINYL**
- **SH-A1 SHEET VINYL**
- **WD-PL LVT VINYL PLANKING**
- **SD-VCT STATIC DISSIPATIVE VCT**
- **EPX EPOXY SEAMLESS FLOORING**
- **FT-GP-1 FLOOR TILE**
- **FT-2 FLOOR TILE**
- **ST-CO-1 STAINED/COLORED CONCRETE**
- **SC SEALED CONCRETE**
- **CPT-WO CARPET TILE WALK-OFF MAT**

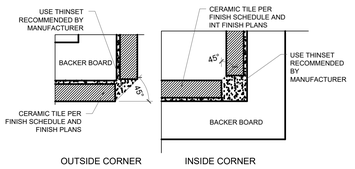
1 i-f-1.2 FLOOR FINISH PLAN - WAREHOUSE
SCALE: 1/8"= 1'-0"



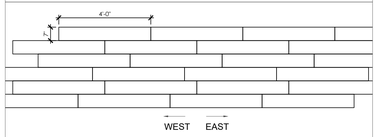
2 i-f-1.2 FLOOR FINISH PLAN - HEALTH BUDGET, MANAGED HEALTH, BILLING
SCALE: 1/8"= 1'-0"



TH-MTL: SCHLUTER METAL TRANSITION STRIP DETAIL AT ALL BATHROOMS
SCALE: NTS

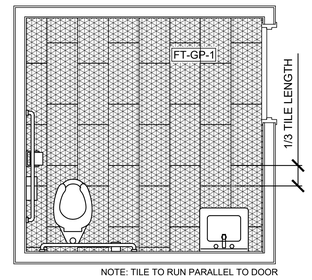


TILE CORNER DETAILS
SCALE: NTS



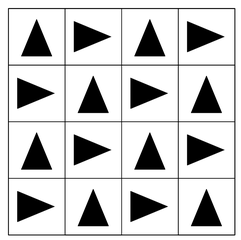
NOTE: ALL WOOD VINYL PLANKING WD-PL TO RUN WEST EAST

WD-PL: WOOD VINYL PLANKING LAYOUT DETAIL AT ALL LOCATIONS
SCALE: 3/8" = 1'-0"

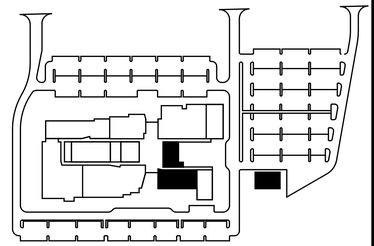


NOTE: TILE TO RUN PARALLEL TO DOOR

FT-GP-1: FLOOR TILE LAYOUT AT ALL SINGLE RR LOCATIONS
SCALE: 1/2" = 1'-0"



CPT-WO: CARPET TILE PLANK QUARTER TURN PATTERN
nts



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FLOOR FINISH PLAN

i-f-1.2

SEE SHEET: i-f-1.0 FOR ALL FLOOR FINISH LEGENDS

INTERIOR FLOOR FINISH KEY

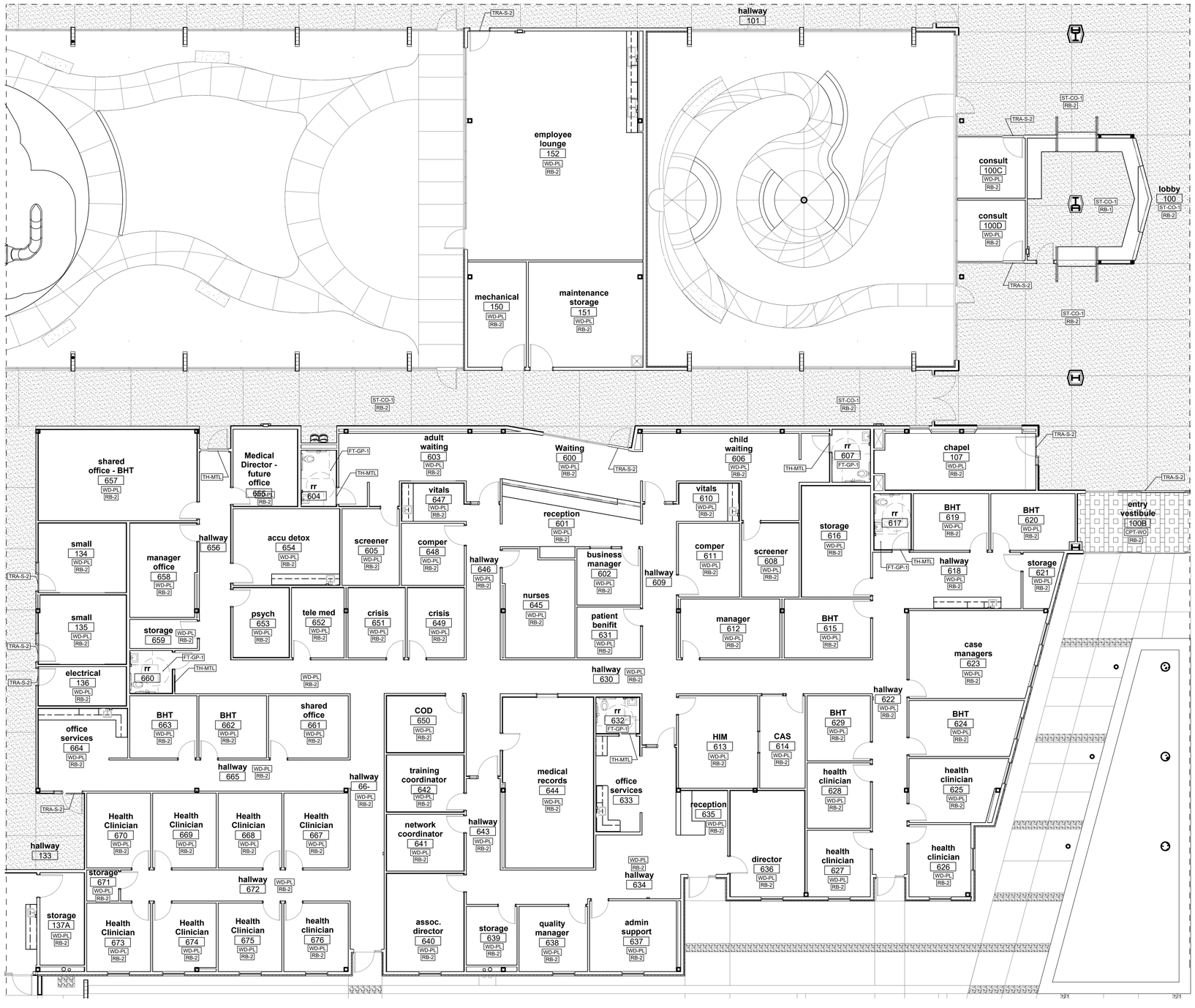
- SH-F1 SHEET VINYL
- WD-PL LVT VINYL PLANKING
- EPX EPOXY SEAMLESS FLOORING
- FT-2 FLOOR TILE
- SC SEALED CONCRETE
- SH-A1 SHEET VINYL
- SD-VCT STATIC DISSIPATIVE VCT
- FT-GP-1 FLOOR TILE
- ST-CO-1 STAINED/COLORED CONCRETE
- CPT-WO CARPET TILE WALK-OFF MAT

INTERIOR FLOOR FINISH CODES / LEGEND

FT-GP-1	12" X 24" CERAMIC TILE RECTIFIED
FT-2	2" X 2" CERAMIC TILE RECTIFIED
TH-MTL	METAL TRANSITION STRIP
RB-2	COVE BASE
TRA-S-2	TRANSITION STRIPS
ST-CO-1	STAINED/COLORED CONCRETE
SC	SEALED CONCRETE
SH-F1 & SH-A1	SHEET VINYL WITH FLASH COVE
WD-PL	LVT WOOD VINYL PLANKING
SD-VCT	STATIC DISSIPATIVE VCT
EPX	EPOXY SEAMLESS FLOORING
CPT-WO	CARPET TILE WALK-OFF MAT

FLOOR FINISH SYMBOL LEGEND

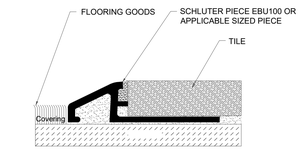
##-#	FIRST TAG INDICATES MAIN FLOOR FINISH
##-#	BOTTOM TAG INDICATES COVE BASE



1 i-f-1.3 FLOOR FINISH PLAN - CENTERED SPIRIT

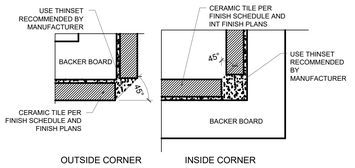
SCALE: 1/8"= 1'-0"

north



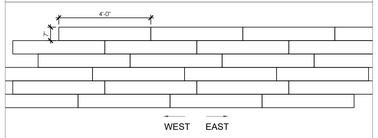
TH-MTL: SCHLUTER METAL TRANSITION STRIP DETAIL AT ALL BATHROOMS

SCALE: NTS



TILE CORNER DETAILS

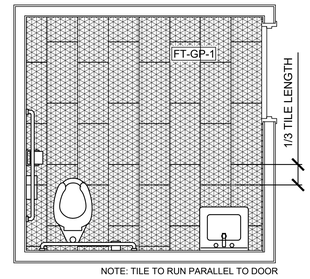
SCALE: NTS



NOTE: ALL WOOD VINYL PLANKING WD-PL TO RUN WEST EAST

WD-PL: WOOD VINYL PLANKING LAYOUT DETAIL AT ALL LOCATIONS

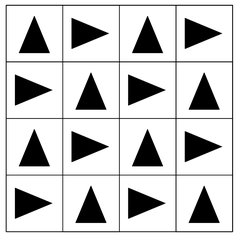
SCALE: 3/8" = 1'-0"



NOTE: TILE TO RUN PARALLEL TO DOOR

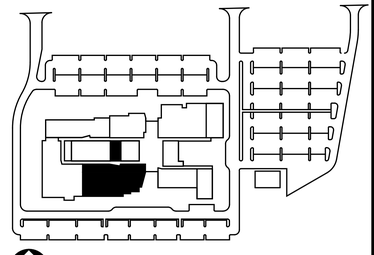
FT-GP-1: FLOOR TILE LAYOUT AT ALL SINGLE RR LOCATIONS

SCALE: 1/2" = 1'-0"



CPT-WO: CARPET TILE PLANK QUARTER TURN PATTERN

nts



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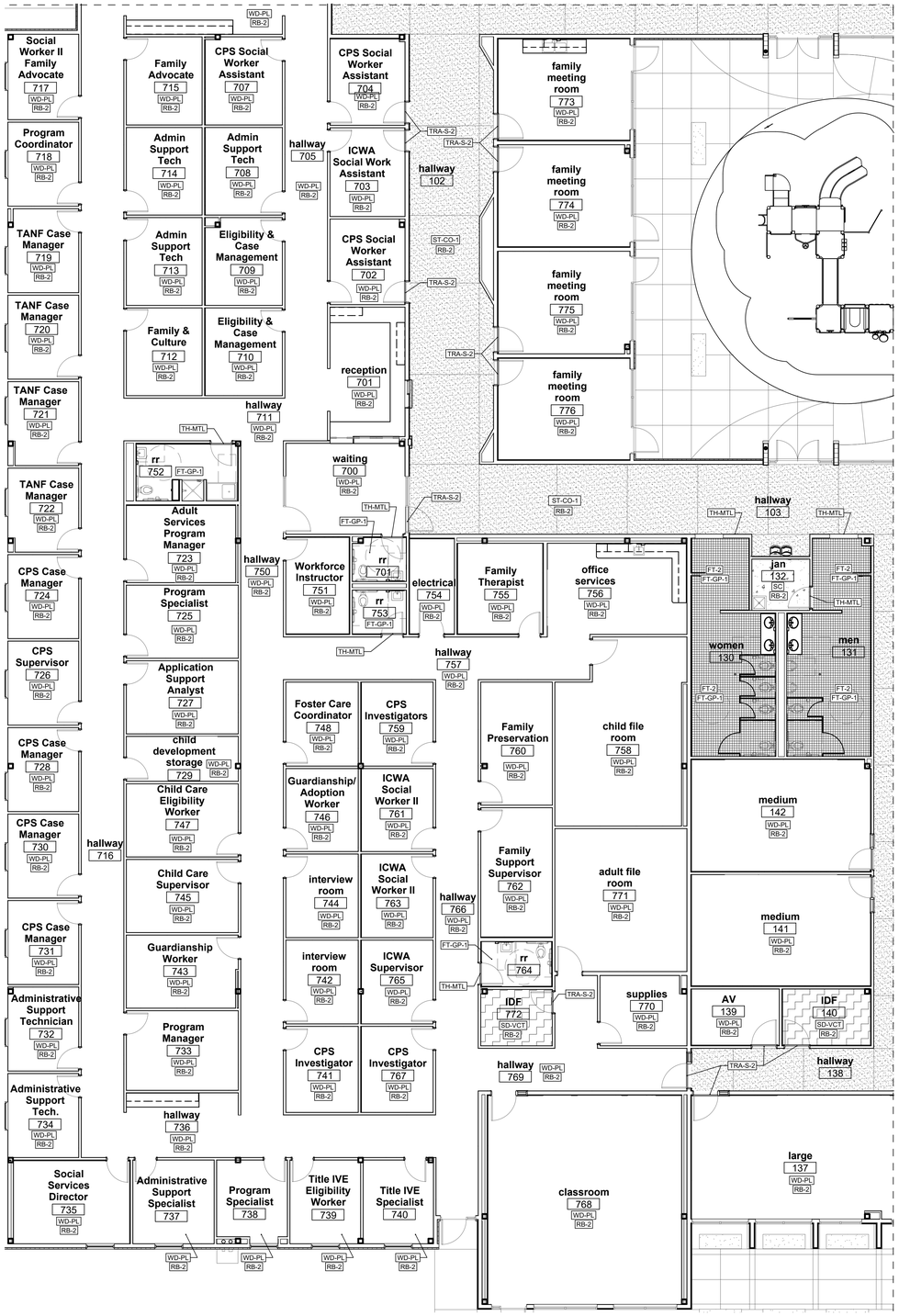
FLOOR FINISH PLAN

i-f-1.3

SEE SHEET: i-f-1.0 FOR ALL FLOOR FINISH LEGENDS



1 i-f-1.4 FLOOR FINISH PLAN - SOCIAL SERVICES

SCALE: 1/8"= 1'-0"

FLOOR FINISH SYMBOL LEGEND

##-# FIRST TAG INDICATES MAIN FLOOR FINISH
##-# BOTTOM TAG INDICATES COVE BASE

INTERIOR FLOOR FINISH CODES / LEGEND

FT-GP-1	12" X 24" CERAMIC TILE RECTIFIED
FT-2	2" X 2" CERAMIC TILE RECTIFIED
TH-MTL	METAL TRANSITION STRIP
RB-2	COVE BASE
TRA-S-2	TRANSITION STRIPS
ST-CO-1	STAINED/COLORED CONCRETE
SC	SEALED CONCRETE
SH-F1 & SH-A1	SHEET VINYL WITH FLASH COVE
WD-PL	LVT WOOD VINYL PLANKING
SD-VCT	STATIC DISSIPATIVE VCT
EPX	EPOXY SEAMLESS FLOORING
CPT-WO	CARPET TILE WALK-OFF MAT

INTERIOR FLOOR FINISH KEY

SH-F1
SHEET VINYL

SH-A1
SHEET VINYL

WD-PL
LVT VINYL PLANKING

SD-VCT
STATIC DISSIPATIVE VCT

EPX
EPOXY SEAMLESS FLOORING

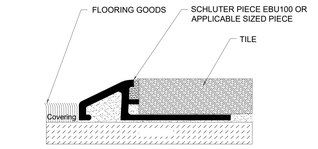
FT-GP-1
FLOOR TILE

FT-2
FLOOR TILE

ST-CO-1
STAINED/COLORED CONCRETE

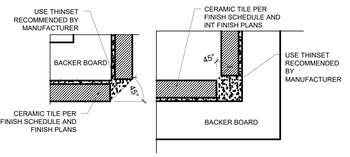
SC
SEALED CONCRETE

CPT-WO
CARPET TILE WALK-OFF MAT



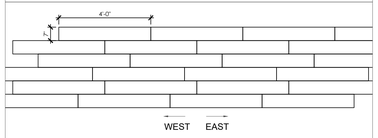
TH-MTL: SCHLUTER METAL TRANSITION STRIP DETAIL AT ALL BATHROOMS

SCALE: NTS



TILE CORNER DETAILS

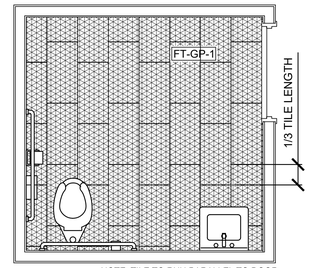
SCALE: NTS



NOTE: ALL WOOD VINYL PLANKING WD-PL TO RUN WEST EAST

WD-PL: WOOD VINYL PLANKING LAYOUT DETAIL AT ALL LOCATIONS

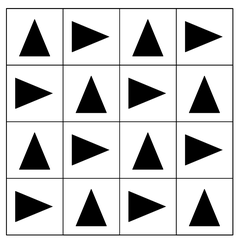
SCALE: 3/8" = 1'-0"



NOTE: TILE TO RUN PARALLEL TO DOOR

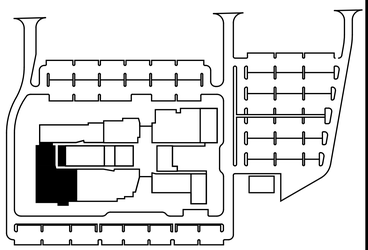
FT-GP-1: FLOOR TILE LAYOUT AT ALL SINGLE RR LOCATIONS

SCALE: 1/2" = 1'-0"



CPT-WO: CARPET TILE PLANK QUARTER TURN PATTERN

nts



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FLOOR FINISH PLAN

i-f-1.4

FLOORING INSTALLER QUALIFICATIONS

A. INSTALLER QUALIFICATIONS:
THE FLOORING SUB-CONTRACTOR MUST HAVE A MINIMUM FIVE YEARS OF EXPERIENCE AND HAVE COMPLETED AT LEAST FIVE PROJECTS OF SIMILAR MAGNITUDE, MATERIAL AND COMPLEXITY. UPON REQUEST, PROVIDE PROJECT REFERENCES INCLUDING CONTRACT NAMES AND TELEPHONE NUMBERS FOR FIVE PROJECTS. SAMPLE MOCK-UPS ON ALL PRODUCTS THAT REQUIRE WELDING SHALL BE PROVIDED PRIOR TO JOB START.

B. FINANCIAL QUALIFICATIONS:
THE FLOORING CONTRACTOR MUST BE ABLE TO SUBMIT, UPON REQUEST, BANK OR FINANCIAL REFERENCES INCLUDING CONTACT NAMES AND TELEPHONE NUMBERS THEREFOR SUPPORTING ITS ABILITY TO FINANCE THE FLOORING MATERIALS, INSTALLATION, RELATED SUNDRIES, SERVICES AND LABOR IN FULL. THIS INCLUDES ADVANCE PURCHASING OF THE SPECIFIED MATERIALS IN ACCORDANCE WITH THE MANUFACTURERS' OR SUPPLIERS' MINIMUM VOLUME PURCHASE REQUIREMENTS FOR FULL TRUCKLOADS OR OCEAN FREIGHT CONTAINERS. A PERFORMANCE BOND FOR THE FULL VALUE OF THE FLOORING CONTRACT MAY BE REQUIRED.

C. LOGISTICS QUALIFICATIONS:
THE FLOORING CONTRACTOR MUST BE ABLE TO PROVIDE ITS OWN WAREHOUSING AND STORAGE FACILITIES FOR MATERIALS THAT ARE SECURE, CLIMATE CONTROLLED, EQUIPPED WITH A SPRINKLER OR A FIRE SUPPRESSION SYSTEM AND ABLE TO RECEIVE AND UNLOAD FULL TRUCKLOADS AND OCEAN FREIGHT CONTAINERS. THIRD PARTY WAREHOUSING OR LOGISTICS SERVICES ARE NOT PREFERRED UNLESS THE FLOORING CONTRACTOR CAN SHOW, IN WRITING, THAT IT HAS USED THIS 3PL VENDOR SUCCESSFULLY FOR AT LEAST THE PAST 3 YEARS PRIOR TO THIS PROJECT AND THE WAREHOUSE FACILITY MEETS THE SECURITY, CLIMATE CONTROL, FIRE SUPPRESSION REQUIREMENTS SET FORTH ABOVE IN THIS PARAGRAPH . STORAGE AT THE JOB SITE OR ANYWHERE ELSE IN TEMPORARY, NON-CLIMATE CONTROLLED FACILITIES WITHOUT FIRE SUPPRESSION SYSTEMS, INCLUDING OUTDOOR STORAGE IN TRAILERS OR CONTAINERS IS NOT PERMITTED. THE FACILITY MUST BE OPEN DURING REGULAR BUSINESS HOURS AND ALL MATERIALS MUST BE AVAILABLE FOR INSPECTION BY THE GENERAL CONTRACTOR OR OWNER, UPON 24 HOUR REQUEST.

D. INSURANCE QUALIFICATIONS:
IN ADDITION TO ANY INSURANCES REQUIRED BY THE GENERAL CONTRACTOR FOR THE FLOORING CONTRACTOR, THE FLOORING CONTRACTOR MUST PRESENT PROOF OF INSURANCE COVERING THE FULL CONTRACT VALUE OF THE SPECIFIED MATERIALS STORED IN ITS WAREHOUSE FACILITY AGAINST LOSS, FIRE, DAMAGE, CONTAMINATION AND ANYTHING THAT MIGHT DIMINISH THE FULL VALUE OF THE PRODUCTS BEFORE THEY ARE DELIVERED TO THE JOB SITE FOR INSTALLATION. ANY APPROVED THIRD PARTY WAREHOUSE OR LOGISTICS COMPANY MUST SUBMIT AN ADDITIONAL INSURED CERTIFICATE FOR THE CONTRACT VALUE OF THE MATERIALS AND LIABILITY LIMITS EQUAL TO THE REQUIREMENTS SET FORTH IN THE CONTRACT FOR THE FLOORING CONTRACTOR, NAMING THE GENERAL CONTRACTOR AND OWNER OF THE PROJECT AS ADDITIONALLY INSURED PARTIES.

FLOORING FINISH NOTES

1. ALL INTERIOR FINISH SPECIFICATIONS ARE INCLUDED HEREIN.
2. ALL FLOORING TO BE INSTALLED PER MANUFACTURERS' RECOMMENDATIONS.
3. ALL APPROPRIATE MOISTURE TESTS TO BE PERFORMED AND FLOORING INSTALLED IN ACCORDANCE WITH FLOORING MANUFACTURES' REQUIREMENTS.
4. ANY CONFLICTS BETWEEN ARCHITECTURAL AND INTERIOR FINISH SPECIFICATIONS ARE REQUIRED TO BE REPORTED IN WRITING TO THE ARCHITECT AND THE INTERIOR DESIGNER DURING BIDDING OR NEGOTIATION AND A REQUEST FOR CLARIFICATION WILL BE PUBLISHED. THE INTERIOR DESIGNER IS TO BE CONSULTED BEFORE PROCEEDING.
5. THE INTERIOR DESIGNER IS NOT RESPONSIBLE FOR DISCREPANCIES THAT ARISE DUE TO CHANGES BY THE ARCHITECT, CONTRACTORS, CONSULTANTS AND TENANTS OR OWNERS AFTER THE INITIAL PUBLISHED DATE OF THESE DRAWINGS.
6. ORIENT ALL VINYL PLANKING AS SHOWN ON PLANS.
7. ALL TILE TO HAVE MINIMAL GROUT LINES RECOMMENDED BY THE MANUFACTURER. GROUT, TILE AND STONE TO BE SEALED WITH PENETRATING SEALER OR EQUIVALENT PER SPECIFICATIONS. GROUT SPECIFIED IN FINISH LEGEND.
8. INSTALL ALL FLOOR TILE SO THAT LONG SIDE OF TILE LIES PARALLEL TO THE DOOR.
9. **FLOORING INSTALLER TO CONFIRM ALL TRANSITIONS AND APPROPRIATE USE OF TRANSITION STRIP(S) AND REDUCER STRIPS AT ALL CHANGES OF FLOORING TYPES AND LEVELS. TRANSITION STRIPS SPECIFIED IN FINISH LEGEND.**
10. **REFER TO FLOOR FINISH KEY ON EACH FLOOR FINISH PLAN FOR ALL FLOORING HATCHES.**

U.N.O = UNLESS NOTED OTHERWISE

HOMOGENOUS FLOORING NOTES

1. FLOOR TO BE CONDITIONED PER MANUFACTURER INSTRUCTIONS
2. INSTALL HOMOGENOUS FLOORING WITH MINIMAL SEAMS
3. PREPARE SUBFLOOR AS NECESSARY TO REMOVE ALL TRACE OF DEBRIS
4. ENSURE THAT MATERIAL WITH IDENTICAL BATCH NUMBERS ARE ALLOCATED WITHIN EACH AREA TO BE INSTALLED. INSTALL ROLLS IN CONSECUTIVE ORDER IF POSSIBLE.
5. PLAN SHEET LAYOUT / DIRECTION TO MINIMIZE JOINTS AT DOORWAYS OR MAIN TRAFFIC LANES.
6. ALL CONSECUTIVE SHEETS SHOULD BE INSTALLED IN THE OPPOSITE DIRECTION TO THE PREVIOUS SHEET INSTALLED.
7. ONLY INSTALL THE AMOUNT OF FLOOR COVERING THAT CAN BE ADHERED TO SUBFLOOR IN ONE DAY
8. REFER TO MANUFACTURER INSTRUCTIONS FOR BEST PRACTICES ON INSTALLING SELF COVED HOMOGENOUS FLOORING.
9. SELF COVE ALL HOMOGENOUS FLOORING TO 4" IN BASEMENT ROOMS
10. **FLOORING INSTALLER TO PROVIDE SEAMING DIAGRAM FOR HOMOGENEOUS FLOORING. AutoCAD DRAWING AVAILABLE UPON REQUEST.**
11. **CONTRACTOR TO PROVIDE SEAMING SAMPLES TO INCLUDE ONE (1) STRAIGHT SEAM, ONE (1) SELF-COVED SEAM & ONE (1) CURVED OR HALF-ROUND CORNER FOR ALL SHEET VINYL & HOMOGENEOUS FLOORING FROM TWO (2) OR MORE SUBCONTRACTORS PRIOR TO AWARDING THE JOB.**

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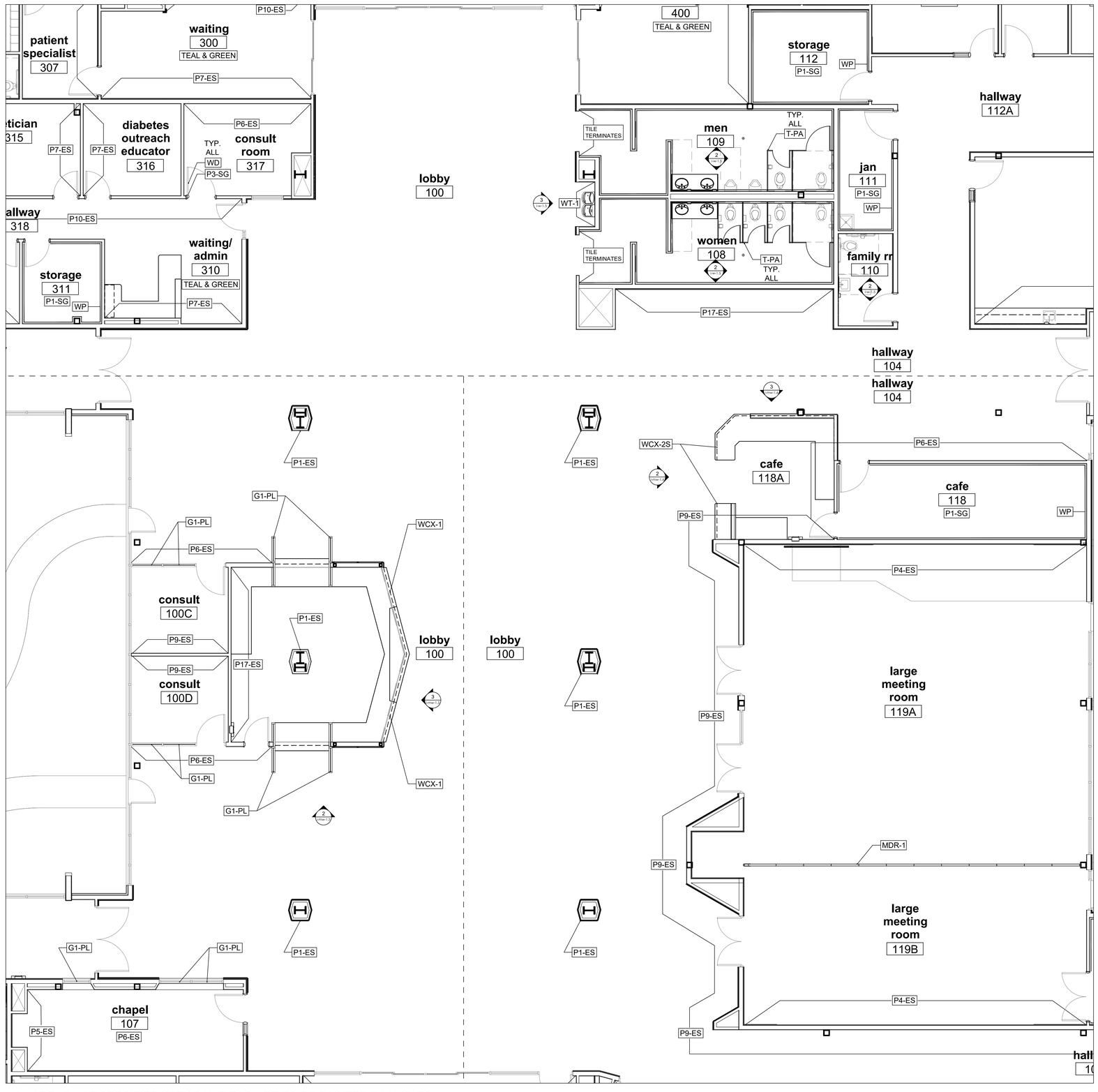
FLOOR FINISH NOTES & DETAILS

i-f-1.5

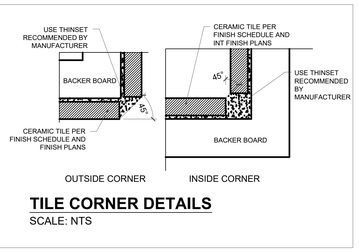
SEE SHEET: i-w-1.0 FOR ALL WALL FINISH LEGENDS



ALL AREAS NOT SPECIFIED WITH PAINT TAG ARE TO BE PAINTED P1-UNO-ES

1 i-w-0.1 WALL FINISH PLAN - LOBBY
SCALE: 3/16"= 1'-0"

north



TILE CORNER DETAILS
SCALE: NTS

WALL FINISH PLAN GENERAL NOTES:

1. REFER TO MILLWORK PLANS FOR MILLWORK FINISHES.
2. ALL WALL COVERING OR ALL WALL TILE TO BE INSTALLED PER NOTES ON FINISH LEGEND AND PER MANUFACTURES RECOMMENDATIONS.
3. WITH REGARD TO WALL AND FLOOR TILE: IF ACTUAL SIZE VARIES FORM NOMINAL SIZES IN THIS PROJECT, NOTE THAT HEIGHTS OF WALL TILE PATTERN IS CRITICAL AND AND MUST BE MAINTAINED, MEASURED AND MARKED, PRIOR TO TILE INSTALLATION.
4. SPECIFIED TRIM TO BE USED AS NOTED AND TO BE LEFT IN CLEAN AND WELL CAULKED CONDITION IF NEEDED.
5. **WALL PROTECTION ALL TO BE SAME FINISH AND COLOR AS CORNER GUARDS. FOLLOW THE ARCHITECTURAL PLANS FOR TYPE AND LOCATION.**
6. **ALL WALL SIGNS, WALL MOUNTED RACKS AND OTHER WALL MOUNTED PRODUCT HAS TO BE REMOVED AND REINSTALLED IN THE SAME LOCATION.**

WALL FINISH CODES / LEGEND

WT-1	WALL TILE RECTIFIED
WT-1A - WT-5A	WALL TILE - ACCENT
MDR-1	MODULAR DOORS
CC-1	CUBICLE CURTAINS
CG-4	CORNER GUARD 48"
CG-8	CORNER GUARD 96"
WP	WALL PROTECTION
T-PA	TOILET PARTITIONS
DF-P	DOOR FRAMES (PAINTED)
WCX-1	XOREL WALL COVERING
WCX-2S	XOREL WALL COVERING

WALL PAINT CODES / LEGEND

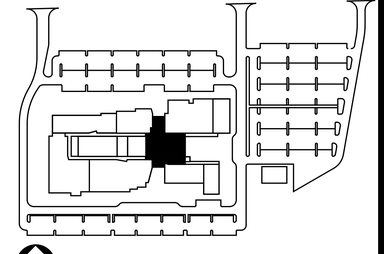
PR	PRIMER
SG	SEMI-GLOSS
ES	EGGSHELL
V	VELVET
MET	METALLIC PAINT
UNO	UNLESS NOTED OTHERWISE
P1-UNO-ES	PAINTED WALL FINISH
P1-	PAINTED WALL FINISH
P2-	PAINTED WALL FINISH
P2-	PAINTED WALL FINISH
P3-	PAINTED WALL FINISH
P4- - P17-	PAINTED WALL FINISH - ACCENT
P12-MET	METALLIC PAINT

WALL FINISH SYMBOL LEGEND

P#-XX — TAG INDICATES WALL PAINT COLOR & FINISH

P#-XX — INDICATES WALL ACCENT PAINT LOCATION

TILE TERMINATES — INDICATES POINT ALONG WALL TO TERMINATE TILE



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job 1717

date 11.16.18

revisions

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WALL FINISH PLAN

i-w-0.1

WALL

PASCUA YAQUI TRIBE . HEALTH CENTER II - INTERIOR WALL FINISH KEY			
PAINT			
CODE	STOCK NO.	MANUFACTURER	DESCRIPTION / NOTES / LOCATION
NEUTRALS & BROWNS			
P1-UNO-ES EGGSHELL	DE6212 / CRISP MUSLIN	DUNN EDWARDS	SPARTAWALL EGGSHELL SWLL30-1 ALL WALLS UNLESS NOTED OTHERWISE: UNO
P1-SG	DE6212 / CRISP MUSLIN	DUNN EDWARDS	SPARTAWALL SEMI GLOSS SWLL50-1
P2-ES	NOT USED		NOT USED
P2-SG	NOT USED		NOT USED
P3-SG + PR	DEC756 / WEATHERED BROWN	DUNN EDWARDS	SPARTAWALL SEMI GLOSS SWLL50-1 PLUS PRIMER ON DOOR FRAMES BLOC-RUST PREMIUM PRIMER #BRPR00
TEAL (S)			
P4-ES	DES796 / BEFORE THE STORM	DUNN EDWARDS	SPARTAWALL EGGSHELL SWLL30-1
P5-ES	DES773 / STONE SILVER	DUNN EDWARDS	SPARTAWALL EGGSHELL SWLL30-1
P6-ES	NOT USED		NOT USED
P7-ES	DES788 / AEGEAN SEA	DUNN EDWARDS	SPARTAWALL EGGSHELL SWLL30-1
P8-ES	NOT USED		NOT USED
P9-ES	DES751 / PLUNGING WATER	DUNN EDWARDS	SPARTAWALL EGGSHELL SWLL30-1
GREEN (S)			
P10-ES	DES520 / CROCODILE TEARS	DUNN EDWARDS	SPARTAWALL EGGSHELL SWLL30-1
P11-ES	DES523 / LAZY LIZARD	DUNN EDWARDS	SPARTAWALL EGGSHELL SWLL30-1
P12-MET	METALLIC ME247 SAGE	MODERN MASTERS	1. METALLIC PAINT COLLECTION 2. CLEAR COAT: 2 COATS OF ME664 - MASTER CLEAR SATIN 3. ALL PRODUCT TO BE SPRAY APPLICATION
PLUM (S)			
P13-ES	DES979 / PURPLE THICKET	DUNN EDWARDS	SPARTAWALL EGGSHELL SWLL30-1
P14-ES	DE6007 / OLD-FASHIONED PURPLE	DUNN EDWARDS	NOT USED
P15-ES	NOT USED		SPARTAWALL EGGSHELL SWLL30-1
ORANGE			
P16-ES	NOT USED		NOT USED
P17-ES	DES146 / CAMPFIRE	DUNN EDWARDS	SPARTAWALL EGGSHELL SWLL30

PAINT LEGEND

DUNN-EDWARDS PRODUCTS DON'T CONTAIN ETHYLENE GLYCOL OR ANY OTHER HAZARDOUS AIR POLLUTANTS. THIS IS A REQUIREMENT OF THE PRODUCTS USED ON THIS PROJECT.

PAINT KEY:		
CODE	MANUFACTURER	DESCRIPTION
PR	DUNN EDWARDS	BLOC-RUST PREMIUM PRIMER FOR DOOR FRAMES #BRPR00
SG	DUNN EDWARDS	SPARTAWALL - SEMI GLOSS SWLL50-1 (LOW VOC)
ES	DUNN EDWARDS	SPARTAWALL - EGGSHELL # SWLL30-1 (LOW VOC)
V	DUNN EDWARDS	SPARTAWALL - VELVET #SWLL20-1 (LOW VOC)
MET	MODERN MASTERS	METALLIC PAINT

WALL

PASCUA YAQUI TRIBE . HEALTH CENTER II - INTERIOR WALL FINISH KEY			
WALL TILE			
CODE	STOCK NO.	MANUFACTURER	DESCRIPTION / NOTES / LOCATION
WT-1	DALTILE, KONCRETE COLOR: WHITE KC01 12" X 24" WALL TILE COLOR: MG57 COOL BEIGE RECOMMENDED GROUT JOIN 3/16"	DALTILE	1. RECOMMENDED GROUT WIDTH: 3/16" 2. SIZE: 12" X 24" 3. TILE THICKNESS: 3/8" 4. OVERLAP SHOULD NOT EXCEED 33% WHEN INSTALLING TILE WITH A LENGTH 15" OR GREATER IN A STAGGERED BRICK JOINT PATTERN. 5. CERAMIC FLOOR AND WALL TILE 6. RECOMMENDED GROUT JOINT 3/16" 7. SEE PLAN FOR TILE PATTERN
GROUT	GROUT: MAPEI 100% SOLID EPOXY KERAPOXY CQ COLOR: 94 STRAW		
WT-1A	DALTILE GLAZED CERAMIC SEMI GLOSS & MATTE COLOR: Q094 OCEAN BLUE FLAT LINER ¾" X 8 ½" PART# 9999422158	DALTILE	1. ALL ACCENT WALL TILE: WT-1A TO WT-5A AS NOTED TO BE SET ON WHITE THIN SET 2. RECOMMENDED GROUT JOINT 3/16" 3. SEE PLANS FOR COLOR ARRANGEMENT AND PATTERN 4. GROUT: SAME AS WT-1: 5. GROUT: MAPEI / 100% SOLID EPOXY KERAPOXY CQ / COLOR: 94 STRAW
WT-2A	DALTILE GLAZED CERAMIC SEMI GLOSS & MATTE COLOR: Q140 CITRIC BLOOM FLAT LINER ¾" X 8 ½" PART# 9999422158		
WT-3A	DALTILE GLAZED CERAMIC SEMI GLOSS & MATTE COLOR: Q097 ORANGE BURST FLAT LINER ¾" X 8 ½" PART# 9999422158		
WT-4A	DALTILE GLAZED CERAMIC SEMI GLOSS & MATTE COLOR: Q178 PLUM CRAZY FLAT LINER ¾" X 8 ½" PART# 9999422158		
WT-5A	DALTILE GLAZED CERAMIC SEMI GLOSS & MATTE COLOR: Q098 KEY LIME FLAT LINER ¾" X 8 ½" PART# 9999422158		
GROUT: SAME AS WT-1:		MAPEI	GROUT: MAPEI 100% SOLID EPOXY KERAPOXY CQ COLOR: 94 STRAW

WALL

PASCUA YAQUI TRIBE . HEALTH CENTER II - INTERIOR WALL FINISH KEY			
CODE	STOCK NO.	MANUFACTURER	DESCRIPTION / NOTES / LOCATION
MODULAR DOORS			
MDR-1	MODULAR DOORS 1. TRIM & HINGE: TRIM & HINGE COLOR: DARK BRONZE SW6006 2. VINYL WALL COVERING FINISH: KOROSEAL GRASSLAND, COLOR: STEEL OXIDE GO21-95	MODERNFOLD OPERABLE PARTITIONS	MODULAR PARTITIONS: SEE ARCHITECTURAL SPECIFICATION & PLANS FOR LAYOUT AND SPECIFICATIONS
CUBICLE CURTAINS			
CC-1	CUBICLE CURTAINS MESH TOP: 24" HIGH COLOR: WHITE 1. CUBICLE MESH WITH TOP KNIT BOTTOM AS WELL AS GROMMETS (GROMMETS TO BE NICKEL PLATED BRASS 2. MESH COMPOSITION: 100% NYLON FLAME RETARDANT: PASSES NFPA 701 1 NOTE: PROVIDE DOUBLE THE AMOUNT SHOW ON PLAN FOR LAUNDERING PURPOSES. SUPPLY PACKAGED OVERAGES TO OWNER	FABRIC: ARCHITEX 800-621-0827 BDD (520) 327-0123 FABRICATOR	FABRIC NAME: COLOR: RX 6010 SUMMER RX PRIVACY CURTAINS COLLECTION RAILROADED SO "TREE" IS VERTICAL FABRIC SPECIFICATIONS 1. PATTERN (TREE) TO RUN VERTICAL 2. WIDTH: 72" 3. REPEAT: 279" V - 72" H 4. RAILROADED: YES REVERSE THE REPEATS 5. WEIGHT:. 920 LBS. / YARD 6. CONTENT: 100% TREVIRA CS 7. BACKING: NONE 8. LIGHTFASTNESS: 40 HOURS AATCC 16 9. CLEANING CODE: WS 10. FIRE CODES: NFPA 701 CAL TITLE 19 / ASTME84 UNADHRD 11. CERTIFICATIONS OEKO-TEX 100 CERTIFIED / KAISER APPROVED 12. PRODUCT. 13. PROVIDE CLEANING INSTRUCTIONS TO CLIENT CLEANING INSTRUCTIONS: 1. WASHABLE TO 160 DEGREES. PRE-TEST ONE 2. PANEL BEFORE PROCESSING ENTIRE LOT. WHEN WASHING, PROCESS AS ORDINARY COLORED FABRIC 3. TEMPERATURE NOT TO EXCEED 160 DEGREES F. WASH ONLY WITH LIKE MATERIAL. 4. DO NOT USE CAUSTIC SOAP OR BLEACH. 5. DO NOT PUT THROUGH A MANGLER. 6. PROMPTLY 7. REMOVE FROM DRYER.

WALL

PASCUA YAQUI TRIBE . HEALTH CENTER II - INTERIOR WALL FINISH KEY			
CODE	STOCK NO.	MANUFACTURER	DESCRIPTION / NOTES / LOCATION
CORNER GUARDS			
CG-4	4 FT.: 160BN BLUNOSE® SURFACE MOUNT CORNER GUARD, 90°, 2" WING, 48" (WITH RETAINER) STANDARD COLOR: HAZE 0114	INPRO 866-222-5556	1. INSTALL AT TOP OF COVE BASE 2. TEXTURE: VELVET 3. LOCATION: PER PLANS – OUTSIDE CORNER 4. INSTALL USING MANUFACTURERS RECOMMENDED METHODS 5. INSTALL CORNER GUARDS AT 4' FROM TOP OF COVE BASE (VERTICALLY) 6. LENGTHS AVAILABLE 4', 8', 9', 12'
CG-8	8 FT. 160BN BLUNOSE® SURFACE MOUNT CORNER GUARD, 90°, 2" WING, 96" (WITH RETAINER) STANDARD COLOR: HAZE 0114	INPRO 866-222-5556	1. INSTALL AT TOP OF COVE BASE 2. TEXTURE: VELVET 3. LOCATION: PER PLANS – OUTSIDE CORNER 4. INSTALL USING MANUFACTURERS RECOMMENDED METHODS 5. INSTALL CORNER GUARDS AT 8' FROM TOP OF COVE BASE (VERTICALLY) 6. LENGTHS AVAILABLE 4', 8', 9',12'
WP	PALLADIUM RIGID SHEET WITH RIGID TRIM 406 - .060" THICK, 4' X 8' [OPTIONAL: 80' ROLL*] STANDARD COLOR: HAZE 0114	INPRO 866-222-5556	1. INSTALL AT TOP OF DOOR FRAME: 7' 2" HIGH. LINE UP WITH TOP OF DOOR FRAME. 2. TEXTURE: VELVET 3. LOCATION: PER PLANS: STORAGE CLOSETS AS INDICATED 4. INSTALL USING MANUF. RECOMMENDED METHODS 7. LENGTHS AVAILABLE 4', 8', 9',12'
TOILET PARTITIONS			
T-PA	HINY HIDERS COLOR: BRONZE FINISH: ROTARY BRUSHED	SCRANTON PRODUCTS	1. TOILET PARTITIONS: SEE PLANS FOR LAYOUT
WALLCOVERING			
WCX-1	FRONT DESK WRAP (OUTSIDE AND BELOW COUNTER) PRODUCT: XOREL NAME: NEXUS 6425 W915 WIDTH: 52" BACKING: X-PROTECT WALL WARRANTY: 10 YEARS FLAME RETARDANT ASTM E84 CLASS A CLEANING CODE: WS & BC-WATER / SOLVENT & BLEACH CLEANABLE DURABILITY: ONE MILLION DOUBLE RUBS – NO WEAR	CARNEIGE 800-727-6770	LOCATION: FRONT DESK 1. NOTES: INSTALL BEHIND COVE BASE, INSTALLATION PER MANUFACTURER'S INSTRUCTIONS INCLUDING ADHESIVE. 2. SUBSTRATE IS REQUIRED TO BE A LEVEL 5 SOOTH AND CONSISTENT FINISH. 3. INSTALL WITH MINIMAL SEAMS AND CONSULT DESIGNER FOR SEAM LOCATIONS.
WCX-2S	SNACK BAR WRAP (OUTSIDE AND BELOW COUNTER) 1. PRODUCT: XOREL 2. NAME: PLAIN & SIMPLE #8110 10 3. WIDTH: 54" 4. BACKING: NON-WOVEN 5. WARRANTY: 10 YEARS 6. FLAME RETARDANT ASTM E84 CLASS A 7. CLEANING CODE: WS & BC-WATER / SOLVENT & BLEACH CLEANABLE 8. DURABILITY: ONE MILLION DOUBLE RUBS – NO WEAR	CARNEIGE 800-727-6770	LOCATION: CAFE 1. NOTES: INSTALL BEHIND COVE BASE, INSTALLATION PER MANUFACTURER'S INSTRUCTIONS INCLUDING ADHESIVE. 2. SUBSTRATE IS REQUIRED TO BE A LEVEL 5 SOOTH AND CONSISTENT FINISH. 3. INSTALL WITH MINIMAL SEAMS AND CONSULT DESIGNER FOR SEAM LOCATIONS.
DRYWALL FINISH	LIGHT HAUCK AND TROWEL UNLESS OTHERWISE NOTED	N/A	SEE ARCHITECTURAL SPECIFICATIONS

WALL FINISH PLAN GENERAL NOTES:

1. REFER TO MILLWORK PLANS FOR MILLWORK FINISHES.
2. ALL WALL COVERING OR ALL WALL TILE TO BE INSTALLED PER NOTES ON FINISH LEGEND AND PER MANUFACTURES RECOMMENDATIONS.
3. WITH REGARD TO WALL AND FLOOR TILE: IF ACTUAL SIZE VARIES FORM NOMINAL SIZES IN THIS PROJECT, NOTE THAT HEIGHTS OF WALL TILE PATTERN IS CRITICAL AND AND MUST BE MAINTAINED, MEASURED AND MARKED, PRIOR TO TILE INSTALLATION.
4. SPECIFIED TRIM TO BE USED AS NOTED AND TO BE LEFT IN CLEAN AND WELL CAULKED CONDITION IF NEEDED.
5. **WALL PROTECTION ALL TO BE SAME FINISH AND COLOR AS CORNER GUARDS. FOLLOW THE ARCHITECTURAL PLANS FOR TYPE AND LOCATION.**
6. **ALL WALL SIGNS, WALL MOUNTED RACKS AND OTHER WALL MOUNTED PRODUCT HAS TO BE REMOVED AND REINSTALLED IN THE SAME LOCATION.**

WALL FINISH CODES / LEGEND

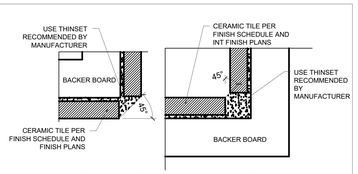
WT-1	WALL TILE RECTIFIED
WT-1A - WT-5A	WALL TILE - ACCENT
MDR-1	MODULAR DOORS
CC-1	CUBICLE CURTAINS
CG-4	CORNER GUARD 48"
CG-8	CORNER GUARD 96"
WP	WALL PROTECTION
T-PA	TOILET PARTITIONS
DF-P	DOOR FRAMES (PAINTED)
WCX-1	XOREL WALL COVERING
WCX-2S	XOREL WALL COVERING

WALL FINISH SYMBOL LEGEND

P#-XX — TAG INDICATES WALL PAINT COLOR & FINISH

P#-XX — INDICATES WALL ACCENT PAINT LOCATION

TILE TERMINATES — INDICATES POINT ALONG WALL TO TERMINATE TILE

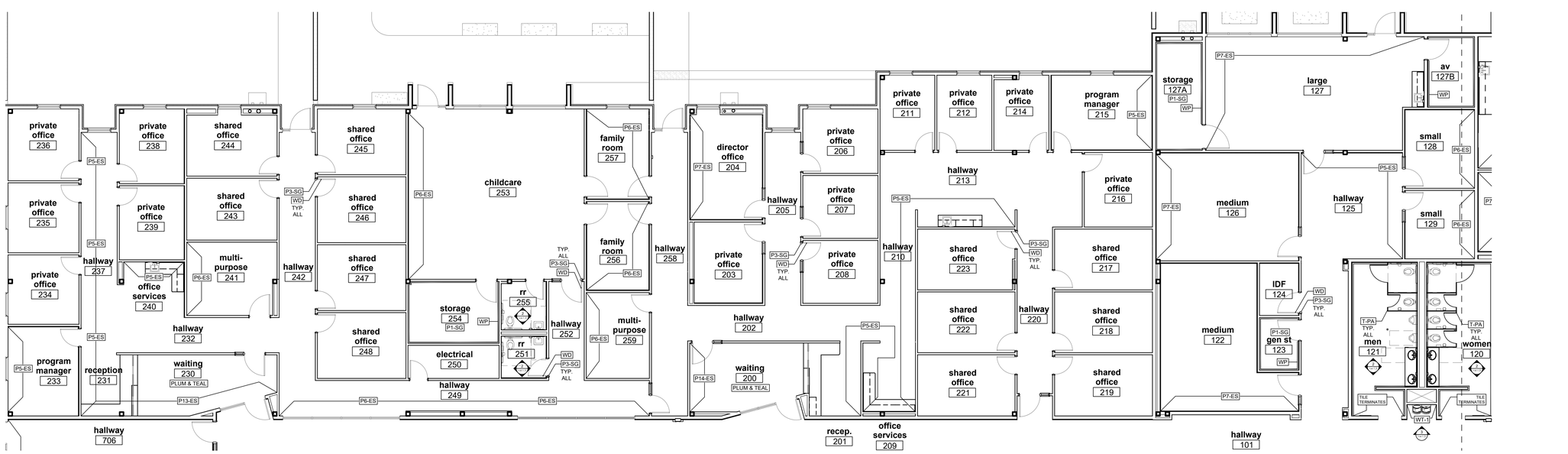


TILE CORNER DETAILS

SCALE: NTS

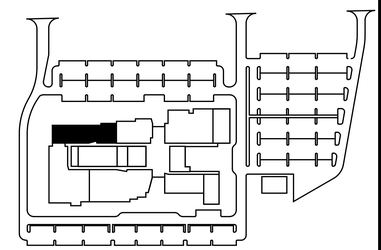
WALL PAINT CODES / LEGEND

PR	PRIMER
SG	SEMI-GLOSS
ES	EGGSHELL
V	VELVET
MET	METALLIC PAINT
UNO	UNLESS NOTED OTHERWISE
P1-UNO-ES	PAINTED WALL FINISH
P1-	PAINTED WALL FINISH
P2-	PAINTED WALL FINISH
P2-	PAINTED WALL FINISH
P3-	PAINTED WALL FINISH
P4- - P17-	PAINTED WALL FINISH - ACCENT
P12-MET	METALLIC PAINT



1 i-w-1.0 WALL FINISH PLAN - SEWA U'USIM

SCALE: 1/8"= 1'-0"



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WALL FINISH PLAN

i-w-1.0

SEE SHEET: i-w-1.0 FOR ALL WALL FINISH LEGENDS

WALL FINISH CODES / LEGEND

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SG	SEMI-GLOSS
ES	EGGSHELL
V	VELVET
MET	METALLIC PAINT
UNO	UNLESS NOTED OTHERWISE
P1-UNO-ES	PAINTED WALL FINISH
P1-	PAINTED WALL FINISH
P2-	PAINTED WALL FINISH
P2-	PAINTED WALL FINISH
P3-	PAINTED WALL FINISH
P4- - P17-	PAINTED WALL FINISH - ACCENT
P12-MET	METALLIC PAINT

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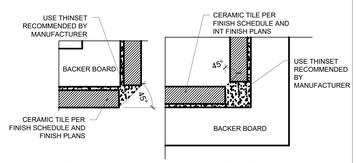


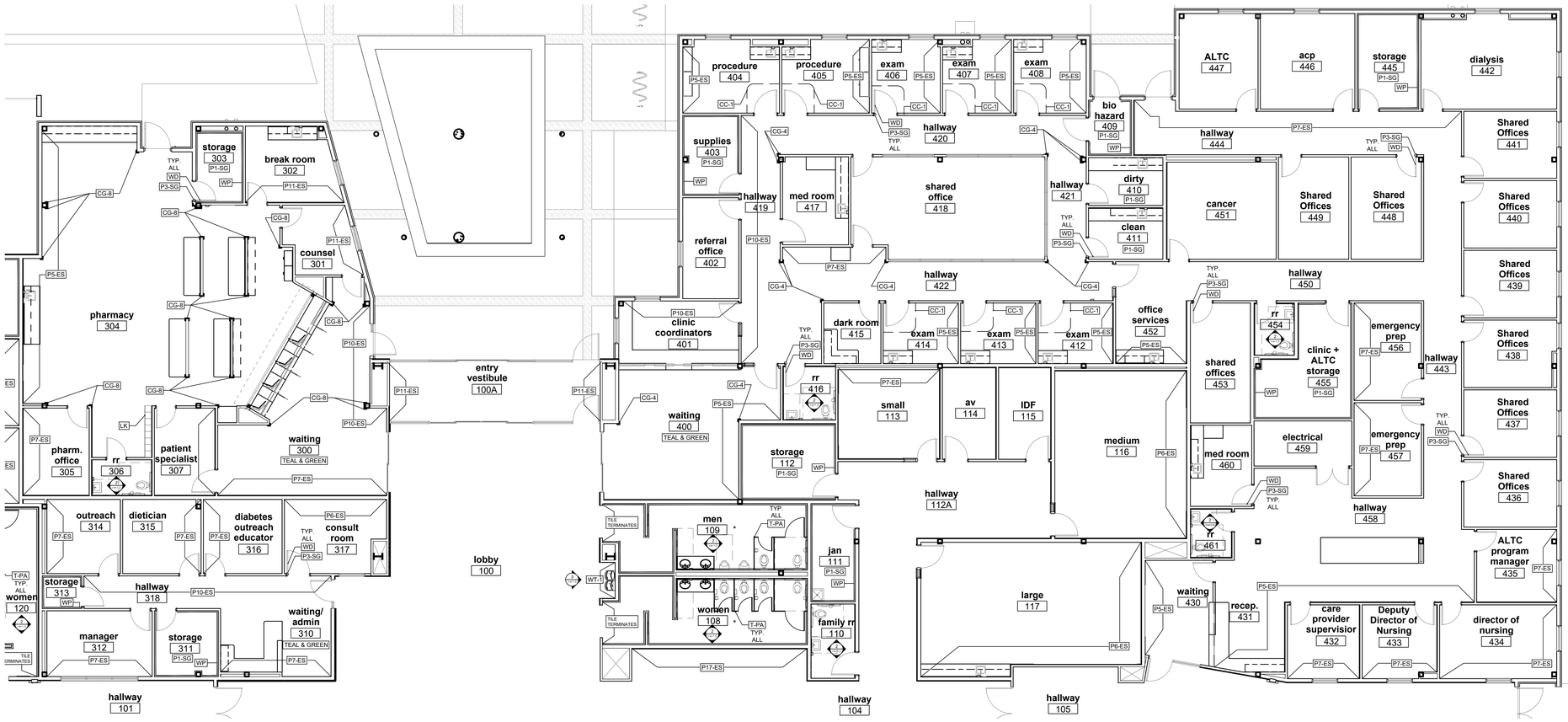
TILE CORNER DETAILS

SCALE: NTS

CG TYP. ALL

CORNER GUARD LOCATION INDICATOR

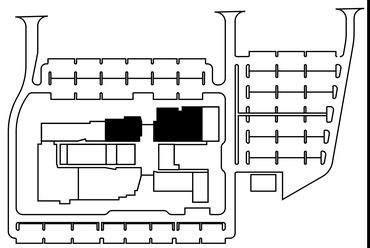
NOTE: WALL PROTECTION ETC. ARE TO BE SAME COLOR AND FINISH AS CORNER GUARDS.



1 / i-w-1.1 WALL FINISH PLAN - PHARMACY, DIABETES, NURSING & CLINICS

SCALE: 1/8"= 1'-0"

north



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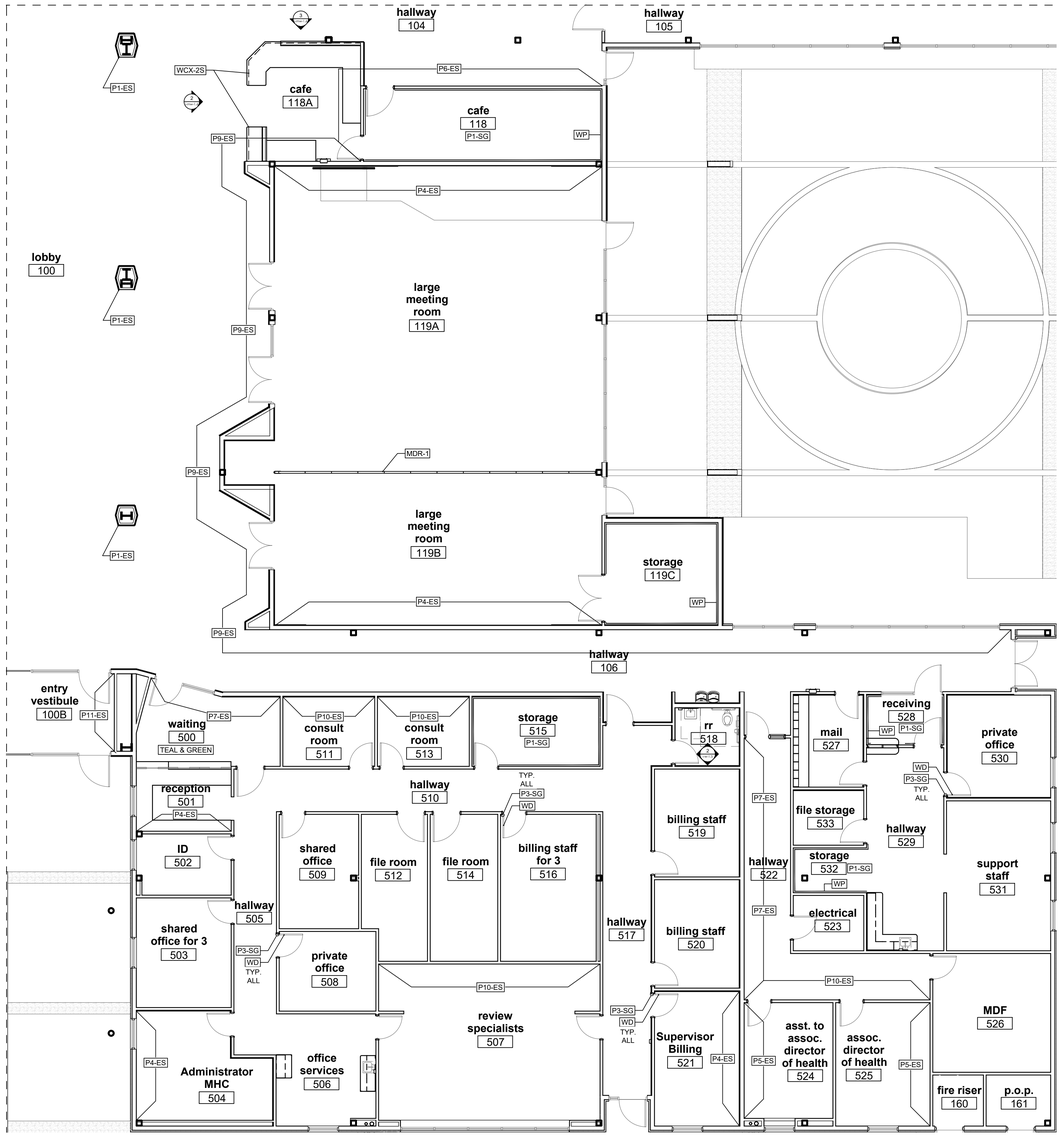
WALL FINISH PLAN

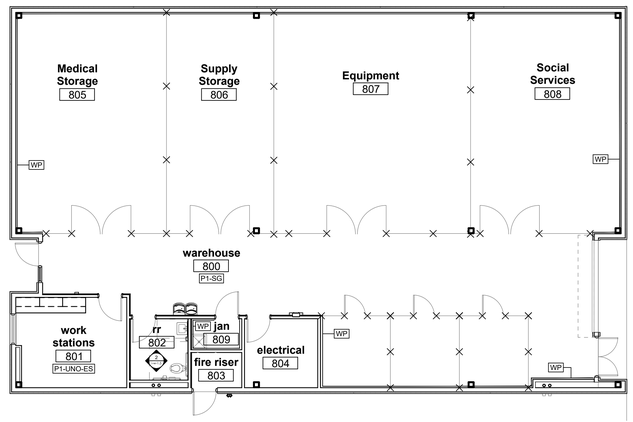
i-w-1.1

SEE SHEET: i-w-1.0 FOR ALL WALL FINISH LEGENDS



1 / i-w-1.2 WALL FINISH PLAN - HEALTH BUDGET, MANAGED HEALTH & BILLING

SCALE: 1/8"= 1'-0"



2 / i-w-1.2 WALL FINISH PLAN-WAREHOUSE

SCALE: 1/8"= 1'-0"

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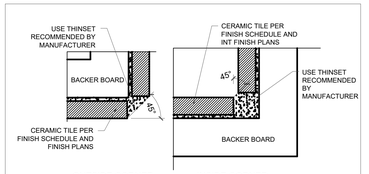
T-PA	TOILET PARTITIONS
DF-P	DOOR FRAMES (PAINTED)
WCX-1	XOREL WALL COVERING
WCX-2S	XOREL WALL COVERING

WALL PAINT CODES / LEGEND

PR	PRIMER
SG	SEMI-GLOSS
ES	EGGSHELL
V	VELVET
MET	METALLIC PAINT
UNO	UNLESS NOTED OTHERWISE
P1-UNO-ES	PAINTED WALL FINISH
P1-	PAINTED WALL FINISH
P2-	PAINTED WALL FINISH
P2-	PAINTED WALL FINISH
P3-	PAINTED WALL FINISH
P4- - P17-	PAINTED WALL FINISH - ACCENT
P12-MET	METALLIC PAINT



TILE CORNER DETAILS

SCALE: NTS

WALL FINISH SYMBOL LEGEND

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P#-XX — INDICATES WALL ACCENT PAINT LOCATION

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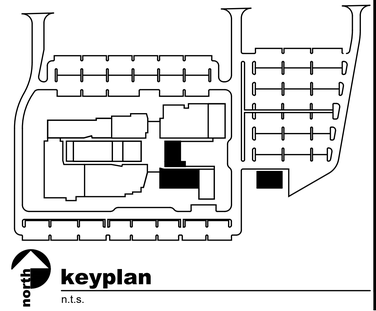

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REGISTERED PROFESSIONAL ARCHITECT PRELIMINARY

job 1717

date 11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson, AZ 85746

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WALL FINISH PLAN

i-w-1.2

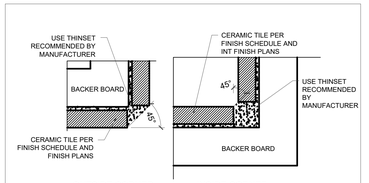
SEE SHEET: i-w-1.0 FOR ALL WALL FINISH LEGENDS



1 i-w-1.3 WALL FINISH PLAN - CENTERED SPIRIT

SCALE: 1/8"= 1'-0"

north



TILE CORNER DETAILS

SCALE: NTS

WALL FINISH PLAN GENERAL NOTES:

1. REFER TO MILLWORK PLANS FOR MILLWORK FINISHES.
2. ALL WALL COVERING OR ALL WALL TILE TO BE INSTALLED PER NOTES ON FINISH LEGEND AND PER MANUFACTURES RECOMMENDATIONS.
3. WITH REGARD TO WALL AND FLOOR TILE: IF ACTUAL SIZE VARIES FORM NOMINAL SIZES IN THIS PROJECT, NOTE THAT HEIGHTS OF WALL TILE PATTERN IS CRITICAL AND AND MUST BE MAINTAINED, MEASURED AND MARKED, PRIOR TO TILE INSTALLATION.
4. SPECIFIED TRIM TO BE USED AS NOTED AND TO BE LEFT IN CLEAN AND WELL CAULKED CONDITION IF NEEDED.
5. **WALL PROTECTION ALL TO BE SAME FINISH AND COLOR AS CORNER GUARDS. FOLLOW THE ARCHITECTURAL PLANS FOR TYPE AND LOCATION.**
6. **ALL WALL SIGNS, WALL MOUNTED RACKS AND OTHER WALL MOUNTED PRODUCT HAS TO BE REMOVED AND REINSTALLED IN THE SAME LOCATION.**

WALL FINISH CODES / LEGEND

WT-1	WALL TILE RECTIFIED
WT-1A - WT-5A	WALL TILE - ACCENT
MDR-1	MODULAR DOORS
CC-1	CUBICLE CURTAINS
CG-4	CORNER GUARD 48"
CG-8	CORNER GUARD 96"
WP	WALL PROTECTION
T-PA	TOILET PARTITIONS
DF-P	DOOR FRAMES (PAINTED)
WCX-1	XOREL WALL COVERING
WCX-2S	XOREL WALL COVERING

WALL PAINT CODES / LEGEND

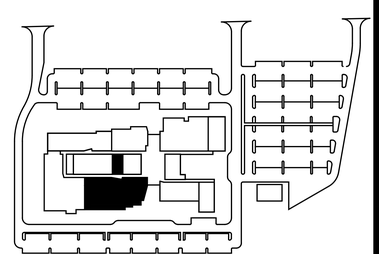
PR	PRIMER
SG	SEMI-GLOSS
ES	EGGSHELL
V	VELVET
MET	METALLIC PAINT
UNO	UNLESS NOTED OTHERWISE
P1-UNO-ES	PAINTED WALL FINISH
P1-	PAINTED WALL FINISH
P2-	PAINTED WALL FINISH
P2-	PAINTED WALL FINISH
P3-	PAINTED WALL FINISH
P4- - P17-P12-MET	PAINTED WALL FINISH - ACCENT METALLIC PAINT

WALL FINISH SYMBOL LEGEND

P#-XX — TAG INDICATES WALL PAINT COLOR & FINISH

P#-XX — INDICATES WALL ACCENT PAINT LOCATION

TILE TERMINATES — INDICATES POINT ALONG WALL TO TERMINATE TILE



north **keyplan**

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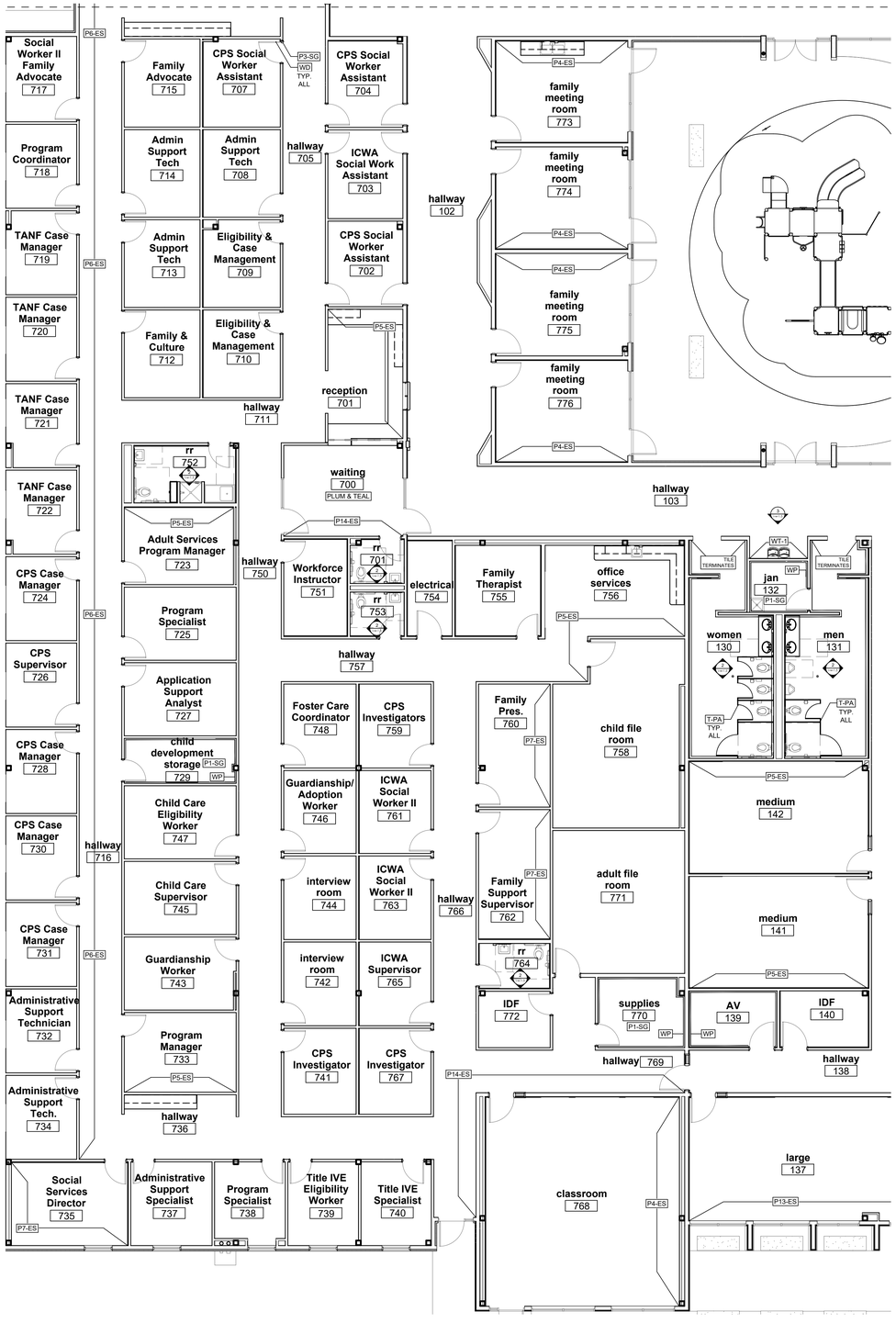
WALL FINISH PLAN

i-w-1.3

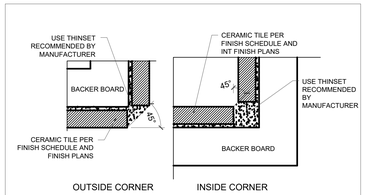
SEE SHEET: i-w-1.0 FOR ALL WALL FINISH LEGENDS



1 / 1-w-1.4 WALL FINISH PLAN - SOCIAL SERVICES

SCALE: 1/8"= 1'-0"

north



TILE CORNER DETAILS

SCALE: NTS

WALL FINISH PLAN GENERAL NOTES:

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WT-1A - WT-5A	WALL TILE - ACCENT
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WP	WALL PROTECTION
T-PA	TOILET PARTITIONS
DF-P	DOOR FRAMES (PAINTED)
WCX-1	XOREL WALL COVERING
WCX-2S	XOREL WALL COVERING

WALL PAINT CODES / LEGEND

PR	PRIMER
SG	SEMI-GLOSS
ES	EGGSHEL**L**
V	VELVET
MET	METALLIC PAINT
UNO	UNLESS NOTED OTHERWIS**E**
P1-UNO-ES	PAINTED WALL FINISH
P1-	PAINTED WALL FINISH
P2-	PAINTED WALL FINISH
P2-	PAINTED WALL FINISH
P3-	PAINTED WALL FINISH
P4- - P17-	PAINTED WALL FINISH - ACCENT
P12-MET	METALLIC PAINT

WALL FINISH SYMBOL LEGEND

P#-XX — TAG INDICATES WALL PAINT COLOR & FINISH

P#-XX — INDICATES WALL ACCENT PAINT LOCATION

TILE TERMINATES — INDICATES POINT ALONG WALL TO TERMINATE TILE

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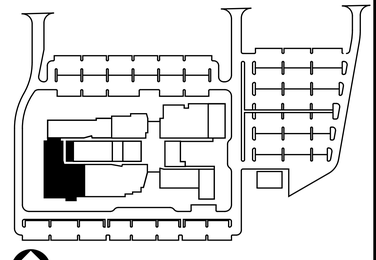
WALL FINISH PLA

i-w-1.4



north **keyplan**
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SEE SHEET: i-w-1.0 FOR ALL WALL FINISH LEGENDS

TILE INSTALLATION NOTES

1. FIELD VERIFY OFF ALL CONDITIONS REQUIRE BEFORE STARTING THE JOB, WITH ANY DISCREPANCIES REPORTED TO BHIDP.
2. ALL SURFACE PREPARATION MUST BE EXECUTED TO PROVIDE A LEVEL AND EVEN SUBSTRATE.
3. ALL TILE MUST BE INSTALL PER THE DIMENSIONS SHOW ON THE PLANS PER THE PATTERN LAYOUT. ANY VARIATIONS IN THE HEIGHTS OF THE PATTERN MUST BE REPORTED TO ARCHITECT OR BHIDP BEFORE PROCEEDING.
4. ALL INTERIOR TILE INSTALLATION TO BE INSTALLED PER MANUFACTURERS' RECOMMENDATIONS ALL FLOORING.
5. NEVER ASSUME A ROOM IS PERFECTLY SQUARE - ALWAYS SQUARE OFF FROM THE CENTER AND BEGIN PATTERN ALONG ONE EDGE.
6. TO AVOID ROUGH EDGES ON TILE, ALWAYS FLOAT THE FLOOR TO A LEVEL STATE BEFORE INSTALLING TILE.
7. ALWAYS ROUND TO THE NEXT HIGHEST FOOTAGE WHEN CALCULATING SQUARE FOOTAGE OF TILE NEEDED.
8. RANDOM IS NOT A PATTERN, BUT A SPECIFIC LOOK DESIGNED BY THE INSTALLER. MOST RANDOM ARRANGEMENTS NEED TO WORK ON PERCENTAGES.
9. ALL APPROPRIATE MOISTURE TESTS TO BE PERFORMED AND FLOORING INSTALLED IN ACCORDANCE WITH FLOORING MANUFACTURES' REQUIREMENTS.
10. THE CUTTING OF TILE MUST BE EXECUTED TO PROVIDE A SMOOTH AND EVEN CUT FREE OF DEFECTS AND CHIPS.
11. ALL TILE MUST BUTT AGAINST DOOR FRAMES AND AN EVEN MANNER OR BE MITERED TO PROVIDE AND APPROPRIATE TERMINATION TO THE TILE. ANY QUESTIONS ON THIS CONDITION SHOULD BE APPROVED BY ARCHITECT OR BHIDP BEFORE PROCEEDING.
12. ALL GLASS TILE TO BE INSTALLED ON A WHITE THIN SET, IF APPLICABLE.
13. ALL TILE MUST BE INSTALLED ON THE SAME LEVEL FOR FLOOR S AND WALLS. BACK BUTTERING MAY BE REQUIRED TO GET A LEVEL SURFACE WHEN DIFFERENT TYPES OF MATERIAL IN SPECIFIED.
14. ALL TILE MUST BE SEALED BEFORE GROUT IS INSTALLED.
15. ALL GROUT MUST BE REMOVED FROM SURFACE OF TILE IN A TIMELY MANNER.
16. WHEN USING EPOXY GROUT: GROUT SMALL AREAS THEN MOVE TO THE NEXT ON FLOORS AND WALLS. ALL TILE MUST BE SEALED BEFORE INSTALLING GROUT OF ANY TYPE.
17. ALL GROUT MUST BE INSTALLED IN A SMOOTH AND CONSISTENT MANNER FREE OF DEFECTS, GAPS AND HOLES.
18. ALL GROUT TO BE SEALED AFTER INSTALLATION.
19. ELASTOMERIC CAULK IS TO BE INSTALLED AT TOP OF L-SH SCHLUTER TRIM AT TOP OF WALL TILE, PER FINISH LEGEND.
20. LEAVE UNUSED TILE ON JOB SITE, BOXED AND SECURED.

WALL FINISH PLAN GENERAL NOTES:

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WALL PAINT CODES / LEGEND

PR	PRIMER
SG	SEMI-GLOSS
ES	EGGSHELL
V	VELVET
MET	METALLIC PAINT
UNO	UNLESS NOTED OTHERWISE
P1-UNO-ES	PAINTED WALL FINISH
P1-	PAINTED WALL FINISH
P2-	PAINTED WALL FINISH
P2-	PAINTED WALL FINISH
P3-	PAINTED WALL FINISH
P4- - P17-	PAINTED WALL FINISH - ACCENT
P12-MET	METALLIC PAINT

WALL FINISH SYMBOL LEGEND

P#-XX TAG INDICATES WALL MATERIAL FINISH

TILE FINISH KEY

WT-1
NOMINAL 11 3/16" X 23 3/16" X 3/8"
SEE BATHROOM ELEVATIONS 1/i-w-1.5

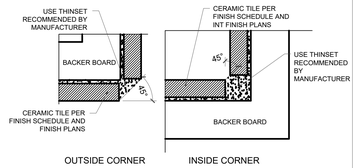
WT-1A (ACCENT)
FLAT LINER 3/4" X 8 1/2"
SEE BATHROOM TILE DETAIL 2/i-w-1.5

WT-2A (ACCENT)
FLAT LINER 3/4" X 8 1/2"
SEE BATHROOM TILE DETAIL 2/i-w-1.5

WT-3A (ACCENT)
FLAT LINER 3/4" X 8 1/2"
SEE BATHROOM TILE DETAIL 2/i-w-1.5

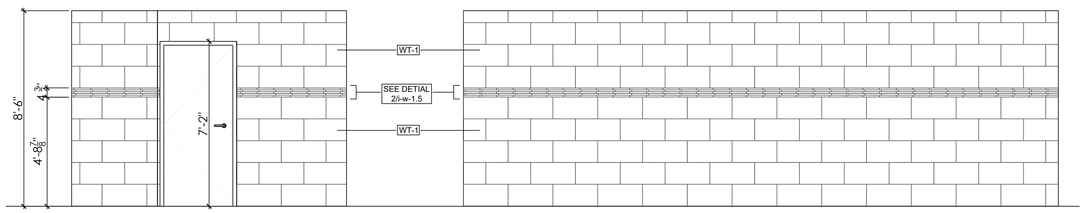
WT-4A (ACCENT)
FLAT LINER 3/4" X 8 1/2"
SEE BATHROOM TILE DETAIL 2/i-w-1.5

WT-5A (ACCENT)
FLAT LINER 3/4" X 8 1/2"
SEE BATHROOM TILE DETAIL 2/i-w-1.5



TILE CORNER DETAILS

SCALE: NTS

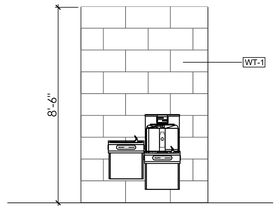


1 i-w-1.5 RESTROOM ELEVATIONS, TYP. ALL WALLS
SCALE: 3/8"= 1'-0"

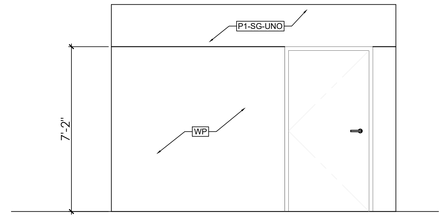
2 i-w-1.5 BATHROOM TILE DETAIL ELEVATION
SCALE: 6"= 1'-0"

ROOM NUMBERS

ROOM #'s:108,109,110,120,121,130,131,251, 255, 306,416,454,461,518,604,607,617,632, 660,701,752,753,764



3 i-w-1.5 WATER FOUNTAIN ELEVATIONS, TYP. ALL LOCATIONS
SCALE: 3/8"= 1'-0"



NOTE: WALL PROTECTION TO ALIGN WITH TOP OF DOOR FRAME. TYP. ALL

4 i-w-1.5 STORAGE ELEVATIONS, TYP. ALL LOCATIONS
SCALE: 3/8"= 1'-0"

ROOM NUMBERS

ROOM #'s:111, 112, 118, 119C, 123, 127A, 127B, 132, 137A, 139, 151, 254, 303, 311, 313, 403, 409, 445, 455, 515, 528, 532, 616, 621, 639, 659, 671, 729, 770, 800, 805, 806, 807, 808, 809

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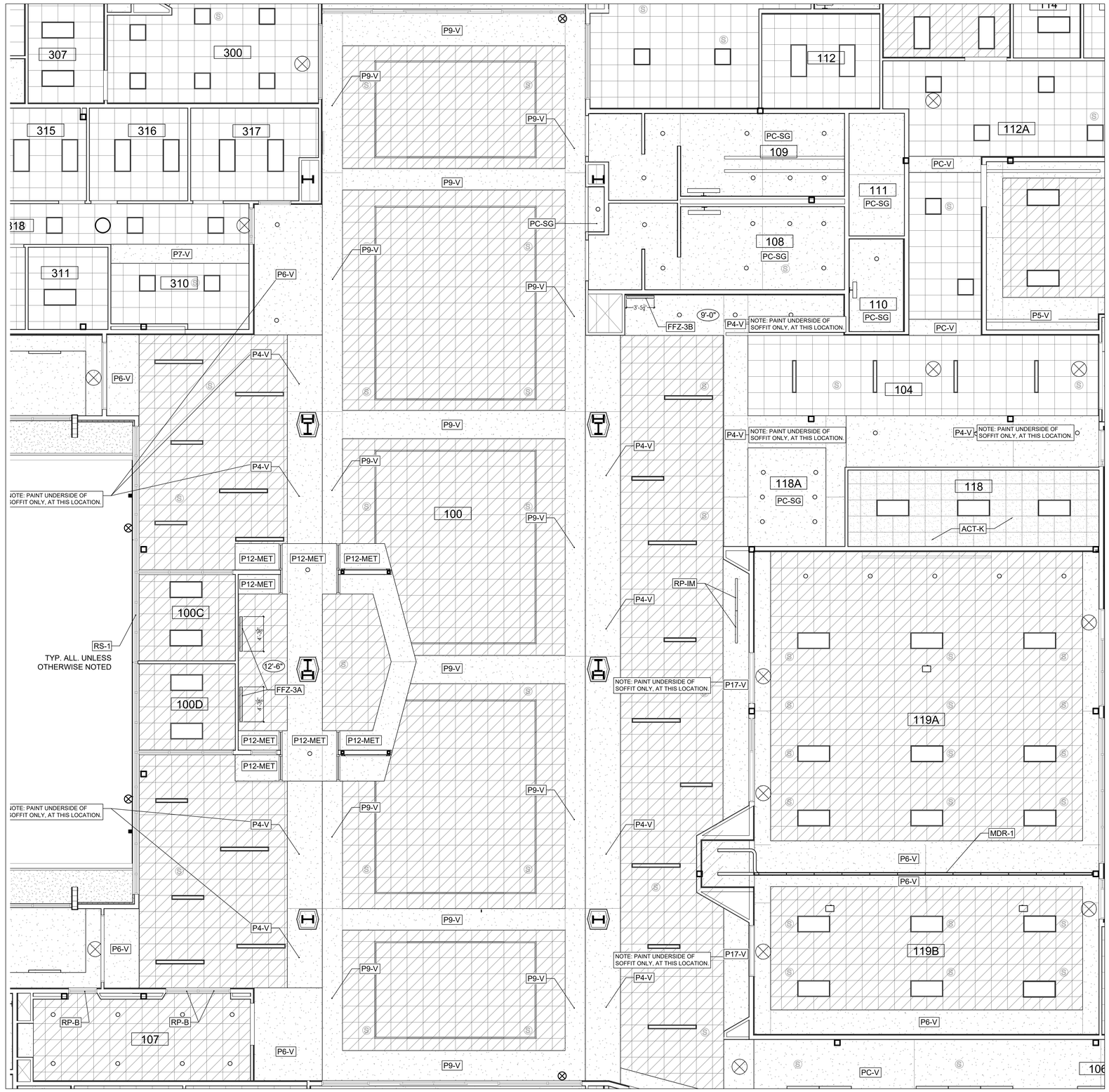
WALL FINISH ELEVATIONS & DETAILS

i-w-1.5

SEE SHEET: i-rcp-1.0 FOR ALL CEILING FINISH LEGENDS



ALL SOFFITS TO BE PAINTED AS INDICATED BY TAG ON **BOTTOM AND SIDE** SURFACES

1 i-rcp-0.1 CEILING FINISH PLAN - LOBBY
SCALE: 3/16"= 1'-0"

north

RCP FINISH PLAN GENERAL NOTES:

1. ALL EXPOSED FACES OF SOFFITS TO BE PAINTED PER FINISH TAG.
2. **ALL SOFFITS TO BE PAINTED AS INDICATED ON BOTTOM AND SIDES SURFACES.**
3. SEE CEILING FINISH KEY FOR LOCATION AND TYPES OF CEILINGS.
4. ALL GWB (HARD CEILINGS) TO BE P1 UNLESS NOTED OTHERWISE.
5. ALL CEILING TILE TO MATCH EXISTING PRODUCT.
6. ALL CEILING TILE AND GRID TO BE INSTALLED IN A CONSISTENT AND LEVEL MANNER.
7. SEE ARCHITECTURAL PLANS FOR METAL CEILING DETAILS AND ALL OTHER NECESSARY INFORMATION.

RCP FINISH SYMBOL LEGEND

P#-XX TAG INDICATES CEILING PAINT COLOR & FINISH

RCP LEGEND

GWB (HARD) CEILING

ACT-1
24" X 24" ACOUSTIC CEILING TILE

ACT-2
24" X 24" ACOUSTIC CEILING TILE

ACT-K
24" X 24" KITCHEN CEILING TILE

GWB	HARD CEILING
ACT	ACOUSTIC CEILING TILE
PC	CEILING PAINT

GRAPHIC LEGEND

FILZFELT PANELS

SEE SHEET : i-rcp-1.0 FOR ALL FILZFELT INSTALLATION INSTRUCTIONS

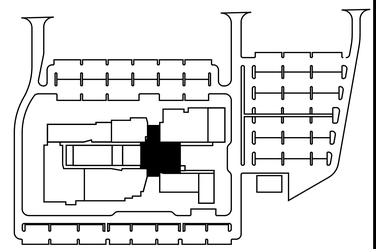
RCP FINISH CODES/LEGEND

CEILING PAINT FINISH CODES / LEGEND	
PR	PRIMER
SG	SEMI-GLOSS
ES	EGGSHELL
V	VELVET
MET	METALLIC PAINT
UNO	UNLESS NOTED OTHERWISE
PC-SG-UNO	PAINTED CEILING FINISH
PC-V	PAINTED CEILING FINISH
P4-P17	PAINTED CEILING FINISH
P12-MET	METALLIC PAINT

CEILING FINISH CODES / LEGEND	
ACT-1	2 X 2 CEILING TILE & GRID
ACT-2	2 X 4 CEILING TILE & GRID
ACT-K	2 X 2 KITCHEN CEILING TILE
CC-1	CUBICLE CURTAIN

FILZFELT HANGING PANELS	
FFZ-1	FILZFELT HANGING PANELS
FFZ-2	FILZFELT HANGING PANELS
FFZ-3A	FILZFELT HANGING PANELS
FFZ-3B	FILZFELT HANGING PANELS
FFZ-4	FILZFELT HANGING PANELS

WINDOW COVERINGS	
MTL-B	METAL BLINDS
RS-1	ROLLER SHADE - 5% SHEER SCREEN
RS-2B	ROLLER SHADE - BLACKOUT SCREEN
RS-1 + RS-2B SHADES	BOTH 5% & BLACKOUT ROLLER



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CEILING FINISH PLAN

i-rcp-0.1

			CEILING
PASCUA YAQUI TRIBE . HEALTH CENTER II - INTERIOR REFLECTED CEILING FINISH KEY			
ACOUSTICAL CEILING TILES			
CODE	STOCK NO.	MANUFACTURER	DESCRIPTION / NOTES / LOCATION
ACT-1	MESA #680 SIZE: 24" X 24" SQUARE EDGE LAY-IN COLOR: WHITE	ARMSTRONG	LOCATION: MAIN LOBBY & MEETING ROOMS COLOR: WHITE
GRID (ACT-1)	15/16 GRID BEVELED COLOR: WHITE		
ACT-2	FINE FISSURED #1754 SIZE: 24" X 24" X 7/8" SQUARE EDGE LAY-IN COLOR: WHITE	ARMSTRONG	LOCATION: PER PLANS
GRID (ACT-2)	15/16 GRID SQUARE LAY-IN COLOR: WHITE		
ACT-K	KITCHEN ZONE #673 SIZE: 24" X 24" SQUARE LAY-IN SMOOTH TEXTURE	ARMSTRONG	LOCATION: CAFÉ & BACK OF THE HOUSE
GRID (ACT-1)	15/16 GRID SQUARE LAY-IN COLOR: WHITE		
CEILING / SOFFIT PAINT			
PC-SG-UNO	WHITE DEW380 SEMI-GLOSS CEILING ONLY	DUNN EDWARDS	ALL HARD CEILINGS UNLESS OTHERWISE NOTED: ALL BATHROOM AND STORAGE ROOMS
PC-V	WHITE DEW380 P1-SG: VELVET	DUNN EDWARDS	LOCATION: PER PLANS SPARTAWALL - VELVET #SWLL20-1 (LOW VOC)
P4-V	DE5796 BEFORE THE STORM	DUNN EDWARDS	LOCATION: PER PLANS SPARTAWALL - VELVET #SWLL20-1 (LOW VOC)
P6-V	DE5777 FROSTPROOF	DUNN EDWARDS	LOCATION: PER PLANS SPARTAWALL - VELVET #SWLL20-1 (LOW VOC)
P9-V	DE5751 PLUNGING WATERFALL	DUNN EDWARDS	LOCATION: PER PLANS SPARTAWALL - VELVET #SWLL20-1 (LOW VOC)
P10-V	DE5520 CROCODILE TEARS	DUNN EDWARDS	LOCATION: PER PLANS SPARTAWALL - VELVET #SWLL20-1 (LOW VOC)
P17-V	DE5146 CAMPFIRE	DUNN EDWARDS	LOCATION: PER PLANS SPARTAWALL - VELVET #SWLL20-1 (LOW VOC)
P12-MET	METALLIC ME247 SAGE	MODERN MASTERS	LOCATION: PER PLANS MODERN MASTERS METALLIC

PAINT LEGEND
1. DUNN-EDWARDS PRODUCTS DON'T CONTAIN ETHYLENE GLYCOL OR ANY OTHER HAZARDOUS AIR POLLUTANTS.
2. THIS IS A REQUIREMENT OF THE PRODUCTS USED ON THIS PROJECT.

PAINT KEY:

CODE	MANUFACTURER	DESCRIPTION
PR	DUNN EDWARDS	BLOC-RUST PREMIUM PRIMER FOR DOOR FRAMES #BRPR00
SG	DUNN EDWARDS	SPARTAWALL - SEMI GLOSS SWLL50-1 (LOW VOC)
ES	DUNN EDWARDS	SPARTAWALL - EGGSHELL # SWLL30-1 (LOW VOC)
V	DUNN EDWARDS	SPARTAWALL - VELVET #SWLL20-1 (LOW VOC)
MET	MODERN MASTERS	METALLIC PAINT

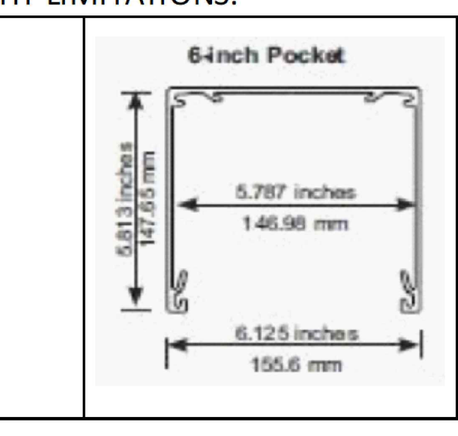
			WINDOW COVERINGS / PLAN LOCATION: RCP
PASCUA YAQUI TRIBE . HEALTH CENTER II - INTERIOR REFLECTED CEILING FINISH KEY			
WINDOW COVERINGS / PLAN LOCATION: RCP			
PASCUA YAQUI TRIBE - INTERIOR REFLECTED CEILING FINISH KEY			
CODE	STOCK NO.	MANUFACTURER	DESCRIPTION / NOTES / LOCATION
WINDOW COVERINGS			
ROLLER SHADES			
RS-1 MAIN SHADE FINISH OUTSIDE MOUNT SEE MOUNTING BOX REQUIREMENT BELOW	ROLLER SHADES VERTILUX SCREEN TYPE: VX 3000 SCREEN: 5% COLOR: 0-004-62-02598 BROWN CHOCOLATE 6" POCKET FINISH: CLEAR ALUMINUM	ROLLER SHADE SYSTEM B.D.D. SONORAN SHADING SYSTEMS	1. COMPOSITION: 30% PES + 70% PVC 2. WEIGHT: UNE EN 12127 / 12.39 OZ/YD² 3. THICKNESS: UNE EN 1S0 5084 0.58 MM (±5%) | 0.023 IN (±5%) 4. ROLL WIDTH 98 IN, 118" (CAN BE RAILROADED IF NECESSARY) 5. OPENNESS FACTOR: 5% 6. UV BLOCKAGE APPROX. 95% 7. MESH / IN WARP: 49 | FILL: 46 8. COLOR FASTNESS AATCC 16-2002 CLASS 4.5 9. FLAME RETARDANT: NFPA 701 PASS 10. ENVIRONMENTAL HEALTH PROPERTIES: OEKO TEX 100 CERTIFIED 11. SPRING ASSIST IF NECESSARY
DOUBLE BRACKET WILL BE NEEDED WHERE BLACK OUT SHADE NEEDED – CODED WITH BE A COMBINATION OF RS-1 + RS-B2			
BLACKOUT SHADES			
RS-2B BLACKOUT SHADE OUTSIDE MOUNT SEE MOUNTING BOX REQUIREMENT BELOW	ROLLER SHADES VERTILUX MERIDIAN – BLACKOUT SHADE FABRIC BLACKOUT – FOR ROOM DARKENING COLOR: PORCELAIN 02 6" POCKET FINISH: CLEAR ALUMINUM	ROLLER SHADE SYSTEM B.D.D. SONORAN SHADING SYSTEMS	1. COLOR: PORCELAIN 02 2. OPENNESS FACTOR: NONE 3. FIRE RETARDANT: NFPA 701-2010 4. ROLL WIDTH: 118" 5. COMPOSITION: 100% POLYESTER 6. WEAVE: PLAIN 7. NOMINAL THICKNESS: 0.5MM +/-0.05MM 8. NOMINAL WEIGHT: 420GSM 9. CUTTING: ULTRASONIC, PRESSURE CUT, RAZOR 10. WELDING: WELD WITH BONDING TAPE 11. SPRING ASSIST IF NECESSARY
RS-1/ RS-2B	COMBINATION OF MAIN SHADE (RS-1) WITH BACK OUT SHADE (RS-2B)		

GENERAL INFORMATION:
PULL LOCATION ON RIGHT:
1. CONTROLS MAY BE PLACED ON LEFT IF THERE IS AN INTERFERENCE IN PLACE THIS ON THE RIGHT
2. METAL CHAIN DRIVE, FINISH: CHROME

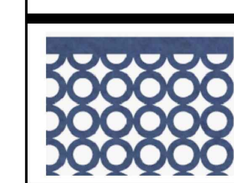
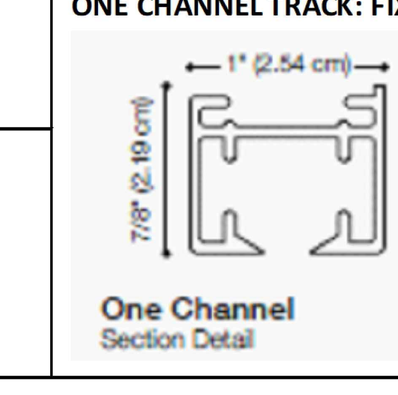
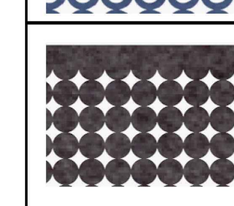
CLEANING: DUST CAN BE REMOVED FROM THE FABRIC BY VACUUM CLEANING OR SOFT DUSTER. LIGHT STAINS CAN BE REMOVED WITH SPONGE AND SOAPY WATER. AVOID USING DETERGENTS, SOLVENTS AS IT MAY CAUSE DAMAGE TO THE COATING OF THE FABRIC.

LAYOUT OF SCREENS TO BE EXECUTED ON WINDOW ELEVATION SHEETS, VIA MARK-UP AND SUBMITTAL TO DESIGNER / ARCHITECT FOR APPROVAL. NOTE: COVER AS MANY WINDOWS AS IS FEASIBLE WITH OUT CAUSING AN ISSUE REGARDING PULLS AND WEIGHT LIMITATIONS.

MOUNTING BOX FOR OUTSIDE MOUNT ON ALL WINDOWS



FINISH: CLEAR ALUMINUM
6" POCKET TO BE USED FOR OUTSIDE MOUNT IN ALL LOCATIONS

			CEILING
PASCUA YAQUI TRIBE . HEALTH CENTER II - INTERIOR WALL FINISH KEY			
FILZFELT – HANGING PANELS			CEILING
CODE	STOCK NO.	MANUFACTURER	DESCRIPTION / NOTES
CODES: FFZ-1, FFZ-2, FFZ-3, FFZ-4, SEE BELOW FOR COLOR ID.	FILZFELT HANGING PANELS COLOR: AS NOTED BELOW PATTERN: POLKA 90 & POLKA 90 LIGHT PER DESIGNATION BELOW	FILZFELT 800.482.7777	1. LOCATION: PER PLANS 2. INSTALL PER MANUFACTURER INSTRUCTIONS 3. SEE PLANS FOR SIZES & LOCATIONS 4. USE MANUFACTURE'S RECOMMENDED HARDWARE 5. PANEL THICKNESS: PER COLOR DESIGNATION 6. HANGING OPTIONS: VELCRO 7. SEE MOUNTING GUIDE ON DRAWINGS & COORDINATE WITH MANUFACTURER 8. HARDWARE VARIES PER GRID CEILING OR HARD CEILING 9. COLORFASTNESS TO LIGHT CLASS 4–5 (40 HOURS) 10. COLORFASTNESS TO CROCKING CLASS 3–4 (WET), CLASS 4–5 (DRY) 11. DURABILITY + STRENGTH ASTM 4966 (MARTINDALE ABRASION TESTER METHOD): 5,000 GRADE 4, 10,000 12. GRADE 3.5, 20,000 GRADE 3.5, 40,000 13. ASTM D 5034 (GRAB TEST): 243 LB. (AVG. OF WARP), 214 LB. (AVG. OF WEFT) 14. ONE CHANNEL TRACK: FIXED TRACK (SEE LINE DRAWING BELOW)
FFZ-1 (1 EA.) COLOR: 437 AUBERGINE PANEL THICKNESS: 5 mm	CODE: FFZ-1 / POLKA 90 COLOR: 437 AUBERGINE SIZE: 5' - 7 5/8" WIDE x 8' - 7 13/16" LONG ONE (1) CHANNEL TRACK LOCATION: HALLWAY #736 AT HALLWAY #766		
FFZ-2 (1 EA.) COLOR: 384 LIND (GREEN) PANEL THICKNESS: 5 mm	CODE: FFZ-2 / POLKA 90 LIGHT COLOR: 384 LIND GREEN SIZE: 4' -8 3/4" WIDE x 9' - 5 3/8" LONG ONE (1)SINGLE CHANNEL TRACKS" LOCATION: HALLWAY #736 AT HALLWAY #766		
FFZ-3A (2 EA.) FFZ-3B (1 EA.) COLOR: 312 LAGUNE (TEAL) PANEL THICKNESS: 5 mm	CODE: FFZ-3A & FFZ-3B / POLKA 90 LIGHT COLOR: 312 LAGUNE (TEAL) FFZ-3A: SIZE: 4' - 3 5/8" WIDE x 9' - 5 3/8" LONG ONE CHANNEL TRACK – TWO PANELS SIDE BY SIDE WITH SPACE BETWEEN, SEE PLANS LOCATION ROOM #100 LOBBY FFZ-3B: SIZE: 3' - 5 5/16" WIDE x 8' - 7 1/8" LONG LOCATION ROOM #104 HALLWAY		
FFZ-4 (1 EA.) COLOR: 242 PINK PANEL THICKNESS: 5 mm	CODE: FFZ-4 / POLKA 90 COLOR: 242 PINK SIZE: 5'- 7 5/8" WIDE x 9' - 4 5/8" LONG ONE (1) CHANNEL TRACK LOCATION: #101 HALLWAY		
	PATTERN: POLKA 90 LIGHT (OPEN CIRCLES) HANGING PANEL WITH ASSOCIATED HARDWARE		ONE CHANNEL TRACK: FIXED TRACK 
	PATTERN: POLKA 90 (CLOSED FILLED CIRCLES) HANGING PANEL WITH ASSOCIATED HARDWARE		

RCP FINISH CODES/LEGEND

CEILING PAINT FINISH CODES / LEGEND

PR	PRIMER
SG	SEMI-GLOSS
ES	EGGSHELL
V	VELVET
MET	METALLIC PAINT
UNO	UNLESS NOTED OTHERWISE
PC-SG-UNO	PAINTED CEILING FINISH
PC-V	PAINTED CEILING FINISH
P4-P17	PAINTED CEILING FINISH
P12-MET	METALLIC PAINT

CEILING FINISH CODES / LEGEND

ACT-1	2 X 2 CEILING TILE & GRID
ACT-2	2 X 4 CEILING TILE & GRID
ACT-K	2 X 2 KITCHEN CEILING TILE
CC-1	CUBICLE CURTAIN

FILZFELT HANGING PANELS

FFZ-1	FILZFELT HANGING PANELS
FFZ-2	FILZFELT HANGING PANELS
FFZ-3A	FILZFELT HANGING PANELS
FFZ-3B	FILZFELT HANGING PANELS
FFZ-4	FILZFELT HANGING PANELS

WINDOW COVERINGS

MTL-B	METAL BLINDS
RS-1	ROLLER SHADE - 5% SHEER SCREEN
RS-2B	ROLLER SHADE - BLACKOUT SCREEN
RS-1 + RS-2B SHADES	BOTH 5% & BLACKOUT ROLLER

GRAPHIC LEGEND

FILZFELT PANELS

RCP FINISH PLAN GENERAL NOTES:

1. ALL EXPOSED FACES OF SOFFITS TO BE PAINTED PER FINISH TAG.
2. ALL SOFFITS TO BE PAINTED AS INDICATED ON BOTTOM AND SIDE SURFACES.
3. SEE CEILING FINISH KEY FOR LOCATION AND TYPES OF CEILINGS.
4. ALL GWB (HARD CEILINGS) TO BE P1 UNLESS NOTED OTHERWISE.
5. ALL CEILING TILE TO MATCH EXISTING PRODUCT.
6. ALL CEILING TILE AND GRID TO BE INSTALLED IN A CONSISTENT AND LEVEL MANNER.
7. SEE ARCHITECTURAL PLANS FOR METAL CEILING DETAILS AND ALL OTHER NECESSARY INFORMATION.

RCP FINISH SYMBOL LEGEND

P#-XX TAG INDICATES CEILING PAINT COLOR & FINISH

RCP LEGEND

GWB (HARD) CEILING

ACT-1
24" X 24" ACOUSTIC CEILING TILE

ACT-2
24" X 24" ACOUSTIC CEILING TILE

ACT-K
24" X 24" KITCHEN CEILING TILE

GWB	HARD CEILING
ACT	ACOUSTIC CEILING TILE
PC	CEILING PAINT

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ALL SOFFITS TO BE PAINTED AS INDICATED BY TAG ON **BOTTOM AND SIDE** SURFACES

1 REFLECTED CEILING PLAN - SEWA U'USIM
i-rcp-1.0
SCALE: 1/8"= 1'-0"

north

NOTE: SINGLE TRACK IN ALL LOCATIONS.

1 A template is supplied which shows the correct drill positions for the track. The FRONT LINE on the template refers to the position of the front of the track. Draw a straight line along the ceiling marking the FRONT LINE of the track, ensuring clearance of door handles, sills, etc. is maintained along the full length.

2 Mark along this line the position of the locking clamps. Each end clamp should be 4 in (10 cm) from the ends of the track and each subsequent clamp should be spaced equally apart at 24-30 in (60-80 cm) intervals.

3 Using the template, mark the drill holes indicated for each clamp using a pencil.

4 Screw the clamps flat side to the ceiling, at the points marked. Fix until clamps are secure but can still be easily rotated, leaving the tail pointing to the back.

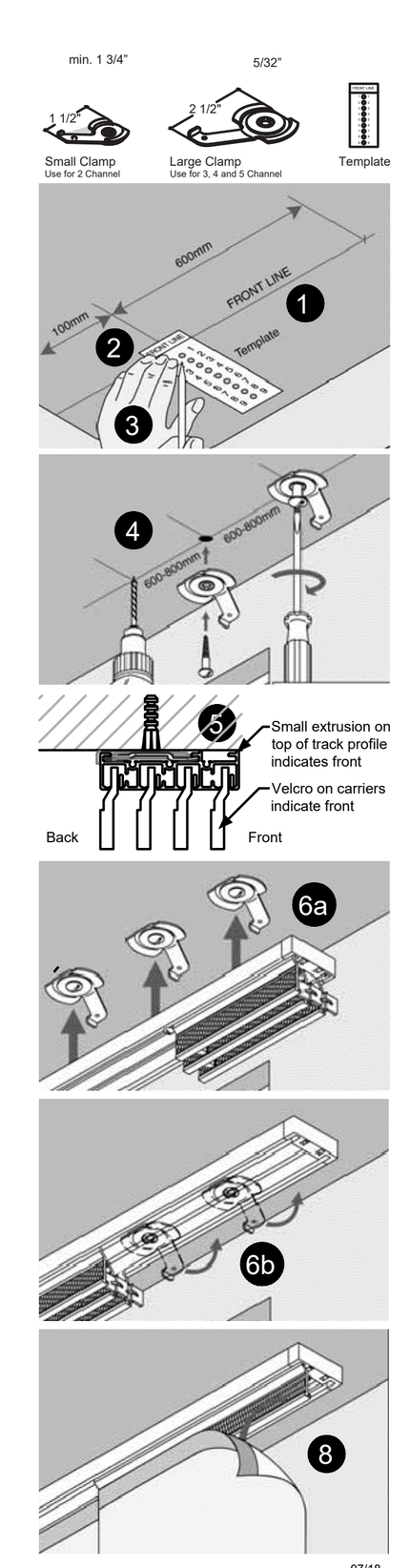
5 A small extrusion on top of the track indicates the front. The velcro on the carriers also indicates the front. The extrusion and velcro on the carriers should be oriented accordingly.

6 Raise the track to the clamps (6a). Start at the center and rotate clamps until they touch the back of the track (6b). It may be necessary to gently tap the clamps with a light hammer to lock them into place. Move along the track until all the clamps are locked.

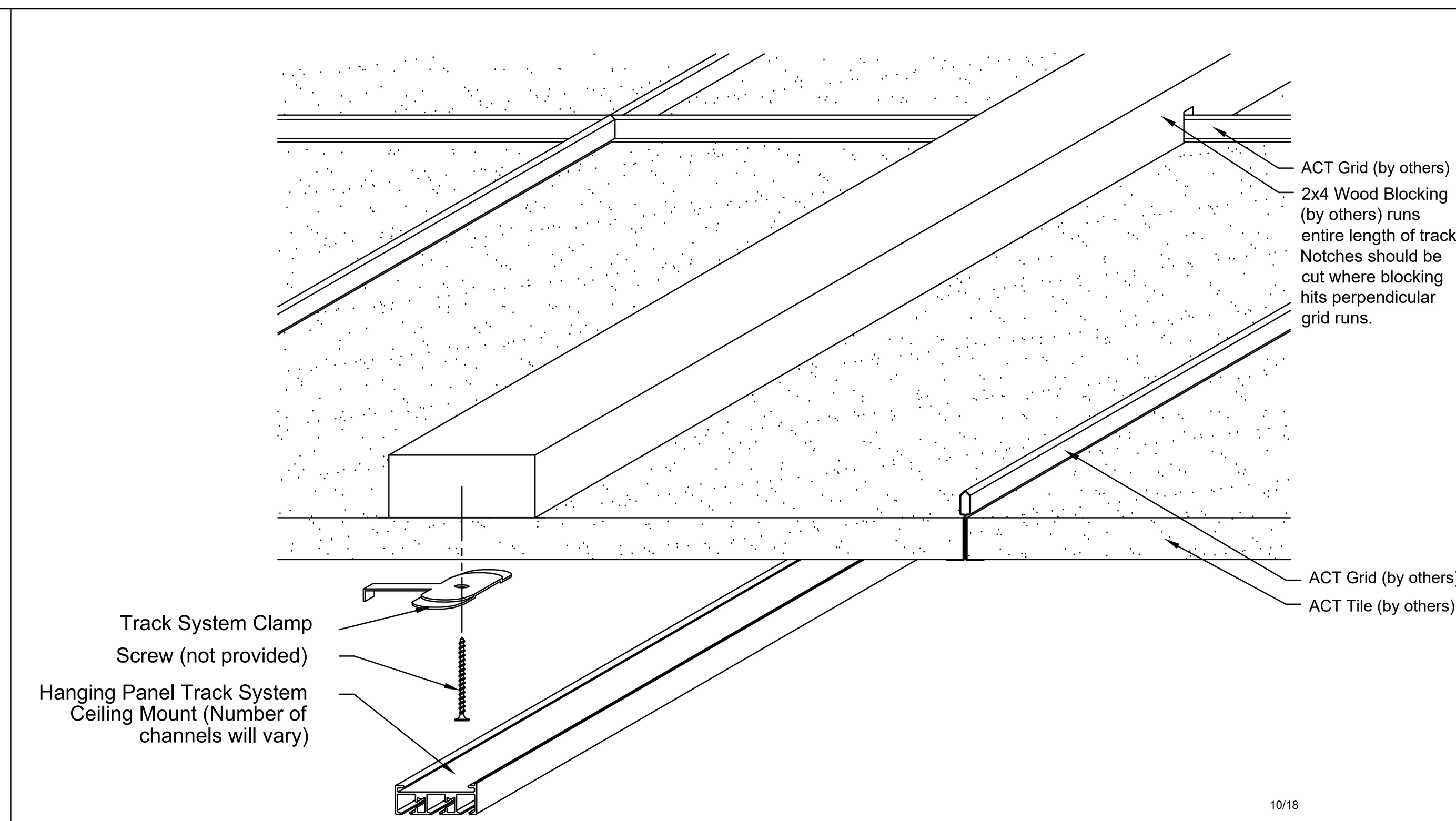
Note: For combination systems to make up six or seven channels, always fit the front clamps and track first.

7 Move carriers to ensure that the separate carriers pick up one another so that they move in sequence. Should one connection between carriers miss, simply clip back into place.

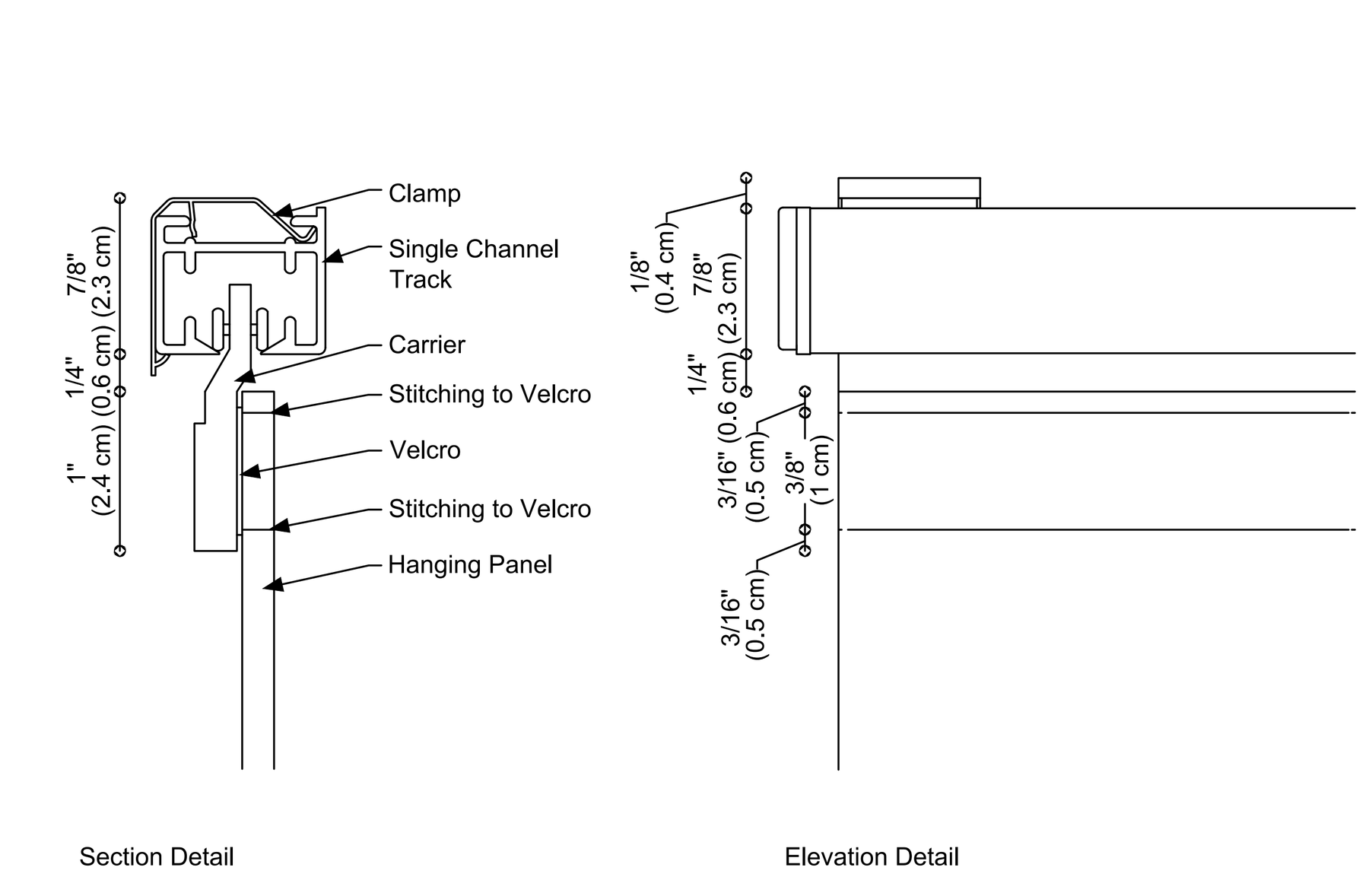
8 Hang the Hanging Panels onto each of the carriers using the velcro tape. Ensure that the felt is smoothed along the full length of the carrier.



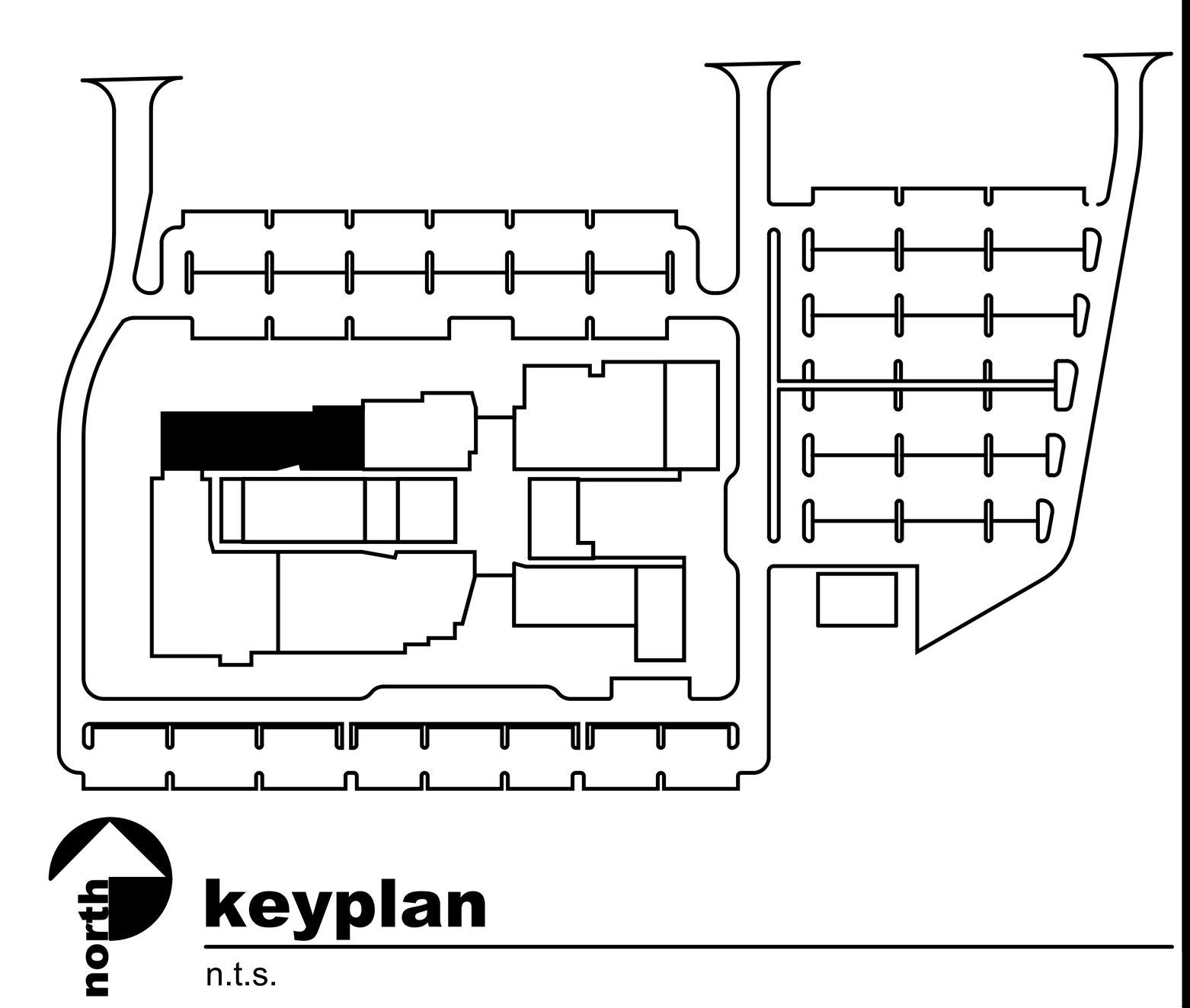
HANGING PANEL TRACK SYSTEM INSTALLATION INSTRUCTIONS
CEILING MOUNTED



RECOMMENDED INSTALLATION METHOD FOR HANGING PANEL TRACK SYSTEM INSTALLED TO ACT CEILING GRID



FILZFELT VELCRO ATTACHMENT



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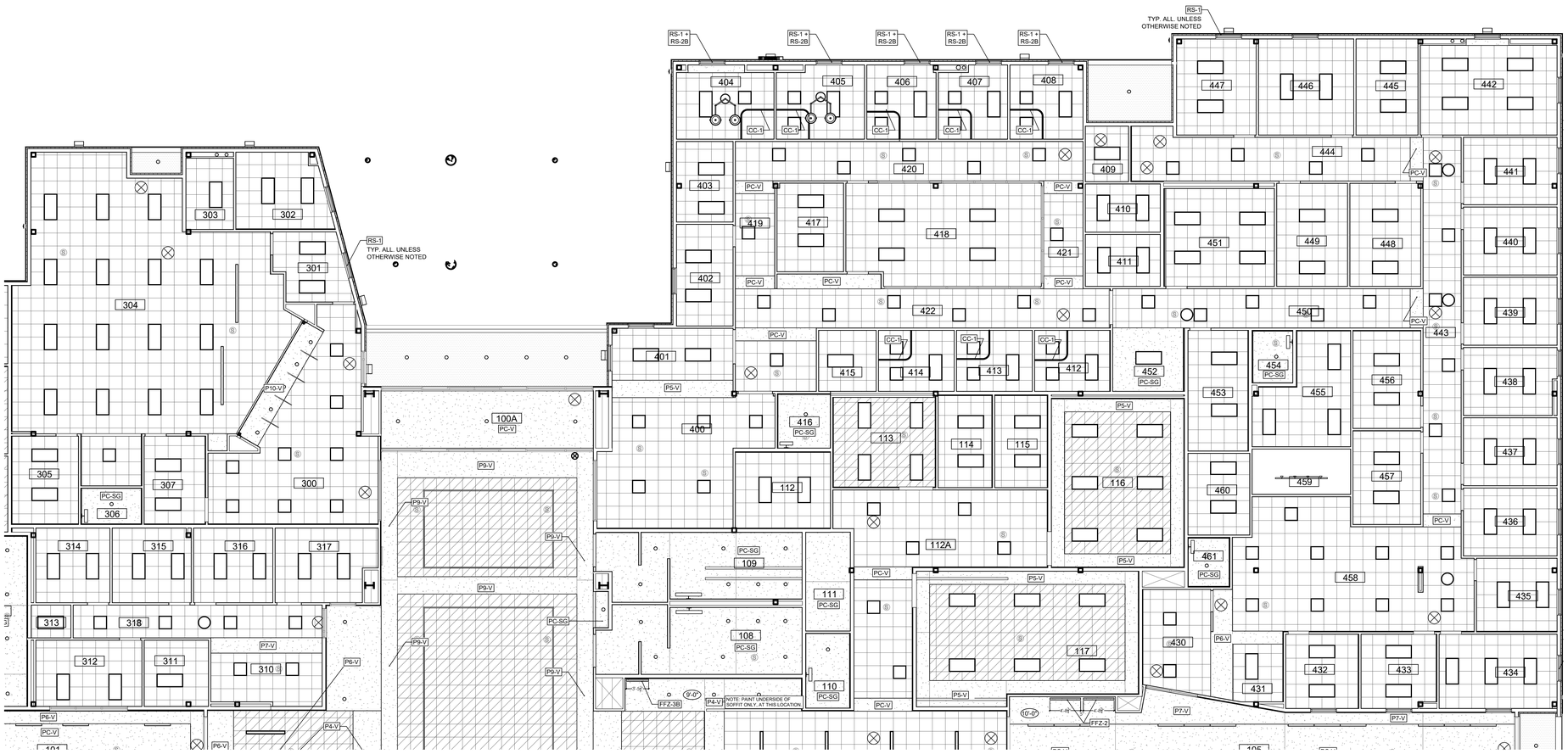
CEILING FINISH PLAN

i-rcp-1.0

SEE SHEET: i-rcp-1.0 FOR ALL RCP FINISH LEGENDS



1 i-rcp1.1 REFLECTED CEILING PLAN - PHARMACY, DIABETES, NURSING & CLINICS

SCALE: 1/8"= 1'-0"

north

RCP FINISH PLAN GENERAL NOTES:

1. ALL EXPOSED FACES OF SOFFITS TO BE PAINTED PER FINISH TAG.
2. ALL SOFFITS TO BE PAINTED AS INDICATED ON BOTTOM AND SIDE SURFACES.
3. SEE CEILING FINISH KEY FOR LOCATION AND TYPES OF CEILINGS.
4. ALL GWB (HARD CEILINGS) TO BE P1 UNLESS NOTED OTHERWISE.
5. ALL CEILING TILE TO MATCH EXISTING PRODUCT.
6. ALL CEILING TILE AND GRID TO BE INSTALLED IN A CONSISTENT AND LEVEL MANNER.
7. SEE ARCHITECTURAL PLANS FOR METAL CEILING DETAILS AND ALL OTHER NECESSARY INFORMATION.

RCP FINISH SYMBOL LEGEND

P#-XX TAG INDICATES CEILING PAINT COLOR & FINISH

RCP LEGEND

GWB (HARD) CEILING

ACT-1
24" X 24" ACOUSTIC CEILING TILE

ACT-2
24" X 24" ACOUSTIC CEILING TILE

ACT-K
24" X 24" KITCHEN CEILING TILE

GWB	HARD CEILING
ACT	ACOUSTIC CEILING TILE
PC	CEILING PAINT

RCP FINISH CODES/LEGEND

CEILING PAINT FINISH CODES / LEGEND

PR	PRIMER
SG	SEMI-GLOSS
ES	EGGSHELL
V	VELVET
MET	METALLIC PAINT
UNO	UNLESS NOTED OTHERWISE
PC-SG-UNO	PAINTED CEILING FINISH
PC-V	PAINTED CEILING FINISH
P4-P17	PAINTED CEILING FINISH
P12-MET	METALLIC PAINT

CEILING FINISH CODES / LEGEND

ACT-1	2 X 2 CEILING TILE & GRID
ACT-2	2 X 4 CEILING TILE & GRID
ACT-K	2 X 2 KITCHEN CEILING TILE
CC-1	CUBICLE CURTAIN

FILZFELT HANGING PANELS

FFZ-1	FILZFELT HANGING PANELS
FFZ-2	FILZFELT HANGING PANELS
FFZ-3A	FILZFELT HANGING PANELS
FFZ-3B	FILZFELT HANGING PANELS
FFZ-4	FILZFELT HANGING PANELS

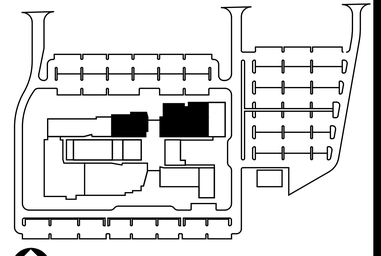
WINDOW COVERINGS

MTL-B	METAL BLINDS
RS-1	ROLLER SHADE - 5% SHEER SCREEN
RS-2B	ROLLER SHADE - BLACKOUT SCREEN
RS-1 + RS-2B SHADES	BOTH 5% & BLACKOUT ROLLER

GRAPHIC LEGEND

FILZFELT PANELS

SEE SHEET : i-rcp-1.0 FOR ALL FILZFELT INSTALLATION INSTRUCTIONS



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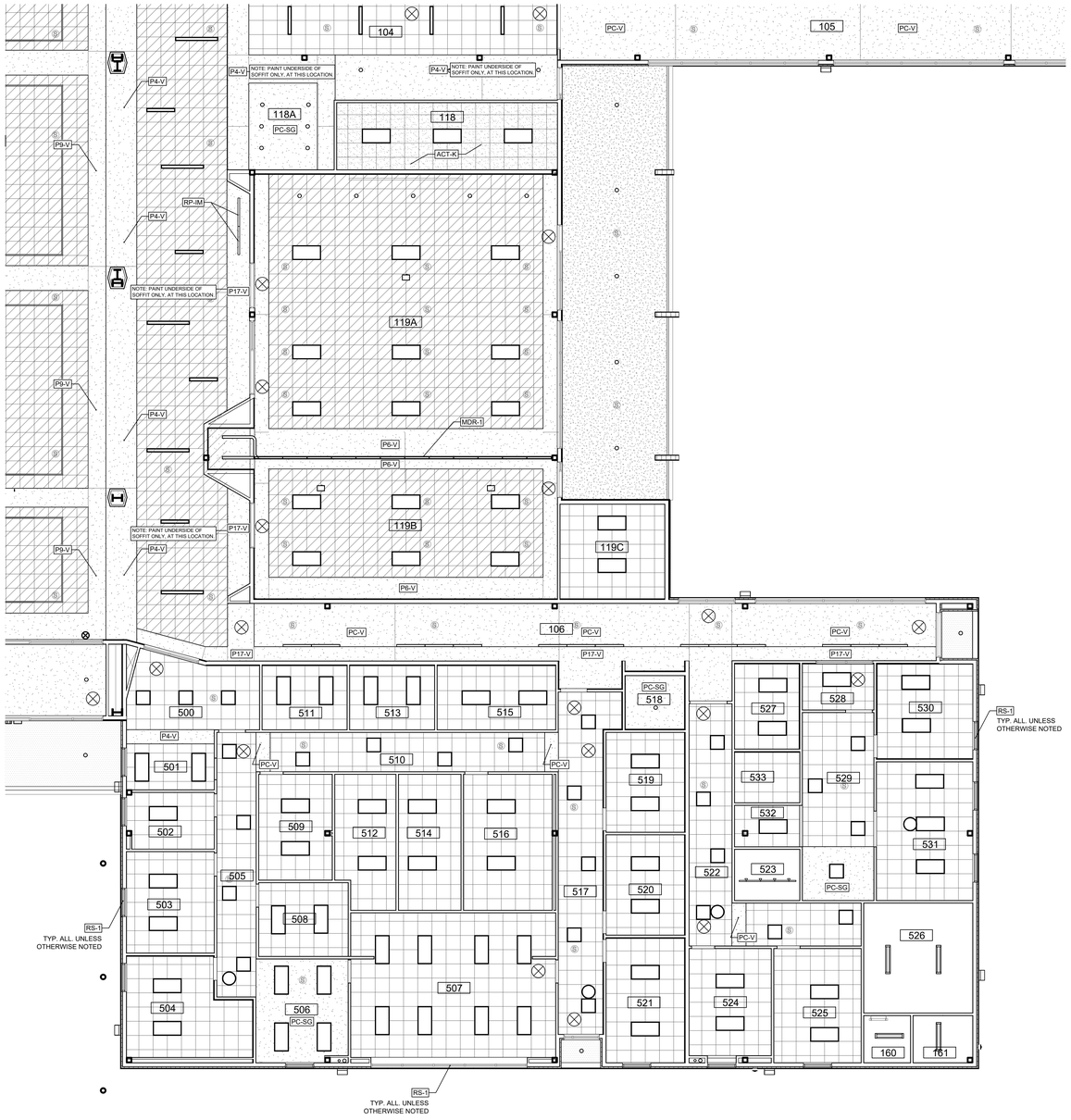
CEILING FINISH PLAN

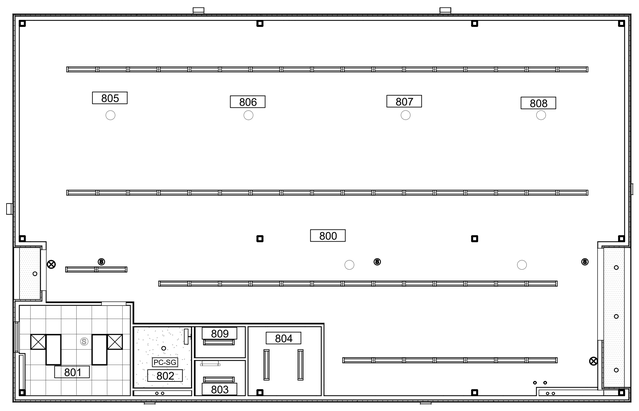
i-rcp-1.1

SEE SHEET: i-rcp-1.0 FOR ALL RCP FINISH LEGENDS



1 i-rcp-1.2 REFLECTED CEILING PLAN - HEALTH BUDGET, MANAGED HEALTH, BILLING

SCALE: 1/8"= 1'-0"



2 i-rcp-1.2 REFLECTED CEILING PLAN - WAREHOUSE

SCALE: 1/8"= 1'-0"

RCP FINISH CODES/LEGEND

CEILING PAINT FINISH CODES / LEGEND

PR	PRIMER
SG	SEMI-GLOSS
ES	EGGSHELL
V	VELVET
MET	METALLIC PAINT
UNO	UNLESS NOTED OTHERWISE
PC-SG-UNO	PAINTED CEILING FINISH
PC-V	PAINTED CEILING FINISH
P4-P17	PAINTED CEILING FINISH
P12-MET	METALLIC PAINT

CEILING FINISH CODES / LEGEND

ACT-1	2 X 2 CEILING TILE & GRID
ACT-2	2 X 4 CEILING TILE & GRID
ACT-K	2 X 2 KITCHEN CEILING TILE
CC-1	CUBICLE CURTAIN

FILZFELT HANGING PANELS

FFZ-1	FILZFELT HANGING PANELS
FFZ-2	FILZFELT HANGING PANELS
FFZ-3A	FILZFELT HANGING PANELS
FFZ-3B	FILZFELT HANGING PANELS
FFZ-4	FILZFELT HANGING PANELS

WINDOW COVERINGS

MTL-B	METAL BLINDS
RS-1	ROLLER SHADE - 5% SHEER SCREEN
RS-2B	ROLLER SHADE - BLACKOUT SCREEN
RS-1 + RS-2B SHADES	BOTH 5% & BLACKOUT ROLLER

RCP FINISH PLAN GENERAL NOTES:

1. ALL EXPOSED FACES OF SOFFITS TO BE PAINTED PER FINISH TAG.
2. ALL SOFFITS TO BE PAINTED AS INDICATED ON BOTTOM AND SIDE SURFACES.
3. SEE CEILING FINISH KEY FOR LOCATION AND TYPES OF CEILINGS.
4. ALL GWB (HARD CEILINGS) TO BE P1 UNLESS NOTED OTHERWISE.
5. ALL CEILING TILE TO MATCH EXISTING PRODUCT.
6. ALL CEILING TILE AND GRID TO BE INSTALLED IN A CONSISTENT AND LEVEL MANNER.
7. SEE ARCHITECTURAL PLANS FOR METAL CEILING DETAILS AND ALL OTHER NECESSARY INFORMATION.

RCP FINISH SYMBOL LEGEND

P#-XX TAG INDICATES CEILING PAINT COLOR & FINISH

RCP LEGEND

GWB (HARD) CEILING

ACT-1
24" X 24" ACOUSTIC CEILING TILE

ACT-2
24" X 24" ACOUSTIC CEILING TILE

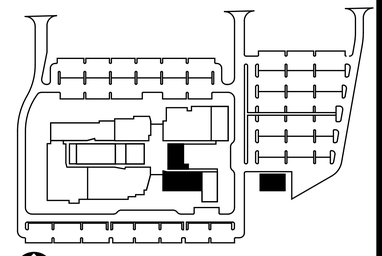
ACT-K
24" X 24" KITCHEN CEILING TILE

GWB	HARD CEILING
ACT	ACOUSTIC CEILING TILE
PC	CEILING PAINT

GRAPHIC LEGEND

FILZFELT PANELS

SEE SHEET : i-rcp-1.0 FOR ALL FILZFELT INSTALLATION INSTRUCTIONS



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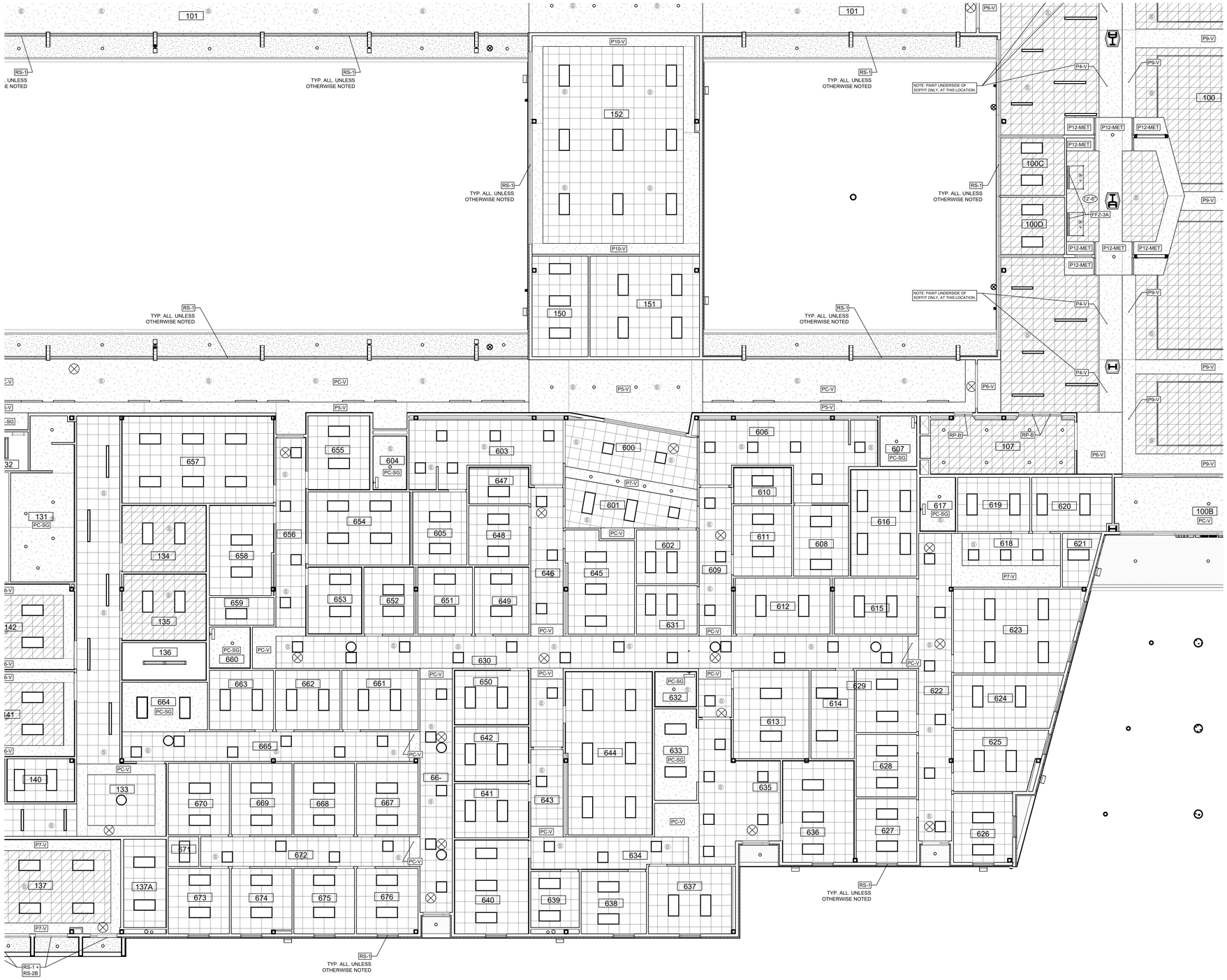
CEILING FINISH PLAN

i-rcp-1.2

SEE SHEET: i-rcp-1.0 FOR ALL RCP FINISH LEGENDS



1 i-rcp-1.3 REFLECTED CEILING PLAN - CENTERED SPIRIT

SCALE: 1/8"= 1'-0"

north

RCP FINISH PLAN GENERAL NOTES:

1. ALL EXPOSED FACES OF SOFFITS TO BE PAINTED PER FINISH TAG.
2. ALL SOFFITS TO BE PAINTED AS INDICATED ON BOTTOM AND SIDE SURFACES.
3. SEE CEILING FINISH KEY FOR LOCATION AND TYPES OF CEILINGS.
4. ALL GWB (HARD CEILINGS) TO BE P1 UNLESS NOTED OTHERWISE.
5. ALL CEILING TILE TO MATCH EXISTING PRODUCT.
6. ALL CEILING TILE AND GRID TO BE INSTALLED IN A CONSISTENT AND LEVEL MANNER.
7. SEE ARCHITECTURAL PLANS FOR METAL CEILING DETAILS AND ALL OTHER NECESSARY INFORMATION.

RCP FINISH SYMBOL LEGEND

P#-XX TAG INDICATES CEILING PAINT COLOR & FINISH

RCP LEGEND

GWB (HARD) CEILING

ACT-1
24" X 24" ACOUSTIC CEILING TILE

ACT-2
24" X 24" ACOUSTIC CEILING TILE

ACT-K
24" X 24" KITCHEN CEILING TILE

GWB	HARD CEILING
ACT	ACOUSTIC CEILING TILE
PC	CEILING PAINT

GRAPHIC LEGEND

FILZFELT PANELS

SEE SHEET : i-rcp-1.0 FOR ALL FILZFELT INSTALLATION INSTRUCTIONS

RCP FINISH CODES/LEGEND

CEILING PAINT FINISH CODES / LEGEND

PR	PRIMER
SG	SEMI-GLOSS
ES	EGGSHELL
V	VELVET
MET	METALLIC PAINT
UNO	UNLESS NOTED OTHERWISE
PC-SG-UNO	PAINTED CEILING FINISH
PC-V	PAINTED CEILING FINISH
P4-P17	PAINTED CEILING FINISH
P12-MET	METALLIC PAINT

CEILING FINISH CODES / LEGEND

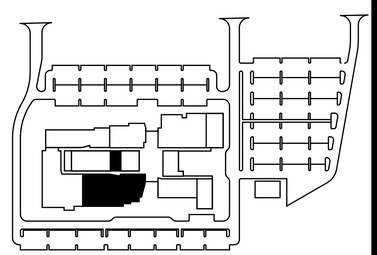
ACT-1	2 X 2 CEILING TILE & GRID
ACT-2	2 X 4 CEILING TILE & GRID
ACT-K	2 X 2 KITCHEN CEILING TILE
CC-1	CUBICLE CURTAIN

FILZFELT HANGING PANELS

FFZ-1	FILZFELT HANGING PANELS
FFZ-2	FILZFELT HANGING PANELS
FFZ-3A	FILZFELT HANGING PANELS
FFZ-3B	FILZFELT HANGING PANELS
FFZ-4	FILZFELT HANGING PANELS

WINDOW COVERINGS

MTL-B	METAL BLINDS
RS-1	ROLLER SHADE - 5% SHEER SCREEN
RS-2B	ROLLER SHADE - BLACKOUT SCREEN
RS-1 + RS-2B SHADES	BOTH 5% & BLACKOUT ROLLER



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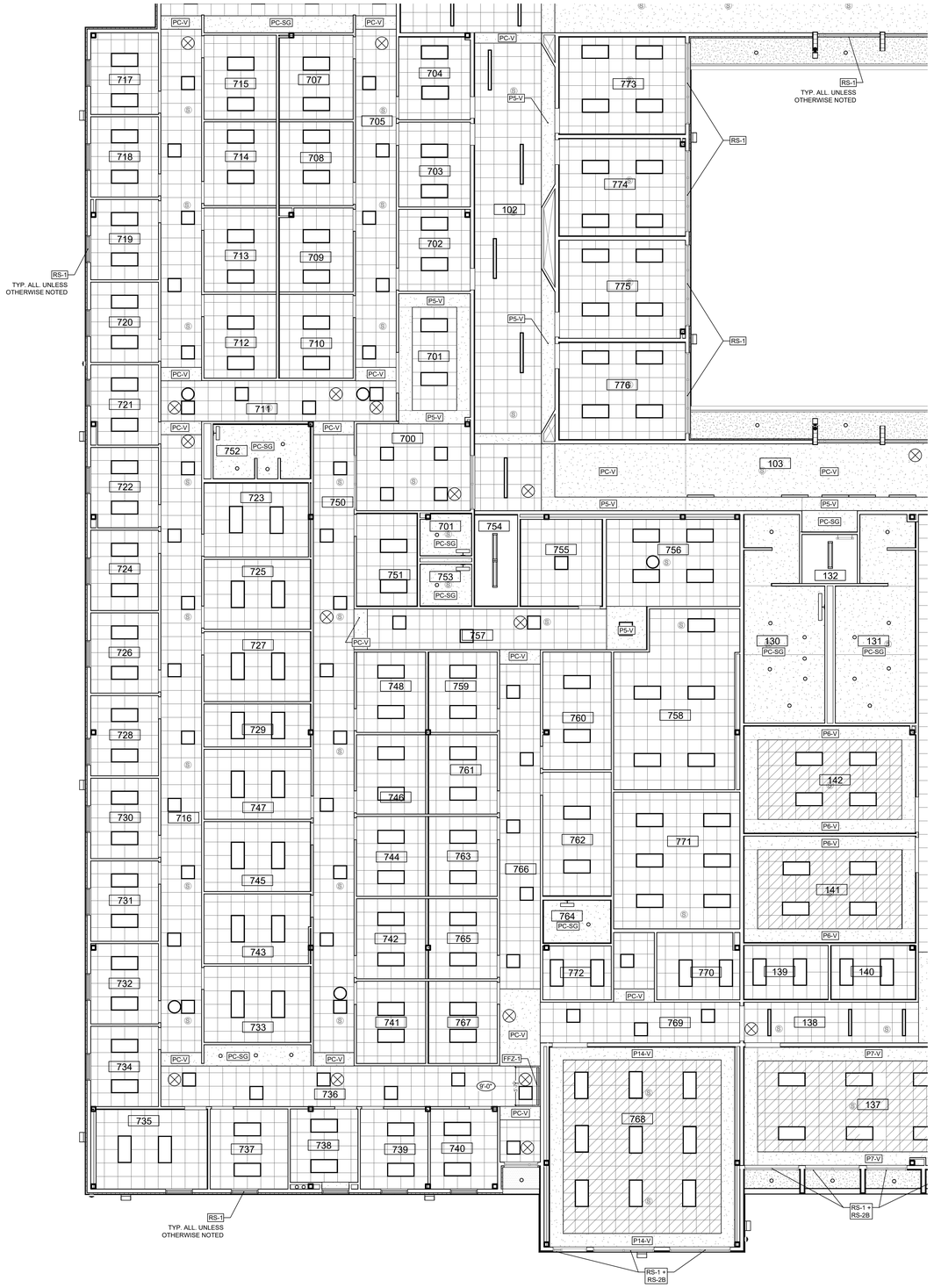
CEILING FINISH PLAN

i-rcp-1.3

SEE SHEET: i-rcp-1.0 FOR ALL RCP FINISH LEGENDS



1 i-rcp-1.4 REFLECTED CEILING PLAN - SOCIAL SERVICES

SCALE: 1/8"= 1'-0"

north

RCP FINISH PLAN GENERAL NOTES:

1. ALL EXPOSED FACES OF SOFFITS TO BE PAINTED PER FINISH TAG.
2. ALL SOFFITS TO BE PAINTED AS INDICATED ON BOTTOM AND SIDE SURFACES.
3. SEE CEILING FINISH KEY FOR LOCATION AND TYPES OF CEILINGS.
4. ALL GWB (HARD CEILINGS) TO BE PC-V UNLESS NOTED OTHERWISE.
5. ALL CEILING TILE TO MATCH EXISTING PRODUCT.
6. ALL CEILING TILE AND GRID TO BE INSTALLED IN A CONSISTENT AND LEVEL MANNER.
7. SEE ARCHITECTURAL PLANS FOR METAL CEILING DETAILS AND ALL OTHER NECESSARY INFORMATION.

RCP FINISH SYMBOL LEGEND

P#-XX TAG INDICATES CEILING PAINT COLOR & FINISH

RCP LEGEND

GWB (HARD) CEILING

ACT-1
24" X 24" ACOUSTIC CEILING TILE

ACT-2
24" X 24" ACOUSTIC CEILING TILE

ACT-K
24" X 24" KITCHEN CEILING TILE

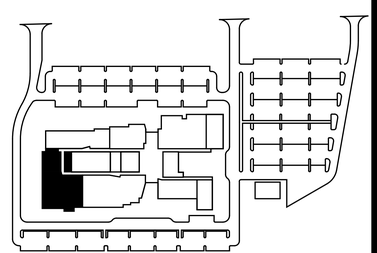
GWB	HARD CEILING
ACT	ACOUSTIC CEILING TILE
PC	CEILING PAINT

GRAPHIC LEGEND

FILZFELT PANELS

SEE SHEET : i-rcp-1.0 FOR ALL FILZFELT INSTALLATION INSTRUCTIONS

RCP FINISH CODES/LEGEND



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CEILING FINISH PLAN

i-rcp-1.4

SEE SHEET: i-mw-1.0 FOR ALL MILLWORK FINISH LEGENDS

MILLWORK FINISH NOTES

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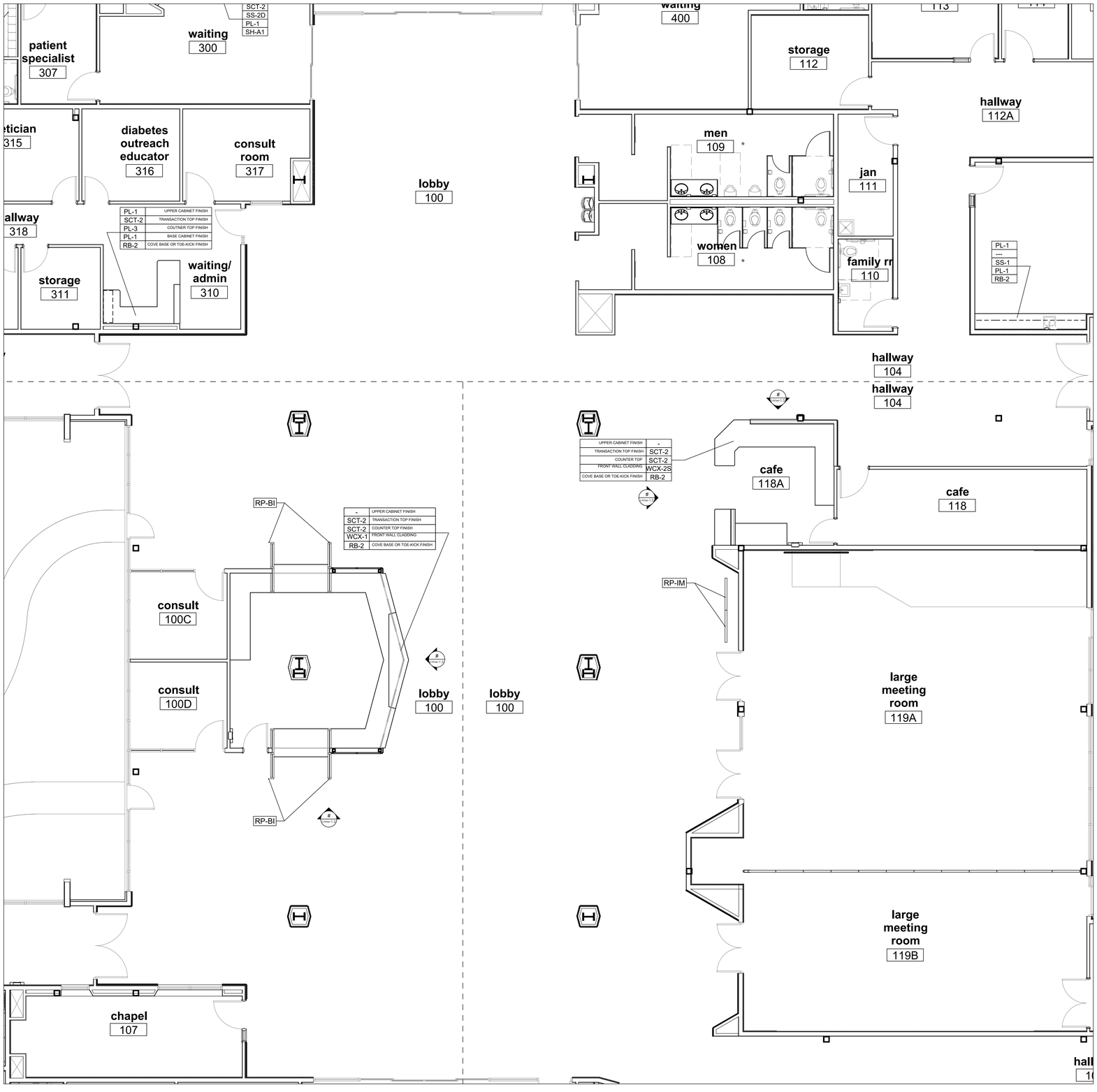
12. ALL CABINET INTERIOR SURFACES SHALL BE WHITE MELAMINE WITH EDGES OF SAME, UNLESS NOTED OTHERWISE.
13. ALL PLASTIC LAMINATE COUNTERTOPS TO HAVE SELF EDGE.

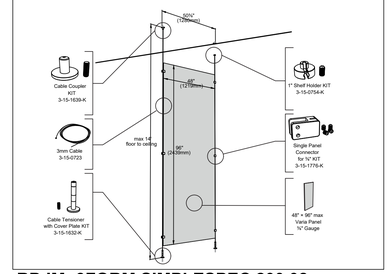


1 i-mw-0.1 WALL FINISH PLAN - LOBBY
SCALE: 3/16"= 1'-0"

north

3FORM RESIN PANELS:





RP-IM: 3FORM SIMPLESPEC 200.08

2 PANELS EA. @ 48" W x 96" H. COMBINED: 101" W INCLUDING MOUNTING HARDWARE

REFER TO ARCHITECTURAL SPECS FOR INSTALLATION MANUAL

MILLWORK FINISH CODES / LEGEND

PL-1 - PL-3	PLASTIC LAMINATE
ML	WHITE MELAMINE CABINET
SCT-2	QUARTZ /STONE
SS-1	SOLID SURFACE
SS-2D	SOLID SURFACE
WD	WOOD DOOR
LK	LOCKERS
RP-IM	RESIN PANELS WITH IMAGE
G1-PL	RESIN PANELS WITH BURCH INLAY
WCX-1	XOREL WALL COVERING
WCX-2S	XOREL WALL COVERING
RB-2	COVE BASE

MILLWORK FINISH SYMBOL LEGEND

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##-# — THIRD TAG INDICATES COUNTERTOP
##-# — FOURTH TAG INDICATES BASE CABINET FINISH
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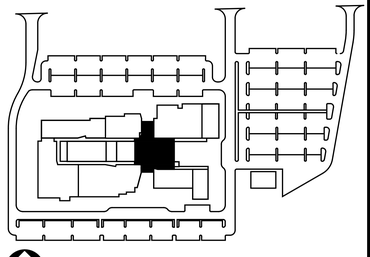
* UNLESS OTHERWISE NOTED ON PLAN

PL-# — TAG INDICATES TEXTURED PLASTIC LAMINATE ONLY ON MILLWORK SURFACE TAGGED. SEE ALSO INTERIOR MILLWORK FINISH KEY AND LEGEND BELOW.

SCT-# — TAG INDICATES STONE COUNTER/TRANSACTION TOP AT MILLWORK LOCATIONS.

SS-# — TAG INDICATES SOLID SURFACE COUNTER/TRANSACTION TOP AT MILLWORK LOCATIONS.



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MILLWORK FINISH PLAN

i-mw-0.1

MILLWORK

PASCUA YAQUI TRIBE . HEALTH CENTER II - MILLWORK FINISH LEGEND			
INTERIOR ARCHITECTURAL CASEWORK			
CODE	**STOCK NO.**	**MANUFACTURER**	**DESCRIPTION / NOTES / LOCATION**
PL-1	**WILSONART LAMINATE #7970K-18 COLOR: HIGH LINE LINEARITY FINISH WITH AEON**	**WILSONART**	1. FINISH: LINEARITY FINISH WITH AEON 2. LOCATION: PER PLANS 3. **PROVIDE DOLLKEN MATCHING 3MM PVC EDGE** 4. **NOTE: PATTERN TO RUN HORIZONTAL ONLY**
PL-2	**LAMINART # 2402-T COLOR: BRONZE "PEARLESCENCE" FINISH**	**LAMINART**	1. FINISH: TEXTURED FINISH WITH OYSTER SHIELD 2. LOCATION: PER PLANS 3. FOR HORIZONTAL USE ONLY
PL-3	**FORMICA LAMINATE #5880-58 COLOR: EARTHEN WARP MATTE FINISH**	**FORMICA**	1. FINISH: MATTE 2. LOCATION: PER PLANS 3. **PROVIDE DOLLKEN MATCHING 3MM PVC EDGE**
ML	**MELAMINE COLOR: WHITE**	**MELAMINE**	1. FINISH: TEXTURED 2. COLOR: WHITE 3. LOCATION: INTERIOR OF ALL MILLWORK CABINETS INCLUDING INTERIOR SHELF EDGES
NOTE: MANY OF THE LAMINATES AND PVC EDGES HAVE A 6 WEEK LEAD TIME – ORDER IMMEDIATELY			

MILLWORK

PASCUA YAQUI TRIBE . HEALTH CENTER II - MILLWORK FINISH LEGEND			
CODE	**STOCK NO.**	**MANUFACTURER**	**DESCRIPTION / NOTES / LOCATION**
INTERIOR ARCHITECTURAL CASEWORK			
SOLID SURFACE / STONE / QUARTZ COUNTERTOPS			
SCT-2	**QUARTZ SILESTONE BLANCO MAPLE 14 THICKNESS: 2 CM**	**SILESTONE**	**1. LOCATION: RECEPTION, CAFÉ & COUNTER CAPS AS NOTED ON MILLWORK PLANS, TO INCLUDE TRANSACTION TOP/CAP IF APPLICABLE** **2.** FINISH: POLISHED **3.** SLAB SIZE: 128" x 63" JUMBO **4.** THICKNESS: 2 CM OR 3 CM **5.** PENCIL EDGE PROFILE – ALL EDGES
SS-1	**MILK GLASS SPECTRA #9077ST SOLID SURFACE**	**WILSONART**	**1. LOCATION: ALL COUNTER TOPS WITH A SINK/ WATER** **2.** FINISH: POLISHED **3.** PANEL SIZE: 30" x 144" **4.** THICKNESS: ½" **5.** PENCIL EDGE PROFILE – ALL EDGES
SS-2D	**CASHMERE MIRAGE #9135MG SOLID SURFACE**	**WILSONART**	**1.** LOCATION: ALL COUNTER TOPS & TRANSACTION TOPS IN PHARMACY **2.** FINISH: POLISHED **3.** PANEL SIZE: 30" x 144" **4.** THICKNESS: ½" **5.** PENCIL EDGE PROFILE – ALL EDGES
WOOD FINISH ON DOORS			
WD	**WOOD FINISH ON DOORS SPECIES: NATURAL BIRCH ROTARY STAIN COLOR: CLEAR**	**MASONITE**	1. WOOD FINISH ON ALL INTERIOR DOORS 2. LOCATION: ALL INTERIOR DOORS
LOCKERS			
LK	**TRIPLE TIER LOCKERS COLOR: #71 MARINE BLUE**	**REPUBLIC LOCKERS**	1. SEE SPECIFICATIONS FOR LOCKERS IN ARCHITECTURAL PLANS 2. INSTALL PER MANUFACTURES RECOMMENDATIONS

MILLWORK

PASCUA YAQUI TRIBE . HEALTH CENTER II - MILLWORK FINISH LEGEND			
INTERIOR ARCHITECTURAL CASEWORK			
RESIN PANELS & GLASS PANELS			
RP-IM	**RESIN PANELS WITH PHOTOGRAPHIC IMAGE: TO BE DETERMINED AND IMAGE TO BE PHOTOGRAPHED BY TRIBE OR PHOTOGRAPHER SUPPLIED BY THE DESIGNER FOR THE TRIBE. PASCUA YAQUI IMAGE HIGH-RESOLUTION IMAGE PROVIDED. 1. VARIA 3/8" – FIRE RATED B 2. USE 3FORM SIMPLE SPEC .200.08 3. 3FORM TO ADD HI-RES WHITE LAYER, NOT A DIFFUSING LAYER. 4. OVERALL DIMENSIONS 2 WIDTHS OF RESIN MATERIAL: 60" WIDE x 120" HIGH EACH PANEL 5. FRONT FINISH IS SANDSTONE FINISH #F01 6. BACKGROUND BEHIND IMAGE WILL BE REMOVED BY PHOTOGRAPHER**	**3FORM**	**1. LOCATION: ADJACENT TO FRONT RECEPTION DESK PER PLANS.** **2. IMAGE TO BE SUPPLIED BY THE PASCUA YAQUI TRIBE, HIGH-RESOLUTION IMAGE PER THE SPECIFICATIONS OF 3FORM.** **3. SUSPENDED CABLES TO BE ADJUSTED TO LOCATION.** **4. SEE MILLWORK DRAWING FOR DETAILS** **5. LIGHTING TO BE PART OF BUILDING LIGHTING PLANNED TO BACK-LITE THE IMAGE** **6. APPROVAL OF ALL SUBMITTAL SAMPLES REQUIRED** **7. LIGHTING WILL BE NEED BEHIND THE IMAGE: SEE ARCHITECTURAL PLANS & SPECS.**
G1-PL	**BIRCH GLASS PANELS 1. PRESSED GLASS: BIRCH IMAGE 2. STYLE: CUSTOM HIGHRES GAUGE: 9/16" 3. FRONT FINISH: LOW IRON, BACK FINISH: LOW IRON SAMPLE # 427814S1.2 4. FRAME CONSTRUCTION & FINISH TO BE SPECIFIED BY ARCHITECT.**	**3FORM**	**1. GAUGE: 9/16"** **2. PANEL SIZES: PER PLANS.** **3. PATTERN: 3FORM HI-RES BIRCH.** **4. LOCATION: PER PLANS.** **5. SEE MILLWORK DRAWING FOR DETAILS.** **6. APPROVAL OF ALL SUBMITTAL SAMPLES** **7. REQUIRED.**

MILLWORK FINISH CODES / LEGEND

PL-1 - PL-3	PLASTIC LAMINATE
ML	WHITE MELAMINE CABINET
SCT-2	QUARTZ /STONE
SS-1	SOLID SURFACE
SS-2D	SOLID SURFACE
WD	WOOD DOOR
LK	LOCKERS
RP-IM	RESIN PANELS WITH IMAGE
G1-PL	RESIN PANELS WITH BURCH INLAY
WCX-1	XOREL WALL COVERING
WCX-2S	XOREL WALL COVERING
RB-2	COVE BASE

MILLWORK FINISH SYMBOL LEGEND

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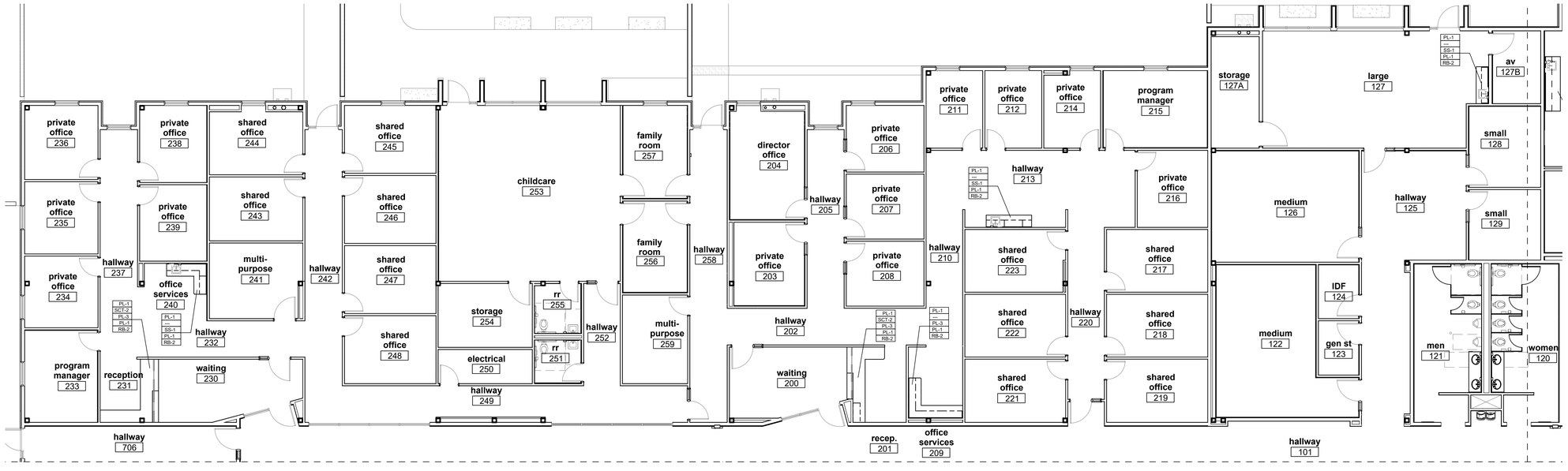
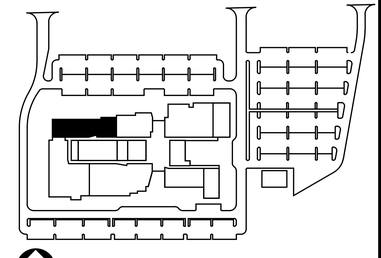


1 i-mw-1.0 MILLWORK FINISH PLAN - SEWA U'USIM
SCALE: 1/8"= 1'-0"

north



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MILLWORK FINISH PLAN

i-mw-1.0

SEE SHEET: i-mw-1.0 FOR ALL MILLWORK FINISH LEGENDS

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PL-1 - PL-3	PLASTIC LAMINATE
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RP-IM	RESIN PANELS WITH IMAGE
G1-PL	RESIN PANELS WITH BURCH INLAY
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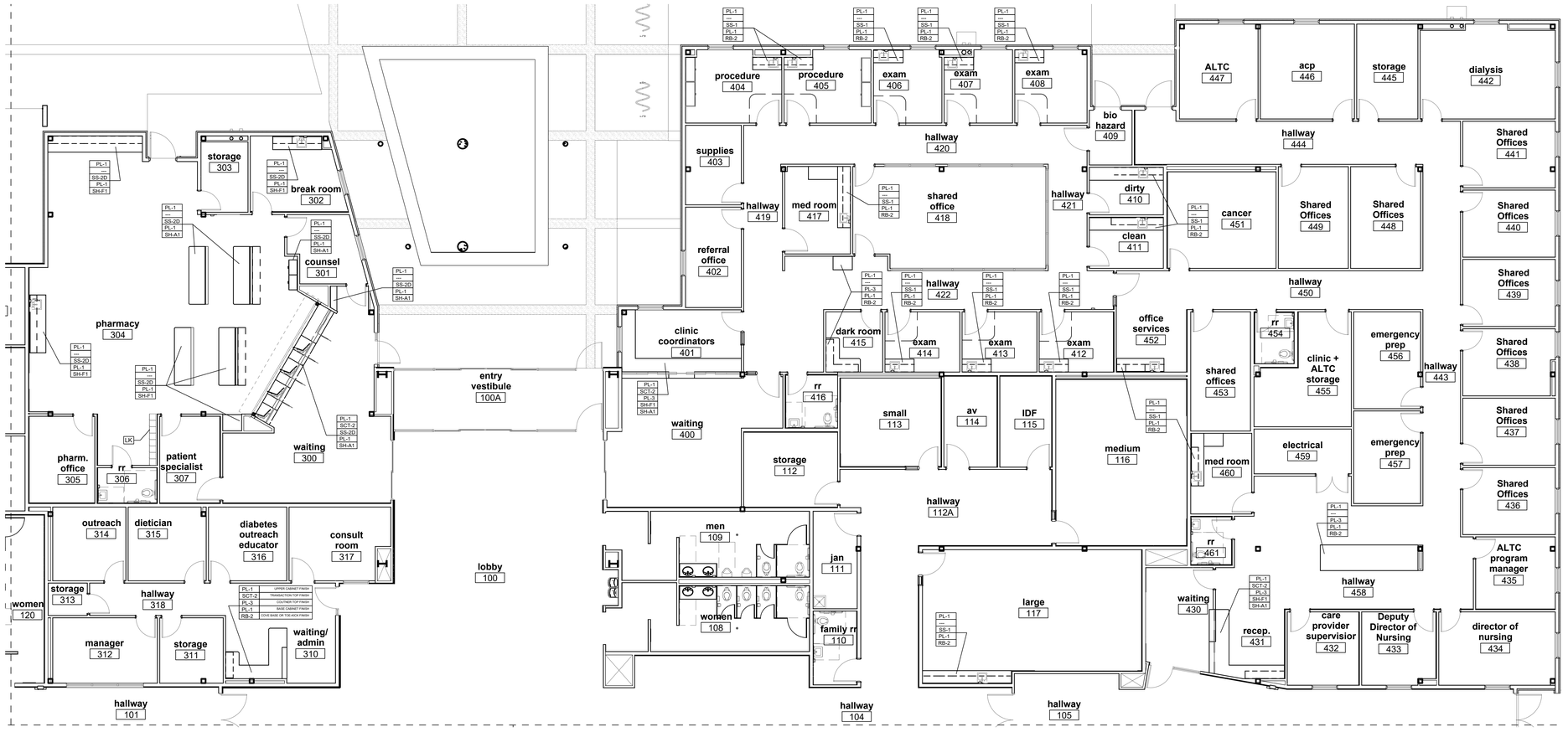
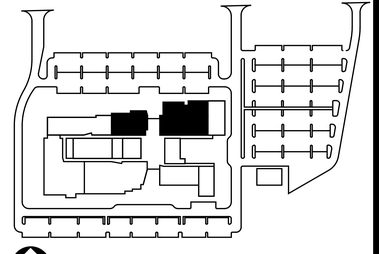
13. ALL PLASTIC LAMINATE COUNTERTOPS TO HAVE SELF EDGE.



1 / i-mw-1.1 MILLWORK FINISH PLAN - PHARMACY, DIABETES, NURSING & CLINICS

SCALE: 1/8"= 1'-0"

north



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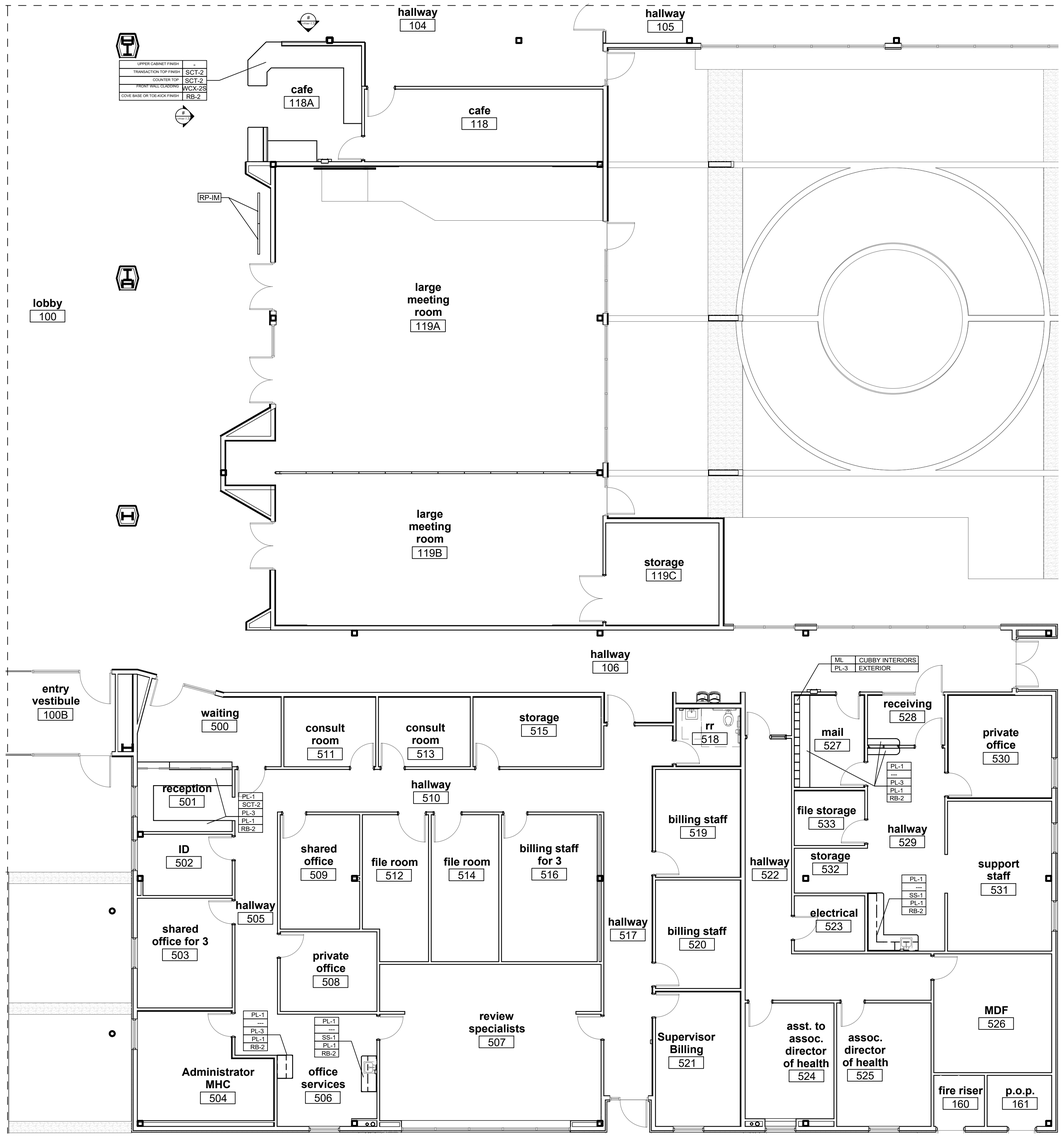
MILLWORK PLAN

i-mw-1.1

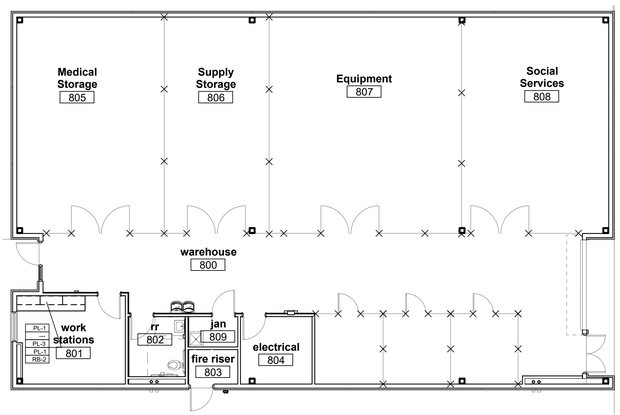
SEE SHEET: i-mw-1.0 FOR ALL MILLWORK FINISH LEGENDS



1 i-mw-1.2 MILLWORK FINISH PLAN - HEALTH BUDGET, MANAGED HEALTH, BILLING

SCALE: 1/8"= 1'-0"

north



2 i-mw-1.2 MILLWORK FINISH PLAN - WAREHOUSE

SCALE: 1/8"= 1'-0"

north

MILLWORK FINISH CODES / LEGEND

PL-1 - PL-3	PLASTIC LAMINATE
ML	WHITE MELAMINE CABINET
SCT-2	QUARTZ /STONE
SS-1	SOLID SURFACE
SS-2D	SOLID SURFACE
WD	WOOD DOOR
LK	LOCKERS
RP-IM	RESIN PANELS WITH IMAGE
G1-PL	RESIN PANELS WITH BURCH INLAY
WCX-1	XOREL WALL COVERING
WCX-2S	XOREL WALL COVERING
RB-2	COVE BASE

MILLWORK FINISH SYMBOL LEGEND

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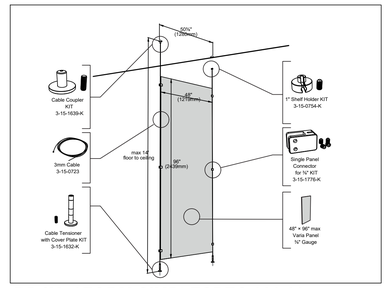
[SS-#] — TAG INDICATES SOLID SURFACE COUNTER/TRANSACTION TOP AT MILLWORK LOCATIONS.



RP-IM: 3FORM SIMPLESPEC 200.08

2 PANELS EA. @ 48" W x 96" H. COMBINED: 101" W INCLUDING MOUNTING HARDWARE

REFER TO ARCHITECTURAL SPECS FOR INSTALLATION MANUAL

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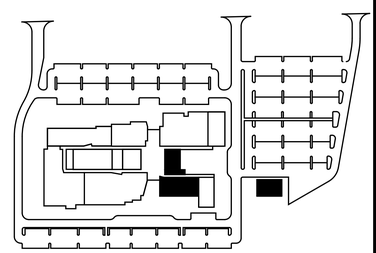

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MILLWORK PLAN

i-mw-1.2

SEE SHEET: i-mw-1.0 FOR ALL MILLWORK FINISH LEGENDS



1 i-mw-1.3 MILLWORK FINISH PLAN - CENTERED SPIRIT

SCALE: 1/8"= 1'-0"

north

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SS-1	SOLID SURFACE
SS-2D	SOLID SURFACE
WD	WOOD DOOR
LK	LOCKERS
RP-IM	RESIN PANELS WITH IMAGE
G1-PL	RESIN PANELS WITH BURCH INLAY
WCX-1	XOREL WALL COVERING
WCX-2S	XOREL WALL COVERING
RB-2	COVE BASE

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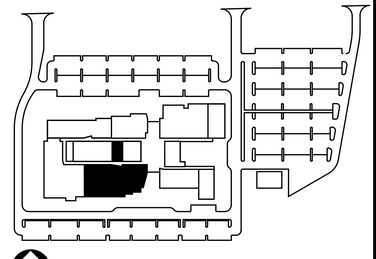

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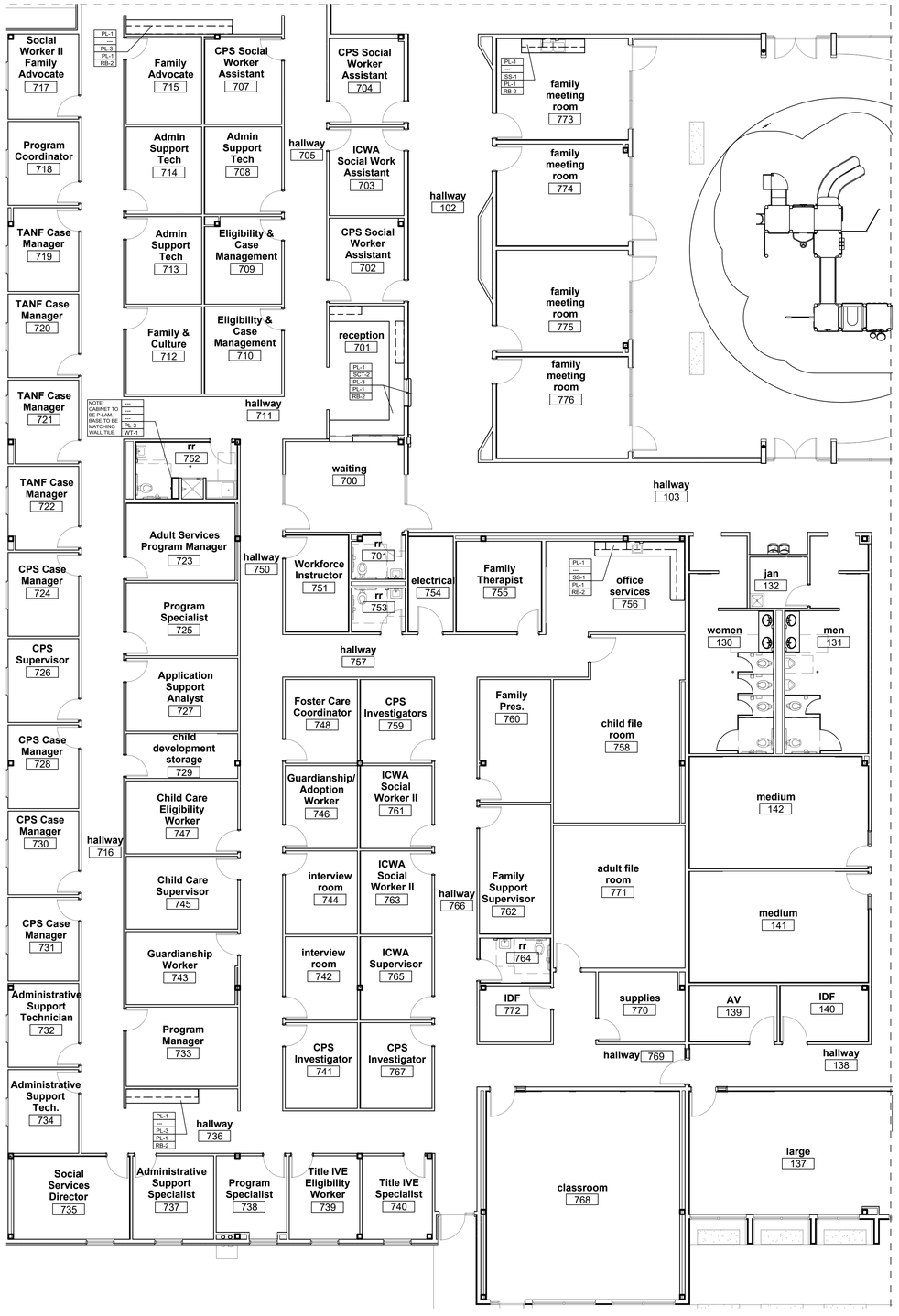
MILLWORK PLAN

i-mw-1.3

SEE SHEET: i-mw-1.0 FOR ALL MILLWORK FINISH LEGENDS



1 i-mw-1.4 MILLWORK FINISH PLAN - SOCIAL SERVICES

SCALE: 1/8"= 1'-0"

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MILLWORK FINISH CODES / LEGEND

PL-1 - PL-3	PLASTIC LAMINATE
ML	WHITE MELAMINE CABINET
SCT-2	QUARTZ /STONE
SS-1	SOLID SURFACE
SS-2D	SOLID SURFACE
WD	WOOD DOOR
LK	LOCKERS
RP-IM	RESIN PANELS WITH IMAGE
G1-PL	RESIN PANELS WITH BURCH INLAY
WCX-1	XOREL WALL COVERING
WCX-2S	XOREL WALL COVERING
RB-2	COVE BASE

MILLWORK FINISH SYMBOL LEGEND

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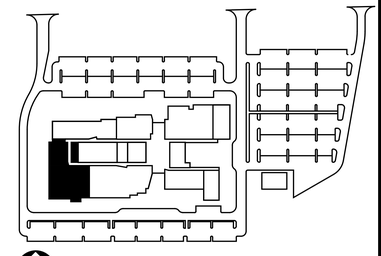

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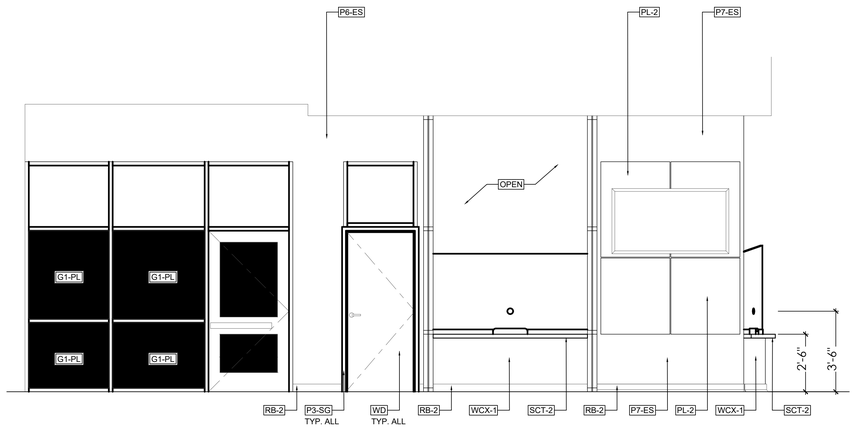
MILLWORK PLAN

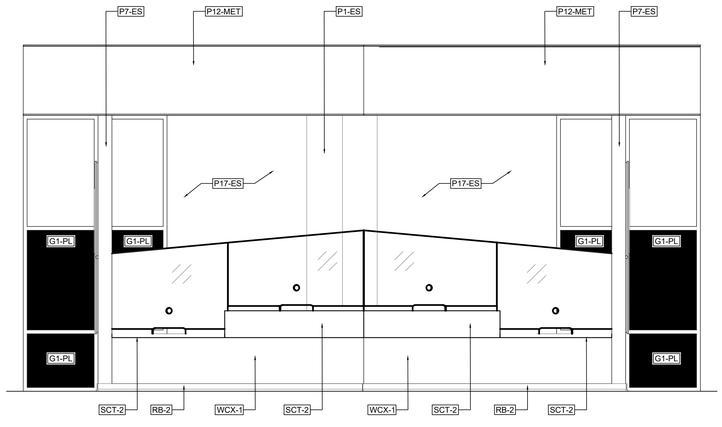
i-mw-1.4



1 i-mw-1.5 100 - LOBBY/RECEPTION - PERSPECTIVE
SCALE: 3/8"= 1'-0"



2 i-mw-1.5 100 - LOBBY/RECEPTION - NORTH
SCALE: 3/8"= 1'-0"



3 i-mw-1.5 100 - LOBBY/RECEPTION - WEST
SCALE: 3/8"= 1'-0"

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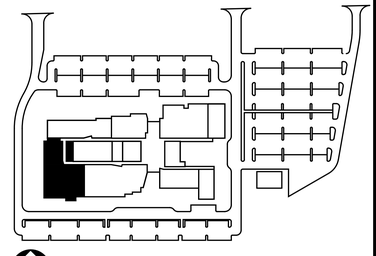

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job
1717

date
11.16.18

revisions

Pascua Yaqui Tribe
Health Services Center II
4567 W Tetakusim Rd
Tucson. AZ 85746

B.H.I.D.P.
COMMERCIAL INTERIOR DESIGN
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MILLWORK ELEVATIONS & DETAILS

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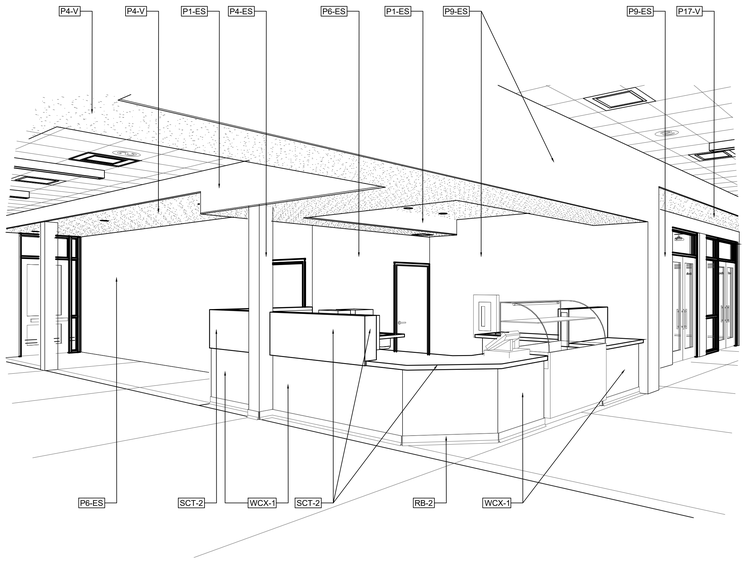

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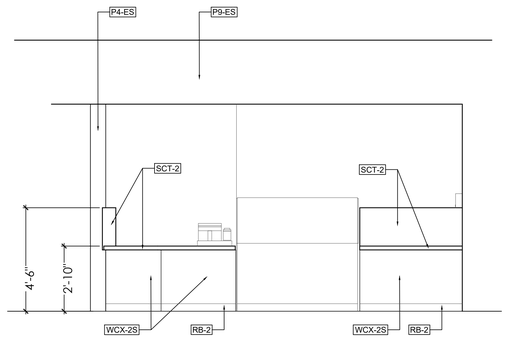

2 i-mw-1.6 — 118A - CAFE - EAST
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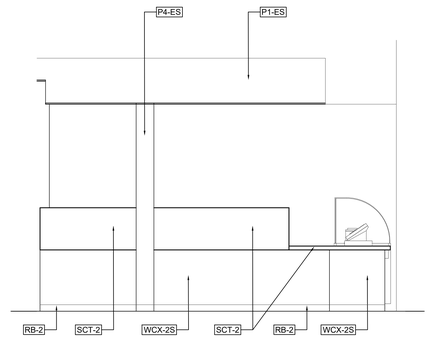

3 i-mw-1.6 — 118A - CAFE - SOUTH
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MILLWORK FINISH NOTES

1. CABINETRY AND MILLWORK CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL SITE DIMENSIONS REQUIRED FOR ACCURATE INSTALLATION AND FIT OF THE WORK.
2. CABINETRY AND MILLWORK CONTRACTORS ARE RESPONSIBLE FOR SUBMITTING SHOP DRAWINGS WITH ALL DIMENSIONS NOTED. BHIDP IS ONLY RESPONSIBLE FOR THE REVIEW OF MILLWORK FINISHES UNLESS BHIDP DESIGNED THE MILLWORK. IT IS REQUIRED THAT ALL SHOP DRAWINGS BE SUBMITTED TO BHIDP AND THE ARCHITECT OF RECORD FOR REVIEW AND APPROVAL.
3. THE DESIGNER IS NOT RESPONSIBLE FOR THE MEANS AND METHODS EMPLOYED BY THE GENERAL CONTRACTOR OR SUBCONTRACTOR FOR THE FABRICATION OR INSTALLATION OF A SPECIFIC ITEM OR MATERIAL.
4. SUBSTITUTIONS ARE NOT ALLOWED FOR ANY MATERIAL WITHOUT PRIOR WRITTEN APPROVAL.
5. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND REPORT ANY CONDITIONS THAT ARE IN CONFLICT WITH THE DRAWINGS AND SPECIFICATIONS TO THE DESIGNER. CONSTRUCTION IS NOT TO PROCEED UNTIL ALL DISCREPANCIES AND CONFLICTS HAVE BEEN RESOLVED.
6. ALL CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS AND GOVERNING FEDERAL, STATE AND LOCAL BUILDING CODES AND REQUIREMENTS.
7. ALL INTERIOR FINISH DESIGNATIONS ARE INCLUDED HEREIN.
8. ANY AND ALL CONFLICTS BETWEEN ARCHITECTURAL FINISH SPECIFICATIONS ARE REQUIRED TO BE REPORTED IN WRITING TO THE ARCHITECT AND THE DESIGNER DURING BIDDING OR NEGOTIATION AND A REQUEST FOR CLARIFICATION WILL BE PUBLISHED. THE DESIGNER IS TO BE CONSULTED BEFORE PROCEEDING. THE DESIGNER IS NOT RESPONSIBLE FOR DISCREPANCIES THAT ARISE DUE TO CHANGES BY THE ARCHITECT, CONTRACTORS, CONSULTANTS AND TENANTS OR OWNERS AFTER THE INITIAL PUBLISHED DATE OF THESE DRAWINGS.
9. THE CONTRACTOR SHALL PREPARE DUPLICATE SAMPLES OF ALL STAINS FOR CASE GOODS OR MILLWORK FOR DESIGNER APPROVAL PRIOR TO PROCEEDING WITH STAINING AND FINISHING OF ANY SURFACE. COLOR, FINISH AND MATERIAL OF COMPLETED WORK SHALL MATCH THAT OF SUBMITTAL SAMPLE.
10. ALL EXPOSED EDGES OF PLYWOOD USED IN SHELVING ETC. TO RECEIVE SELF EDGE.
11. STAIN OR PAINT GRADE TRIM IS DESIGNATED HEREIN IF APPLICABLE. ALL WOOD THAT IS TO BE STAINED MUST BE OF THE SAME SPECIES OF THE SELECT WOOD SPECIES.
12. ALL CABINET INTERIOR SURFACES SHALL BE WHITE MELAMINE WITH EDGES OF SAME, UNLESS NOTED OTHERWISE.
13. ALL PLASTIC LAMINATE COUNTERTOPS TO HAVE SELF EDGE.

MILLWORK FINISH CODES / LEGEND

PL-1 - PL-3	PLASTIC LAMINATE
ML	WHITE MELAMINE CABINET
SCT-2	QUARTZ /STONE
SS-1	SOLID SURFACE
SS-2D	SOLID SURFACE
WD	WOOD DOOR
LK	LOCKERS
RP-IM	RESIN PANELS WITH IMAGE
G1-PL	RESIN PANELS WITH BURCH INLAY
WCX-1	XOREL WALL COVERING
WCX-2S	XOREL WALL COVERING
RB-2	COVE BASE

MILLWORK FINISH SYMBOL LEGEND

[##-#] — INDICATES MILLWORK LOCATION

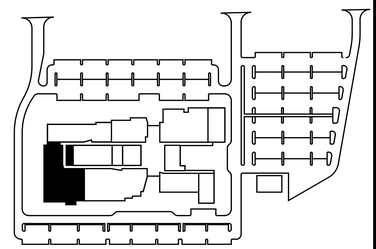
* [##-#] — FIRST TAG INDICATES UPPER CABINET FINISH
[##-#] — SECOND TAG INDICATES TRANSACTION TOP
[##-#] — THIRD TAG INDICATES COUNTERTOP
[##-#] — FOURTH TAG INDICATES BASE CABINET FINISH
[##-#] — FIFTH TAG INDICATES COVE BASE OR TOE-KICK FINISH

* UNLESS OTHERWISE NOTED ON PLAN

[PL-#] — TAG INDICATES TEXTURED PLASTIC LAMINATE ONLY ON MILLWORK SURFACE TAGGED. SEE ALSO INTERIOR MILLWORK FINISH KEY AND LEGEND BELOW.

[SCT-#] — TAG INDICATES STONE COUNTER/TRANSACTION TOP AT MILLWORK LOCATIONS.

[SS-#] — TAG INDICATES SOLID SURFACE COUNTER/TRANSACTION TOP AT MILLWORK LOCATIONS.



north — keyplan
n.t.s.

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Specifications

Pascua Yaqui Tribe Health Services Center II

4567 W Tetakusim Road
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Swaim Project No.: 1717

March 08, 2019

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INVITATION TO BID

The Pascua Yaqui Tribe is soliciting bids for Health Services Center II project identification number 1717, located on the Pascua Yaqui Tribe Reservation. This project consists of a 100,000 SF single story health services building with social and behavioral health services, pharmacy, and specialty clinics.

Native American and local firms will receive preference. The Owner reserves the right to select the most responsive and responsible bidder.

Bid packages are available beginning Tuesday, March 12, 2019. Hard copies will be available at Reproductions, Inc. located at 234 E. 6th Street, Tucson, AZ 85705 with a $350 refundable deposit. Electronic copies will be available on the Pascua Yaqui Tribe bid portal. http://pyt.mfd.company/

A mandatory Pre-Bid Conference is scheduled for March 21, 2018 at 10:00 am in the Pascua Yaqui Tribe Justice Center, Albert V. Garcia Auditorium, located at 7777 S. Camino Huivism, Tucson, AZ 85757.

Sealed bids shall be received up to, but no later than, 3:00 pm local time, April 11, 2019, at Pascua Yaqui Finance Department, located at 7474 S. Camino De Oeste Tucson, AZ 85757 Attention Bertha Lopez. Bids will be publically opened on April 11, 2019 at 3:30 pm in the Pascua Yaqui Tribe Justice Center, Albert V. Garcia Auditorium, located at 7777 S. Camino Huivism, Tucson, AZ 85757

All bid questions, Requests for Information (RFI), and substitution requests should be directed to the Project Manager via email. Send to Rolando Espinoza at Rolando.espinoza@pascuayaqui-nsn.gov and copy Ian Geitner at ian.geitner@pascuayaqui-nsn.gov at the Pascua Yaqui Tribe. No RFIs or substitution requests will be accepted after March 26, 2019 5:00 pm. RFI responses and substitution determinations will be distributed to all pre-bid meeting attendees via email on April 01, 2019.

For more information, please contact Rolando Espinoza, Pascua Yaqui Tribe Project Manager, at (520) 237-4855.

All bids must be submitted on provided form Exhibit (A). Segregated bids will not be accepted.

BIDDING

Each bid shall be made out on the bid form marked Exhibit (A), which shall be accompanied by a certified or cashier's check or bid bond for ten percent (10%) of the total amount of the bid. Such check or bid bond will be given as a guarantee that the bidder will enter into the contract to perform the work if awarded to him and shall be declared forfeited as liquidated damages if the successful Bidder refuses to enter into the said Contract after being requested to do so by the Owner.

Such check of bid bond will be returned to the respective unsuccessful Bidders upon the Award of the Contract to the successful Bidder, and will be returned to the successful Bidder upon the execution and delivery of satisfactory surety company bonds and construction contract.

Bidders will submit, with the sealed bid, a minimum of three (3) project references for completed work of similar size and/or scope to this project, with all required information listed on the Contractor Project Reference Form included in the Bid Package. One form for each project shall be submitted.

The contract will be awarded to the lowest responsive/responsible Bidder whose bid does not exceed the amount of funds estimated by the Owner to be available for construction of the project, including any applicable Tribal Preference requirements. Only Bids meeting all of the bid requirements included herein shall be considered for award.

The Pascua Yaqui Tribe reserves the right to reject any and all bids, whether within the applicable cost limits and estimated total contract price or not, and to waive any informality in the bids received whenever such rejection is in the interest of the Pascua Yaqui Tribe.

TRIBAL PREFERENCE

Competition in this Bid solicitation will be open to all qualified bidders. However, if a bid is received from a qualified responsive/responsible Tribal Organization or Tribal Owned Economic Enterprise and the bid is responsive to all other conditions of the bid, the Contract may be awarded if the bid does not exceed the lowest bid by the applicable percentage listed in the Tribal Preference Percentage Scale below.

TRIBAL PREFERENCE PERCENTAGE SCALE:

BID AMOUNT	PERCENTAGE
Up to $10,000	6%
$10,001 to $250,000	4%
Over $250,000	2%

Bidders claiming Tribal Preference are required to submit to Owner a completed questionnaire/statement to the Owner in accordance with the "Instruction to Bidders", which is contained in the Bid Package.

TIMEFRAME OF PROJECT

Award of this Contract is subject to a determination by BIA that the contractor is eligible to contract for federally funded activities. The Contract time allotted for this project is 18 months.

TRIBAL PRIVILEGE TAX AND INSPECTION FEE

The Pascua Yaqui Tribe's Privilege Tax and Inspection Fee do not apply to this project.

TEMPORARY BUSINESS LICENSE AND BUILDING PERMIT

All Contractors performing construction projects for the Pascua Yaqui Tribe are subject to a $25.00 TERO Business License Fee and a $25.00 Facilities Department Building Permit Fee.

STATE AND LOCAL TAXES

The Pascua Yaqui Tribe is a Sovereign Nation. As such, Contractors performing work for the Pascua Yaqui Tribe are exempt from local and state taxes other than those state and local taxes as required by the contractors or subcontractors operations. Please consult your own tax expert to know your own tax liability.

TRIBAL AND CERTIFIED WAGES

The Pascua Yaqui Tribe requires that Tribal members performing work on this project through the TERO program are to be paid per the Tribal Wage Scale. Weekly certified payrolls will be required on this project for Tribal members only.

END OF SECTION

INSTRUCTIONS TO BIDDERS

1. BID FORM

A. All bids must be submitted on forms furnished by the Owner and shall be subject to all requirements of the specifications and drawings. Bids will be furnished in duplicate, one to be submitted with the bid (original and copy) and one to be retained by the bidder for his records. Only one of the two copies of the bid shall be signed. The other shall be conformed. The following documents constitute a complete bid and are required to be submitted to form a responsive bid:

(1) Form of Bid – (Exhibit A)
(2) Contractor Project Reference Forms (3 minimum) – (Exhibit A.1)
(3) Bid Guarantee (See Section 3, Exhibits B & C)
(4) Form of Non-Collusive Affidavit (Exhibit D)
(5) Bidder's Certification of Eligibility (Exhibit E)
(6) Contractor's Questionnaire (Exhibit F)

2. INTERPRETATIONS

A. No oral interpretation will be made to any bidder as to the meaning of the specifications and drawings. Every request for an interpretation shall be made in writing and any inquiry received by March 26, 2019 at 5pm will be given consideration. Interpretations will be distributed on April 01, 2019 via emails provided during the pre-bid meeting and be on file in the offices of the Owner. Any reference to days shall be interpreted to mean calendar days.

3. BID GUARANTEE

A. The bid guarantee shall not be less than ten percent (10%) of the amount of the bid, and at the option of the bidder, may be a certified check, or bank draft, irrevocable letter of credit, U.S. Governments bonds at par value, or a bid bond secured by a surety appearing on the Treasury Department's most current Circular 570 as amended. Any certified check, bank draft, or letter of credit must be made payable to the order of the Owner. The bid guarantee shall ensure the execution of the contract and the furnishing of performance and payment bond or bonds by the successful bidder in the appropriate amount. The bid guarantee of unsuccessful bidders shall be returned as soon as practicable after the opening of the bids (see Exhibits B and C).

B. Failure to furnish a bid guarantee in the proper form and amount, by the time set for opening of bids, may be cause for rejection of the bid.

4. NON-COLLUSIVE AFFIDAVIT

A. Each person submitting a bid for any portion of the work contemplated by the bidding documents shall execute an affidavit, in the form provided by the Owner, to the effect that he has not colluded with any other person, firm or corporation in regard to any bid submitted. Such affidavit shall be attached to the bid (See Exhibit D)

5. BIDDER'S CONSTRUCTION EXPERIENCE

A. Before a bid is considered for award, the bidder may be requested by the Owner to submit additional information regarding his previous experience in performing comparable work, his business and technical organization, and finance resources. In addition, the bidder shall be required to submit the following documentation within 48 hours upon request by the Owner:

1. List of Subcontractors
2. Schedule of Values listed by CSI divisions

B. If a bidder is claiming Tribal Preference, he must submit the Indian Enterprise Qualification Statement to the Owner seven (7) calendar days prior to the time of the bid opening. This Questionnaire/Statement must include, the following minimum data:

1. Whether he is seeking Tribal Preference as a bidder;
2. Evidence showing fully the extent of Tribal Ownership/Control and interest in the enterprise;
3. Evidence of structure and financing of the enterprise, major subcontracts and purchase agreements and management and profit sharing arrangements, including evidence showing the effect of all these on the extent of Indian Ownership and interest;
4. A demonstration that the bidder has the experience and capability for timely completion of the contract work;
5. A current financial statement indicating financial status of the enterprise; and
6. Current resumes of principles of the firm or company who will be active in the supervision of the work.

C. All bidders must provide references from a minimum of three (3) recent successful projects of similar size and/or scope to this project. The references for each project shall be provided on the Contractor Project Reference Form (Exhibit A.1) and include all required information listed on the form. Provide one form for each project referenced.

6. TIME FOR RECEIVING BIDS

A. Bids received prior to the time of opening will be securely kept, unopened. The officer whose duty it is to open them will decide when the specified time has arrived, and no bid received thereafter will be considered; except that when a bid arrives by mail after the time fixed for opening, but before award is made, and it is shown to the satisfaction of the officer authorized to make the award, that non-arrival on time was due solely to delay in the mail for which the bidder was not responsible, such bid will be received and considered. No responsibility will attach to an officer for the premature opening of a bid not property addressed and identified. Unless specifically authorized by telegraphic bids will not be considered, and modification by telegraph of bids already submitted will not be considered even if received prior to the hour set for opening and written confirmation of such modification, over the signature of the bidder, is placed in the mail and postmarked prior to the time set for bid opening. The term "telegraph" includes mail-grams.

B. Bidders are cautioned telegraphic changes of bids will not be accepted.

7. OPENING OF BIDS

A. At the time and place fixed for opening of bids, every bid received within the time fixed for receiving bids will be opened and publicly read aloud, irrespective of any irregularities therein. Bidders (and/or their representatives) and other persons properly interested may be present.

8. WITHDRAWAL OF BIDS

A. Bids may be withdrawn on written or telegraphic request dispatched by the bidder, in time for delivery in the normal course of business, prior to the time fixed for opening; provided that written confirmation of any telegraphic withdrawal, over the signature of the bidder, is placed in the mail and postmarked prior to the time set for bid opening. Negligence on the part of the bidder in preparing his bid confers no right of withdrawal or modification of his bid after such bid has been opened.

9. AWARD OF CONTRACT: REJECTION OF BIDS

A. The contract will be awarded to the responsible bidder submitting the lowest proposal complying with the conditions of the Invitation for Bids and Instruction to Bidders, provided is bid is reasonable and it is to the interest of the Owner to accept it. The bidder to whom the award is made will be notified at the earliest practicable date. The Owner, however, reserves the right to reject any and all bids and to waive any informality in bids received whenever such rejection or waiver is in the interest of the Owner.

B. The Owner also reserves the right to reject the bid of any bidder and/or subcontractor who has previously failed to perform properly, or to complete on time, contracts of a similar nature; who is not in a position to perform the contract; or who has habitually and without just cause neglected the payment of bills or otherwise disregarded his obligations to subcontractors, materials, men or employees.

C. The ability of a bidder to obtain a performance and payment security shall not be regarded as the sole test of such bidder's competency or responsibility.

10. EXECUTION OF CONTRACT, PERFORMANCE AND PAYMENT SECURITY

A. Subsequent to the award of the contract and within ten days after the prescribed forms are presented for signature, the successful bidder shall execute and deliver to the Owner a contract in the form furnished in such number of counterparts as the Owner may require. Having satisfied all conditions of the award, as set forth elsewhere in these documents, the successful bidder shall, with the approval of the Owner, present with the contract one of the following:

1. Performance and Payment Bond

a. The bond must be in a penal sum of at least the full amount of the contract as awarded, and secure the faithful performance of the contract and the payment of all persons, firms or corporations to whom the contractor may become legally indebted for labor, materials, tools, equipment, or services, of any nature, employed or used by him in performing the work.

b. On each bond, the rate of premium shall be stated, together with the total amount of the premium charged. The current power of attorney for the person who signs for any surety company shall be attached to such bond. The bond shall be in the form of Exhibit (G).

c. Surety companies executing bonds must appear on the Treasury Department's most current list and must be authorized to transact business in the state where the project is located.

2. Letter of Credit

a. The contractor shall furnish (1) a Letter of Credit for 10% of the total contract price, and (2) a Completion Assurance Agreement. The Letter of Credit shall read as Exhibit (H). The Completion Assurance Agreement shall read as Exhibit (I). The Letter of Credit shall be irrevocable and unconditional and shall be payable to the Owner according to its provisions and the provisions of the Completion Assurance Agreement.

The Letter of Credit shall be interpreted and used in conjunction with the Completion Assurance Agreement. The Letter of Credit shall be on bank letterhead and signed by an officer of the bank legally authorized to execute it. The Completion Assurance Agreement shall be signed by the contractor and the Owner.

3. Cash Deposit

a. The contractor shall establish in a bank acceptable to the Owner an account in the name of the Owner of not less than 10 percent (10%) of the contract amount. This account shall be in the form of Certificates of Deposit or other interest-bearing accounts. The contractor shall provide evidence of this account in the form of a letter from said bank to the Owner agreeing to the terms of this procedure, along with such Certificates of Deposit or deposit acknowledgments as are applicable. This letter shall be on bank letterhead and signed by an officer of the bank legally authorized to execute it. The letter shall read as Exhibit (J). The account will be administered in accordance with the terms of the letter evidencing it and a Completion Assurance Agreement (see Exhibit I).

b. If either Exhibit (H) or (J) is used by the contractor, there shall be retained, from each partial payment under the construction contract, 10 percent (10%) of the estimated amount of such payment until interim settlement.

c. The failure of the successful bidder to execute the contract and to supply the required performance and payment security within ten days after the prescribed forms are presented for signature, or within such extended period as the Owner may grant, shall be grounds for the Owner to either award the contract to the next lowest responsible bidder or re-advertise for bids. In such event, the Owner may charge against the bidder the difference between the amount of the bid and the amount for which a contract for the work is subsequently executed, irrespective of whether the amount thus due exceeds the amount of the bid guaranty.

11. TRIBAL PREFERENCE

A. Attention is called to the Tribal Preference provisions of the contract, set forth in the Tribal Preference section of the Invitation for Bids.

12. EQUAL EMPLOYMENT OPPORTUNITY

A. Attention is called to the Equal Employment Opportunity provisions of the Contract and the requirements for affirmative action by the Contractor thereunder.

B. A Certification of Non-segregated Facilities must be submitted prior to the award of a federally assisted construction contract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity clause. Such a certification is printed on Exhibit (M) and is deemed executed by submission of the bid.

C. The Contractor must also provide for the forwarding of the following notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed $10,000 and are not exempt from the provisions of the Equal Opportunity clause:

1. NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS OF NON-SEGREGATED FACILITIES:

2. A Certificate of Non-segregated Facilities must be submitted prior to the award of a subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity clause.

3. Contractors receiving subcontract awards exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause will be required to provide for the forwarding of the notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed $10,000 and are not exempt from the provisions of the Equal Opportunity clause.

D. Certifications submitted by subcontractors shall be retained in the files of the prime contractor or subcontractor receiving the certification. Where a prime contractor or subcontractor does business with a concern on a continuing basis, a single certification may be submitted periodically, rather than with each transaction.

13. PRE-CONSTRUCTION CONFERENCE

A. Within ten calendar days of the contract execution and prior to the commencement of work, the contractor or his representative and all known subcontractors shall attend a Pre-construction Conference with the Owner and/or his representative. The conference will serve to acquaint the participants with the general plan of contract administration and requirements under which the construction operation is to proceed, and will inform the contractor or subcontractor in detail of their obligations under Tribal Preference, Equal Employment Opportunity, and Labor Standards Provisions, if applicable.

B. The date, time, and place of the conference will be furnished to the contractor by the Owner.

14. TAXES

A. The Pascua Yaqui Tribe’s Privilege Tax and Inspection Fee do not apply to this project.

B. The Pascua Yaqui Tribe is a Sovereign Nation. As such, Contractors performing work for the Pascua Yaqui Tribe are exempt from local and state taxes other than those state and local taxes as required by the contractors or subcontractors operations. Please consult your own tax expert to know your own tax liability.

15. ELIGIBILITY OF BIDDER

A. The Owner is prohibited from making any awards to contractors or accepting as subcontractors any individuals or firms which are ineligible to be awarded contracts by any agency of the United States Government. Exhibit (E) Bidder's Certification of Eligibility must be executed by the bidder and included in the bid submission.

EXHIBIT A

FORM OF BID

BID FOR: _____

PROJECT NO.:_____

PROJECT NAME: _____

TO THE: _____
(owner)

Tribal Council:

1. The undersigned, having been familiarized with the existing conditions at the site of the work, and with the Contract Documents, which include the Invitation for Bid, Instructions to Bidders, this bid, the Bid Bond or Letter of Credit, the Non-Collusive Affidavit, the requirements for Performance and Payment Security, the form of Construction Contract, General Condition, any applicable Special Conditions, Specifications and Drawings (and exhibits and addenda, if any thereto, and on file in the office of the Owner), hereby proposes to furnish all supervision, technical personnel, labor, material, machinery, tools, equipment, fixtures, and services including transportation services, and to perform and complete all work required within the time specified in the Contract Documents for the sum shown below.

   BASE BID: $_____

   WRITTEN SUM: _____

   ALTERNATE 1: Remove Courtyard Shade Canopies
   a. Meditation Courtyard (east): $_____
   b. Staff/Play Courtyard (west): $_____

   ALTERNATE 2: Alternate HVAC Manufacturer: $_____

   Circle Manufacturer used for alternate cost: Daikin or York

   ALTERNATE 3: Mechanical Controls by Delta: $_____

   ALTERNATE 4: Dry Chemical Fire Suppression System in MDF Room: $_____

2. In submitting this bid, it is understood that the right is reserved by the Owner to reject any and all bids. If written notice of the acceptance of this bid is mailed, telegraphed or delivered to the undersigned within thirty days after the opening thereof, or at any time thereafter before this bid is withdrawn, the undersigned agrees to execute and deliver a contract in the prescribed form and furnish the required performance and payment security within ten (10) days (or within a time period as the Owner may grant) after the contract is presented to him for a signature

3. Security in the sum of _____ dollars ($_____) in the form of _____ is submitted herewith in accordance with the Invitation to Bidders.

4. Attached hereto is an affidavit in proof that the undersigned has not colluded with any person with respect to this proposal.

5. Attached hereto is an affidavit in proof that the undersigned has not colluded with any person with respect to this proposal.

6. The bidder represents that he ( )has, ( )has not, participated in a previous contract or subcontract subject to the equal opportunity clause prescribed by Executive Orders 10925, 11114, or 11246; that he ( )has, ( )has not, filed all required compliance reports, and that representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained prior to subcontract awards. (The above representation need not be submitted in connection with subcontracts which are exempt from the clause.)

7. Certification of Non-Segregated Facilities. By signing this bid, the bidder certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. He certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The bidder agrees that a breach of this certification is a violation of the Equal Opportunity clause in the Contract. As used in this certification, the term “segregated facilities” means any waiting rooms, work areas, restrooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom or otherwise. He further agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that he will retain such certifications in his files; and that he will forward a notice to his proposed subcontractors as provided in the Instruction to Bidders.

8. The bidder hereby acknowledges receipt of the follow addenda, if any:
   Addendum #: _____ _____ _____ _____
   Date: _____ _____ _____ _____

Note: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001

Date: _____ _____
(Name of Bidder)

Official Address: _____

By:_____

Title: _____

EXHIBIT A.1

CONTRACTOR PROJECT REFERENCE FORM

PROJECT NAME _____

PROJECT LOCATION _____

OWNER NAME / CONTACT PERSON _____

OWNER ADDRESS _____

OWNER PHONE NUMBER _____

OWNER EMAIL _____

ORIGINAL CONTRACT VALUE _____

FINAL CONTRACT VALUE _____

REASON FOR ANY CHANGE ORDERS _____

_____

ORIGINAL CONSTRUCTION START & COMPLETION DATES _____

FINAL CONSTRUCTION COMPLETION DATE _____

REASON FOR ANY TIME EXTENSIONS _____

_____

PROJECT AREA (SITE & BUILDING SF) _____

PROJECT SCOPE _____

_____

_____

PROJECT PHOTOS (provide additional pages as necessary)

EXHIBIT B

(Bank Letterhead)

BID SECURITY
IRREVOCABLE LETTER OF CREDIT

Dear _____:

We hereby authorize you to draw on us to the aggregate amount of $_____ (five percent of the amount of the bid) in the event _____ withdraws its bid within the bid holding period, or upon being awarded a contract, fails to provide adequate performance and payment security as required by the Contract documents.

Such drafts must be accompanied by the following document:

A written certification by you that the proceeds of any draft drawn on this Letter of Credit will be used solely to indemnify the Owner against loss or damage suffered by it resulting from any act or omission described in the above paragraph.

We warrant to you that all drafts drawn in compliance with the terms of this Letter of Credit will be unconditionally and duly honored upon delivery of the documentation specified and presented to this office.

This Letter of Credit is irrevocable and shall be in full force and effect until notification in writing is received from you that a contract for Project_____ has been awarded and executed, whereupon this Letter of Credit shall automatically be canceled.

This Letter of Credit shall not be modified or amended except upon the written agreement of this Bank and the Owner.

Sincerely yours,

President

EXHIBIT C

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____ PRINCIPAL, and as SURETY, are held and firmly bound unto herein called the "Owner" in the penal sum of $_____ , lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted this accompanying bid, dated _____, for_____
_____

NOW, THEREFORE, if the Principal shall not withdraw said bid within the period specified therein after the opening of the same, or, if no period specified, within sixty (60) days after the said opening, and shall within the period specified therefore, or, if no period specified, within ten (10) days after the prescribed forms are presented to him for signature, enter into a written contract with the Owner in accordance with the bid as accepted, and have the required performance and payment security for the faithful performance and proper fulfillment of such contract; or in the event of the withdrawal of said bid within the period specified, or the failure to enter into such contract and give security within the time specified, if the Principal shall pay the Owner the difference between the amount specified in said bid and the amount for which the Owner may procure the required work or supplies or both, if the latter amount be in excess of the former, then the above obligation shall be void and of no effect, otherwise it shall remain in full force and effect.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument this _____ day of_____, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

_____	_____
Principal	Surety
_____	_____
Name and Title	Name and Title

(Signatures must be notarized.)

(Power-of-Attorney for person signing for surety company must be attached to bond.)

EXHIBIT D

FORM OF NON-COLLUSIVE AFFIDAVIT

AFFIDAVIT

State of _____

County of _____

_____, being first duly sworn, deposes and says:

That he is,_____ the party making the foregoing proposal for bid, that such proposal or bid is genuine and not collusive or sham; that said bidder has no colluded, conspired, connived or agreed, directly or indirectly, with any bidder or person, to put in a sham bid or to refrain from bidding, and has not, in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the bid price of affiant or of any other bidder, or to fix any overhead, profit or cost element of said bid price, or of that of any other bidder, or to secure any advantage against the Owner or any person interested in the proposed contract, and that all statements in said proposal for bid are true.

Project No._____

Location _____

_____
Signature

_____
Name and title

_____
Date

(Signature should be notarized.)

EXHIBIT E

BIDDER'S CERTIFICATION OF ELIGIBILITY

By the submission of this bid, the bidder certifies that to the best of its knowledge and belief, neither it, nor any person of firm which has an interest in the bidder's firm, nor any of the bidder's subcontractors, is ineligible to:

(1) Be awarded contracts by any agency of the United States Government

_____
Company Name of Bidder

_____
Address

BY:

Title:

NOTE: This certification is a material representation of fact upon which reliance is placed when making award. If it is later determined that the bidder knowingly rendered an erroneous certification, the contract may be terminated for default, and the bidder may be debarred or suspended from participation in HUD programs and other Federal programs.

EXHIBIT F

CONTRACTOR QUESTIONNAIRE

NAME _____

SOCIAL SECURITY NUMBER _____

D.B.A. _____

STREET ADDRESS _____

CITY _____

TELEPHONE _____

STATE LICENSE NO._____

TYPE _____

BANK REFERENCES:

_____

_____

HOW LONG IN BUSINESS? _____

HOW MANY EMPLOYEES? _____

ARE YOU AN EQUAL OPPORTUNITY EMPLOYER? _____

ARE YOU ELIGIBLE TO PERFORM FEDERAL GOVERNMENT WORK? _____

NAME AND ADDRESS OF INSURANCE CARRIER:

_____

_____

Conflict of Interest: Are you or any member of your family related to

(1) Any employee of the Owner or member of the governing board of the Owner?

No _____; Yes _____.

(2) If yes, please explain relationship:

_____

Signature of License Holder Signature of Company Representative

_____ Date _____

Signature of Company Representative (if different)

_____ Date _____

EXHIBIT G

(Page 1 of 4)

PERFORMANCE AND PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: THAT we, _____

_____

as PRINCIPAL, and_____,

as SURETY, are held firmly bound unto _____

_____hereinafter called the Owner, in

the penal sum of _____

_____ ($_____), for

the payment of which sum we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally.

WHEREAS, Principal has entered into a certain Contract with the Owner, dated _____, a copy of which is hereto attached and made a part hereof.

NOW, THEREFORE, the condition of this obligation is such that if the Principal shall in all respects fully perform the Contract and all duly authorized modifications thereof, during its original term and any extensions thereof that may be granted and during any guaranty period for which the Contract provides, and if the Principal shall fully satisfy all claims arising out of the prosecution of the work under the Contract and shall fully indemnify the Owner for all expenses which it may incur by reason of such claims, including its attorney's fees and court costs, and if the Principal shall make full payment to all persons supplying labor, services, materials, or equipment in the prosecution of the work under the Contract, in default of which such persons shall have a direct right of action hereupon; and if the Principal shall pay or cause to be paid all sales and use taxes payable as a result of the performance of the Contract as well as payment of gasoline and special motor fuel taxes in the performance of the Contract and all motor vehicle fees required for commercial motor vehicles used in connection with the performance of the Contract, then this obligation shall be void; otherwise, it shall remain in full force and effect. No modification of the Contract or extension of the term thereof, nor any forbearance on the part of the Owner shall in any way release the Principal or the Surety from liability hereunder. Notice to the Surety of any such modification, extension, or forbearance is hereby waived.

EXHIBIT G

IN WITNESS WHEREOF, the aforesaid Principal and Surety have executed this instrument and affixed their seals hereto, this _____ day of _____.

_____	_____
Principal	Surety
_____	_____
Name and Title	Name and Title

(Signatures must be notarized.)

(Power-of-Attorney for person signing for Surety Company must be attached to bond.)

The rate of premium on this bond is $_____ per thousand.

The total amount of premium charge is $_____.

(The above is to be filled in by Surety Company.)

EXHIBIT G

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the _____ Secretary of the corporation named as Principal in the foregoing bond; that _____ _____, who signed the bond on behalf of the Principal, was then _____ of said corporation; that I know his signature thereto is genuine; and that said bond was fully signed, sealed, and attested for and in behalf of said corporation by authority of its governing body.

EXHIBIT G

DIRECTIONS FOR PREPARATION OF PERFORMANCE AND PAYMENT BOND

1. Individual sureties, partnerships or corporations not in the surety business are not acceptable.

2. The name of the Principal shall be shown exactly as it appears in the Contract.

3. The penal sum shall not be less than required by the Contract.

4. If the principals are partners or joint ventures, each member shall execute the bond as an individual and state his place of residence.

5. The official character and authority of the person(s) executing the bond for the Principal, if a corporation, shall be certified by the Secretary of Assistant Secretary thereof under the corporate seal, or copies attached to such records of the corporation as will evidence the official character and authority of the officer signing, duly certified by the Secretary of Assistant Secretary, under the corporate seal, to be true copies.

6. The current power-of-attorney of the person signing for the surety company must be attached to the bond.

7. The date of the bond must not be prior to the date of the contract.

8. The following information must be placed on the bond by the surety company:

A. The rate of premium in dollars per thousand; and

B. The total dollar amount of premium charged.

9. Type or print the name underneath each signature appearing on the bond.

10. An executed copy of the bond must be attached to each copy of the Contract (original counterpart) intended for signing.

EXHIBIT H

(Bank Letterhead)

IRREVOCABLE LETTER OF CREDIT

(Address to Owner)

Dear _____:

We hereby authorize you to draw on us to the aggregate amount of $_____ in the event name of contractor defaults, or fails to complete construction and/or payments under that certain Construction Contract with you dated _____

Such drafts must be accompanied by:

1. Completion Assurance Agreement dated _____ for the project known as Project Number _____

2. Written certification by you that the proceeds of any draft drawn on this Letter of Credit will be used solely for the purposes and interests described in the Completion Assurance Agreement.

We warrant you that all drafts drawn in compliance with the terms of this Letter of Credit will be duly honored upon delivery of documentation specified and presented to this office until _____or until fifteen months after the date of substantial completion of the Construction Contract dated between _____, the contractor, and _____, the Owner, as the said date of substantial completion is defined in said Construction Contract, whichever first occurs.

This Letter is irrevocable and shall be in full force and effect unless notification in writing is received by you canceling same.

This credit shall not be modified or amended except upon the written agreement of this Bank and the Owner.

Sincerely,

President

(cc: Contractor)

EXHIBIT I

COMPLETION ASSURANCE AGREEMENT

THIS AGREEMENT made this _____ day of_____

by and between the _____ (Owner) and

_____ (Contractor).

WITNESSETH

WHEREAS, the Contractor and the Owner have entered into a Construction Contract dated, providing for the construction of a project described in such Contract; and

WHEREAS, the Contractor desires to meet his obligations to supply 100 percent Performance and Payment Bonds with a substitution of another form of security; and

WHEREAS, the Owner has determined that a Letter of Credit arrangement would provide sufficient security in lieu of a performance and payment bond.

NOW THEREFORE, in consideration of the mutual promises and undertakings herein contained, and for the purpose of inducing the Owner to substitute a Letter of Credit arrangement for a Performance and Payment Bond, the parties hereto agree that:

1. The Contractor has provided the Owner with an unconditional, irrevocable, Letter of Credit (Fund), issued by a banking institution in the amount of $_____ to secure and indemnify the Owner for any expense, loss or damage suffered or sustained as a result of any default by the Contractor in the performance of its obligations under the Construction Contract. It is expressly understood and agreed that said Fund shall at all times be under the control of the Owner.

2. All disbursements from the Fund shall be authorized and made by the Owner.

3. The Fund shall be maintained as a separate trust account and may be drawn in increments up to its aggregate amount or the aggregate may be drawn. Any incremental draw will not impair or diminish the right of the Owner to make

subsequent draws in any amount(s) up to the aggregate amount of the Fund. The proceeds of a draw may be disbursed as follows:

A. To the Contractor during the course of construction to promote the completion of the project, as may be deemed necessary by the Owner.

B. To the Owner the entire fund or balance remaining therein in the event of a default by the Contractor under the Construction Contract to be used by the Owner to indemnify it for any loss, damage or expense whatsoever which it may suffer by reason of the Contractor's failure to perform the Construction Contract.

C. To the Contractor the balance of such fund remaining after three months from the date that the work has been substantially completed in accordance with the Construction Contract (except for punch list items and items awaiting seasonal opportunity to complete) and accepted by the Contracting Officer in accordance with Section 20 of the General Conditions, but only so long as the Project is free and clear of any liens, claims or encumbrances whatsoever. There shall be withheld from the payment of said balance an amount equal to 2-1/2 percent of the total amount of the Construction Contract, which sum is to be retained in account for a period of fifteen months from the date of substantial completion or for another period less than fifteen months if authorized by the Owner. Said sum shall be held as a Fund to guarantee against defects in construction due to faulty materials or workmanship or damage to the premises resulting from such defects, which defects or damage become apparent within one year from the date of substantial completion. Said sum may be used for the correction of defects or damage in the event the Contractor fails to make such corrections. The Contractor's liability for such corrections is not limited by the amount of such sum.

4. It is agreed the Contractor may provide a separate unconditional and irrevocable Letter of Credit to satisfy the requirement set forth in paragraph 3C above, that 2-1/2 percent of the total Construction Contract amount, for latent defects, to be retained for fifteen months beyond the date of substantial completion. If such separate unconditional and irrevocable Letter of Credit is provided, it must be delivered to the Owner and made subject to this Completion Assurance Agreement before any balance remaining in the Fund is released to the Contractor or the Fund is canceled.

5. Any other provision of this Agreement notwithstanding, it is understood and agreed that no funds may be disbursed to the Contractor so long as there are any outstanding liens, claims or encumbrances against the project, written notice of which have been received by the Owner. If any such claims, liens and encumbrances have not been removed or resolved, and written notice of such removal or resolution received by the Owner by the date of substantial completion, the Owner may in its sole discretion exercise any of its rights under the Construction Contract General Conditions.

EXHIBIT I

(Page 3 of 3)

6. It is expressly understood by all parties hereto that in the event of a default by Contractor in any of its obligations under the Construction Contract, the entire Fund, any part thereof, or balance remaining therein may, at the option of the Owner, be paid to Owner together with an assignment of all rights granted to the Owner.

7. This agreement shall not alter or limit the obligations and liabilities of the Contractor under the Construction Contract, but shall be deemed to be additional security for the performance by the Contractor of its obligations there under.

8. It is understood and agreed in the event the fund is held by a depository, that the depository is not charged with any duty or responsibility to see to the performance of or compliance with any agreements between any of the parties hereto other than that of paying over the fund as directed in writing by the Owner, nor to see to the application of the Fund after making disbursements as so directed. It is expressly understood and agreed that any claim, controversy, dispute or disagreement which may exist between the Contractor and the owner shall have no effect whatsoever upon the obligation of the Depository to pay the Owner promptly upon receipt of a notice issued pursuant to the terms of the Fund and this Agreement.

9. Notwithstanding any other provision of the Construction Contract, it is agreed the fund will be administered pursuant to the terms of the Fund, this Agreement and any consistent provisions in the Construction Contract. Any inconsistent provisions in the Construction Contract shall be superseded and controlled by the Fund and this Agreement. It is expressly agreed that reference to this Agreement or collateral Construction Contract document does not make the issuance of the Fund conditional.

_____	_____
Contractor	Owner
_____	_____
Name and Title	Name and Title

Approved by Bank:

_____

_____

Name and Title

EXHIBIT J

(Bank Letterhead)

CASH DEPOSIT LETTER

(Address to Owner)

Dear _____:

This will acknowledge that this Bank has established an account in the amount of $_____ with funds received from _____. This account has been issued in the name of _____ and the original certificate manifesting the same is being handed to you herewith. It is our understanding that this account is being established in lieu of performance and payment bonds customarily furnished in construction projects. The account shall serve as the "Fund" referred to in the Completion Assurance Agreement, dated _____, by and between the Owner and the Contractor.

The Bank shall pay over all or part of the funds in the account together with interest herein to the Owner, or to another as the Owner may designate, upon written notification by the Owner to the Bank of a default by the Contractor under the Construction Contract, or of the Contractor's failure to perform the Construction Contract.

The Bank shall pay over all or part of the funds in the account upon proper notification by the Owner without regard to any objections, claims, defenses, assertions, or actions by the Contractor or any other person or entity acting on behalf of the Contractor. The Bank specifically recognizes that any controversy, dispute, claim or disagreement which may exist between the Contractor and the Owner have no effect whatsoever upon the obligation of the Bank to pay the Owner promptly upon receipt of the notice referred to above.

Sincerely,

President

EXHIBIT L

NOTICE TO PROCEED

Date: _____

Contractor: _____

Address: _____

SUBJECT: _____

Project Number: _____

Project Name: _____

Location: _____

Amount of Contract $ _____

Gentlemen:

Pursuant to the terms of your Contract, dated _____, you are hereby notified to commence work there under at the start of business on _____. The time for completion set forth herein is _____ calendar days, including the starting day, which establishes _____ as the completion date.

Please acknowledge receipt of this Notice to Proceed by signing, dating, and returning this document to the Contracting Officer.

Sincerely,

	Accepted:
_____	_____
By: _____	By: _____
Title: _____	Title: _____
	License No. _____
	Date: _____

EXHIBIT M

CERTIFICATION OF NON-SEGREGATED FACILITIES

Certification of Non-Segregated Facilities. By submitting a bid, the bidder certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. He certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The bidder agrees that a breach of this certification is a violation of the Equal Opportunity clause in the Contract. As used in this certification, the term “segregated facilities" means any waiting rooms, work areas, restrooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom or otherwise. He further agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that he will retain such certification in his files; and that he will forward a notice to his proposed subcontractors as provided in the Instruction to Bidders.

INDIAN ENTERPRISE QUALIFICATION STATEMENT

NOTE: Submit completed questionnaire to the Pascua Yaqui Procurement Officer within the time frame specified. Use additional sheets to complete answer if needed.

The Undersigned certifies under oath the truth and correctness of all answers to questions made hereinafter:

1. Applicant wishes to qualify as:

   An "Economic Enterprise" as defined in Section 3(e) of the Indian Financing Act of 1974 (P.L. 93-262); that is "any Indian-Owned...commercial, industrial or business activity established or organized for the purpose of profit: Provided, that such Indian Ownership shall constitute not less than 51 percent of the enterprise:

   --or--

   A "Tribal Organization" as defined in Section 4(c) of the Indian Self-Determination and Education Assistance Act (P.L. 93-638); that is: "the recognized governing body of any Indian Tribe; any legally established organization of Indians which is controlled, sanctioned or chartered by such governing body or which is democratically elected by the adult members of the Indian community to be served by such organization and which includes the maximum participation of Indians in all phases of its activities: Provided, that in any case where a contract is let or grant made to an organization to perform services benefiting more than one Indian Tribe, the approval of each such Indian Tribe shall be a prerequisite to the letting or making of such contract or grant..."

2. Name of Enterprise or Organization: _____

   Address: _____

   _____

   Telephone No.: _____

3. Check One:

   ___ Corporation ___ Joint Venture

   ___ Partnership ___ Other:

   ___ Sole Proprietorship

4. Answer the following:

If a Corporation:

a. Date of incorporation:_____

b. State of incorporation: _____

c. Give the names and addresses of the officers of this Corporation and establish whether they are Indian (I) or Non-Indian (NI).

Name and Social Security No.	I or NI	Title	Address	% of Stock Ownership
_____	____	President	_____	_____
_____	____	Vice-President	_____	_____
_____	____	Secretary or Clerk	_____	_____
_____	____	Treasurer	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

d. Complete the following information on all stockholders who are not listed in c. above, owning O% or more of the stock. Establish whether they are Indian (I) or Non-Indian (NI).

Name and Social Security No.	I or NI	Address	% of Stock Ownership
_____	____	_____	_____
_____	____	_____	_____
_____	____	_____	_____
_____	____	_____	_____

If a Sole Proprietorship or Partnership:

a. Date of Organization: _____

b. Give the following information on the individual or partners and establish whether they are Indian (I) or Non-Indian (NI).

Name and Social Security No.	I or NI	Address	% of Stock Ownership

If a Joint Venture:

a. Date of Joint Venture Agreement: _____

b. Attach the information for each member of the joint venture prepared in the appropriate format given above.

5. Give the name, address, and telephone number of the principal spokesperson of your organization: _____

_____

6. Has any officer or partner of your organization listed in #4 been an officer or partner of another organization that failed in the last ten years to complete a contract? _____

If yes, state circumstances:

_____

_____

_____

_____

_____

_____

7. Has this enterprise failed in the last ten years to complete any work awarded to it or to complete the work on time? ___

   If so, note when, where and why:

   _____

   _____

   _____

   _____

8. Will any officer or partner listed in #4 be engaged in out-side employment?

   ____ Yes ____ No

   If Yes, complete:

Name/Title	Hours Per Week Outside the Enterprise

9. If the enterprise or anyone listed in #4 above, currently subject to an administrative sanction issued by any department or agency of the Federal Government?

   ____ Yes ____ No

   If Yes, complete:

Name of person/business	Date of Action	Type of Action	Department or Agency

10. Does this enterprise have any subsidiaries or affiliates or is it a subsidiary or affiliate of another concern?

____ Yes ____ No

If Yes, complete:

Name and address of subsidiary, affiliate or other concern	Description of Relationship
_____	_____
_____	_____
_____	_____
_____	_____

11. Does this enterprise or any person listed in #4 above have or intend to enter into any type of agreement with any other concern or person which relates to or affects the on-going administration, management or operations of this enterprise? These include but are not limited to management, and joint venture agreements and any arrangement or contract involving the provision of such compensated services as administrative assistance, data processing, management consulting of all types, marketing, purchasing, production and other types of compensated assistance.

____ Yes ____ No

If yes, attach a copy of any written agreement or an explanation of any oral or intended agreement.

12. Has this enterprise ever been subject to a judgment of any court or administrative sanction (Federal, State, or Tribal)?

____ Yes ____ No

Has any individual listed in #4 ever been subject to judgment of any court or administrative sanction (Federal, State, or Tribal)?

____ Yes ____ No

If the answer is Yes to either question, furnish details in a separate attachment.

13. Has any tax lien or other collection procedure been instituted against this enterprise or the individuals listed in #4 as a sole proprietor or partner in their capacities with this enterprise or other enterprise?

____ Yes ____ No

If yes, furnish details in a separate exhibit.

14. Has this enterprise or any person listed in #4 ever been involved in a bankruptcy or insolvency proceeding?

    ____ Yes ____ No

    If yes, provide details in an attachment.

15. What dollar amount of Working Capital is available to your enterprise prior to the start of construction?

    $_____

    Explain the source of these funds: _____

    _____

    _____

    Include a copy of the Company's most recent audited financial statement.

16. How will project development bookkeeping and payroll be maintained: (check one)

    a. By contract with an outside professional accounting firm: _____

       Name: _____ Address: _____

       _____ Telephone: _____

    b. Records are to be kept by enterprise personnel: _____
       If "b" has been checked--state the qualifications of your personnel to perform this function:

       _____

       _____

    c. Other: _____

       _____

       _____

17. Trade References (include addresses and phone numbers):

    _____

    _____

    _____

18. Bank and credit references (including addresses and phone numbers):

_____

_____

_____

_____

_____

19. Indicate the core crew employees in your work force, their job titles, and whether they are Indian or Non-Indian. Core crew is defined as an individual who is either a current bonafide employee or who is not a current employee but who is regularly employed in a supervisory or other key skilled position when work is available.

_____

_____

_____

_____

_____

_____

Over the past three years, what has been the average number of employees:

_____

20. Attach certification by a tribe or other evidence of enrollment in a federally recognized tribe for each officer, partner or individual designated as an Indian in #4.

21. Attach a certified copy of the charter, article of incorporation, by-laws, partnership agreement, joint venture agreement and/or other pertinent organizational documentation.

22. Explain in narrative form the stock ownership, structure, management, control, financing, and salary or profit sharing arrangements of the enterprise, if not covered in answers to specific questions heretofore. Attach copies of all shareholder agreements, including voting trust, employment contracts, agreements between owners and enterprise. Include information on salaries, fees, profit sharing, material purchases, and equipment lease or purchase arrangements.

    Evidence relating to structure, management, control, and financing should be specifically included. Also, list the specific management responsibilities of each principal, sole proprietor, partner, or party to a joint venture (as appropriate) listed in response to #4.

23. Attach evidence that the enterprise (or an individual in it) is appropriately licensed for the type of work that is to be performed. Include Federal ID Number.

24. Attach a brief resume of the education, technical training, business, employment, design and/or construction experience for each officer, partner or sole proprietor listed in #4. Include references.

NOTES:

I. Omission of any information may be cause for this statement not receiving timely and complete consideration.

II. The persons signing below certify that all information in this INDIAN ENTERPRISE QUALIFICATION STATEMENT, including exhibits and attachments, is true and correct.

III. Print and type name below all signatures.

If applicant is Sole Proprietor, Sign Below:

_____ _____
Name Date

If applicant is in a Partnership or Joint Venture, all Partners must sign below:

_____ _____
Name Date

_____ _____
Name Date

If applicant is a corporation, affix corporate seal

_____
Corporate Seal

By: _____ _____
President's Signature Date

Attested by: _____ _____
Corporate Secretary's Signature Date

WARNING: U.S. Criminal Code, Section 1010, Title 18, U.S.C. provides in part: "Whoever...makes, passes, utters, or publishes any statement, knowing the same to be false...shall be fined not more than $5,000 or imprisoned not more than two years, or both."

TRIBAL EMPLOYMENTS RIGHTS ORDINANCE (TERO)

TITLE 8 – REGULATORY CODE
PART III –LABOR
CHAPTER 3-1 – EMPLOYMENT

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TITLE 8 – REGULATORY CODE
PART III - LABOR
CHAPTER 3-1—EMPLOYMENT

Legislative History: *Passed on August 16, 1981 by Tribal Council as TERO Ordinance (Ord. No. 4)*

Enabled on September 23, 1981 by Resolution No. C-43-91 to be full force & effect.

Amended and codified on February 16, 2005 by Resolution No. C02-34-05.

Recodified on August 9, 2006 by Resolution No. C08-313-06.

Amended on August 10, 2011 by Resolution No. C08-234-11 and Ord. No. 20-11

SUBCHAPTER A POLICY LEGAL BASIS; DEFINITIONS

Section 10 Indian Preference Employment and Training Policy (8 PYTC § 3-1-10)

(A) The Pascua Yaqui Tribe believes that, like natural and human resources, jobs in private and public employment on or near the Reservation is a critical resource of Indian people. The Tribal Council must use its sovereign power to obtain the rightful share of such jobs for Indian people and to eradicate discrimination against Indian people. Indians are entitled to the protection of federal laws which have been adopted to combat employment and economic discrimination and the Pascua Yaqui Tribal Council intends to play an important role in the enforcement of such laws.

(B) The Tribal Council finds it necessary to establish a Tribal Employment Rights Office (TERO) to increase employment of Indians and to ensure that Indian Preference in employment and training is adhered to.

Section 20 Federal Law as Basis for Indian Preference (8 PYTC § 3-1-20)

The Indian Self-Determination and Education Assistance Act of 1974 (Public Law 93-638), Section 7(b) states:

> Any contract, subcontract, grant or subgrant pursuant to this act…or any other act authorizing federal contracts with or grants to Indian organizations or for the benefit of Indians shall require that to the greatest extent feasible:
>
> (1) Preferences and opportunities for training and employment in connection with the administration of such contracts or grants shall be given to Indians; and
>
> (2) Preference in the award of subcontracts and subgrants in connection with the administration of such contracts or grants shall be given to Indian organizations and to Indian-owned economic enterprises…"

Section 30 Equal Employment Opportunity (8 PYTC § 3-1-30)

Nothing contained in this Chapter shall violate or undermine federal requirements of Equal Employment Opportunity, namely Title VII of the 1964 Civil Rights Act, the "Office of Federal Contract Compliance Programs" (OFCCP) Compliance of Federal Contract Compliance Program, or Executive Order 11246. Title VII prohibits preferential employment on the basis of race, religion, color, sex or national origin. However, Title VII contains a special exception: Section 30 (i) states: "Nothing contained in this title shall apply to any business or enterprise on or near an Indian Reservation with regard to any publicly announced

employment practice of such business or enterprise under which preferential treatment is given to an individual because he/she is Indian."

Section 40 Tribal Power to Impose Preferential Requirements (8 PYTC § 3-1-40)

The U.S. Congress justifies tribal power to impose preferential requirements on the grounds that: "This exemption is consistent with the federal governmental policy of encouraging Indians employment and with the special legal position of Indians."

Section 50 Office of Federal Contract Compliance Program (OFCCP) Regulations (8 PYTC § 3-1-50)

In January 1977, the OFCCP issued regulations which state: "Work on or near Indian Reservations. It shall not be a violation of the equal opportunity clause for a construction or non-construction contractor to extend a publicly announced preference in employment to Indians living on or near an Indian Reservation. The use of the word "near" would include all that area where a person seeking employment could reasonably be expected to commute to and from in the course of a work day. Contractors and subcontractors extending such a preference shall not, however, discriminate among Indians on the basis of region, sex, or tribal affiliation, and the use of such a preference shall not exempt a contractor from complying with the other requirements contained in this Chapter."

Section 60 Definitions (8 PYTC § 3-1-60)

(A) The term "commerce" includes all trade, traffic, distribution, communication, transportation, provision of services, manufacturing, production, agricultural production, building, maintenance, construction, banking, mining, gas and oil production.

(B) The term "employee" shall include any employee or applicant for employment and shall not be limited to the employees of a particular employer, unless a section of this document explicitly states otherwise, and shall include any individual whose work has ceased as a consequence of, or in connection with, any current labor dispute or because of unfair labor practices and who has not obtained any other regular and substantially equivalent employment. The term "employee" shall not include any individual employed in the domestic service of any family or person at home or any individual employed by any other person who is not an employer as herein defined.

(C) The term "employees on the Pascua Yaqui Reservation" shall include employees who, in a non-supervisory or non-managerial position, spend more than one-tenth of their working hours per month or per pay period, whichever is shorter, on the Pascua Yaqui Reservation. This term shall also include employees who, in a supervisory or managerial position, spend more than 1/20 of their working hours per month or per pay period, whichever is shorter, on the Pascua Yaqui Reservation.

(D) The term "employer" includes but is not limited to, any person who engages in commerce through paid agents or servants, and who hires or contracts for services within the boundaries of the Pascua Yaqui Reservation. The term "employer" includes any person acting as an agent, contractor or subcontractor of an employer, directly or indirectly, but shall not include the United States Government or any wholly-owned corporation of said government. This term shall include, however, independent contractors, subcontractors, grantees and subgrantees of the Federal Government or of wholly-owned government corporations.

(E) The term "covered employer" includes an employer who employs two or more employees on the Pascua Yaqui Reservation for more than two months or on an intermittent but continuing basis.

(F) The term "Indian" means:

(1) any member of any recognized American Indian tribe now under federal jurisdiction;

(2) descendants of members who were on June 1, 1934 residing within the boundaries of any Indian Reservation;

(3) until January 17, 1981 a descendent of at least one-forth degree Indian ancestry of a currently federally recognized tribe whose rolls have been closed by an Act of Congress;

(4) all others of one-half or more Indian blood of tribes indigenous to the United States, Native Alaskan, Eskimo, or other aboriginal people of Alaska; or

(5) direct lineal descendants of enrolled tribal members, recognized by the community as Indian.

(G) The term "Indian-owned firm or entity" means any commercial, industrial or business activity which is owned by an Indian or Indians or other Indian-owned firm or entity, provided that such Indian ownership constitutes not less than 50% of the enterprise and that control of management affairs of the entity is conducted by Indians.

(H) The term "Indian Preference" means that Indians (as defined in this section) shall be given absolute preference in all phases of employment, training, contracting, and subcontracting. "Preference" means that in all cases where a qualified Indian or Indian firm is available, the Indian shall be granted preference to a similarly qualified non-Indian person or entity.

(I) The term **"**Indian resident**"** or "resident Indian" means any Indian person, without regard to tribal affiliation, who at the time any work commences on the Reservation by any employer, contractor or subcontractor, has resided on the Pascua Yaqui Reservation for not less than the preceding 60 days.

(J) The term **"**non-resident Indian**"** includes all Indians who are not resident Indians within the definition of this section.

(K) **"**Notice**"** is written notification of apparent or alleged non-compliance or violation. As required to be given by the Tribal Employment Rights Office, notice shall be sufficient as to unnamed parties in an action, all interested person not parties to an action, and in all instances where a specific person is not addressed, if it is posted in a public place in the Tribal Employment Rights Office for not less than five working days and is on file in the Tribal Employment Rights Office open to public inspection.

(L) **"**Citation**"** is written notification of findings of non-compliance or violation and sanctions and/or penalties imposed. Citation shall be sufficient if posted in a public place in the Tribal Employment Rights Office for not less than five working days and placed on file in the office open to public inspection, as stated in definition "Notice" above.

(M) The term "person" shall include both natural persons and artificial persons, including but not limited to corporations, trusts, partnership, unions, agents, societies, sole proprietorships and estates of decedents.

(N) The term "union" or "labor union" means any organization of any kind or any agency or employee representation committee or plan in which employees participate and which exists for the purpose, in whole or in part, of dealing with employers concerning grievances, labor disputes, wages, rates of pay, hours of employment or conditions of work.

SUBSECTION B GENERAL PROVISIONS

Section 70 Tribal Employment Rights Office (8 PYTC § 3-1-70)

The Pascua Yaqui Tribal Employment Rights Office (TERO) shall be a unit of the Human Resources Department. The Human Resources Department is vested with full supervisory authority in the Human Resources Director who shall report directly to the Tribal Council. The Human Resources Director shall supervise and have authority over the TERO Manager.

Section 80 Authority of TERO (8 PYTC § 3-1-80)

(A) The TERO Manager shall have authority to hire staff, expend funds appropriated by the Tribal Council, obtain and expend funding from federal, state or other resources to carry out the purposes of the TERO.

(B) The TERO Manager shall have authority to issue rules, regulations and guidelines to implement the employment and contracting rights requirements imposed by this chapter, to hold compliance hearings, to subpoena witnesses and documents, to require employers to submit records, to issue cease and desist and related orders, through its own office or through the Tribal Court, to petition Tribal Court for removal orders, to conduct site monitoring on employer premises, to interview employees throughout the Reservation at any time, to examine employer records and documents on the Reservation and to take such other actions as are necessary for the fair and vigorous implementation of this chapter.

(C) The TERO Manager may appoint another person to serve as Tribal Employment Rights Officer for the conduct of any hearing

Section 90 Publication to Bidders (8 PYTC § 3-1-90)

The obligation of all employers to comply with this chapter shall be made known to all existing and future employers, contractors and subcontractors. All bid announcements issued by any tribal, federal, state or other private or public entity for the benefit or use of Pascua Yaqui Indians shall contain a statement that the successful bidder will be obligated by tribal law to comply with this chapter and that a bidder or potential bidder may contact the TERO to obtain additional information.

Section 100 Tribal Departments' and Agencies' Responsibilities (8 PYTC § 3-1-100)

Those departments responsible for issuing business licenses or contracts or subcontracts or otherwise engaged in activities involving contact with prospective employers or contractors on the Reservation shall be responsible for informing such prospective employers or contractors of their obligations under this chapter.

Section 110 TERO Responsibilities (8 PYTC § 3-1-110)

Within one month of the effective date of this chapter and for each amendment thereto, the TERO shall send copies of this chapter to every employer and contractor/subcontractor presently operating on the Reservation. It shall be the responsibility of the TERO to send copies of any future revisions to the chapter to all Tribal departments and agencies as described in Section 100 of this chapter.

SUBCHAPTER C EMPLOYMENT PREFERENCE

Section 120 Scope of Indian Preference in Employment (8 PYTC § 3-1-120)

(A) All existing and future covered employers operating within the boundaries of the Pascua Yaqui Reservation are required to give absolute preference to qualified Indians in all phases of employment and training (including recruitment, advertising of jobs, hiring, upgrading, promotion, transfer, rate of pay, layoff or termination and selection for training or apprenticeship). Indian preference means that if a qualified Indian is available, he or she will be given preference over a qualified non-Indian in any phase of employment. All jobs which exist within the boundaries of the Reservation, permanent, temporary, contracted or subcontracted are subject to Indian preference.

(B) All covered employers and agencies shall comply with the rules, regulations and guidelines of the TERO with regard to Indian Preference.

Section 130 Specific Indian Preference Obligations of Employers (8 PYTC § 3-1-130)

(A) The TERO shall establish the minimum number or percentage of Indian persons that each employer must employ in its work force during any year that its employees work on the Reservation. The goals set shall be based on knowledge of the available Indian labor pool and projected employment opportunities.

(B) The employer shall meet with the TERO before it actually begins work on the reservation and immediately after a contract is signed.

(C) For existing employers, Indian preference employment goals shall be reviewed by the TERO at least annually and revised as necessary to reflect changes in the Indian work force available and in the employer's hiring plans.

(D) Each employer shall submit reports to the TERO with a frequency established by the TERO, indicating number of Indian and non-Indian employees, hires, terminations, layoffs, promotions, pay increases, reprimands, how close the employer is to meeting its goals and such other information as the TERO requests. An employer who fails to submit these reports in a timely manner shall be subject to the sanctions provided for in Subchapter E of this chapter.

(E) Each employer shall meet its minimum goals for the employment of Indians or shall demonstrate by written and other evidence that it has made every possible effort to meet its goals, including actively recruiting Indians on and off the Reservation, interviewing and if necessary skill testing Indian applicants, providing trainee positions if no qualified Indians are available, posting public notices for job opportunities and other actions which indicate the employer has made every possible effort.

Section 140 Non-Compliance (8 PYTC § 3-1-140)

(A) The TERO shall have authority to issue a notice of non-compliance when, based on reports, observations or other evidence, reason exists to believe the employer is not meeting or making every effort to meet its goals for Indian preference. Before issuing citations for non-compliance, however, the TERO will make every reasonable effort to resolve the non-compliance by informal means.

(B) Upon receipt of such notice, an employer shall be entitled to a hearing as provided in Subchapter E of this chapter. The burden shall be on the TERO to demonstrate that an employer has failed or is failing to meet its goals or abide by the chapter or TERO Guidelines. The burden shall then shift to the employer to demonstrate that it has made every possible effort to meet its goals or come into

compliance with the regulations. An employer who is found to be out of compliance because it failed or failing to meet its goals and commitments to the TERO and who is unable to demonstrate by evidence that it made every possible effort to do so, shall be subject to remedial actions and sanctions provided for in Subchapter E.

Section 150 Subcontractors (8 PYTC § 3-1-150)

The Indian preference requirements contained in this chapter shall be binding on all subcontractors of covered employers, regardless of their size and shall be deemed a part of all resulting subcontract specifications. The primary employer or contractor shall have the initial and primary responsibility for ensuring that all its subcontractors comply with these requirements. The TERO is authorized to impose sanctions and penalties on the primary employer as well as on the subcontractor if the subcontractor fails to comply.

Section 160 Employment Procedures (8 PYTC § 3-1-160)

The employer may use whatever employment process it chooses, provided a non-Indian person will not be hired if there is a similarly qualified Indian available. The employer may obtain qualified Indian referrals from the TERO and other sources. The employer is cautioned to thoroughly check the documentation of Indian blood of any potential employee not referred by the TERO to ensure that the person is qualified as defined in Section 60 of this chapter. In all cases, the employer is required to notify the TERO and post in the TERO office all jobs planned for a project. Except for key personnel of the employer (which must be identified in the TERO/Employer Agreement signed before commencement of work), all jobs existing or planned to exist on the Reservation are subject to Indian preference requirements.

Section 170 Notification of Jobs (8 PYTC § 3-1-170)

Each employer is required to notify the TERO a reasonable time ahead of all planned employment on the Reservation. For the purposes of this requirement "reasonable time" is defined as: (a) for construction jobs, the TERO shall have 49 working hours' notice to locate plus 12 hours to refer a qualified Indian; (b) for all non-construction jobs, the TERO shall have five working days' notice to refer qualified Indians.

Section 180 Waiver of Notice to TERO (8 PYTC § 3-1-180)

The TERO will consider waivers of requirement for advance notification stated in Section 170 for specific individual jobs, upon a showing by the employer that such time period imposes an undue burden on employer. Proof of undue burden rests with the employer.

Section 190 Violation of Notice to TERO (8 PYTC § 3-1-190)

Any job not first cleared through the TERO shall be subject to suspension by TERO Manager. The employer shall be subject to a fine as proved in Subchapter E.

Section 200 Employer's Right to a Hearing (8 PYTC § 3-1-200)

Any employer cited for violation of Section 190 has the right to a hearing and appeal in accordance with subchapter E.

Section 210 Lay-Offs (8 PYTC § 3-1-210)

In all layoffs or reductions in force, no Indian worker shall be terminated or laid off if a non-Indian worker is still employed in the same craft or job classification. Non-Indians shall be terminated first as long as an Indian employee meets the threshold qualifications for the job. Further, if the employer lays off by crews, qualified Indians shall be transferred to crews that will be retained so long as there are non-Indians in the same craft or job classification employed elsewhere on the Reservation.

Section 220 Promotion, Career Advancement, Job Enhancement, Pay Policies (8 PYTC § 3-1-220)

Employers shall give Indians preferential consideration for all promotional opportunities, career advancement/enhancement opportunities or programs, specialized or general training opportunities, employee or management development activities, etc. Each employer shall adopt goals and timetables each year to develop Indian employees for positions in each job classification/category (for example, manager/official, professional, office/clerical, skilled craft, technician and service worker).

Section 230 Training and Apprenticeship (8 PYTC § 3-1-230)

(A) All employers, as requested by the TERO, shall participate in existing and planned training programs to assist Indians in becoming qualified for job classifications used by the employer. In cases where there is an inadequate pool of qualified Indians to fill certain job categories, the employer may be required to institute formal classroom and/or on the job training programs to fulfill this obligation.

(B) Construction employers shall employ the maximum number of Yaqui apprentices or trainees allowable under Federal law or, in the absence of federal guidelines, according to the guidelines set forth by the TERO.

(C) To the extent they are available, all trainees or apprentices employed by an employer on the Reservation shall be Indian people referred through the TERO.

Section 240 Part-Time, Temporary, Summer and Co-Operative Student Employees (8 PYTC § 3-1-240)

(A) Opportunities for part-time, temporary, summer and co-operative student employment shall be reserved for Indians. The TERO will work in conjunction with employers to locate and refer qualified candidates.

(B) Employers are further encouraged to make every effort to promote after-school, summer and vacation employment for Indian youth.

Section 250 Religious Accommodation (8 PYTC § 3-1-250)

(A) Employers shall make accommodations to the religious beliefs and practices of Indian workers in accordance with Public Law 95-341, "American Indian Religious Freedom", and tribal custom.

(B) Employers should be aware that Indians of various tribes practice different religions, both traditional Indian religions and modern American religions. Therefore, the specific religious practices of an Indian employee may vary from any other Indian employee. Employers are advised to contact the TERO in all instances where an Indian employee has requested special accommodation to his/her religious beliefs, to request counsel in determining that the request is both necessary and reasonable.

Section 260 Counseling and Support Programs (8 PYTC § 3-1-260)

(A) The TERO and other Tribal and federal departments will provide counseling and other support services to Indians employed on and off the Reservation. Employers are advised to cooperate with such counseling and support services, since most are aimed toward assisting the employee in retaining employment.

(B) The Equal Employment Opportunity Commission (EEOC) contracts with the TERO to protect Indian employment rights. Therefore, the TERO not only represents the Tribe's laws but also those of the Federal Government.

(C) The TERO staff is available to assist both employees and employers in improving communications and avoiding discrimination complaints or formal charges.

Section 270 Job Qualification Requirements of Employers (8 PYTC § 3-1-270)

(A) A employer may use no job qualification criteria or personnel requirements that serve as a barrier to the employment of Indians or that has an adverse impact on Indians as a group or as individuals. The exception is a Bona Fide Occupational Qualification as defined by the EEOC.

(B) The burden shall be on the TERO to demonstrate that a criteria or personnel requirement is a barrier to Indian employment. The burden will then shift to the employer to demonstrate that (a) a criteria or personnel requirement is not a barrier to Indian employment or (b) such criteria or requirement is a valid requirement of the job.

(C) If the employer fails to meet this burden, the employer will be required to eliminate the criteria or requirement at issue.

Section 280 Right of Appeal (8 PYTC § 3-1-280)

Where the TERO and employer are unable to reach agreement on the matters covered in Section 270 the employer is entitled to a hearing as provided in Subchapter E. The employer may appeal the TERO's decisions as provided in Subchapter E.

Section 290 Reporting Requirements and On-Site Inspections (8 PYTC § 3-1-290)

(A) Employers shall submit reports and such other information as are requested by the TERO. Failure to do so may result in the levying of sanctions as provided in Subchapter E.

(B) Employees of the TERO shall have the right to make on-site inspections during regular working hours in order to monitor an employer's compliance. TERO shall have the authority to inspect and copy all relevant records of an employer, of an employer's signatory unions or subcontractors, to speak with employees on the job site, and to engage in similar investigatory activities. Employers operating on the Pascua Yaqui Reservation shall not have authority to prevent, prohibit or restrict said activities by TERO employees.

All information and documentation collected by the TERO shall be kept confidential unless disclosure is required during a hearing or appeal as provided in Subchapter E of this chapter.

Section 300 Compliance Plan (8 PYTC § 3-1-300)

No employer may commence work on the Pascua Yaqui Reservation until it has signed a TERO/Employer Agreement and provided an acceptable Indian Preference Plan for meeting its obligations under this chapter.

Section 310 Unions (8 PYTC § 3-1-310)

(A) Employers shall be responsible for obtaining agreement from all signatory unions stating that the union will comply with the Tribe's TERO requirements before the employer will be permitted to commence work on the Reservation. Such agreements shall be subject to approval of the TERO.

(B) Unions must agree to:

(1) give absolute preference to qualified Indians in referrals, regardless of which union referral list they are on;

(2) cooperate with TERO hiring and employment procedures;

(3) establish a mechanism so that Indians are not required to travel on a regular basis to retain their place on union lists. (This could involve phone or mail registration or a union sub-office on the Reservation, for example);

(4) indenture and refer only qualified Indian apprentices to employers;

(5) remove all barriers to entry into the union for Indians who are qualified for journey person status and wish to join the union;

(6) grant temporary work permits to Indians who do not wish to join the union; and

(7) meet such other requirements as the TERO may deem necessary to fulfill the employer's Indian preference obligations.

(C) The model union/TERO/employer agreement provided at the end of this document is by reference incorporated as part of this chapter. The TERO's participation in a written agreement with a union in no way constitutes official tribal recognition of the union or tribal endorsement of any recruiting activities conducted by the union.

(D) If a union fails to meet its obligations under this chapter, the TERO has authority to require the employer to accept other Indian referrals. The TERO will cooperate and work in conjunction with union hiring halls to ensure that the requirements of the employer, the union and TERO are met.

Section 320 Issuance of Regulations (8 PYTC § 3-1-320)

In issuing rules, regulations and guidelines, the TERO shall be guided by the policy and standards enumerated throughout this chapter and by any such further resolutions as the Tribal Council may issue. The TERO shall insure that all rules, regulations and guidelines issued provide due process.

SUBCHAPTER D INDIAN PREFERENCE IN CONTRACTING AND SUBCONTRACTING

Section 330 Indian Preference on Contracting and Subcontracting (8 PYTC § 3-1-330)

(A) All covered employers and state and local governments operating on the Reservation or for the benefit of the Yaqui Indians shall give preference in the award of contracts, subcontracts, grants and subgrants to tribally owned and other Indian owned businesses. Federal agencies are not subject to this chapter, since they are covered by federal laws governing Indian preference.

(B) The TERO shall maintain a list of Indian-owned businesses, and all employers shall make use of the list to contact Indian-owned businesses and invite their participation in contracting and subcontracting, regardless of size or amount of contract. Employers shall be required to provide documented evidence of their efforts to carry out Indian preference in contracting and subcontracting. Subchapter C provides detailed regulations on this matter.

Section 340 Coverage (8 PYTC § 3-1-340)

(A) These rules and regulations apply to all construction and non-construction contracts and subcontracts involving work to take place "on or near the Pascua Yaqui Reservation." A contract or subcontract taking place "on or near the Yaqui Reservation" means 50% or more of the work under contract or subcontract is to be performed within daily commuting distance of the Yaqui Reservation.

(B) Indian contract preference requirements set out in Subchapter C, Sections 360 and 370 of this chapter shall apply to:

(1) All contracts and subcontracts which are federally funded.

(2) All contracts and subcontracts which are non-direct federal or federally funded contracts.

(3) All contracts and subcontracts which are for the benefit of Indians and which therefore are covered by Section 7(b) of the Indian Education and Self Determination Act (P.L. 93-638).

(4) All contracts and subcontracts "on or near the Pascua Yaqui Reservation."

Section 350 Definitions (8 PYTC § 3-1-350)

(A) "Indian Contractor" is a contractor that is 51% or more Indian owned and controlled. The TERO reserves the right to require such proof as it deems necessary to substantiate that a firm actually is 51% or more Indian owned and controlled.

(B) "For the Benefit of Indians" is work to be performed under a federal or federally funded contract for the benefit of Indians if the benefits provided to Indians are in addition to any incidental benefits which might accrue to the general public.

(C) "Prime Contractor" is the prime construction, forestry, mining or other contractor on a project. This is the entity responsible for the entire project.

(D) "Subcontract" is any contract let by a prime contractor or its subcontractors for supplies, services, or work on prime contracts, regardless of tier.

(E) "On or Near the Reservation" means that 50% or more of the work under contract or subcontract is to be performed within the boundaries of the Yaqui Reservation or within daily commuting distance of the Reservation.

(F) "Direct Federal Contract" is a contract let by a Federal agency directly to a prime contractor.

(G) "Federally Funded Contracts" is one in which the Federal Government has contracted or granted funds to an entity which, in turn, lets the prime contract.

Section 360 Indian Contract Preference Requirements in Prime Contracts (8 PYTC § 3-1-360)

Each entity (including Tribal Agencies, State or Local Government, Indian Organization, Private Corporation, Association, Partnership, Individual Enterprise, Tribal Enterprise, or other) letting contracts for construction, mining forestry, services, supplies or other work on the Yaqui Reservation shall comply with the following requirements when letting prime contracts.

(A) The entity shall obtain from the Pascua Yaqui TERO the source list of Indian contractors and subcontractors.

(B) The entity shall send summaries of the proposed prime contract to Indian firms on that list to determine if any Indian contractor is interested in and qualified to bid on the proposed prime contract.

(C) If more than one Indian firm expresses an interest in the contract and is qualified to perform it, the entity shall restrict competition to those Indian firms.

(D) If the entity letting the contract determines that no Indian firm is interested in or qualified to perform the contract, the entity may let the bid on an open and competitive basis and award the contract in such a manner as it so chooses without regard to this section of the rules and regulations.

(E) If only one Indian firm expresses an interest in the contract and is qualified to perform it, the entity shall determine if that Indian firm is capable of performing the contract within the fiscal limitations. Based on this information, the entity may elect to award the contract to the Indian firm or, in the case of limited fiscal capability of the Indian firm, may let the bid on an open and competitive basis, considering the bid of the Indian firm along with other non-Indian firms, so long as equitable and complete cost negotiations have taken place.

(F) The entity letting the contract shall be responsible for making the determination whether or not an interested Indian firm is qualified to perform the work. However, the TERO reserves the right to require documentation from the entity supporting its conclusion that an Indian firm is not qualified to perform the work.

(G) The entity letting the contract shall be responsible in all cases for reviewing the proposed contract to explore the possibility of dividing the work into components or sub-components such that a larger number of Indian contractors and subcontractors would be qualified to perform the work.

(H) All subcontract let by the prime contractor shall require formal bid advertising and opening procedures and shall be bound by Section 370, Indian Preference in Subcontracting.

(I) The entity letting the contract or subcontract shall require a format as to acceptable compliance with this chapter.

Section 370 Indian Preference in Subcontracting (8 PYTC § 3-1-370)

(A) Prior to the letting of any contract to be performed on the Pascua Yaqui Reservation, whether that contract is a direct federal contract, a federally funded contract or a non-federal contract, the TERO shall be contacted by the awarding entity to establish the portion of work that shall be performed by Indian contractors and subcontractors. The TERO may establish a percentage of work in terms of total subcontracting dollars to be awarded to Indian firms, based on: availability of Indian subcontractors, nature of work to be performed, requisite skills to perform the work, and such other factors as may be recommended by the entity letting the contract and accepted by the TERO. Before setting requirements, the TERO shall meet with the entity letting the contract to inform it of the proportion it is proposing and to explain how it reached its conclusions. The TERO shall provide the entity letting the contract with a copy of this chapter, a memo setting forth the proportion of work to be performed by Indian contractors and a list of Indian contractors available to perform subcontract work on the contract.

(B) All federal and non-federal contracts shall require that the agency letting the contract include in its bid offering material which sets forth Indian preference requirements and appropriate listings of Indian contracts or subcontracts.

(C) The entity letting the prime contract shall require every bidder to submit, as part of its bid, a plan describing how it will satisfy the Indian subcontractor utilization requirement established by the TERO. A bid that fails to contain a satisfactory Indian subcontractor utilization plan shall be considered a non-qualifying bid, because it violates this chapter.

(D) The successful prime contractor selected by the entity letting the contract shall be free to select its subcontractors in whatever manner it so chooses and to make its own determination on qualifications and reasonableness in price. However, a successful contractor who fails to meet the requirements for utilization of Indian subcontractors shall be required to demonstrate to the TERO that good cause exists for its failure to meet said requirements. If it fails to demonstrate good

cause, it shall be subject to one or more of the sanctions set forth in this chapter, pursuant to the procedures and appeals processes set forth in subchapter E.

(E) Prime contractors shall be encouraged to explore the possibility of dividing their subcontracts into components or sub-components that would enable the maximum number of Indian contractors and subcontractors to apply.

Section 380 Responsibilities of the TERO (8 PYTC § 3-1-380)

(A) The TERO shall develop and keep updated a list of Indian contractors available to perform work on or near the Yaqui Reservation. The list shall include information on the areas in which these Indian contractors consider themselves qualified to work and their present availability to the extent known. The TERO shall coordinate with the Bureau of Indian Affairs, Indian Health Service, Indian Housing Authority, Council for Tribal Employment Rights, Department of Defense, and other agencies that maintain Indian contractor source lists.

(B) The TERO shall work closely with the federal agencies which have regulations requiring Indian contract preference (Bureau of Indian Affairs, Indian Health Service, Indian Housing Authority, Office of Federal Contract Compliance Programs, and others) to seek to coordinate their requirements, monitoring efforts and sanctioning activities to the extent feasible.

(C) Within available resources, the TERO shall provide advice and counseling to Indian contractors located on or near the Pascua Yaqui Reservation on the ways and means to improve their capability and qualifications; assist them in obtaining bonding; assist them in understanding the nature of federal procurement processes and requirements; assist them in locating other resources for technical assistance in the field; and shall carry out such other activities as will promote the development of Indian enterprises on other contracts on the Pascua Yaqui Reservation.

(D) The TERO shall take steps to ensure that all federal and non-federal agencies or entities letting contractors on the Pascua Yaqui Reservation have notice of this chapter and its requirements.

SUBCHAPTER E ADMINISTRATION; ENFORCEMENT; APPEALS

Section 390 Administration (8 PYTC § 3-1-390)

The Administration of this chapter is vested in the Pascua Yaqui Tribal Council and shall be exercised by the Tribe's Tribal Employment Rights Office. The authority and duties of the TERO Manager are as set forth in Subchapter B, Sections 80 and 110.

Section 400 Administrative Review (8 PYTC § 3-1-400)

If an employer appears to be out of compliance with the laws, rules, regulations or guidelines on Indian preference, the TERO shall take remedial action to correct the problem.

Section 410 Informal Resolution (8 PYTC § 3-1-410)

If the TERO has reason to believe an employer has failed to comply with any part of the chapter, the TERO shall notify the employer in writing, specifying the alleged violation and scheduling a meeting to resolved the issue. If after discussion, the employer refuses to come into compliance, the TERO shall issue a formal citation stating the sanctions provided for in Subchapter E, Section 430.

Section 420 Hearing (8 PYTC § 3-1-420)

(A) The employer shall then be entitled to a hearing before the TERO to present evidence and call witnesses to demonstrate that it has complied with the requirements of the chapter or has made every possible effort to do so.

(B) The TERO shall have the right to subpoena witnesses and documents, to put witnesses under oath, to present evidence in the Tribe's behalf, and to take such other steps as are necessary to ensure a fair and complete hearing on the issues.

(C) On the basis of the evidence presented at the hearing and the information collected, the TERO shall determine whether or not the employer is in compliance or has made every possible effort to comply.

(D) The TERO, if it finds the employer out of compliance, shall issue a formal decision, imposing one or more of the sanctions provided for, as appropriate, and shall order the employer to take such corrective action as is necessary to remedy any harm done to the tribe or to individual Indians by the employer's non-compliance. The TERO shall send copies of the decision to the Tribal Judge and Council Officers.

Section 430 Sanctions and Penalties (8 PYTC § 3-1-430)

In the event an employer is found out of compliance with the requirements of this chapter, the TERO shall be authorized to impose any or all of the following sanctions or penalties, after considering such mitigating factors as the employer's efforts to comply and its efforts to remedy any harm done to the tribe or to individual Indians by its non-compliance:

(A) Monetary fines not to exceed $500 per day per violation.

(B) Suspension of employer's operations until corrective action is taken or a plan for corrective action developed.

(C) Termination of employer's operations.

(D) Prohibition of employer from engaging in any future operations on the Pascua Yaqui Reservation.

(E) Order to remove and/or hire certain employees.

(F) Provision by employer of back pay, employment, promotion, training and/or other relief to individual Indians.

(G) Order to employer to make such changes in its procedures or policies as is necessary to comply with this chapter.

(H) The TERO shall obtain a Pascua Yaqui Tribal Court Order to enforce injunction and removal orders. All other orders of the TERO are self-executing.

Section 440 Individual Complaint Procedures (8 PYTC § 3-1-440)

(A) Any Indian, group of Indians, or representatives of a class of Indians who believes that any employer has failed to comply with this chapter or who believes that an Indian has been discriminated against by any covered employer, may file a complaint with the TERO. Persons may file a complaint whether or not they can show that they were personally harmed by the employer's non-compliance.

(B) Upon receipt of such a complaint, the TERO shall conduct an investigation of the charge and shall attempt to achieve an informal settlement of the matter. If voluntary conciliation cannot be achieved, the TERO shall hold a hearing on the matter, shall make a determination on the validity of the charge, and shall order such relief as is deemed necessary to restore the rights or repair the damages to any Indian who was harmed by the employer's non-compliance or discriminatory behavior. The TERO's decision shall be sent to all parties in writing within 30 calendar days of the initial receipt of the complaint.

Section 450 Retaliation by Employer (8 PYTC § 3-1-450)

The employer is prohibited from taking any retaliatory action against an employee who has filed a complaint of non-compliance or discrimination with the TERO. Such actions will be deemed serious violations of this chapter. Retaliatory actions may include, but are not limited to, termination of employment, demotion, suspension, reprimand, withdrawal of benefits or privileges, layoff, etc. Further, the TERO is authorized to obtain from the Tribal Court a temporary injunction to prevent any harm or further harm caused by an employer, union or person's retaliatory actions.

Section 460 Judicial Review: Appeals Procedure and Jurisdiction (8 PYTC § 3-1-460)

(A) Any person or entity aggrieved by an order of the TERO may file an appeal with the Pascua Yaqui Tribal Court, asking that the order be modified or set aside in whole or in part. An appeal must be filed within 20 calendar days after receipt of notice of the TERO's decision. The TERO Manager shall represent the interests of the Tribe during appeal. A copy of the appeal shall be sent by the Tribal Court Clerk to the TERO Manager upon receipt.

(B) Upon filing of the appeal, the Tribal Court shall have exclusive jurisdiction to affirm, modify or set aside such order, in whole or in part, so far as it is applicable to the petitioner. Findings of fact by the Tribal Court, when supported by substantial evidence, shall be conclusive. No objection to the order of the TERO shall be considered by the Tribal Court unless such objections have been urged before the TERO Manager or unless reasonable grounds are established.

Section 470 Enforcement (8 PYTC § 3-1-470)

(A) The Pascua Yaqui Tribal Court is vested with jurisdiction over every person and entity engaging or continuing in business activity on or near the Pascua Yaqui Reservation and with jurisdiction to hear and determine any challenge to the validity of this chapter either generally or as applied to any person or entity.

(B) The Tribal Court is vested with jurisdiction to issue removal, restraining or other legal orders affecting any person or entity transacting business on or near the Pascua Yaqui Reservation and to direct the Tribal Police to carry out any such orders.

Section 480 Effective Date (8 PYTC § 3-1-480)

This chapter shall take effect upon enactment by the Pascua Yaqui Tribal Council and conditions imposed by this chapter shall become binding upon every covered person and entity performing work on the Reservation after August 16, 1984.

DISPOSITION TABLE

Former Section	New Section
Article One	**Subchapter A**
Section 1101	Section 10
Section 1102	Section 20
Section 1103	Section 30
Section 1104	Section 40
Section 1105	Section 50
Section 1106	Section 60
Article Two	**Subchapter B**
Section 1201	Section 70
Section 1202	Section 80
Section 1203	Section 90
Section 1204	Section 100
Section 1205	Section 110
Section 1206	
Article Two	**Subchapter C**
Section 1207	Section 120
Section 1208	Section 130
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Section 1210	Section 150
Section 1211	Section 160
Section 1212	Section 170
Section 1213	Section 180
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Section 1223	Section 280
Section 1224	Section 290
Section 1225	Section 300
Section 1226	Section 310
Section 1227	Section 320
Article Four	**Subchapter D**
Section 1401	Section 340
Section 1402	Section 350
Section 1403	Section 360
Section 1404	Section 370
Section 1405	Section 380

Former Section	New Section
Article Five	**Subchapter E**
Section 1501	Section 390
Section 1301	Section 400
Section 1302	Section 410
Section 1303	Section 420
Section 1304	Section 430
Section 1305	Section 440
Section 1306	Section 450
Section 1307	Section 460
Section 1502	Section 470
Section 1503	Section 480

PASCUA YAQUI TRIBE

RESOLUTION NO. C03-55-18

RESOLUTION OF THE PASCUA YAQUI TRIBE REVISING THE TRIBE'S CONSTRUCTION WAGE SCALES.

WHEREAS, the Pascua Yaqui Tribal Council is vested with the power to develop and adopt ordinances, resolutions, rules and regulations to facilitate the conduct and operation of tribal government (Article VI, Section 1(o) of the Constitution of the Pascua Yaqui Tribe) ; and

WHEREAS, the Tribal Council adopted Resolution No. C08-313-06 on August 9, 2006 which recodified the Tribal Employment Rights Ordinance ("TERO"); and

WHEREAS, The Pascua Yaqui Tribal Council funds construction projects entirely from the Tribe's resources or in partnership with Federal Agencies and other financing mechanisms; and

WHEREAS, All contractors employed by the Pascua Yaqui Tribe are required to adhere to the rules, regulations and standards established and enforced by the TERO Office, including hiring members of the Tribe at a specified minimum wage rate; and

WHEREAS, the current wage scales were approved by Resolution No. C10-230-13 and have not been revised by the Pascua Yaqui Tribe for four years. A new wage scale has been developed which is attached hereto and incorporated herein by this reference ("the 2018 Construction Wage Scale"); and

WHEREAS, the Development Services Department recommends that the Council approve the 2018 Construction Wage Scale; and

WHEREAS, the Tribal Council has determined that it is desirable and in the best interest of the Tribe and its members to approve the 2018 Construction Wage Scale.

NOW THEREFORE BE IT RESOLVED BY THE TRIBAL COUNCIL OF THE PASCUA YAQUI TRIBE that the Tribal Council hereby approves the attached 2018 Construction Wage Scale which all future construction contractors employed by the Pascua Yaqui Tribe must adopt for members of the Tribe employed as construction workers.

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BE IT FURTHER RESOLVED that the Tribal Council hereby authorizes the Chairman to take any necessary and proper action to execute, implement, and enforce this Resolution and the 2018 Construction Wage Scale.

BE IT FINALLY RESOLVED that this Resolution shall go into effect immediately.

CERTIFICATION

THE FOREGOING was on **March 14, 2018** duly adopted by a vote of **TEN** in favor, **ZERO** opposed, and **ZERO** abstained, by the Tribal Council of the Pascua Yaqui Tribe pursuant to authority vested in it by Article VI, Sections 1(o) and Section 2 and Article VII, Section 1, of the Constitution of the Pascua Yaqui Tribe as adopted on January 26, 1988 and approved by the Secretary of the Interior on February 8, 1988 pursuant to Section 16 of the Indian Reorganization Act of June 18, 1934 (48 Stat. 984).

CHAIRMAN OF THE PASCUA YAQUI TRIBE

SECRETARY OF THE PASCUA YAQUI TRIBE

PASCUA YAQUI TRIBE



PASCUA YAQUI TRIBAL WAGE SCALE

CLASSIFICATION	HOURLY WAGE RATES		
	RESIDENTIAL	BLDG/VERTICAL	CIVIL
BLOCKLAYER/BRICKLAYER	22.00	23.00	25.36
ELECTRICIAN	21.00	26.16	26.16
ELECTRICIAN (LOW-VOLTAGE WIRING FOR ALARMS)	21.00	26.16	26.16
CARPENTER (EXCL DW HANGING, FORM WORK)	24.45	25.00	28.00
CEMENT MASON/CONCRETE FINISHER	20.00	23.00	25.00
DRYWALL HANGER/METAL STUD FRAMER	19.00	21.00	
DRYWALL TAPER/FINISHER	20.38	22.00	
HVAC INSTALLATION (DUCT INSTALLATION ONLY)	19.00	21.00	
HVAC TECHNICIAN	21.00	23.00	
INSULATOR - BATT/BLOWN	15.00	16.00	
IRON WORKER STRUCTURAL (REBAR)	26.00	26.00	27.00
IRON WORKER REINFORCING	20.00	22.00	23.00
IRON WORKER ORNAMENTAL (HANDRAILS)	18.00	19.00	19.00
LATHER	18.00	20.00	
PAINTER	18.00	19.00	19.00
PAINTER - BRUSH (EXCL DW FINISHING/TAPING)	18.00	19.00	22.00
PAINTER - PAVING/PARKING LOT STRIPPING	-	19.00	22.00
PAINTER - ROLLER/SPRAY	18.00	19.00	22.00
PIPEFITTER	20.00	26.00	27.00
SPRINKLER FITTER (FIRE)	-	25.00	28.00
PLASTERER	19.00	20.00	
PLUMBER	22.00	25.00	28.00
FENCE INSTALLER	15.00	16.00	19.00
GUARDRAIL INSTALLER	15.00	16.00	16.00
SCAFFOLD ERECTOR (CERTIFIED)	15.00	18.00	19.00
SIGN INSTALLER	14.00	17.00	18.00
STONE MASON/GROUTED RIP RAP	18.00	21.00	21.00
ROOFER	17.00	19.00	
IRRIGATION TECHNICIAN	14.00	17.00	18.00
FORM SETTER/FORM STRIPPING	18.00	21.00	21.00
GLAZIER	16.86	18.00	
GRADE CHECKER	20.00	20.00	20.00
TILE SETTER/FINISHER	19.00	20.00	20.00
WELDER - (RATE PRESCRIBED FOR CRAFT PERFORMING OPERATION TO WHICH WELDING IS INCIDENTAL)			
LABORERS			
ASPHALT WORKER (RAKER, SHOVELOR, SPREADER)	15.00	17.00	18.00
DEMOLITION	13.00	15.00	
FLAGGER	14.00	14.00	14.00
FORM STRIPPING	18.00	21.00	21.00
GENERAL / CLEAN UP	12.00	14.00	16.00
GRADE CHECKER	16.83	20.00	20.00
LANDSCAPER	12.00	14.00	14.00
MASON TENDER - BLOCK	16.00	19.00	19.00
MASON TENDER (CEMENT/CONCRETE/STONE	16.00	19.00	19.00
PIPELAYER	13.00	15.09	16.00

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PASCUA YAQUI TRIBE



PASCUA YAQUI TRIBAL WAGE SCALE

CLASSIFICATION	HOURLY WAGE RATES		
	RESIDENTIAL	BLDG/VERTICAL	CIVIL
POWER EQUIPMENT OPERATORS			
BACKHOE	16.32	20.00	20.00
GRADER BLADE (ROUGH)	18.00	21.39	27.36
GRADER BLADE (FINISH)	20.00	23.00	28.44
SKIDSTEER/BOBCAT	15.00	16.00	24.09
FRONT END LOADER	16.38	18.00	22.50
BULLDOZER	18.00	20.54	27.36
CONCRETE SAW (HAND HELD / WALK BEHIND)	17.00	17.00	17.00
GUARDRAIL POST DRIVER		18.00	18.00
ROLLER/COMPACTOR	16.24	21.67	24.09
EXCAVATOR	24.67	20.00	20.00
FORKLIFT	16.00	18.00	20.00
PAVER (ASPHALT, AGGREGATE, CONCRETE)	21.00	23.00	24.00
SCRAPER	21.00	23.00	27.36
SLURRY SEAL OPERATOR	23.00	23.00	23.00
TRACTOR GANNON	16.32	20.00	24.93
SCREED	20.00	22.17	24.00
TRENCHER	18.00	23.00	25.00
TRACKHOE	18.00	20.00	20.00
OILER	18.00	24.09	24.09
SWEEPER/KICKBROOM	16.00	17.00	19.00
CRANE	22.00	25.25	25.25
TRUCK DRIVERS (CDL ENDORSEMENTS)			
DUMP	18.00	20.00	22.00
WATER	15.00	17.00	20.00
WATER PULL	17.00	20.00	20.00
FLATBED	16.00	18.00	20.00

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CONSTRUCTION AGREEMENT

between the

PASCUA YAQUI TRIBE

And

[company]
An Arizona Company

SAMPLE

This Construction Agreement between the Pascua Yaqui Tribe and the Contractor identified below ("Contractor"), (collectively the "Party" or the "Parties"), shall constitute and shall hereinafter be referred to as the "Agreement."

1. **NAME OF CONTRACTOR: [company]**

2. **ADDRESS: [address]**

3. **PRINCIPAL PLACE OF BUSINESS OF CONTRACTOR (if different from above):**
   Same as above

4. **QUALIFICATIONS:**

   A. Contractor is licensed with the Arizona Registrar of Contractors. ROC [number]

5. **NAME OF PROJECT AND LOCATION WHERE COVERED SERVICES ARE TO BE PROVIDED: (the "Project")**

   [project name]

6. **DATE OF AGREEMENT**: [month / day / year]

7. **CONTRACT TIME REQUIREMENTS:**

   A. Time is of the essence in the construction and completion of all work and services provided by Contractor.

   B. Work for this Contract shall commence upon the issuance of a Notice to Proceed by the Tribe and shall be completed no later than [*days/weeks/other*] following the issuance of the Notice to Proceed.

   C. Specific time requirements: None

   D. Contractor may be excused from delays of performance of the terms or obligations of this Agreement pursuant to the provisions of the Force Majeure paragraph in the Agreement.

Contractor's excused delay in performance shall equal the period of the duration of the allowable delay.

8. CONTRACTOR'S COMPENSATION:

The Contractor's Compensation for this contract is: $[amount] **CONTRACT CAP:** The total amount of the Contract shall not exceed the amount of $[amount] ("Contract Cap"). Services performed beyond the Contract Cap shall be paid only with the prior approval of Tribe in a written modification to this Agreement.

9. FUNDING: IS THIS AGREEMENT SUBJECT TO NON-TRIBAL FUNDING SOURCES/RESTRICTIONS?
Yes: ____
No: ___
Not Applicable: ____

10. TAXES.

A. Contractor shall pay all taxes applicable to Contractor's operation. Contractor shall hold Tribe harmless from responsibility for taxes, damages and interest, if applicable, contributions required under Federal and/or State and local laws and regulations and any other costs.

B. There is a Tribal Transaction Privilege Tax. The current Tribally Imposed Transaction Privilege Tax is 5%.

1. Waiver. By initialing here the Tribe hereby waives its Transaction Privilege Tax for this Agreement. _____

2. Unless waived by the Tribe, the Tribe's Transaction Privilege Tax will be applicable to this Agreement.

C. Contractor and all its subcontractors are exempt from State of Arizona privilege or sales taxes under the holding in the case of ***Gila River Indian Community v. Waddell*, 967 F.2d 1404 (1992).** Contractor will not charge Tribe any State of Arizona privilege or sales taxes, and will assure that all of its subcontractors do not charge State of Arizona Privilege or Sales Taxes to Contractor or the Tribe on this project. If applicable, Tribe shall provide Contractor with an AZDOR Form 5000, with Box 24 checked, showing this transaction to be exempt from Arizona State and Local Transactional Privilege Taxes.

11. CHANGE ORDERS:

A. Prior to any deviation from the approved plans and specifications as requested by Contractor (a "Change Order"), Contractor shall submit the proposed Change Order to Architect, Tribe's Project Manager, Contracting Officer and the Inspector for written approval, and shall not be reimbursed without first receiving such written Change Order. After Change order is approved, Contractor shall modify pay application and Completion date as approved,

12. LIQUIDATED DAMAGES:

SAMPLE

Yes _____; No _____. If yes:

A. Tribe will suffer financial loss if Contractor fails to complete or reach substantial completion the Project by the time specified in Section 7 B.

B. In the event the Project is not completed within the time period set forth in Section 7 B. Contractor shall pay Tribe the amount of _____ Dollars ($_____) per _____ for each calendar day after the end of the required time period, as liquidated damages,

13. PERFORMANCE BOND:

A. For all contracts having a value greater than $100,000, the Contractor shall be required to execute, in connection with this contract, a performance and payment bond for 100 percent of the contract amount, to secure fulfillment of all Contractor's obligations under this contract, and to assure payment of all persons supplying labor and materials as may be provided in any subcontract or other agreement executed by the Contractor. Said bond(s) shall be executed by one or more Surety companies legally authorized to conduct business in the State of Arizona.

B. As an alternate to the above bond requirement the Tribe will, in its sole discretion accept one of the alternatives below: (Check if acceptable)

1. __: Separate payment and performance bonds, each for 50% of the contract price.

2. __: A 20% of contract amount cash escrow account.

3. __: A 25% of contract amount irrevocable letter of credit.

4. __: An irrevocable letter of credit for 10% of the total contract amount with a monitoring and disbursement agreement with the HUD (applicable only to contracts awarded by an IHA under the Indian Housing Program).

14. RETAINAGE:

Yes _____; No ____. If yes:

A. If applicable, during the performance of this Agreement Tribe shall retain 10% of each payment from Contractor. The Contracting Officer may decrease retention amount to 5% when project reaches the 50% competition date depending on contractor's performance.

B. The Tribe shall hold the Retainage to pay the cost of punch list and/or warranty related repairs (collectively the "Punch List Repairs").

C. Upon completion of all Work and all punch list items to Tribe's satisfaction the retention amount will be released to Contractor.

SAMPLE

15. PAYMENT PROCEDURES:

A. Payments shall be made as follows: [payment terms]

B. Final Payment shall be made after completion of all work and after final written acceptance is provided by the Tribe. Payment shall not be made until the work site has been cleaned up to Tribe's satisfaction and all work has been inspected, approved and accepted by Tribe. The Project Manager shall review the invoice and inspect the work to ensure that all work has been completed to the satisfaction of the Tribe. All close out items must be submitted.

C. Invoices must be detailed and must specify charges for different personnel and expense classifications. The invoice must reference the Pascua Yaqui Tribe Purchase Order Number, an invoice number, dates of services, an invoice date and a detailed list of all charges.

D. Contractor shall submit the invoice to Tribe within _____ days of the provision of Covered Services

E. Contractor shall submit the original invoice and four (4) copies to:

Pascua Yaqui Tribe
Attn: Contracting Officer
7474 S. Camino de Oeste
Tucson, Arizona 85757

F. Contractor shall submit copies of invoice to the Contracting Officer so that it may be included in the Purchase Order file. In the event Contractor has not made satisfactory progress, the Contracting Office may instruct the Tribe's Finance Department to withhold or delay payment to Contractor.

G. Contractor shall direct all inquiries concerning claims and payments directly to the Procurement Office, telephone number (520) 879-5142.

H. Tribe shall make check payable to: [company name]

I. Tribe shall mail reimbursement to Contractor at the following address:
[company address]

J. Payment of any amount by the Tribe does not constitute a waiver of the Tribe's right to subsequently question, dispute, obtain reimbursement of, compromise or request repayment of, or require future credit for, such amount. Tribe retains the right to audit all bills or files that are or have been the subject matter of any billing or payment made pursuant to or in connection with this Agreement of the Facility. In the event of such an audit, Contractor shall produce all documentation that would support the billing submitted by Contractor.

SAMPLE

16. DESCRIPTION OF THE SCOPE OF SERVICES ("Covered Services"):

A. Contractor shall perform and complete all services set forth herein and in all attachments. Work shall be performed pursuant to the Contractors Proposal dated [date], and associated or referenced drawings therein, and other drawings and specifications as approved by Tribe.

B. Contractor shall:

[scope of work]

C. Contractor acknowledges that Tribe has contracted with Contractor only for the specific Covered Services as designated in the Covered Services section of this Agreement and the Contractors proposal. While providing services to the Tribe or on the Tribe's Reservation or in or on the Tribe's facilities, Contractor agrees to limit its activities to those Covered Services set forth herein or those services necessarily and ordinarily related thereto. Contractor also agrees that it will not perform any tasks, duties or actions that are not within or are outside of the Scope of Covered Services to be provided by Contractor.

D. Contractor shall perform additional services as required by Tribe provided the Contractor and Tribe agree to the scope and compensation for such additional Work in writing. If Contractor reasonably believes that additional services will be required due to circumstances beyond Contractor's control, Contractor shall provide written notification to Tribe and must receive Tribe's prior written preauthorization to perform additional services prior to the commencement of such services.

E. Contractor shall be responsible for the conformance with industry and regulatory standards. Contractor shall provide professional expertise and the quality of work equivalent to work and services performed by licensed individuals, organizations, licensed companies or other agents.

F. Contractor shall attend construction meetings and other meetings as determined or required by Tribe.

17. CRITICAL PATH SCHEDULE: Contractor shall provide a Critical Path Schedule.

Yes _____; No ____;

A. If Yes, commencing on the effective date of this Agreement, Contractor shall provide a Critical Path Schedule for all Work to the Tribe and shall include allowances for periods of time required for the Tribe's review and for approval of submissions by the Contracting Officer having supervisory authority over the Project.

B. Time limits established by this Critical Path Schedule shall not be adjusted as the Project proceeds without the express written consent of the Contracting Officer.

SAMPLE

C. On a _____ basis, Contractor shall update the Critical Path Schedule and shall provide such update to: (i) an inspector or inspectors designated by the Tribe (the "Tribal Inspector"); (ii) the Contracting Officer (defined below); (iii) and the Project Manager or Managers designated by the Tribe (the "Project Manager"). This requirement shall be in force until completion of the Work and until all punch list items are completed.

18. CONTRACTING OFFICER AND PROJECT MANAGER:

A. The Tribe will designate a Project Manager and/or a Contracting Officer for operational issues arising under this Agreement ("Project Manager" and/or "Contracting Officer"). Upon written notice to the Contractor, Tribe's designation of the Project Manager and/or Contracting Officer may be changed.

B. The Project Manager and/or Contracting Officer shall have authority to enforce the provisions of this Agreement.

C. The Project Manager and/or Contracting Officer or their designated representative shall visit the Work site to ascertain whether the Work is proceeding in accordance with this Agreement and its specifications and plans.

D. Tribe designates the following individual as the Contracting Officer: **Carmen Rivera**; telephone number **520-879-5146**.

E. Tribe designates the following individual as the Infrastructure Project Manager: **Antonio Burrola**; telephone number **520-306-8876.**

19. WARRANTY:

A. Contractor warrants that the materials provided by Contractor shall be:

1. Of a quality to pass without objection in the trade under the Contract description.

2. Fit for the intended purposes for which the materials are used.

3. Within the variations permitted by the Contract and are of even kind, quantity, and quality within each unit and among all units.

4. Adequately contained, packaged and marked as the Contract may require.

5. Conform to the written promises or affirmations of fact made by the Contractor.

B. Contractor agrees to warranty all work for a period of (2) years from the date of final acceptance of the work. Contractor agrees to warranty all products for period of (2) years from the date of final acceptance of the work or for the period warranted by the manufacturer, whichever is longer. Contractor shall remedy at its own expense any defective work or unsuitable materials. Tribe shall notify Contractor, in writing, within a reasonable time after the discovery of any failure or defect. If Contractor fails to correct the

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failure or defect within a reasonable time after receipt of notice, Tribe may repair or remedy the failure or defect and charge Contractor for all costs and expenses related to the repair or remedy.

C. Neither Tribe's final payment nor inspection approval shall relieve Contractor of liability with respect to any express or implied warranties for faulty workmanship or materials.

D. Prior to the final inspection, Contractor shall provide to Tribe all manufacturers and supplier written guarantees and warranties covering materials and equipment furnished under this Agreement.

20. INSURANCE:

A. Insurance Required. Contractor will provide and maintain at all times during the performance of the Agreement the following insurance:

1. Comprehensive Commercial General Liability Insurance. Contractor shall obtain and maintain, and require to be obtained and maintained from all Subcontractors at their sole expense throughout the entire term of this Agreement, a Comprehensive Commercial General Liability insurance policy in the amount of $1 Million ($1,000,000) combined single limit Bodily Injury and Property Damage and ($2,000,000) annual aggregate. The Pascua Yaqui Tribe, its officials, employees, agents and volunteers shall be named as an additional insured for all operations including products and completed operations within the scope of the Agreement. Contractor shall also endorse their policy and require endorsement of subcontractors' policies that the Contractor's and subcontractors' coverage shall be primary and non-contributory to any other insurance available to cover the Pascua Yaqui Tribe. It is further agreed that Contractor's and all subcontractors' policies shall waive their subrogation rights against the Pascua Yaqui Tribe, its officials, agents, employees and volunteers.

2. Umbrella Liability Insurance. Contractor shall obtain and maintain, and require to be obtained by all subcontractors, Umbrella Liability Insurance for a limit of not less than $2,000,000 annual aggregate. The Contractors and subcontractors' Umbrella Policies must also agree to name the Pascua Yaqui Tribe as an additional insured.

3. Commercial or Business Automobile Liability. If Contractor is required to use Contractor's privately owned vehicle or any other vehicle within the scope of responsibilities and duties as required by this Agreement, Contractor shall maintain Commercial or Business Automobile Liability coverage for owned, non-owned and hired vehicles used in the performance of this Contract with limits in the amount of $1 Million ($1,000,000) combined single limit, or $1 Million ($1,000,000) Bodily Injury, $1 Million ($1,000,000) Property Damage. Tribe shall be named as an additional insured for all operations performed within the scope of the Agreement between Tribe and Contractor.

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4. Workers' Compensation Insurance. If Contractor is providing services through its employees, Contractor agrees to maintain and require all subcontractors to maintain Workers Compensation insurance for all employees, if required by applicable law. Contractor's and subcontractors' Workers Compensation carrier shall be required to waive any rights of subrogation against the Pascua Yaqui Tribe.

B. Changes in Insurance. Contractor shall provide Tribe with a minimum of thirty (30) days prior written notice in the event any of the policies set forth in this paragraph are modified or canceled.

C. Certificates of Insurance. Contractor shall provide and require all subcontractors to provide to Tribe, current certificates of insurance, evidencing that the policies of insurance required hereunder are in full force and effect, and valid and existing in accordance with the provisions of this Paragraph. All certificates of insurance must provide for guaranteed thirty (30) days written notice of cancellation, non-renewal or material change to Tribe.

D. Claims. Contractor shall provide immediate written notice to Tribe of any claims filed against Contractor or its employees, agents or representatives.

E. Contractor and Subcontractor Floater Policies. Contractor shall, and shall require all subcontractors, to have all property floaters, installation floaters, and transit floaters, including Contractor's equipment floater policies, endorsed to waive subrogation rights against the Tribe, its officials, employees, agents, and volunteers.

21. INSPECTIONS: Applicable_____; Not Applicable_____. If applicable:

A. The Inspection Department of the Tribe ("Project Inspector") will perform inspections and must provide final inspection approval prior to acceptance and final payment by Tribe. When the work is substantially completed, Contractor shall notify the Tribe in writing that the work will be ready for final inspection on a definite and specific date.

B. The Project Inspector and any other representative of the Tribe cannot relieve Contractor from any requirements or responsibility for damages or losses.

C. The Project Inspector or any other representatives of the Tribe is not authorized to modify any term or condition of the specification without the Tribe's written authorization.

D. Contractor shall, without charge, promptly replace or correct all work determined by either the Contracting Officer, Project Manager or Project Inspector, not to conform to work requirements, unless Tribe agrees to accept the work with an appropriate adjustment in the Project Cost. If the defective work is not promptly corrected, the Tribe may elect to correct the work and charge the cost to make the correction to Contractor or Tribe may elect to terminate the Contract.

E. If Tribe examines completed work by removing work completed by Contractor, Contractor shall promptly furnish all necessary facilities, labor and material. If the work is determined

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to be defective or nonconforming according to the terms of this Agreement, Contractor shall pay for all costs of satisfactory reconstruction. However, if the work is determined to meet Agreement requirements, Tribe shall adjust the contract price to compensate for the additional services required to reconstruct the work and will grant an extension of time if Contractor's work was delayed due to Tribe's removal of work. Rejected work shall be corrected by Contractor immediately.

F. Tribe's final acceptance of the work shall be final except for latent defects, fraud, gross negligence, and Contractor's warranties, representations or guarantees.

G. Contractor shall pay an Inspection Fee to Tribe in the amount of 2.5 percent (2.5%) of the total contract award for Tribe to perform inspection services. The Inspection Fee shall be paid monthly to Tribe.

H. Special Inspection by others for Tribe.

22. GENERAL PROVISIONS.

A. The Agreement shall not be valid or enforceable unless approved and executed in accordance with the requirements of the Constitution and laws of the Pascua Yaqui Tribe, as they may exist from time to time.

B. This Agreement is entered into and executed on the Pascua Yaqui Reservation and will be performed in its entirety on the Pascua Yaqui Reservation.

C. Each person executing this Agreement warrants to all parties hereto that such person is authorized to execute and deliver the Agreement on behalf of the party for which that execution occurs.

D. Contractor will not be entitled to a Change Order or other modifications to the Contract Documents, or the requirements of the Contract Documents, for conditions about which Contractor knew or reasonably should have known by review of the Contract Documents or work site conditions prior to the execution of the Agreement.

E. Contractor agrees that in the event, during the term of this Agreement, Contractor becomes aware of any conflicts, errors, ambiguities, or discrepancies in the Contract Documents and/or the Work and/or the Site and/or the Facility, Contractor will immediately notify the Tribe in writing of such conflicts, errors, ambiguities or discrepancies. In the event Contractor fails to so notify the Tribe of any conflicts, errors, ambiguities or discrepancies, and receive written instructions from the Tribe prior to proceeding, Contractor will not be entitled to any change order, and will complete the project without further payment resulting from additional costs or expenses related to such conflict, error, ambiguity or discrepancy.

F. Contractor will be responsible for paying for, and will pay for, all materials and labor arising hereunder and for making payment to any subcontractors that Contractor uses in connection with its work. In no event will Tribe be responsible for making payments to or

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be liable to materials vendors or suppliers or to Contractor's workers, employees, or subcontractors.

G. Contractor agrees to comply with all applicable tribal, federal and state laws and regulations governing the provision of the product or Covered Services called for in the Agreement.

1. In particular, Contractor will perform its work in conformance with all OSHA and other local, state or other governmental requirements. In particular:

a. Contractor will comply with the Drug Free Work Place requirements of Tribe.

b. Contractor will maintain appropriate danger or warning signs at the construction site. All signs shall be visible to all individuals who enter the construction site.

c. Contractor will insure the safety of visitors when visitors other than the Project Manager or Project Inspector are present.

2. The Pascua Yaqui Tribe is a right to work jurisdiction. Contractor will not require any person working for contractor to become a member of a labor union or other association in order to work for Contractor on work done under this Agreement, and Contractor will assure that no sub-contractor of Contractor under this Agreement requires an employee of the subcontractor to become a member of a labor union or other association in order to work for the subcontractor on work done under a subcontract under this Agreement.

H. Contractor will maintain the work area, including any storage areas, free from waste and trash. Contractor shall remove waste and trash from the site on a daily basis. Upon final completion of the Work, Contractor shall remove all debris, waste, trash, tools, and equipment from the site, leaving a clean, neat and orderly site. In the event Contractor fails to clean up the work site to the satisfaction of Tribe, Tribe will charge Contractor clean up costs which amount may be off-set against the final payment.

I. Contractor shall take prompt and appropriate remedial measures to protect health and safety in the event of the discovery of an unanticipated hazardous condition. Contractor will keep the work site in a safe condition at all times, and will insure that unsafe conditions are remedied immediately, and upon termination of this Agreement as required by law or industry standards.

J. Contractor shall be responsible for the prompt, appropriate and lawful reporting to the appropriate governmental authorities of the discovery of, or release of, any hazardous or otherwise regulated substances. Contractor shall also provide immediate written notification to Tribe of the discovery of any hazardous materials or conditions. Tribe may require Contractor to notify surrounding property owners in the event that an actual or suspected hazardous or otherwise regulated substances or conditions are encountered at

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the Site or otherwise in connection with the Contractor's performance of the Work. Contractor will also promptly notify Tribe of any suspected or other unanticipated conditions or potential conditions that become known to Contractor during or after completion of services and are associated with Contractor's performance under this Agreement.

K. At Tribe's request, Contractor agrees to assist or report on behalf of Tribe, any disclosures required by law to the appropriate governing agencies. Tribe will hold Contractor harmless for any and all consequences of disclosures made by Contractor which are required by law.

L. Upon the termination or expiration of this Agreement, Contractor agrees to immediately return to Tribe, all property of Tribe, including, but not limited to manuals, forms, procedures and policies.

M. Upon termination and prior to termination, all documents, data and reports prepared by Contractor under this Agreement shall become the property of and be delivered to Tribe.

23. REPRESENTATIONS AND WARRANTIES:

In order to induce Tribe to enter into this Agreement, Contractor makes the following representations:

A. Contractor warrants and represents that Contractor is certified, licensed or specially qualified, as noted above.

B. Contractor warrants and represents that Contractor has obtained and will maintain throughout the term of this Agreement all licenses, permits, accreditation and certification required by law for Contractor to provide Covered Services. Contractor will provide current copies of applicable certifications, permits and licenses.

C. Contractor warrants and represents that Contractor possesses the required AZ ROC License and experience required to perform Covered Services as set forth in this Agreement.

D. Contractor represents and warrants that the information set forth in Contract Attachments and the information set forth in Contractor's application for participation hereunder is true and correct. Contractor shall provide written notification to Tribe of any material changes in the information contained in Contractor's application within thirty (30) days of such change or in the event Contractor is subject to any investigation, disciplinary proceeding or sanction by any governmental authority, regulatory board or agency or professional society and shall provide relevant facts and circumstances, or if there are changes in the status of Contractor's insurance coverage or office address or other information contained in Contractor's application or representations.

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E. Contractor warrants and represents that it has examined and carefully studied this Agreement (including all Exhibits and Attachments) and is familiar with and has satisfied all requirements of the agreement and its attachments.

F. Contractor warrants and represents that it has, prior to or at the time of its bid, provided the Contracting Officer and Project Manager of the Tribe with written notice of all conflicts, errors, ambiguities, discrepancies or discoverable work site conditions affecting the Agreement that Contractor has discovered, or should have reason to know about, with this Agreement and other documents provided to Contractor in connection with the Project (the "Contract Documents").

G. Contractor warrants and represents that it is, or will become, familiar with the applicable federal, state, Tribal, and local laws, regulations, codes and ordinances that may affect cost, progress, performance, and all other aspects of completing the work.

H. The Parties warrant and represent that they know of no impediment to the execution of this Agreement and the performance of its provisions.

I. All warranties and representations herein shall survive the execution or termination hereof.

24. STANDARD OF CARE & NOTIFICATION:

A. Contractor will conduct its performance under the Contract with the level of care, skill and training expected by members of the profession practicing under the same or similar circumstances at the time performance is rendered. Contractor will exercise appropriate precautions according to industry and regulatory standards and any requirements, if any, pursuant to the Contract Documents. Tribe does not waive any rights it may have against Contractor to any claim or liability that may arise as a result of Contractor's performance under the Contract.

B. Contractor agrees to comply with and perform all work in accordance with the best modern practice, with new materials and workmanship of the highest quality, in compliance with applicable building codes, federal, state and local laws, rules, regulations and standards, including those relating to safety, environmental protection, quality of workmanship and other standards. Contractor shall check and verify all dimensions, grades and levels before commencement of performance, and whenever necessary during the progress thereof. Contractor, in performing this Agreement, is acting as an independent contractor, and will provide all labor, tools, scaffolding, equipment, supplies and supervision necessary for the complete and satisfactory performance of this contract work.

C. Contractor hereby agrees that all work performed, whether by Contractor or any Subcontractor, shall meet or exceed all uniform fire, building, plumbing, electrical and mechanical codes as adopted by the Pascua Yaqui Tribe or other applicable governmental authorities (collectively, the "Codes"). In addition, Contractor warrants that all work completed, whether by Contractor or any Subcontractor, shall meet the minimum workmanship standards as set forth by the Arizona Registrar of Contractors and the standards set forth herein (the "Standards"). Any work that is discovered to fall below the

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Codes or the Standards shall be deemed substandard and will require appropriate remedial measures; the expense of which shall be the direct and sole responsibility of Contractor.

25. NOTICES:

All notices to Tribe must be in writing, payments, requests, demands or other communications required or permitted pursuant to this Agreement may be effected by: (a) personal delivery; (b) certified United States mail, return receipt requested, postage prepaid; or (c) overnight courier or delivery service which provides receipts or delivery notification, and properly addressed to the Parties at the addresses listed immediately below. Notice to Tribe shall not be complete or proper unless given to all addresses. Notices shall be deemed communicated as of the date of actual receipt. Parties may designate a new address after providing actual written notice to the other Party of such new address. All notices shall be delivered as follows:

To Tribe: Pascua Yaqui Tribe
Attn: Chairman of the Tribe
7474 South Camino de Oeste
Tucson, Arizona 85757

With a copy to: Pascua Yaqui Tribe
Attorney General
7777 S.Camino Huivisim. Bldg. C
Tucson, Arizona 85757

With a copy to: Pascua Yaqui Tribe
Attn: Contracting Officer
7474 S. Camino de Oeste
Tucson, Arizona 85757

For Contractor: [company name / address]

26. CONTRACT ORDER OF PRECEDENCE:

This Agreement shall prevail over any attachments or contract documents. In the event there is a conflict of contract document terms, other documents shall prevail in the following order:

A. Contractors Proposal

27. HIRING OF PERSONNEL:

Contractor agrees to give employment preference to Indians, pursuant to 25 U.S.C. 450e (b). Contractor agrees to execute and comply with Contractor's Agreement with the Tribal Employment Rights Office ("TERO"), hereinafter incorporated into the terms of this Agreement. As a condition of this Agreement, Contractor shall register with the TERO.

28. OWNERSHIP OF MATERIALS AND INFORMATION:

SAMPLE

A. Contractor will retain all pertinent records relating to the services performed under this Agreement for the greater of either Seven (7) years after completion of the Work or as otherwise required by industry standards, during which time the records will be made available to Tribe at any time and without charge.

29. SAMPLES, TEST OR STUDY MATERIALS:

Contractor shall retain all photographs, surveys, any other data, documents or materials of any nature pertaining to services performed pursuant to this Agreement for a period to be determined by the Tribe. Contractor shall not destroy or otherwise transfer such items without prior written authorization from Tribe.

30. SUBCONTRACTS:

In the event that Tribe authorizes Contractor to hire subcontractors, Contractor shall not subcontract with any subcontractor who is presently denied participation in a HUD program or who is presently suspended or barred from participating in contracting programs by any agency of the United States Government, the State of Arizona or the Pascua Yaqui Tribe.

31. CONTRACT DOCUMENTS:

The **"**Contract Documents" that comprise this entire Agreement between Tribe and Contractor concerning the Work shall consist of this Agreement and the following Attachments:

1	Contractor Bid Submission / Proposal Dated _____
2	Contractor Agreement with Tribal Employment Rights Officer (TERO)
3	Pascua Yaqui Tribe Purchase Request No. _____ in the amount of $[amount]
4	Certificate of Workers' Compensation Insurance dated _____
5	Certificate of General Liability Insurance dated _____
6	Certificate of Automobile Insurance dated _____
7	TERO Temporary Business License for Pascua Yaqui Reservation
8	Internal Revenue Service form W-9
9	Notice to Proceed

32. LICENSURE, ACCREDITATION AND CERTIFICATION:

If at any time during the term of this Agreement there shall be a voluntary or involuntary restriction, suspension, withdrawal or non-renewal of Contractor's license, certification or permit, or any of Contractor's employees, agents, subcontractors or representatives, or any formal charges against Contractor or Contractor's employees, agents, subcontractors or representatives, by any government agencies or any licensing would, if sustained, materially impair Contractor's ability to comply with Contractor's duties or obligations pursuant to this Agreement, Contractor shall immediately notify Tribe of the issuance of such restriction, suspension, withdrawal or non-renewal of Contractor's license or any of Contractor's employees, agents, subcontractors or representatives.

33. CONDITIONS PRECEDENT:

SAMPLE

This Agreement shall become effective only upon satisfaction of the following conditions precedent:

A. Full execution of this Agreement;

B. Tribe's receipt of the following in form and substance acceptable to Tribe, each of which shall be attached hereto as the indicated exhibits:

1. Current Certificates of Insurance for all polices set forth herein; and

2. A fully completed Request for Taxpayer Identification Number and Certification, IRS Form W-9.

C. Payment of any bill by Tribe does not constitute a waiver of Tribe's right to subsequently question, dispute, obtain reimbursement of, compromise or request repayment of future credit, for any bill or invoice previously paid. Tribe retains the right to audit all bills or files which are or have been the subject matter of any billing in the past. Such an audit will require Contractor to produce all documentation which would support the billing submitted by Contractor.

34. TERMINATION: (Check Applicable Provisions)

A. _X__ Tribe shall have the right, in its sole and absolute discretion to terminate this Contract immediately for its convenience. If it does so the Contractor shall be entitled to be paid for the actual cost of work completed in accordance with the Contract to the date of the termination, plus its expected profit margin as applied to the work completed through the date of termination, but shall not be entitled to any extended project costs or the like.

B. ____ Tribe may terminate this Contract with cause with ___ days written notice to Contractor if Contractor breaches any Contract term, representation, warranty or covenant. If the Contract is terminated for cause, Contractor shall be entitled to the cost of work completed in accordance with the Contract, less all damages, including consequential damages, caused by its breach of the Contract. In the event such damages exceed the amount which would otherwise be owed by Tribe, Contractor shall be liable to Tribe for the amount that said damages exceed the amount which the Tribe would otherwise owe on the Contract.

C. ____ Tribe may terminate this Contract without cause or for its convenience with __ days written notice to Contractor. If it does so the Contractor shall be entitled to be paid for the actual cost of work completed to the date of the termination, plus its expected profit margin as applied to the work completed through the date of termination, but shall not be entitled to any extended project costs or the like.

D. _____ Contractor may terminate this Contract with cause with ___ days written notice to Tribe if Tribe materially breaches this Contract. However, Tribe may cure the breach any time prior to the expiration of the required notice period.

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E. ____ This Agreement will terminate upon the occurrence of any of the following events:

1. Automatically and without notice upon the cancellation or termination of Contractor's general or professional liability insurance;

2. Subject to state and federal requirements applicable to continuation of services, automatically and without notice if either Party becomes insolvent, or is adjudicated as bankrupt or its business comes into possession or control, even temporarily, of any trustee in bankruptcy, or a receiver is appointed for it, or it makes a general assignment for the benefit of creditors (in those instances no interest in this Agreement will be deemed an asset or liability of either party, nor will any interest in this Agreement pass by the operation of law without the consent of the other party).

3. In the event that Contractor, in the performance of the contract, engages in any actions outside the scope of Contractor's contracted Scope of Covered Services as described in this Agreement.

F. Upon notification of termination Contractor will immediately cease all work as directed in the notice, unless otherwise notified by Contractor, and minimize further costs to Tribe.

G. Contractor agrees that any Tribe decision to terminate this Agreement shall be final. Tribe shall not be bound by any financial obligation to Contractor upon termination of this Agreement, except for payments due in accordance with the terms of this Agreement for Covered Services provided prior to contract termination.

35. PARTIES REPRESENTED BY COUNSEL:

This Agreement is made and entered into voluntarily by Tribe and Contractor, free and clear from any duress or influence on either party by the other. Tribe and Contractor warrant that each has read this Agreement in its entirety. Tribe and Contractor have been advised fully and adequately by their respective legal counsel as to the character and legal effect of all terms and covenants contained in this Agreement. Tribe and Contractor further warrant that each fully understands the nature and effect of said terms and covenants prior to the execution of the Agreement.

36. DOCUMENT RETENTION AND ACCESS.

A. If required by an outside funding source, such as the U.S. or the State of Arizona, Contractor agrees to comply with applicable governmental requirements governing the maintenance of documentation with respect to the cost of materials and services rendered pursuant to this Agreement.

B. If Contractor carries out any of Contractor's duties pursuant to this Agreement through a subcontract, with a value or cost of $10,000.00 or more over a 12-month period, with a related organization (as that term is defined by relevant Federal statute, rule, or regulation), such subcontract shall contain a clause to the effect subcontractor will also comply with applicable governmental requirements of the government funding the project.

SAMPLE

37. ADDITIONAL DOCUMENTS:

A. The parties agree to execute whatever papers and documents may be necessary to effectuate the terms of this Agreement.

B. In addition to any documents, reports or information required by any other section of this Contract, Contractor shall furnish Tribe with any further documents and information deemed necessary by Tribe.

38. AMENDMENTS:

A. The terms and/or provisions of this Agreement may not be amended or modified unless the Addendum or Amendment is mutually agreed upon, in writing, approved in accordance with the laws of the Tribe, and signed by both Parties and attached to the original Agreement.

B. A copy of the fully executed Addendum or Amendment shall be fully incorporated into the original Agreement and made a part hereof.

39. ASSIGNMENT AND DELEGATION:

A. Contractor may not assign any of Contractor's rights or delegate any of Contractor's duties hereunder without the prior written consent of Tribe.

B. Tribe may assign this Agreement or any of its rights or delegate its duties to any transferee or assignee of Tribe, upon written notice to Contractor.

40. CHOICE OF LAW, JURISDICTION, AND SOVEREIGN IMMUNITY:

A. The validity, interpretation, effect, and any disputes arising out of this Agreement or the performance or lack of performance there under shall be governed exclusively by the laws of the Pascua Yaqui Tribe, without giving effect to the conflict of laws.

B. All disputes arising under this Agreement shall be resolved pursuant to the laws of the Tribe in the court system of the Tribe.

C. This Agreement is to be construed strictly according to Pascua Yaqui Tribal law.

D. Contractor, by signature below, consents to the exclusive jurisdiction of the Pascua Yaqui Tribal Court over all disputes arising under or relating in any way to this Agreement.

E. By entering into this Agreement, Tribe does not waive any right, privilege, or status, including, but not limited to, Sovereign Immunity.

41. ATTORNEYS' FEES:

SAMPLE

In any action at law or in equity to enforce the terms of this Agreement, the prevailing party shall be entitled to reasonable attorney fees, costs, expenses and necessary disbursements, in addition to other relief which may be granted, subject to Tribe's defense of sovereign immunity.

42. BINDING EFFECT:

This Agreement shall be binding upon, and shall inure to the benefit of, the parties to it, and their respective heirs, legal representatives, successors and assigns.

43. CHANGE IN OWNERSHIP OR COMPOSITION OF CONTRACTOR:

Contractor shall provide Tribe with immediate written notice in the event of any change in composition or legal or beneficial ownership of Contractor.

44. COMMUNICATIONS:

Contractor agrees to meet with Tribe or Tribe's representatives on an as required basis. Contractor's liaison or representative shall have appropriate authority to respond to issues in a timely manner and to bind Contractor for decisions made.

45. COMPLIANCE WITH RULES, REGULATIONS, POLICIES AND PROCEDURES:

Contractor agrees to be bound by and comply with all applicable rules, regulations, policies and procedures of Tribe, State of Arizona and Federal government. Contractor agrees to cooperate with any administrative procedures which may be adopted by Tribe regarding the performance of Covered Services pursuant to this Agreement.

46. CONFIDENTIALITY:

A. Contractor acknowledges that all material and information acquired in connection with this Agreement, is confidential and proprietary data and shall not during and after the term of this contract, disclose, duplicate or utilize information without written consent of Tribe.

B. Contractor shall hold material and information in the strictest of confidence and agrees not to use this information or material in any other manner, except for the performance and management of this Agreement.

C. Contractor shall return all information, notes and compilations to Tribe immediately after the need for such information has expired.

47. CONFLICT OF INTEREST:

A. During the term of this Agreement, Contractor will not enter into any activity, employment or business arrangement which conflicts with the interest of Tribe or the obligations of Contractor under this Agreement.

SAMPLE

B. Contractor agrees to advise Tribe of Contractor's position with respect to any activity, employment or business arrangement contemplated by Contractor, which might conflict or give the appearance of conflict with the interests of Tribe.

48. DRUG FREE WORKPLACE:

Contractor and Contractor's agents and representatives agree to comply with a drug free workplace policy as established by Tribe or Contractor.

49. DUTIES:

Contractor shall devote the time, attention and energy necessary for the competent and effective performance of Contractor's duties hereunder.

50. ENTIRE AGREEMENT:

A. This Agreement and its Attachments comprise the entire Agreement and supersedes all prior written or oral agreements, representations and implied contracts.

B. This Agreement is not conditioned on the performance of any other agreement. All prior and contemporaneous negotiations and understandings between the parties are embodied in this Agreement.

C. Each Party acknowledges that no representations, enticements, promises or agreements, oral or otherwise, have been made on behalf of any Party, which are not embodied herein, and that no other agreement, statement, or promise, not contained in this Agreement shall be valid or binding.

51. EXECUTION:

This Agreement and any amendments may be executed in several counterparts. Each counterpart shall be deemed an original, but all counterparts shall constitute a single instrument.

52. FORCE MAJEURE:

A. Any prevention of performance of the terms or obligations of this Contract by Tribe or Contractor due to strike, labor disputes, inability to obtain labor, materials, equipment or reasonable substitutes, acts of God, governmental restrictions or regulations or controls, judicial orders, enemy or hostile government actions, civil commotion, fire or other casualty, or other causes beyond the reasonable control of the party obligated to perform under this Contract, shall excuse said performance for a period equal to the duration of the prevention or delay.

SAMPLE

B. However, nothing herein shall be construed to prohibit or prevent Tribe from terminating its agreement with Contractor due to Contractor's failure to complete the Work in a timely manner or Contractor's failure to make adequate progress toward completing the Work.

C. Whether Contractor has failed to complete the work in a timely manner or has failed to make adequate progress toward completing the Work shall be determined in Tribe's sole discretion.

53. GRATUITIES:

A. Tribe may, by written notice, terminate this Contract, in whole or in part, if Tribe determines that employment or a Gratuity was offered or made by Contractor or a representative of Contractor to any officer or employee of Tribe for the purpose of influencing the outcome of the procurement or securing the Contract, an amendment to the Contract, or favorable treatment concerning the Contract, including the making of any determination or decision about contract performance.

B. Tribe, in addition to any other rights or remedies, shall be entitled to recover exemplary damages in the amount of three (3) times the value of the Gratuity offered by Contractor.

54. INDEMNIFICATION:

Regardless of the merits, Contractor agrees to indemnify, hold harmless, and defend Tribe, its officers, and employees against any and all claims for damage, loss, demand, cause of action, liability, injury, punitive damages, costs and expense of every type, arising directly or indirectly from any act or omission of Contractor, Contractor's employees, associates, agents or representatives.

55. INDEPENDENT CONTRACTOR STATUS:

A. This Agreement is not intended to create any relationship between Tribe and Contractor, other than that of independent entities, contracting with each other, solely for the purposes of effecting the provisions of this Agreement.

B. Tribe shall not be responsible for withholding or payment of taxes on any funds paid to Contractor.

C. Contractor shall have no authority to incur indebtedness, commit or obligate Tribe as an agent, representative or employee of Tribe, unless such authority is authorized by Tribe in writing.

D. Contractor shall maintain responsibility for hiring, supervising and paying assistants or other employees to perform Covered Services. However, all employees shall be subject to the terms of this Agreement.

E. Contractor is not prohibited from performing or making Contractor's services available to the general public on a regular and consistent basis. Nor is Contractor restricted from

SAMPLE

seeking and performing other gainful work. Tribe may contract with others to perform the same services as provided by Contractor.

D. Contractor shall determine the order and sequence of Contractor's work.

56. LIENS:

Contractor warrants that the materials supplied under this Contract are free of liens.

57. LOBBYING:

During the term of this Agreement, Contractor agrees not to engage in any lobbying activity on behalf of Tribe.

58. NO WAIVER:

A. Tribe's failure to take action for any breach of this Agreement shall not be deemed to be a waiver by Tribe, even if it acquiesces to the nature of the performance and fails to object to it.

B. The subsequent acceptance of partial performance under this Agreement by Tribe shall not be deemed to be a waiver of any preceding breach by Contractor.

C. In the event a condition is waived, all other terms and provisions shall remain in full force and effect.

59. NON-APPROPRIATION:

Notwithstanding any other provision in this Agreement, this Agreement may be terminated if, for any reason, there are insufficient appropriations and available monies.

60. NON-EXCLUSIVE CONTRACT:

This is not an exclusive contract. Contractor may continue to provide Covered Services to other clients and Tribe may contract with other contractors for the same services and/or products, as applicable.

61. NON-EXCLUSIVE REMEDIES:

The rights and remedies of Tribe under this Agreement are not exclusive.

62. OWNERSHIP OF WORK PRODUCT:

A. All tangible work product produced by Contractor in the performance of this Agreement is specially ordered by Tribe and shall be deemed to be "work-made-for-hire" and shall be the exclusive and unrestricted property of Tribe.

SAMPLE

B. In the event of termination of this Agreement, all materials produced by and in the possession of Contractor shall be returned to Tribe. Contractor relinquishes all reserved rights; including patents, trademarks, copyrights, title and trade secrets.

C. In the event Contractor acquires any rights to any work product, Contractor hereby grants to Tribe an irrevocable license of unlimited duration for the possession, use and control of the work product for any commercial or non-commercial purpose.

63. PAYMENT RECOUPMENT:

Contractor must reimburse Tribe upon demand or Tribe may deduct or offset from future payments for any of the following:

A. Any amounts received by Contractor from Tribe for Contract Services which have been inaccurately reported or are found to be unsubstantiated.

B. Any amounts paid by Contractor to a subcontractor not authorized in writing by Tribe.

C. Any amounts paid by Tribe for which Contractor's books, records, and other documents are not sufficient to clearly substantiate that those amounts were used by Contractor to perform Contract Services.

D. Any amounts paid or reimbursed in excess of the Contract or service reimbursement ceiling.

E. Any payments made for services rendered before the Contract begin date or after the Contract termination date.

F. Any expenses or costs incurred by Tribe or damages assessed by Tribe concerning Contractor's non-conforming performance or failure to perform the Agreement, including expenses, overpayments, costs and damages.

G. In the event the Agreement has terminated and it is subsequently determined that Tribe has overpaid Contractor, or has incurred costs or damages caused by Contractor, Tribe is entitled to recover the amount of such overpaid costs, or such damages, from Contractor.

64. RISK OF LOSS:

A. Contractor shall bear all loss of conforming material covered under this Contract until received by authorized personnel at the location designated in the purchase order.

B. Receipt of conforming materials does not constitute final acceptance.

65. SEVERABILITY:

A. Provisions of this Agreement are severable.

B. If any provision of this Agreement is void, invalid or unenforceable, it shall be considered deleted from this Agreement and the invalidity of such provision shall not affect the validity

SAMPLE

or enforceability of any other provisions which shall be given effect in the absence of the invalid provision. The remaining provisions shall continue in full force and effect without being invalidated.

TRIBE:
PASCUA YAQUI TRIBE,
a federally recognized Indian Tribe

By: _____
Robert Valencia Chairman

Date: _____

CONTRACTOR:
[company name]
an Arizona Company

By: _____

TIN: _____

Date: _____

SAMPLE

DOCUMENT 000107 - SEALS PAGE

1.1 DESIGN PROFESSIONALS OF RECORD

A. Architect: Swaim Associates LTD.



B. Landscape Architect: Kimley-Horn



C. Structural Engineer: Schneider & Associates



THIS ELECTRONIC SIGNATURE
HAS BEEN AUTHORIZED BY ME
THIS: 3/8/19

D. HVAC & Plumbing Engineer: Adams and Associates

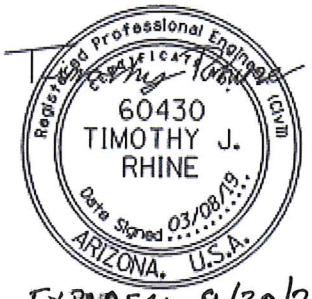


E. Electrical Engineer: M3 Engineers



Expires: 03/31/20

F. Civil Engineer: Kimley-Horn



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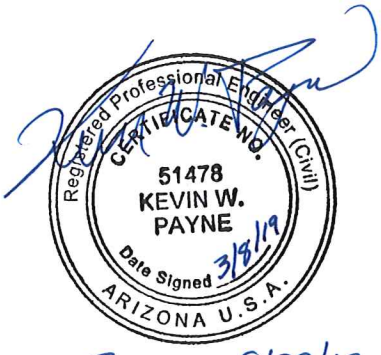

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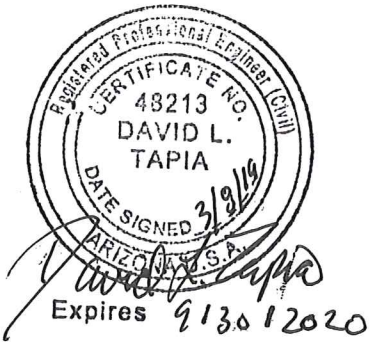

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DOCUMENT 002600 - PROCUREMENT SUBSTITUTION PROCEDURES

1.1 DEFINITIONS

A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.

1.2 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.3 PROCUREMENT SUBSTITUTIONS

A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.

B. Procurement Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by Architect; otherwise requests will be returned without action:

1. Extensive revisions to the Contract Documents are not required.
2. Proposed changes are in keeping with the general intent of the Contract Documents, including the level of quality of the Work represented by the requirements therein.
3. The request is fully documented and properly submitted.

1.4 SUBMITTALS

A. Procurement Substitution Request: Submit to Architect. Procurement Substitution Request must be made in writing in compliance with the following requirements:

1. Requests for substitution of materials and equipment will be considered if received by March 26, 2019.
2. Submittal Format: Submit one copy of each written Procurement Substitution Request.
3. Submittal Format: Submit Procurement Substitution Request.

    a. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specifications Sections and drawing numbers.
    b. Provide complete documentation on both the product specified and the proposed substitute, including the following information as appropriate:

1) Point-by-point comparison of specified and proposed substitute product data, fabrication drawings, and installation procedures.
2) Copies of current, independent third-party test data of salient product or system characteristics.
3) Samples where applicable or when requested by Architect.
4) Detailed comparison of significant qualities of the proposed substitute with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
5) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
6) Research reports, where applicable, evidencing compliance with building code in effect for Project, from ICC-ES.
7) Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, which will become necessary to accommodate the proposed substitute.

c. Provide certification by manufacturer that the substitute proposed is equal to or superior to that required by the Procurement and Contracting Documents, and that its in-place performance will be equal to or superior to the product or equipment specified in the application indicated.
d. Bidder, in submitting the Procurement Substitution Request, waives the right to additional payment or an extension of Contract Time because of the failure of the substitute to perform as represented in the Procurement Substitution Request.

B. Architect's Action:

1. Architect may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. Architect will notify all bidders of acceptance of the proposed substitute by means of an Addendum to the Procurement and Contracting Documents.

C. Architect's approval of a substitute during bidding does not relieve Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents.

END OF DOCUMENT 002600

DOCUMENT 003132 - GEOTECHNICAL DATA

1.1 GEOTECHNICAL DATA

A. This Document is part of the Procurement and Contracting Requirements for Project.

B. A geotechnical investigation report for Project, prepared by Terracon, dated June 12, 2018, is available for viewing as appended to this Document.

END OF DOCUMENT 003132

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Work restrictions.
5. Specification and drawing conventions.
6. Miscellaneous provisions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

A. Project Identification: Health Services Center II

1. Project Location: 5300 Calle Torim, Tucson, AZ 85746.

2. Owner: Pascua Yaqui Tribe.

3. Owner's Representative: Ian Geitner.

B. Architect: Swaim Associates LTD, Kevin Barber: Project Architect, Mark Bollard: Project Manager.

C. Project Web Site: A project Web site administered by Contractor will be used for purposes of managing communication and documents during the construction stage.

1. See Section 013100 "Project Management and Coordination." for requirements for administering using Project Web site.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

This project includes all site work and building improvements related to a new Health Services Building.

1. 22 acres of site improvements

- Grading
- Concrete hardscape
- Asphalt paving
- Irrigation and landscaping
- Site utilities
- Fencing and CMU site walls
- Site electrical

2. 103,000 SF Building

- Concrete
- Steel fabrications and structures
- Wood structural elements
- Millwork
- Single ply roofing
- Skylights
- Metal framing & GWB
- Vinyl flooring
- Aluminum storefront
- Hollow metal doors and frames
- Wood doors
- Door hardware
- Acoustical ceiling systems
- Painting
- Glazing
- Plumbing systems
- HVAC systems and controls
- Electrical systems
- Low voltage systems
- Audio visual systems

B. Type of Contract.

1. Project will be constructed under a single prime contract.

1.4 ACCESS TO SITE

A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

B. Use of Site: Limit use of Project site to areas within the Contract limits. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1.5 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to adjacent properties.

C. Nonsmoking Site: Smoking is not permitted on this site.

1.6 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Execute accepted alternates under the same conditions as other work of the Contract.

C. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Remove courtyard canopies.

1. Base Bid: Include shade canopies in the two central courtyards as shown in drawings.
2. Alternate: Delete the shade canopies and related structure in the two central courtyards. Alternate pricing shall be broken down per courtyard as follows:
   a. Meditation Courtyard (east central courtyard)
   b. Staff/Play Courtyard (west central courtyard)

B. Alternate No. 2: Alternate HVAC Manufacturer.

1. Base Bid: Provide HVAC equipment per schedule by Carrier.
2. Alternate: Provide HVAC equipment from alternate manufacturer, either Daikin or York.

C. Alternate No. 3: Alternate Mechanical Controls Manufacturer.

1. Base Bid: Provide mechanical controls per specifications by Johnson Controls.
2. Alternate: Provide mechanical controls by Delta.

D. Alternate No. 4: Dry Chemical Fire Suppression Systemin MDF Room.

1. Base Bid: Provide wet pipe fire suppression system in MDF room, as part of overall building sprinkler system.
2. Alternate: Provide stand-alone dry chemical fire suppression system in MDF room per specification section 212200.

END OF SECTION 012300

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.2 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.3 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.
    d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Work Change Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:
   1. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
   2. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.2 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

   1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:

      a. Application for Payment forms with continuation sheets.
      b. Submittal schedule.
      c. Items required to be indicated as separate activities in Contractor's construction schedule.

   2. Submit the schedule of values to Architect at earliest possible date.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

   1. Identification: Include the following Project identification on the schedule of values:

      a. Project name and location.
      b. Name of Architect.
      c. Architect's project number.
      d. Contractor's name and address.
      e. Date of submittal.

   2. Arrange schedule of values consistent with format of AIA Document G703 Retain option in first subparagraph below where Contractor's ongoing activities related to Project closeout will be a line item subject to Application for Payment approval.
   3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents.

4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.

8. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Application for Payment Forms: Use AIA Document G702 and AIA Document

C. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

D. Transmittal: Submit Four signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

E. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.

3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707-1994, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. Coordination drawings.
2. Requests for Information (RFIs).
3. Project Web site.
4. Project meetings.

B. Related Requirements:

1. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

1.2 DEFINITIONS

A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.3 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

1.4 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.5 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
b. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid.

2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility.

1.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
14. Provide Cover Sheet with space for Shop Drawing Stamps.

C. Architect's Action: Architect will review each RFI, determine action required, and respond.

D. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Use software log that is part of Project Web site.

E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties.

1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.7 PROJECT WEB SITE

A. Provide, administer, and use Project Web site for purposes of hosting and managing project communication and documentation until Final Completion. Project Web site shall include the following functions:

1. Project directory.
2. Project correspondence.
3. Meeting minutes.
4. Contract modifications forms and logs.
5. RFI forms and logs.
6. Photo documentation.
7. Submittals forms and logs.
8. Drawing and specification document hosting, viewing, and updating.
9. Online document collaboration.
10. Reminder and tracking functions.
11. Archiving functions.

B. On completion of Project, provide one complete archive copy of Project Web site files to Owner and to Architect in a digital storage format acceptable to Architect.

1.8 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, and Architect.

B. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related RFIs.
    d. Related Change Orders.
    e. Purchases.
    f. Deliveries.
    g. Submittals.
    h. Review of mockups.
    i. Possible conflicts.
    j. Compatibility problems.
    k. Time schedules.
    l. Weather limitations.
    m. Manufacturer's written instructions.
    n. Warranty requirements.
    o. Compatibility of materials.
    p. Acceptability of substrates.
    q. Temporary facilities and controls.
    r. Space and access limitations.
    s. Regulations of authorities having jurisdiction.
    t. Testing and inspecting requirements.
    u. Installation procedures.
    v. Coordination with other work.
    w. Required performance results.
    x. Protection of adjacent work.
    y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

C. Progress Meetings: Conduct progress meetings at weekly intervals.

1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction

behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Progress cleaning.
10) Quality and work standards.
11) Status of correction of deficient items.
12) Field observations.
13) Status of RFIs.
14) Status of proposal requests.
15) Pending changes.
16) Status of Change Orders.
17) Pending claims and disputes.
18) Documentation of information for payment requests.

3. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's construction schedule.
2. Construction schedule updating reports.
3. Daily construction reports.
4. Site condition reports.

1.2 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.

1.3 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. PDF electronic file.

B. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

D. Construction Schedule Updating Reports: Submit with Applications for Payment.

E. Daily Construction Reports: Submit at monthly intervals.

F. Site Condition Reports: Submit at time of discovery of differing conditions.

1.4 COORDINATION

A. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

B. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and Contract Time.

C. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.3 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events.
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Construction Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial completions and occupancies.
19. Substantial Completions authorized.

B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Architect**,** Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
2. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
3. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
4. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action.

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.3 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic copies of digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.

1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.

a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

C. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.

a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
4. Transmittal Form for Electronic Submittals: Use software-generated form from electronic project management software acceptable to Owner**,** containing the following information:

a. Project name.
b. Date.
c. Name and address of Architect.
d. Name of Construction Manager.
e. Name of Contractor.
f. Name of firm or entity that prepared submittal.
g. Names of subcontractor, manufacturer, and supplier.
h. Category and type of submittal.
i. Submittal purpose and description.
j. Specification Section number and title.
k. Specification paragraph number or drawing designation and generic name for each of multiple items.
l. Drawing number and detail references, as appropriate.
m. Location(s) where product is to be installed, as appropriate.
n. Related physical samples submitted directly.
o. Indication of full or partial submittal.
p. Transmittal number, numbered consecutively.
q. Submittal and transmittal distribution record.
r. Other necessary identification.
s. Remarks.

D. Options: Identify options requiring selection by Architect.

E. Deviations: Identify deviations from the Contract Documents on submittals.

F. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

G. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

H. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements:

1. Post electronic submittals as PDF electronic files directly to Project Web site specifically established for Project.

a. Architect**,** will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer's catalog cuts.
b. Manufacturer's product specifications.
c. Standard color charts.
d. Statement of compliance with specified referenced standards.
e. Testing by recognized testing agency.
f. Application of testing agency labels and seals.
g. Notation of coordination requirements.
h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

a. Wiring diagrams showing factory-installed wiring.
b. Printed performance curves.
c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:

a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm), but no larger than 30 by 42 inches (750 by 1067 mm).
3. Submit Shop Drawings in the following format:

a. PDF electronic file.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

a. Generic description of Sample.
b. Product name and name of manufacturer.
c. Sample source.
d. Number and title of applicable Specification Section.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.

4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

    a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, through Construction Manager, will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit one set of Samples.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Submit product schedule in the following format:

    a. PDF electronic file.

F. Coordination Drawings Submittals: Comply with requirements specified in Section 013100 "Project Management and Coordination."

G. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."

H. Application for Payment and Schedule of Values: Comply with requirements specified in Section 012900 "Payment Procedures.

I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014000 "Quality Requirements."

J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."

K. Maintenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."

L. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

M. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

N. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

R. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

S. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.

U. Schedule of Tests and Inspections: Comply with requirements specified in Section 014000 "Quality Requirements."

V. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

W. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

X. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

Y. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

C. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
2. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
3. Specific test and inspection requirements are not specified in this Section.

1.2 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.3 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.4 INFORMATIONAL SUBMITTALS

A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.

2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.

B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

1.5 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Field Reports: Prepare written information documenting tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
5. Other required items indicated in individual Specification Sections.

C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Manufacturer's Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

a. Provide test specimens representative of proposed products and construction.
b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.

d. When testing is complete, remove test specimens, assemblies, and mockups, and laboratory mockups; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.

5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed unless otherwise indicated.

1.7 QUALITY CONTROL

A. Owner and Contractor Responsibilities: The Owner will provide material testing and special inspections as required by code and construction documents. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

B. Manufacturer's Field Services: Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with Architect**,** and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.8 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Engage a qualified testing agency special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:

B. Special Tests and Inspections: Conducted by a qualified testing agency special inspector as required by authorities having jurisdiction, as indicated in individual Specification Sections and in Statement of Special Inspections attached to this Section, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.

2. Notifying Architect, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect, with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's, reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.3 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
7. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org.
8. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
9. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
10. AF&PA - American Forest & Paper Association; www.afandpa.org.
11. AGA - American Gas Association; www.aga.org.
12. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
13. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
14. AI - Asphalt Institute; www.asphaltinstitute.org.
15. AIA - American Institute of Architects (The); www.aia.org.
16. AISC - American Institute of Steel Construction; www.aisc.org.
17. AISI - American Iron and Steel Institute; www.steel.org.
18. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
19. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
20. ANSI - American National Standards Institute; www.ansi.org.
21. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
22. APA - APA - The Engineered Wood Association; www.apawood.org.
23. APA - Architectural Precast Association; www.archprecast.org.
24. API - American Petroleum Institute; www.api.org.
25. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
26. ARI - American Refrigeration Institute; (See AHRI).
27. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
28. ASCE - American Society of Civil Engineers; www.asce.org.
29. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
30. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
31. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
32. ASSE - American Society of Safety Engineers (The); www.asse.org.
33. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.

34. ASTM - ASTM International; (American Society for Testing and Materials International); www.astm.org.
35. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
36. AWEA - American Wind Energy Association; www.awea.org.
37. AWI - Architectural Woodwork Institute; www.awinet.org.
38. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
39. AWPA - American Wood Protection Association; (Formerly: American Wood-Preservers' Association); www.awpa.com.
40. AWS - American Welding Society; www.aws.org.
41. AWWA - American Water Works Association; www.awwa.org.
42. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
43. BIA - Brick Industry Association (The); www.gobrick.com.
44. BICSI - BICSI, Inc.; www.bicsi.org.
45. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.com.
46. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
47. BOCA - BOCA; (Building Officials and Code Administrators International Inc.); (See ICC).
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bwfbadminton.org.
49. CDA - Copper Development Association; www.copper.org.
50. CEA - Canadian Electricity Association; www.electricity.ca.
51. CEA - Consumer Electronics Association; www.ce.org.
52. CFFA - Chemical Fabrics & Film Association, Inc.; www.chemicalfabricsandfilm.com.
53. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
54. CGA - Compressed Gas Association; www.cganet.com.
55. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
56. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
57. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
58. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
59. CPA - Composite Panel Association; www.pbmdf.com.
60. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
61. CRRC - Cool Roof Rating Council; www.coolroofs.org.
62. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
63. CSA - Canadian Standards Association; www.csa.ca.
64. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
65. CSI - Construction Specifications Institute (The); www.csinet.org.
66. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
67. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
68. CWC - Composite Wood Council; (See CPA).
69. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
70. DHI - Door and Hardware Institute; www.dhi.org.
71. ECA - Electronic Components Association; www.ec-central.org.
72. ECAMA - Electronic Components Assemblies & Materials Association; (See ECA).
73. EIA - Electronic Industries Alliance; (See TIA).
74. EIMA - EIFS Industry Members Association; www.eima.com.
75. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
76. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
77. ESTA - Entertainment Services and Technology Association; (See PLASA).

78. EVO - Efficiency Valuation Organization; www.evo-world.org.
79. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
80. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
81. FM Approvals - FM Approvals LLC; www.fmglobal.com.
82. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
83. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridaroof.com.
84. FSA - Fluid Sealing Association; www.fluidsealing.com.
85. FSC - Forest Stewardship Council U.S.; www.fscus.org.
86. GA - Gypsum Association; www.gypsum.org.
87. GANA - Glass Association of North America; www.glasswebsite.com.
88. GS - Green Seal; www.greenseal.org.
89. HI - Hydraulic Institute; www.pumps.org.
90. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
91. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
92. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
93. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
94. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
95. IAS - International Approval Services; (See CSA).
96. ICBO - International Conference of Building Officials; (See ICC).
97. ICC - International Code Council; www.iccsafe.org.
98. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
99. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
100. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
101. IEC - International Electrotechnical Commission; www.iec.ch.
102. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
103. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
104. IESNA - Illuminating Engineering Society of North America; (See IES).
105. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
106. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
107. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
108. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
109. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
110. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
111. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
112. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
113. ISO - International Organization for Standardization; www.iso.org.
114. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
115. ITU - International Telecommunication Union; www.itu.int/home.
116. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
117. LMA - Laminating Materials Association; (See CPA).
118. LPI - Lightning Protection Institute; www.lightning.org.
119. MBMA - Metal Building Manufacturers Association; www.mbma.com.
120. MCA - Metal Construction Association; www.metalconstruction.org.

121. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
122. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
123. MHIA - Material Handling Industry of America; www.mhia.org.
124. MIA - Marble Institute of America; www.marble-institute.com.
125. MMPA - Moulding & Millwork Producers Association; (Formerly: Wood Moulding & Millwork Producers Association); www.wmmpa.com.
126. MPI - Master Painters Institute; www.paintinfo.com.
127. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
128. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
129. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
130. NADCA - National Air Duct Cleaners Association; www.nadca.com.
131. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
132. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
133. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
134. NCMA - National Concrete Masonry Association; www.ncma.org.
135. NEBB - National Environmental Balancing Bureau; www.nebb.org.
136. NECA - National Electrical Contractors Association; www.necanet.org.
137. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
138. NEMA - National Electrical Manufacturers Association; www.nema.org.
139. NETA - InterNational Electrical Testing Association; www.netaworld.org.
140. NFHS - National Federation of State High School Associations; www.nfhs.org.
141. NFPA - NFPA; (National Fire Protection Association); www.nfpa.org.
142. NFPA - NFPA International; (See NFPA).
143. NFRC - National Fenestration Rating Council; www.nfrc.org.
144. NHLA - National Hardwood Lumber Association; www.nhla.com.
145. NLGA - National Lumber Grades Authority; www.nlga.org.
146. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
147. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
148. NRCA - National Roofing Contractors Association; www.nrca.net.
149. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
150. NSF - NSF International; (National Sanitation Foundation International); www.nsf.org.
151. NSPE - National Society of Professional Engineers; www.nspe.org.
152. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
153. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
154. NWFA - National Wood Flooring Association; www.nwfa.org.
155. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
156. PDI - Plumbing & Drainage Institute; www.pdionline.org.
157. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
158. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
159. RFCI - Resilient Floor Covering Institute; www.rfci.com.
160. RIS - Redwood Inspection Service; www.redwoodinspection.com.
161. SAE - SAE International; (Society of Automotive Engineers); www.sae.org.
162. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
163. SDI - Steel Deck Institute; www.sdi.org.
164. SDI - Steel Door Institute; www.steeldoor.org.
165. SEFA - Scientific Equipment and Furniture Association; www.sefalabs.com.

166. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
167. SIA - Security Industry Association; www.siaonline.org.
168. SJI - Steel Joist Institute; www.steeljoist.org.
169. SMA - Screen Manufacturers Association; www.smainfo.org.
170. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
171. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
172. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
173. SPIB - Southern Pine Inspection Bureau; www.spib.org.
174. SPRI - Single Ply Roofing Industry; www.spri.org.
175. SRCC - Solar Rating and Certification Corporation; www.solar-rating.org.
176. SSINA - Specialty Steel Industry of North America; www.ssina.com.
177. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
178. STI - Steel Tank Institute; www.steeltank.com.
179. SWI - Steel Window Institute; www.steelwindows.com.
180. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
181. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
182. TCNA - Tile Council of North America, Inc.; (Formerly: Tile Council of America); www.tileusa.com.
183. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
184. TIA - Telecommunications Industry Association; (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
185. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
186. TMS - The Masonry Society; www.masonrysociety.org.
187. TPI - Truss Plate Institute; www.tpinst.org.
188. TPI - Turfgrass Producers International; www.turfgrasssod.org.
189. TRI - Tile Roofing Institute; www.tileroofing.org.
190. UBC - Uniform Building Code; (See ICC).
191. UL - Underwriters Laboratories Inc.; www.ul.com.
192. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
193. USAV - USA Volleyball; www.usavolleyball.org.
194. USGBC - U.S. Green Building Council; www.usgbc.org.
195. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
196. WASTEC - Waste Equipment Technology Association; www.wastec.org.
197. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
198. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
199. WDMA - Window & Door Manufacturers Association; www.wdma.com.
200. WI - Woodwork Institute; (Formerly: WIC - Woodwork Institute of California); www.wicnet.org.
201. WMMPA - Wood Moulding & Millwork Producers Association; (See MMPA).
202. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
203. WPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.

2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; http://dodssp.daps.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; http://eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeia; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from Department of Defense Single Stock Point; http://dodssp.daps.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from Department of Defense Single Stock Point; http://dodssp.daps.dla.mil.

    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.

6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

1. CBHF - State of California; Department of Consumer Affairs; Bureau of Electronic Appliance and Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR - California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS - California Department of Health Services; (See CDPH).
4. CDPH - California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
5. CPUC - California Public Utilities Commission; www.cpuc.ca.gov.
6. SCAQMD - South Coast Air Quality Management District; www.aqmd.gov.
7. TFS - Texas Forest Service; Forest Resource Development and Sustainable Forestry; http://txforestservice.tamu.edu.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.2 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service from Existing System: Provide connections and extensions of services as required for construction operations.

C. Electric Power Service: Provide connections and extensions of services as required for construction operations.

1.3 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire prevention program.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in ICC/ANSI A117.**1**.

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts**,** with 1-5/8-inch- (42-mm-) OD top rails. Barbed tops are not allowed.

B. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Barbed tops are not allowed.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Contractor to provide necessary temporary equipment.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction. Water hydrants will be required prior to some construction activities. Coordination with Golder Ranch Fire required.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

G. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Install electric power service underground unless otherwise indicated.

H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

I. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel.

1. At each telephone, post a list of important telephone numbers.

a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.
d. Contractor's emergency after-hours telephone number.
e. Architect's office.
f. Engineers' offices.
g. Owner's office.
h. Principal subcontractors' field and home offices.

2. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

J. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access project electronic documents and maintain electronic communications.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

C. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

D. Parking: Provide temporary parking areas for construction personnel.

E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

F. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touchup signs so they are legible at all times.

G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

C. Temporary Erosion and Sedimentation Control: Comply with local requirements specified in Section 311000 "Site Clearing."

D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control

procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

G. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

J. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

K. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire prevention program.

1. Prohibit smoking in construction areas.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect materials from water damage and keep porous and organic materials from coming into prolonged contact with concrete.

C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Discard or replace water-damaged and wet material.
4. Discard, replace, or clean stored or installed material that begins to grow mold.
5. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures”.

END OF SECTION 015000

SECTION 015639 - TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

1.2 DEFINITIONS

A. Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.

1.4 INFORMATIONAL SUBMITTALS

A. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

B. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

C. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1.5 QUALITY ASSURANCE

A. Arborist Qualifications: Certified Arborist as certified by ISA, licensed arborist in jurisdiction where Project is located, current member of ASCA, or registered Consulting Arborist as designated by ASCA.

B. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch (25 mm) in diameter; and free of weeds, roots, and toxic and other nonsoil materials.

B. Organic Mulch: Wood and bark chips, free from deleterious materials.

C. Protection-Zone Fencing: Fencing fixed in position and meeting one of the following requirements.

1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2-inch (50-mm) opening, 0.148-inch- (3.76-mm-) diameter wire chain-link fabric; with pipe posts, minimum 2-3/8-inch- (60-mm-) OD line posts, and 2-7/8-inch- (73-mm-) OD corner and pull posts; with 1-5/8-inch- (42-mm-) OD top rails and 0.177-inch- (4.5-mm-) diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.
2. Height of Fencing: 6 feet (1.8 m).
3. Gates: Swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones.

D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes prepunched and reinforced; legibly printed with nonfading lettering.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Protection Zones: Mulch areas inside protection zones and other areas indicated with 4-inch (100-mm) average thickness of organic mulch. Do not place mulch within 6 inches (150 mm) of tree trunks.

3.2 PROTECTION ZONES

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones in a manner that will prevent people from easily entering protected area except by entrance gates.

1. Chain-Link Fencing: Install to comply with ASTM F 567 and with manufacturer's written instructions.
2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
3. Access Gates: Install as required.

B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect.

C. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

D. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.

3.3 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000 "Earth Moving."

B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.

C. Do not allow exposed roots to dry out before placing permanent backfill.

3.4 ROOT PRUNING

A. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:

1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
2. Temporarily support and protect roots from damage until they are permanently covered with soil.
3. Cover exposed roots with burlap and water regularly.
4. Backfill as soon as possible according to requirements in Section 312000 "Earth Moving."

B. Root Pruning at Edge of Protection Zone: Prune roots by cleanly cutting all roots to the depth of the required excavation.

C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

3.5 CROWN PRUNING

A. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:

1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
2. Pruning Standards: Prune trees according to ANSI A300 (Part 1) and the following:
3. Cut branches with sharp pruning instruments; do not break or chop.
4. Do not apply pruning paint to wounds.

B. Chip removed branches and dispose of off-site.

3.6 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

C. Minor Fill within Protection Zone: Where existing grade is 2 inches (50 mm) or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.7 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.8 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

1. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
2. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
3. Perform repairs within 24 hours.
4. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Architect.

3.9 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 015639

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 ACTION SUBMITTALS

A. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.

3. Refer to other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:

    a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements.
    b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements.

4. Manufacturers:

    a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Coordination of Owner-installed products.
6. Progress cleaning.
7. Starting and adjusting.
8. Protection of installed construction.

B. Related Requirements:

1. Section 011000 "Summary" for limits on use of Project site.
2. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.2 INFORMATIONAL SUBMITTALS

A. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

B. Certified Surveys: Submit two copies signed by land surveyor.

1.3 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.

7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

D. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements"

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Disposing of nonhazardous demolition and construction waste.

B. Related Requirements:

1. Section 024119 "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements, and for disposition of hazardous waste.
2. Section 042000 "Unit Masonry" for disposal requirements for masonry waste.
3. Section 311000 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.2 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.3 INFORMATIONAL SUBMITTALS

A. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.2 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Burning: Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

D. Disposal: Remove waste materials and dispose of at designated spoil areas on Owner's property.

E. Disposal: Remove waste materials from Owner's property and legally dispose of them.

3.3 SAMPLE FORMS

Attach samples of forms that will be issued with this Section here or after end of Section according to office preference.

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:

1. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
2. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
3. Section 017900 "Demonstration and Training" for requirements for instructing Owner's personnel.

1.2 ACTION SUBMITTALS

A. Product Data: For cleaning agents.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.3 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner’s signature for receipt of submittals.

5. Submit test/adjust/balance records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.

10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.6 FINAL COMPLETION PROCEDURES

A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings.

B. Inspection: Submit a written request for final inspection to determine acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

1.8 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

    a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    e. Remove snow and ice to provide safe access to building.
    f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    h. Sweep concrete floors broom clean in unoccupied spaces.
    i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
    k. Remove labels that are not permanent.
    l. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
    n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
    o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
    p. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired.

Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

    a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Operation manuals for systems, subsystems, and equipment.
3. Product maintenance manuals.
4. Systems and equipment maintenance manuals.

1.2 CLOSEOUT SUBMITTALS

A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect will comment on whether content of operations and maintenance submittals are acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.

    a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
    b. Enable inserted reviewer comments on draft submittals.

2. Two paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves.

C. Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training.

PART 2 - PRODUCTS

2.1 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information.

B. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

C. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Construction Manager.
7. Name and contact information for Architect.
8. Name and contact information for Commissioning Authority.
9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
10. Cross-reference to related systems in other operation and maintenance manuals.

D. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

E. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

F. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily

navigated file tree. Configure electronic manual to display bookmark panel on opening file.

G. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, post-type binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

a. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.2 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.3 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

2.4 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of operation and maintenance manuals.

F. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.

B. Related Requirements:

1. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set of marked-up record prints.
2. Number of Copies: Submit copies of record Drawings as follows:

a. Final Submittal:

1) Submit PDF electronic files of scanned record prints and one set of prints.
2) Print each drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised Drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data,

whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Record data as soon as possible after obtaining it.
c. Record and check the markup before enclosing concealed installations.

2. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
4. Refer instances of uncertainty to Architect for resolution.
5. Architect will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect.
e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. Note related Change Orders, record Product Data**,** and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

B. Format: Submit record Product Data as annotated PDF electronic file.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record

documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration and training video recordings.

1.2 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.

1. At completion of training, submit complete training manual(s) for Owner's use in PDF electronic file format on compact disc.

1.3 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to demonstration and training.

1.4 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Operations manuals.
    c. Maintenance manuals.
    d. Project record documents.
    e. Identification systems.
    f. Warranties and bonds.
    g. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

    a. Startup procedures.
    b. Equipment or system break-in procedures.
    c. Routine and normal operating instructions.
    d. Regulation and control procedures.
    e. Control sequences.

f. Safety procedures.
g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."

3.2 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
2. Owner will furnish an instructor to describe Owner's operational philosophy.
3. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner, through Construction Manager, with at least seven days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Video Recording Format: Provide high-quality color video recordings with menu navigation in format acceptable to Architect.

END OF SECTION 017900

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected site elements.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

C. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 CLOSEOUT SUBMITTALS

A. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.4 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Storage or sale of removed items or materials on-site is not permitted.

D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

1. Comply with requirements for existing services/systems interruptions specified in Section 011000 "Summary."

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off indicated utilities with utility companies.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
4. Dispose of demolished items and materials promptly.

B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. Related Sections:
   1. Section 072600 “Below slab vapor barrier retarders”.
   2. Section 312000 “Earth Moving” for drainage fill under slabs-on-grade.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement.

1.3 INFORMATIONAL SUBMITTALS

A. Material certificates.

B. Material test reports.

C. Floor surface flatness and levelness measurements.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

C. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

   1. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

2.2 STEEL REINFORCEMENT

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, per General Structural Notes.

B. Normal-Weight Aggregates: ASTM C 33, graded.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M and potable.

2.4 ADMIXTURES

A. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.

3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 FIBER REINFORCEMENT

A. Synthetic Macro-Fiber: per General Structural Notes.

2.6 VAPOR RETARDERS

A. Refer to other specification sections.

2.7 CURING MATERIALS

A. Water: Potable.

B. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

C. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

2.8 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

2.9 CONCRETE MIXTURES

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

B. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 25 percent.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

D. Proportion normal-weight concrete mixture:

1. Per General Structural Notes.

2.10 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.11 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Chamfer exterior corners and edges of permanently exposed concrete.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR RETARDERS

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

C. Cold-Weather Placement: Comply with ACI 306.1.

D. Hot-Weather Placement: Comply with ACI 301.

3.7 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch (6 mm) in one direction.

1. Apply scratch finish to surfaces to receive mortar setting beds for bonded cementitious floor finishes.

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet or ceramic tile.
2. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch (3.2 mm).

D. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

    a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.11 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

END OF SECTION 033000

SECTION 033300 - ARCHITECTURAL CONCRETE (SITE)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Measurement and Payment Procedures: Where applicable, measurement and payment shall be per the City of Tucson/Pima County Standard Specifications for Public Improvements 2003 Edition.

1.2 DESCRIPTION OF WORK

A. The work covered by this section includes, but is not limited to, the:

1. Broom Finish
2. Exposed Aggregate Finish
3. Tumbled Glass Aggregate Finish

1.3 RELATED SECTIONS

A. Structural Concrete: Section 033000

1.4 SUBMITTALS

A. General: Submit the following according to the Conditions of the Contract and Division 01 Specification Sections.

B. Shop Drawings: Layout of concrete pavement score lines and expansion joints.

C. Test Panels: One 4’ x 4’ test panel for each paving treatment specified herein.

D. Certification: Written Certificate of Compliance signed by Contractor, that all concrete paving and curb materials and products to be used on this project will comply with Standards referenced in the Specifications.

E. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, joint systems, curing compounds, dry-shake finish materials, and others if requested by Architect.

F. Design mixes for each class of concrete. Include revised mix proportions when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

G. Laboratory test reports for evaluation of concrete materials and mix design tests.

H. Material certificates in lieu of material laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor certifying that each material item complies with or exceeds requirements. Provide certification from admixture manufacturers that chloride content complies with requirements.

1.5 QUALITY ASSURANCE

A. Concrete Standards: Comply with provisions of the following standards, except where more stringent requirements are indicated.

1. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."
2. ACI 318, "Building Code Requirements for Reinforced Concrete."
3. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."

B. Concrete Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

C. Concrete Testing Service: Engage a qualified independent testing agency to perform materials evaluation tests and to design concrete mixes.

D. Field-Constructed Mockup: Cast mockup of size indicated or as required to demonstrate typical joints, surface finish, texture, color, and standard of workmanship.

1. When Architect determines that mockup does not meet requirements, demolish and remove it from the site and cast another until the mockup is accepted.
2. Keep accepted mockup undisturbed during construction as a standard for judging completed paving. Undamaged mockup may be incorporated into the Work.
3. Demolish accepted mockup and remove from site when directed by Architect.

E. Do not change source of brands of cement and aggregate materials during course of the work.

F. Maintain accurate field records of time, date of placing, curing and removal of forms for concrete work in each portion of the work. Include in this article prerequisites, standards, limitations, and criteria that establish an overall level of quality for products and workmanship. Include only those quality-assurance provisions that affect all Work of this Section rather than those that apply only to Part 2 - Products or Part 3 - Execution.

1.6 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Establish and maintain required lines and grade elevations.

C. Do not install concrete work over wet, saturated, muddy or frozen subgrade.

D. Protect adjacent work.

1. Provide temporary barricades, warning lights and signs as required for protection of work and public safety.
2. Field Measurements: Verify actual dimensions of finish treatments by field measurements before fabrication.

1.7 WARRANTY

A. The General Conditions and Special Provisions of the Contract apply to work specified in this section.

B. Failures include, but are not limited to, the following:

1. Spalling
2. Major cracking

C. Warranty Period: One year from date of Substantial Completion.

PART 2 - MATERIALS

2.1 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other acceptable panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.

1. Use flexible or curved forms for curves of a 100-foot or less radius.

B. Form Release Agent: Provide commercial formulation form-release agent with a maximum of 350 g/L volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars and Tie Bars: ASTM A 615, Grade 60, deformed.

B. Epoxy-Coated Reinforcing Bars: ASTM A 775 with ASTM A 615, Grade 60 deformed steel bars.

C. Plain, Cold-Drawn Steel Wire: ASTM A 82.

D. Welded Steel Wire Fabric: ASTM A 185.

1. Furnish in flat sheets, not rolls, unless otherwise acceptable to Architect.

E. Deformed-Steel Welded Wire Fabric: ASTM A 497.

F. Fabricated Bar Mats: Welded or clip-assembled steel bar mats, ASTM A 184. Use ASTM A 615, Grade 60 steel bars, unless otherwise indicated.

G. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

H. Epoxy-Coated Joint Dowel Bars: ASTM A 775 with ASTM A 615, Grade 60 plain steel bars.

I. Hook Bolts: ASTM A 307, Grade A bolts, internally and externally threaded. Design hook bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

J. Supports for Reinforcement: Chairs, spacers, dowel bar supports and other devices for spacing, supporting, and fastening reinforcing bars, welded wire fabric, and dowels in place. Use wire bar-type supports complying with CRSI specifications.

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I.

1. Use one brand of cement throughout Project unless otherwise acceptable to Architect.

B. Fly Ash: ASTM C 618, Type F.

C. Normal-Weight Aggregates: ASTM C 33, Class 4, and as follows. Provide aggregates from a single source.

1. Maximum Aggregate Size: 1-1/2 inches.
2. Do not use fine or coarse aggregates that contain substances that cause spalling.
3. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Architect.

D. Water: Potable.

2.4 ADMIXTURES

A. Provide concrete admixtures that contain not more than 0.1 percent chloride ions.

B. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

C. Water-Reducing Admixture: ASTM C 494, Type A.

D. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.

E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.

F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

2.5 CURING MATERIALS

A. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

B. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

1. Waterproof paper.
2. Polyethylene film.
3. White burlap-polyethylene sheet.

C. Clear Solvent-Borne Liquid Membrane-Forming Curing Compound: ASTM C 309, Type I, Class A or B, wax free.

D. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type I, Class B.

1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 g/L.

E. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.

2.6 RELATED MATERIALS

A. Boiled Linseed Oil Mixture: Combination of boiled linseed oil and mineral spirits, complying with AASHTO M-233.

B. Bonding Agent: Acrylic or styrene butadiene.

C. Epoxy Adhesive: ASTM C 881, two-component material suitable for dry or damp surfaces. Provide material type, grade, and class to suit requirements.

2.7 CONCRETE MIX

A. Prepare design mixes for each type and strength of normal-weight concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use a qualified independent testing agency for preparing and reporting proposed mix designs.

1. Do not use the Owner's field quality-control testing agency as the independent testing agency.
2. Limit use of fly ash to 25 percent of cement content by weight.

B. Proportion mixes according to ACI 211.1 and ACI 301 to provide normal-weight concrete with the following properties:

1. Compressive Strength (28-Day): 3500 psi.
2. Air Content: 2.5 to 4.5 percent.

C. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, project conditions, weather, test results, or other circumstances warrant.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Comply with requirements and with ASTM C 94.

1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

2.9 COLORED TUMBLED GLASS

A. Product: American Specialty Glass (ASG) Inc. colored tumbled glass or approved equal.

B. Color: Dark Blue, or as approved by Owner.

C. Mix Ratio per 1 ¼ lb. per square foot:

1. 75% #1 Mix (1/8" to ¼")
2. 25% #2 Mix (1/4" to 3/8")

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions with Owner present for compliance with layout requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Proof-roll prepared subbase surface to check for unstable areas and verify need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving.

B. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 FOUNDATION COURSE PLACEMENT: PAVEMENT AND WALKS/PADS

A. Place on dry subgrade in lifts from minimum 6" to maximum 12" for pavement, maximum 6" lifts for walks. Remove all subgrade material churned or mixed with foundation course and replace as necessary at Contractor's expense.

B. Compaction for foundation course shall be 95 percent of standard proctor maximum density.

C. Grades for foundation course shall be +/- .25” of required grades.

3.4 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for paving to required lines, grades, and elevations. Install forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

B. Check completed formwork and screeds for grade and alignment to following tolerances:

1. Top of Forms: Not more than 1/8 inch in 10 feet.
2. Vertical Face on Longitudinal Axis: Not more than 1/4 inch in 10 feet.

C. Clean forms after each use and coat with form release agent as required to ensure separation from concrete without damage.

3.5 PLACING REINFORCEMENT

A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars" for placing and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities or replace units as required before placement. Set mats for a minimum 2-inch overlap to adjacent mats.

3.6 JOINTS

A. General: Construct contraction, construction, and isolation joints true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to the centerline, unless indicated otherwise.

1. When joining existing paving, place transverse joints to align with previously placed joints, unless indicated otherwise.

B. Contraction Joints: Provide weakened-plane contraction joints, sectioning concrete into areas as shown on Drawings. Construct contraction joints for a depth equal to at least 1/4 of the concrete thickness, as follows:

1. Tooled Joints: Form contraction joints in fresh concrete by grooving and finishing each edge of joint with a radiused jointer tool.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into hardened concrete when cutting action will not tear, abrade, or otherwise damage surface and before development of random contraction cracks.
3. Inserts: Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strips into fresh concrete until top surface of strip is flush with paving surface. Radius each joint edge with a jointer tool. Carefully remove strips or caps of two-piece assemblies after concrete has hardened. Clean groove of loose debris.

C. Walks/Pads: Use tool that produces “V” joint not over 1/4” wide.

D. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than 1/2 hour, unless paving terminates at isolation joints.

E. Expansion Joints: Form isolation joints of preformed joint filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 30 feet for curbs and walks, unless otherwise specified on plans, and at all beginnings and ends at radius at curbs.
2. Locate expansion joints at intervals of 50 feet, unless indicated otherwise, for pavement lanes.
3. Extend joint fillers full width and depth of joint, not less than 1/2 inch or more than 1 inch below finished surface where joint sealant is indicated. Place top of joint filler flush with finished concrete surface when no joint sealant is required.
4. Furnish joint fillers in one-piece lengths for full width being placed wherever possible. Where more than one length is required, lace or clip joint filler sections together.
5. Protect top edge of joint filler during concrete placement with a metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
6. Locate expansion joints at a maximum of 150 sq. ft. of walks/pads, except that maximum dimensions between joints in a linear walk to be no more than 30 ft.

F. Installation of joint fillers and sealants is specified in Division 7 Section "Paving Joint Sealants."

G. Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one half of dowel length to prevent concrete bonding to one side of joint.

3.7 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Moisten subbase to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at the required finish elevation and alignment.

C. Comply with requirements and with ACI 304R for measuring, mixing, transporting, and placing concrete.

D. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

E. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

F. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete complying with ACI 309R.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocating reinforcing, dowels, and joint devices.

G. Screed paved surfaces with a straightedge and strike off. Use bull floats or darbies to form a smooth surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces prior to beginning finishing operations.

H. Slip-Form Pavers: When automatic machine placement is used for paving, submit revised mix design and laboratory test results that meet or exceed requirements. Produce paving to required thickness, lines, grades, finish, and jointing as required for formed paving.

1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of paver machine during operations.

I. Cold-Weather Placement: Comply with provisions of ACI 306R and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

J. Hot-Weather Placement: Place concrete complying with ACI 305R and as specified when hot weather conditions exist.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F. Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.

3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.8 CONCRETE FINISHING

A. Float Finish: Begin floating when bleed water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Finish surfaces to true planes within a tolerance of 1/4 inch in 10 feet as determined by a 10-foot-long straightedge placed anywhere on the surface in any direction. Cut down high spots and fill low spots. Refloat surface immediately to a uniform granular texture.

B. Medium Broom Finish: Provide light to medium finish by striating surface with a stiff bristle broom in straight continuous lines.

C. Exposed Aggregate Finish: Broadcast aggregate upon floated paving while concrete is wet. Coverage shall be at a medium to heavy ratio. Provide sample panel as specified in 1.4 d.

D. Final Tooling: Tool edges of paving, gutters, curbs, and joints formed in fresh concrete with a jointing tool to the following radius. Repeat tooling of edges and joints after applying surface finishes. Eliminate tool marks on concrete surfaces.

1. Radius: 1/4 inch.

3.9 TUMBLED GLASS AGGREGATE PAVING

A. Bull float surface to required slopes and planes but do not rough trowel or finish trowel.

B. Apply tumbled glass aggregate, lighter at edges of defined aggregate limits, denser toward center of design. Apply in minimum of two passes or shakes. Lightly trowel after all aggregate placed, pushing approximately 2/3 of the individual aggregate stones into the still wet concrete mixture.

C. Finish with steel trowel. After concrete has achieved initial set, score and edge as specified.

D. Apply specified curing compound as recommended by manufacturer.

E. After minimum curing period as recommended by manufacturer, remove residual curing compound with approved products. Rinse surface, apply diluted Lithochrome Floor Cleaner, rinse and allow to dry.

F. Apply diluted muriatic acid solution. Let stand on surface until desired texture is achieved.

G. Flood surface with clean water to remove solution and neutralize acid solution. Take care not to allow water to stand on areas not to receive acid finish.

H. Brush area with bristle broom to remove excess material and solution.

I. Re-treat areas as required to achieve uniform texture to match approved sample.

3.10 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with the recommendations of ACI 306R for cold weather protection and ACI 305R for hot weather protection during curing.

B. Evaporation Control: In hot, dry, and windy weather, protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before floating.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:

1. Moisture Curing: Keep surfaces continuously moist for not less than 7 days with the following materials:
    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with a 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.11 FIELD QUALITY CONTROL TESTING

A. The Owner will employ a qualified testing and inspection agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include the following:

1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
    a. Slump: ASTM C 143; one test at point of placement for each compressive-strength test but no less than one test for each day's pour of each type of concrete. Additional tests will be required when concrete consistency changes.
    b. Air Content: ASTM C 231, pressure method; one test for each compressive-strength test but no less than one test for each day's pour of each type of air-entrained concrete.
    c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.

d. Compression Test Specimens: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless directed otherwise. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
e. Compressive-Strength Tests: ASTM C 39; one set for each day's pour of each concrete class exceeding 5 cu. yd. but less than 25 cu. yd., plus one set for each additional 50 cu. yd. Test one specimen at 7 days, test two specimens at 28 days, and retain one specimen in reserve for later testing if required.

2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
3. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
4. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.

B. Test results will be reported in writing to Architect, concrete manufacturer, and Contractor within 24 hours of testing. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing agency, concrete type and class, location of concrete batch in paving, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day and 28-day tests.

C. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

D. Additional Tests: The testing agency will make additional tests of the concrete when test results indicate slump, air entrainment, concrete strengths, or other requirements have not been met, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

3.12 REPAIRS AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective, or does not meet the requirements of this Section.

B. Drill test cores where directed by Architect when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep concrete paving not more than 2 days prior to date scheduled for Substantial Completion inspections.

END OF SECTION 03330

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SECTION 033500 - DENSIFIED CONCRETE FINISH

1. GENERAL:

A. Description of Work

1. Work as evident on the drawings and specified herein or required for furnishing all labor, materials, equipment, and services necessary for the application of concrete stain, sealer, densifier, and water and oil repellant, in conjunction with Section 03300, Cast-In-Place Concrete.

B. Related Work

1. Section 033000: Cast-In-Place Concrete.
2. Drawings: General Structural Notes and Room Finish Schedule.

C. Submittals

1. Product data: Submit manufacturer's product data and installation instructions. Include both published data and any specific data prepared for this project.

D. References and Standards

1. American Concrete Institute (ACI):

a. AC1302.1 R-89, Guide for Concrete Floor and Slab Construction.

2. American Society for Testing and Materials (ASTM):

a. ASTM C805, Impact Strength.
b. ASTM 1028, Co-efficient of Friction.
c. ASTM C150, Type I, II Portland cement conformity, depending on soil conditions.

E. Quality Assurance

1. Test Area: Test a representative area of 4 feet by 4 feet to confirm surface preparation procedures, coverage rates, reaction time, finished appearance, etc. Use the manufacturer's application instructions. Let test area cure and dry thoroughly before inspection. Keep test area available for comparison throughout the project**.**

2. PRODUCTS:

A. Acceptable Manufacturers

1. PROSOCO, Inc., 3741 Greenway Circle, Lawrence, KS 66046. Phone: (800) 255-4255; Fax: (785) 830-9797; E-mail: CustomerCare@prosoco.com.
2. Equal products by Lythic Concrete Densifier and Protector of Solomon Colors Pro Dye is approved.
3. Approved equal by Architect. Manufacturers must have a complete system of products that match the types and descriptions below.

B. Product Descriptions

This specification is based upon the Consolideck system manufactured by PROSOCO, Inc. Other systems may be approved at the architect's discretion provided it meets the performance characteristics of the basis system.

1. Penetrating Translucent Concrete Dye: Consolideck GemTone Stain or approved equal.
2. Concrete Sealer, Hardener, and Densifier: Consolideck LS lithium silicate treatment or approved equal.
3. Concrete Protective Treatment: Consolideck LS Guard lithium silicate hardener or approved equal.

3. EXECUTION:

A. Preparation

1. Surfaces to be treated must be clean and structurally sound. Remove all foreign materials including bond breakers, curing agents, surface grease and oil, and construction debris using the appropriate manufacturer's surface prep cleaner.
2. Read "Preparation" and "Safety Information" sections in the manufacturer's Product Data Sheet for the product.

B. Placement

1. Apply each product in strict accordance with manufacturer's instructions. Make note of the placement order, timing and critical interactions between the different products to ensure a properly stained densified concrete finish.

END OF SECTION 033500

SECTION 042200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units (CMU's). Site Walls.
2. Steel reinforcing bars.

1.2 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

1. Concrete Masonry Unit Test: For each type of unit required, according to ASTM C 140 for compressive strength.
2. Mortar Test (Property Specification): For each mix required, according to ASTM C 109/C 109M for compressive strength.
3. Grout Test (Compressive Strength): For each mix required, according to ASTM C 1019.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For reinforcing steel. Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type and size of product indicated. For masonry units include data on material properties.

B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

1.5 QUALITY ASSURANCE

A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

1.6 PROJECT CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

2.2 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

B. CMUs: ASTM C 90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 psi (19.3 MPa).
2. Density Classification: Medium weight.
3. Sizes and Shapes
    a. 8x8x16 Smooth Faced
    b. 8x4x16 Solid Cap Black

2.3 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Aggregate for Mortar: ASTM C 144.

1. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
2. White-Mortar Aggregates: Natural white sand or crushed white stone.

3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

E. Aggregate for Grout: ASTM C 404.

F. Water: Potable.

2.4 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).

2.5 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.6 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene urethane or PVC.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

2.7 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Refer to General Structural Notes.

PART 3 - EXECUTION

3.1 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).

B. Lines and Levels:

1. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m).

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).

3.2 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

C. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in a stacked bond; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

E. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

F. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.3 MORTAR BEDDING AND JOINTING

A. Lay hollow CMUs as follows:

1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.4 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).

1. Space reinforcement not more than 16 inches (406 mm) o.c.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

3.5 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches (1520 mm).

3.6 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.

B. Inspections: Level 1 special inspections according to the "International Building Code."

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

3.7 REPAIRING, POINTING, AND CLEANING

A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
2. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.8 MASONRY WASTE DISPOSAL

A. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042200

SECTION 047300 – MANUFACTURED MASONRY VENEER

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents: General and Supplementary Conditions of the Contract, Division 1 General Requirements, and Drawings are applicable to this Section.

B. Section Includes:
   1. Simulated stone veneers for interior and exterior applications.
   2. Reinforcement, anchorages, mortar, and accessories.

C. Related Sections
   1. Section 05400 – Cold Formed Metal Framing: Wall framing.
   2. Section 06100 – Rough Carpentry: Wall framing and sheathing.
   3. Section 07920 – Joint Sealants: Sealant joints.
   4. Section 07240 – Exterior Insulation and Finish System: Synthetic plaster finish.

1.2 SUBMITTALS

A. Submit following in accordance with Section 01330.
   1. Product Data: Submit for fabricated wire reinforcement and each type of stone specified. Include all applicable physical and performance data.
   2. Samples: Submit samples of simulated stone units to illustrate color, texture, and size range of each type unit.
   3. Manufacturer's detailed installation instructions
   4. List of projects on which manufacturer has supplied simulated stone materials in the past 5 years.
   5. Certifications listed in Quality Assurance article of Part 1 this Section.

1.3 QUALITY ASSURANCE

A. Installer: Minimum 5 years experience in similar types of work of similar scope and be able to furnish list of previous jobs and references if requested by Architect.

B. Fabricator: Licensee of manufacturer with not less than 5 years experience manufacturing simulated stone products of size, type, and quantity as required for this project.

C. Expansion Joints: Provide expansion joints as indicated on Drawings or, if not indicated, install at frequency and in accordance with details and as recommended by Architect and/or Industry Standards. Confirm locations and frequency with Architect before beginning work.

D. Certifications
   1. Provide written documentation that products have met or exceeded at least one of the following certifications for a minimum of 10 years:

a. ICBO – International Conference of Building Officials.

2. Provide written documentation that stone products comply with specified minimum criteria when tested in accordance with testing standards specified in Part 2 of this Section.

1.4 PROJECT CONDITIONS

A. Environmental Requirements:
   a. Minimum air temperature of 40 degrees F (4 degrees C) prior to, during, and for 48 hours after completion of work; and
   b. Cold Weather Requirements: IMIAC (International Masonry Industry All-Weather Council) - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, handle, and protect materials in accordance with Section 01600.
   1. Store mortar materials on pallets in dry place.
   2. Protect materials from rain, moisture, and freezing temperatures.
   3. Protect reinforcement and accessories from elements.

1.6 WARRANTY

A. Special Warranty: Prepare and submit in accordance with Section 01780.
B. Provide 50-year warranty against manufacturing defects in manufactured stone products.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. Manufacturer: Coronado Stone Products.
B. Stone Product: Subject to compliance with requirements, provide the following product:
   1. Enter Stone Profile: Sand Canyon Flagstone
      a. Enter Stone Color: Polamar Blend as manufactured by Coronado Stone Products

2.2 STONE MATERIALS

A. Simulated Stone:
   1. Precast simulated stone, composed of following materials:
      a. Portland Cement: ASTM C 150, Type 1, 2, or 3 depending upon color to be produced.
      b. Course Aggregates: ASTM C 330, lightweight type, color as necessary to obtain final approved color of stone.
      c. Sand: ASTM C 144, special color if required to match approved sample.
      d. Iron oxide colors.
      e. Water: Clean and free from deleterious substances.

2.3 MORTAR MATERIALS

A. Cement: ASTM C 150, Type I or masonry cement meeting ASTM C 91.
B. Masonry sand, complying with ASTM C 144, natural or manufactured.
    1. Mortar Color: To be selected.

2.4 RELATED MATERIALS

C. Setting Accessories:
    1. Moisture Barrier:
       Fluid applied system.
    2. Metal Lath: ASTM C 847; 18 gage, galvanized, flat diamond mesh, self furring, stamped sheet; 3.4lbs or other:
        a. Attachment: Galvanized nails, screws and other metal supports, of type and size to suit applications; to rigidly secure materials in place.
    3. Joint Sealant: Refer to Section 07920.
    4. Fasteners: Coated 1-1/2 inch nails, staples, or screws of type and for spacing as recommended by simulated stone manufacturer.
    5. Cleaner: Nonacid cleaner as recommended by simulated stone manufacturer.
    6. Sealer: Breathable type, non-film forming, non-yellowing.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Examination: Examine conditions and proceed with work in accordance with Section 01400.
    1. Verify that field conditions are acceptable and are ready to receive work.
    2. Verify items provided by other Sections of work are properly sized and located.
    3. Verify that built-in items are in proper location and ready for roughing into masonry work.
    4. Verify correct product and accessories prior to installation.
    5. Consult Owner and manufacturer if deficiencies exist. Correct deficiencies in accordance with stone manufacturer’s recommendations.

B. Protect surrounding area from possible damage during installation work

C. Initiating installation constitutes Installer’s acceptance of existing surfaces and substrate.

3.2 APPLICATION

A. Moisture Barrier:
   Install fluid applied system.

B. Lathing: Apply metal lath taut, with long dimension perpendicular to supports.
    1. Lap ends minimum 1 inch. Secure end laps with tie wire where they occur between supports
    2. Lap sides of lath minimum 1-1/2 inches.

Attach metal lath to framing using nails or screws of type, size, and spacing as recommended by system manufacturer.

3. Place 4 inch wide strips of metal lath centered over junctions of dissimilar backing materials. Secure rigidly in place.

C. Mortar:
   1. Apply 3/8 inch scratch coat of mortar to lath and allow to dry 48 hours.
   2. Apply bonding agent to masonry or concrete substrates in accordance with manufacturer's recommendations.
   3. Apply mortar-thinset adhesive mixture to the back of the stone.

D. Simulated Stone Veneer: Install in accordance with manufacturer's instructions.
   1. Apply 3/8 to 1/2 inch of mortar covering to back of each stone.
   2. Press units firmly into position, wiggle each piece slightly and apply light pressure to unit to ensure firm bonding, causing mortar to extrude slightly around edges of units and to leave a joint width of ¼".
   3. Place units with uniform mortar joints tooled in accordance with manufacturer's instructions.
   4. Install outside corner return units with short and long lengths alternated.
   5. Install accessory pieces (quoins, caps, sills, moldings) as work progresses, using same techniques as units in field of wall.

E. Plan work to minimize jobsite cutting. Perform necessary cutting with proper tools to provide uniform edges; take care to prevent breaking unit corners or edges.

F. Remove excess mortar; do not allow mortar to dry on face of units.
   1. Point and tool joints before mortar has set.
   2. Clean and finish joints in accordance with architect's and manufacturer's instructions.

G. Control Joints: Size in accordance with Section 07920 for sealant performance, but in no case larger than adjacent mortar joints in exposed stone units.

H. Built-in Work: As work progresses, build in door and window frames, nailing strips, anchor bolts, plates, and other items specified in various sections.
   1. Build in items plumb and level.
   2. Bed anchors of metal door and glazed frames in mortar joints. Fill frame voids solid with mortar.
   3. Do not build in organic materials subject to deterioration.

3.3 ADJUSTING

A. Cutting and Fitting: Cut and fit for chases, pipes, conduit, sleeves, and grounds. Cooperate with other sections of work to provide correct size, shape, and location.
   1. Obtain approval prior to cutting or fitting any area not indicated or where appearance or strength of masonry work may be impaired.

3.4 CLEANING AND SEALING

A. Cleaning
   1. Remove excess mortar and smears using brush or steel wool.
   2. Replace defective mortar. Match adjacent work.

3. Clean soiled surfaces with non-acidic solution, acceptable to the stone manufacturer, which will not harm masonry or adjacent materials.
4. Leave surfaces thoroughly clean and free of mortar and other soiling.
5. Use nonmetallic tools in cleaning operations.

B. Sealer: Apply sealer to completed surface in accordance with manufacturer's instructions.

END OF SECTION 047300

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural steel.
2. Grout.

1.2 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication of structural-steel components.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Welding certificates.

C. Mill test reports for structural steel, including chemical and physical properties.

D. Source quality-control reports.

E. Field quality-control and special inspection reports.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD or is accredited by the IAS Fabricator Inspection Program for Structural Steel (AC 172) or is preapproved by the authority having jurisdiction.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.
2. AISC 360.
3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992/A 992M.

B. Channels, Angles: ASTM A 36/A 36M.

C. Plate and Bar: ASTM A 36/A 36M.

D. Cold-Formed Hollow Structural Sections: ASTM A 500/A 500M, Grade B, structural tubing.

E. Steel Pipe: ASTM A 53/A 53M, Type E or Type S, Grade B.

F. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. Bolts, Nuts, and Washers: ASTM A307 heavy-hex steel structural bolts; ASTM A 563, Grade C, (ASTM A 563M, Class 8S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers; all with plain finish.

B. Unheaded Anchor Rods: ASTM F 1554, Grade 36.

1. Configuration: Hooked.
2. Finish: Plain.

C. Headed Anchor Rods: ASTM F 1554, Grade 36, straight.

1. Finish: Plain.

D. Threaded Rods: ASTM A 36/A 36M.

1. Finish: Plain.

2.3 PRIMER

A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

2.4 GROUT

A. Metallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.

B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.

2.6 SHOP CONNECTIONS

A. Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
2. Surfaces to be field welded.
3. Surfaces of high-strength bolted, slip-critical connections.
4. Surfaces enclosed in interior construction.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.8 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform shop tests and inspections.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections. Exception – if fabrication shop is an AISC approved shop, shop tests and inspections are not required.

B. Bolted Connections: Inspect shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Baseplates, Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Pretension (see structural drawings) anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

3.3 FIELD CONNECTIONS

A. Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: See structural drawings. Typically snug tight.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:

1. Verify structural-steel materials and inspect steel frame joint details.
2. Verify weld materials and inspect welds.
3. Verify connection materials and inspect high-strength bolted connections.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Bolted Connections: Inspect bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.

1. In addition to visual inspection, test and inspect field welds according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

a. Liquid Penetrant Inspection: ASTM E 165.
b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
c. Ultrasonic Inspection: ASTM E 164.
d. Radiographic Inspection: ASTM E 94.

END OF SECTION 051200

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SECTION 052100 - STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. K-series steel joists.
2. Joist accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of joist, accessory, and product.

B. Shop Drawings:

1. Include layout, designation, number, type, location, and spacing of joists.
2. Include joining and anchorage details; bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Manufacturer certificates.

C. Mill Certificates: For each type of bolt.

D. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications."

1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.

B. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CMC Joist & Deck.
2. Vulcraft; Nucor Vulcraft Group.

2.2 K-SERIES STEEL JOISTS

A. Manufacture steel joists of type indicated according to "Standard Specification for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.

B. Steel Joist Substitutes: Manufacture according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.

2.3 PRIMERS

A. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

2.4 JOIST ACCESSORIES

A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.

B. Furnish ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch (13 mm) of finished wall surface unless otherwise indicated.

C. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.

1. Finish: Plain

D. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.5 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories.

B. Apply one coat of shop primer to joists and joist accessories.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Do not install joists until supporting construction is in place and secured.

B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written instructions, and requirements in this Section.

1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening.
3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.

C. Field weld joists to supporting steel bearing plates and framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

D. Bolt joists to supporting steel framework using carbon-steel bolts.

E. Bolt joists to supporting steel framework using high-strength structural bolts. Comply with RCSC's "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.

F. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.2 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Visually inspect field welds according to AWS D1.1/D1.1M.

C. Visually inspect bolted connections.

D. Prepare test and inspection reports.

END OF SECTION 052100

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof deck.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings:

1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Product Certificates: For each type of steel deck.

C. Evaluation reports.

D. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

2.2 ROOF DECK

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ASC Profiles, Inc.
2. Cordeck.
3. Nucor Corp.
4. Verco Decking, Inc., a Nucor company.

B. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:

1. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade **33 (230).**
2. Deck Profile: As indicated.
3. Profile Depth: As indicated.
4. Design Uncoated-Steel Thickness: As indicated.

2.3 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 (4.8-mm) minimum diameter.

D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck. For drains, cut holes in the field.

G. Galvanizing Repair Paint: ASTM A 780/A 780M, SSPC-Paint 20, or MIL-P-21035B, with dry film containing a minimum of 94 percent zinc dust by weight.

H. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.

B. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

C. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

D. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.

E. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

F. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

G. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.

1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.

H. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

3.2 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Field welds will be subject to inspection.

C. Prepare test and inspection reports.

3.3 PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.

B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.

END OF SECTION 053100

SECTION 054000 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior non-load-bearing wall framing.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of cold-formed steel framing product and accessory.

B. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Product test reports.

D. Research reports.

1.4 QUALITY ASSURANCE

A. Product Tests: Mill certificates or data from a qualified independent testing agency.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AllSteel & Gypsum Products, Inc.
2. California Expanded Metal Products Company.
3. ClarkWestern Building Systems, Inc.
4. Consolidated Fabricators Corp.; Building Products Division.
5. Craco Mfg., Inc.
6. Custom Stud Inc.
7. Design Shapes in Steel.
8. Dietrich Metal Framing; a Worthington Industries company.
9. Formetal Co. Inc. (The).
10. MBA Building Supplies, Inc.
11. Nuconsteel; a Nucor Company.
12. SCAFCO Corporation.
13. State Building Products, Inc.
14. Steel Construction Systems.
15. Steel Network, Inc. (The).
16. Steel Structural Systems.
17. United Metal Products, Inc.
18. United Steel Manufacturing.

2.2 COLD-FORMED STEEL FRAMING, GENERAL

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:

1. Grade: As required by structural performance. Refer to Structural Drawings.
2. Coating: G60 (Z180) or equivalent.

C. Steel Sheet for Vertical Deflection Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:

1. Grade: As required by structural performance.
2. Coating: G60 (Z180).

2.3 NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as indicated on the drawings. For exterior curtain wall framing, refer to structural drawings.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and matching minimum base-metal thickness of steel studs. For interior non-bearing, non-structural partitions, refer to architectural drawings.

C. Vertical Deflection Clips: Manufacturer's standard head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. AllSteel & Gypsum Products, Inc.
b. ClarkWestern Building Systems, Inc.
c. Dietrich Metal Framing; a Worthington Industries company.
d. MarinoWARE.
e. SCAFCO Corporation.
f. Steel Network, Inc. (The).
g. Steeler, Inc.

D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure.

E. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.4 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration.

2.5 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.

D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

2.6 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B.

B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107/C 1107M, with fluid consistency and 30-minute working time.

D. Shims: Load bearing, high-density multimonomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.

E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

PART 3 - EXECUTION

3.1 PREPARATION

A. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch (6 mm) to ensure a uniform bearing surface on supporting concrete or masonry construction.

B. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.2 INSTALLATION, GENERAL

A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.

C. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

D. Install framing members in one-piece lengths.

E. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

F. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

G. Install insulation, specified in Section 072100 "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

H. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

I. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:

1. Stud Spacing: As indicated.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Install single deep-leg deflection tracks and anchor to building structure.
2. Install double deep-leg deflection tracks and anchor outer track to building structure.
3. Connect vertical deflection clips to infill studs and anchor to building structure.
4. Connect drift clips to cold-formed metal framing and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.

1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches (305 mm) of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
3. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
4. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.4 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Remove and replace work where test results indicate that it does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Miscellaneous steel framing and supports.
2. Shelf angles.
3. Metal ladders.
4. Miscellaneous steel trim.
5. Metal bollards.
6. Loose bearing and leveling plates.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:
1. Paint products.
2. Grout.

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.

D. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

E. Rolled-Stainless-Steel Floor Plate: ASTM A 793.

F. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.

G. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless-steel fasteners for fastening aluminum.
2. Provide stainless-steel fasteners for fastening stainless steel.
3. Provide stainless-steel fasteners for fastening nickel silver.
4. Provide bronze fasteners for fastening bronze.

B. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

C. Post-Installed Anchors: Torque-controlled expansion anchors.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.

D. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches (41 by 22 mm) by length indicated with anchor straps or studs not less than 3 inches (75 mm) long at not more than 8 inches (200 mm) o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.4 MISCELLANEOUS MATERIALS

A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

B. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.

C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

F. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.

C. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended.

D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Locate joints where least conspicuous.

E. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

F. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

C. Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top plates as indicated. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.

2.7 SHELF ANGLES

A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c., unless otherwise indicated.

B. Prime shelf angles located in exterior walls with zinc-rich primer.

C. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.8 METAL LADDERS

A. General:

1. Comply with ANSI A14.3.

B. Steel Ladders:

1. Space siderails 18 inches (457 mm) apart unless otherwise indicated.
2. Siderails: Continuous, 1/2-by-2-1/2-inch (12.7-by-64-mm) steel flat bars, with eased edges.
3. Rungs: 1-inch- (25-mm-) diameter steel bars.
4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
5. Provide nonslip surfaces on top of each rung.
6. Prime exterior ladders, including brackets and fasteners, with zinc-rich primer.

2.9 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

C. Prime exterior miscellaneous steel trim with zinc-rich primer.

2.10 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 40 steel pipe 1/4-inch (6.4-mm) wall-thickness.

1. Cap bollards with 1/4-inch- (6.4-mm-) thick steel plate.

B. Fabricate sleeves for bollard anchorage from steel pipe or tubing with 1/4-inch- (6.4-mm-) thick steel plate welded to bottom of sleeve.

C. Prime bollards with zinc-rich primer.

2.11 DOWNSPOUTS

A. Fabricate downspouts from 1/4-inch- (9.5-mm-) thick pipe.

B. Prime downspouts with zinc-rich primer.

2.12 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

2.13 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.

B. Galvanize loose steel lintels located in exterior walls.

C. Prime loose steel lintels located in exterior walls with zinc-rich primer.

2.14 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.15 FINISHES, GENERAL

A. Finish metal fabrications after assembly.

2.16 STEEL AND IRON FINISHES

A. Shop prime iron and steel items unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

1. Shop prime with universal shop primer.

B. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 3, "Power Tool Cleaning.":

1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
4. Other Items: SSPC-SP 3, "Power Tool Cleaning."

C. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLING METAL BOLLARDS

A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.

B. Anchor bollards in place with concrete footings. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.

C. Fill bollards solidly with concrete, mounding top surface to shed water.

3.3 INSTALLING BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055000

SECTION 055213 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel pipe and tube railings.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected railings.
2. Railing brackets.
3. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For pipe and tube railings, for tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

1. Provide type of bracket with predrilled hole for exposed bolt anchorage and that provides 1-1/2-inch (38-mm) clearance from inside face of handrail to finished wall surface.

2.2 STEEL AND IRON

A. Tubing: ASTM A 500 (cold formed) or ASTM A 513.

B. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.

1. Provide galvanized finish for exterior installations and where indicated.

C. Plates, Shapes, and Bars: ASTM A 36/A 36M.

D. Expanded Metal: ASTM F 1267, Type II (expanded and flattened), Class 1 (uncoated).

1. Style Designation: Refer to drawings.

E. Perforated Metal: Cold-rolled steel sheet, ASTM A 1008/A 1008M, or hot-rolled steel sheet, ASTM A 1011/A 1011M, commercial steel Type B, 0.060 inch (1.52 mm).

F. Woven-Wire Mesh: Intermediate-crimp, per drawings.

2.3 FASTENERS

A. General: Provide the following:

1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5 for zinc coating.

B. Post-Installed Anchors: Torque-controlled expansion anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.

1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

E. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

F. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

H. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION

A. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

B. Form work true to line and level with accurate angles and surfaces.

C. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

D. Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.

E. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

F. Form changes in direction by inserting prefabricated elbow fittings.

G. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

H. Close exposed ends of railing members with prefabricated end fittings.

I. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.

J. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

K. Expanded-Metal Infill Panels: Fabricate infill panels from expanded metal made from same metal as railings in which they are installed.

L. Perforated-Metal Infill Panels: Fabricate infill panels from perforated metal made from steel.

M. Woven-Wire Mesh Infill Panels: Fabricate infill panels from woven-wire mesh crimped into 1-by-1/2-by-1/8-inch (25-by-13-by-3-mm) metal channel frames. Make wire mesh and frames from same metal as railings in which they are installed.

2.6 STEEL AND IRON FINISHES

A. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

1. Do not apply primer to galvanized surfaces.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (6 mm in 3.5 m).

B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact with grout, concrete, masonry, wood, or dissimilar metals.

3.2 ANCHORING POSTS

A. Use metal sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Form or core-drill holes not less than 5 inches (125 mm) deep and 3/4 inch (20 mm) larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill

annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.

C. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members.

3.3 ATTACHING RAILINGS

A. Attach railings to wall with wall brackets, except where end flanges are used. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

B. Secure wall brackets and railing end flanges to building construction as follows:

1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
2. For hollow masonry anchorage, use toggle bolts.
3. For wood stud partitions, use hanger or lag bolts set into studs or wood backing between studs. Coordinate with carpentry work to locate backing members.
4. For steel-framed partitions, use hanger or lag bolts set into wood backing between studs. Coordinate with stud installation to locate backing members.
5. For steel-framed partitions, use self-tapping screws fastened to steel framing or to concealed steel reinforcements.
6. For steel-framed partitions, use toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

3.4 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055213

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Framing with engineered wood products.
3. Rooftop equipment bases and support curbs.
4. Wood blocking, cants, and nailers.
5. Wood sleepers.
6. Plywood backing panels.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.

1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Engineered wood products.
3. Shear panels.
4. Power-driven fasteners.
5. Post-installed anchors.
6. Metal framing anchors.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.

2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
3. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 15 percent for **2-inch nominal (38-mm actual)** thickness or less; 19 percent for more than **2-inch nominal (38-mm actual)** thickness.

C. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, use Category UC3b for exterior construction not in contact with ground and use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

1. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.

C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent. Kiln-dry plywood after treatment to maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

E. Application: Treat all rough carpentry unless otherwise indicated.

1. Framing for raised platforms.
2. Concealed blocking.
3. Roof construction.
4. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

A. Framing Other Than Non-Load-Bearing Partitions: No. 2 grade.

1. Application: Framing other than interior partitions.
2. Species:
   a. Hem-fir (north); NLGA.
   b. Southern pine; SPIB.
   c. Douglas fir-arch; WCLIB or WWPA.
   d. Southern pine or mixed southern pine; SPIB.
   e. Spruce-pine-fir; NLGA.
   f. Douglas fir-south; WWPA.
   g. Hem-fir; WCLIB or WWPA.
   h. Douglas Fir-larch (north); NLGA.
   i. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

B. Framing Other Than Non-Load-Bearing Partitions: Any species and grade with a modulus of elasticity of at least 1,500,000 psi (10 350 MPa for 2-inch nominal (38-mm actual) thickness and 12-inch nominal (286-mm actual) width for single-member use.

C. Exposed Framing: Hand-select material for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.

1. Species and Grade: As indicated above for load-bearing construction of same type.

2.5 ENGINEERED WOOD PRODUCTS

A. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559.

1. Extreme Fiber Stress in Bending, Edgewise: **3100 psi (21.3 MPa)** depth members.
2. Modulus of Elasticity, Edgewise: **2,000,000 psi (13 700 MPa)**.

B. Wood I-Joists: Prefabricated units, I-shaped in cross section, made with solid or structural composite lumber flanges and wood-based structural panel webs, let into and bonded to flanges. Comply with material requirements of and with structural capacities established and monitored according to ASTM D 5055.

1. Web Material: Either OSB or plywood, complying with DOC PS 1 or DOC PS 2, Exposure 1**.**
2. Structural Properties: Depths and design values not less than those indicated.
3. Comply with APA PRI-400. Factory mark I-joists with APA-EWS trademark indicating nominal joist depth, joist class, span ratings, mill identification, and compliance with APA-EWS standard.

C. Rim Boards: Product designed to be used as a load-bearing member and to brace wood I-joists at bearing ends, complying with research or evaluation report for I-joists.

1. Manufacturer: Provide products by same manufacturer as I-joists.
2. Material: All-veneer product, glued-laminated wood, or product made from any combination solid lumber, wood strands, and veneers.
3. Thickness: **1-1/8 inches (28 mm)**.
4. Comply with APA PRR-401, rim board grade. Factory mark rim boards with APA-EWS trademark indicating thickness, grade, and compliance with APA-EWS standard.

2.6 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.
6. Grounds.

B. Dimension Lumber Items: Construction or No. 2 grade lumber of any species.

C. Concealed Boards: 15 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine or southern pine; No. 2 grade; SPIB.
2. Eastern softwoods; No. 2 Common grade; NeLMA.
3. Northern species; No. 2 Common grade; NLGA.
4. Western woods; Construction or No. 2 Common grade; WCLIB or WWPA.

2.7 PLYWOOD BACKING PANELS

D. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C, fire-retardant treated, in thickness indicated or, if not indicated, not less than **3/4-inch (19-mm)** nominal thickness.

2.8 FASTENERS

E. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

F. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

G. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC58 as appropriate for the substrate.

2.9 METAL FRAMING ANCHORS

A. Allowable design loads, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.

1. Use for interior locations unless otherwise indicated.

C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.

1. Use for wood-preservative-treated lumber and where indicated.

2.10 MISCELLANEOUS MATERIALS

D. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

E. Adhesives for gluing, furring, and sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring**,** nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

D. Install shear wall panels to comply with manufacturer's written instructions.

E. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

F. Do not splice structural members between supports unless otherwise indicated.

G. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

H. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

I. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
2. ICC-ES evaluation report for fastener.

3.2 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wall sheathing.
2. Roof sheathing.
3. Sheathing joint and penetration treatment.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements.

1.3 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For following products, from ICC-ES:

1. Preservative-treated plywood.

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS

A. Emissions: Products shall meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Plywood: Either DOC PS 1 or DOC PS 2 unless otherwise indicated.

C. Oriented Strand Board: DOC PS 2.

2.2 PRESERVATIVE-TREATED PLYWOOD

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2[for interior construction, Use Category UC3b for exterior construction].

B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.3 WALL SHEATHING

A. Oriented-Strand-Board Wall Sheathing: Exposure 1 sheathing.

2.4 ROOF SHEATHING

A. Oriented-Strand-Board Roof Sheathing: Exposure 1 sheathing.

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

2.6 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

A. Sealant for Glass-Mat Gypsum Sheathing: Elastomeric, medium-modulus, neutral-curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated and complying with requirements for elastomeric sealants specified in Section 079200 "Joint Sealants."

B. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.

1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches (50 mm) wide, 10 by 10 or 10 by 20 threads/inch (390 by 390 or 390 by 780 threads/m), of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

C. Sheathing Tape for Foam-Plastic Sheathing: Pressure-sensitive plastic tape recommended by sheathing manufacturer for sealing joints and penetrations in sheathing.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's "International Residential Code for One- and Two-Family Dwellings."

D. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:

1. Wall and Roof Sheathing:

a. Nail to wood framing
b. Screw to cold-formed metal framing.
c. Space panels 1/8 inch (3 mm) apart at edges and ends.

END OF SECTION 061600

SECTION 064116 - PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-faced architectural cabinets.
2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets unless concealed within other construction before cabinet installation.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, including panel products high-pressure decorative laminate adhesive for bonding plastic laminate and cabinet hardware and accessories.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

C. Samples:

1. Plastic laminates, for each color, pattern, and surface finish.
2. Thermoset decorative panels, for each color, pattern, and surface finish.

1.3 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.

B. Grade: Premium.

C. Type of Construction: Frameless.

D. Cabinet, Door, and Drawer Front Interface Style: Flush overlay.

E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Nevamar.
b. Formica Corporation.
c. Wilsonart International; Div. of Premark International, Inc.

F. Laminate Cladding for Exposed Surfaces:

1. Vertical Surfaces: Grade HGS.
2. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.

G. Materials for Semiexposed Surfaces:

1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, NEMA LD 3, Grade CLS.
2. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
3. Drawer Bottoms: Thermoset decorative panels.

H. Dust Panels: 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers unless located directly under tops.

I. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As selected by Architect from laminate manufacturer's full range in the following categories:

a. Wood grains, matte finish.
b. Patterns, matte finish.

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 5 to 10 percent.

B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.

1. Recycled Content of Medium-Density Fiberboard and Particleboard: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 5 percent.
2. Composite Wood and Agrifiber Products: Products shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice

for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

3. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.
4. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea formaldehyde.
5. Softwood Plywood: DOC PS 1, medium-density overlay.
6. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde.
7. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.3 CABINET HARDWARE AND ACCESSORIES

A. Butt Hinges: 2-3/4″ five knuckle steel hinges made from 0.095 inch thick metal.

1. Semi Concealed Hinge for Overlay Doors: BHMA A156.9, B01521.

B. Back-Mounted Pulls: BHMA A156.9, B02011.

C. Wire Pulls: Back mounted, solid metal. Stainless Steel Look, Hafele Item No 101.20.753.

D. Catches: Magnetic catches, BHMA A156.9, B03141.

E. Shelf Rests: BHMA A156.9, B04013; metal, two-pin type with shelf hold-down clip.

F. Drawer Slides: BHMA A156.9.
1. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
2. For drawers more than 6 inches (150 mm) high or more than 24 inches (600 mm) wide, provide Grade 1HD-200.

G. Door Locks: BHMA A156.11, E07121.

H. Drawer Locks: BHMA A156.11, E07041.

I. Door and Drawer Silencers: BHMA A156.16, L03011.

J. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Satin Stainless Steel: BHMA 630.

2.4 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

C. Adhesives: Do not use adhesives that contain urea formaldehyde.

D. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.5 FABRICATION

A. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

B. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

C. Install glass to comply with applicable requirements in Section 088000 "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas.

3.2 INSTALLATION

A. Grade: Install cabinets to comply with same grade as item to be installed.

B. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).

C. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

D. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing.

E. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
2. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches (400 mm) o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch (38-mm) penetration into wood framing, blocking, or hanging strips.

END OF SECTION 064116

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Foam-plastic board insulation.
2. Glass-fiber blanket insulation.
3. Mineral-wool blanket insulation.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Research/evaluation reports.

PART 2 - PRODUCTS

2.1 FOAM-PLASTIC BOARD INSULATION

A. Extruded-Polystyrene Board Insulation: ASTM C 578, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. DiversiFoam Products.
b. Dow Chemical Company (The).
c. Owens Corning.
d. Pactiv Building Products.

2. Basis of Design: Owenings Corning Foamular 250 (XPS).

3. Utilized behind stone facing.

2.2 GLASS-FIBER BLANKET INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CertainTeed Corporation.
2. Guardian Building Products, Inc.
3. Johns Manville.
4. Knauf Insulation.
5. Owens Corning.

B. Above Ceilings and concealed locations Reinforced-Foil-Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.2 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Foam-Plastic Board Insulation: Seal joints between units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

C. Glass-Fiber or Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
5. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
6. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.

    a. Exterior Walls: Set units with facing placed toward interior of construction.
    b. Set units with facing placed toward areas of high humidity as indicated.

END OF SECTION 072100

SECTION 072419 - WATER-DRAINAGE EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. EIFS-clad drainage-wall assemblies that are field applied over substrate.
2. Water-resistive coatings.

1.2 PERFORMANCE REQUIREMENTS

A. Class PB EIFS, comply with ICC-ES AC235.

1. Drainage: According to ICC-ES AC24.

1.3 ACTION SUBMITTALS

A. Product Data: For each EIFS component, trim, and accessory, including water-resistive coatings.

B. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer certificates.

B. Product certificates.

C. Product test reports.

D. Field quality-control reports and special inspection reports.

E. Evaluation reports.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An installer who is certified in writing by EIFS manufacturer as qualified to install manufacturer's system using trained workers.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, to set quality standards for materials and execution, and to set quality standards for fabrication and installation.

1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide Dryvit Outsulation Plus MP or comparable product by one of the following:

1. BASF Wall Systems.
2. Corev America, Inc.
3. Dryvit Systems, Inc.
4. Master Wall Inc.
5. Omega Products International, Inc.
6. Parex USA, Inc.
7. Sto Corp.
8. Total Wall, Inc.

C. Source Limitations: Obtain EIFS from single source from single EIFS manufacturer and from sources approved by EIFS manufacturer as compatible with EIFS components.

2.2 PERFORMANCE REQUIREMENTS

A. EIFS Performance: Comply with ASTM E 2568 and with the following:

1. Weathertightness: Resistant to uncontrolled water penetration from exterior, with a means to drain water entering EIFS to the exterior.
2. Impact Performance: ASTM E 2568, Standard impact resistance.
3. Bond Integrity: Free from bond failure within EIFS components or between EIFS and substrates, resulting from exposure to fire, wind loads, weather, or other in-service conditions.

2.3 EIFS MATERIALS

A. Primer/Sealer: EIFS manufacturer's standard substrate conditioner designed to protect substrates from moisture penetration and to improve the bond between substrate and insulation adhesive; that complies with the testing and product requirements of the California Department of Public Health's (formerly, California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Water-Resistive Coatings: EIFS manufacturer's standard formulation and accessories for use as water-resistive barriers; compatible with substrate and complying with physical and performance criteria of ASTM E 2570.

C. Flexible-Membrane Flashing: Cold-applied, self-adhering, self-healing, rubberized-asphalt and polyethylene-film composite sheet or tape and primer; EIFS manufacturer's standard or product recommended in writing by EIFS manufacturer.

D. Insulation Adhesive: EIFS manufacturer's standard formulation designed for indicated use; specifically formulated to be applied to back side of insulation in a manner that creates open vertical channels designed to serve as an integral part of the water-drainage system of the EIFS-clad drainage-wall assembly, compatible with substrate; with VOC content of 50 g/L or less.

E. Expanded Polystyrene Board Insulation: Comply with ASTM C 578.

F. Reinforcing Mesh: Balanced, alkali-resistant, open-weave, glass-fiber mesh treated for compatibility with other EIFS materials, made from continuous multiend strands with retained mesh tensile strength of not less than 150 lbf/in. (21 dN/cm) according to ASTM E 2098.

G. Base-Coat Materials: EIFS manufacturer's standard mixture.

H. Waterproof Adhesive/Base-Coat Materials: EIFS manufacturer's standard waterproof formulation with VOC content of 50 g/L or less.

I. Primer: EIFS manufacturer's standard factory-mixed, elastomeric-polymer primer for preparing base-coat surface for application of finish coat.

J. Finish-Coat Materials: EIFS manufacturer's standard acrylic-based coating.

1. Colors: As selected by Architect from manufacturer's full range including custom.
2. Texture: Sandblast.

K. Trim Accessories: Type as designated or required to suit conditions indicated and to comply with EIFS manufacturer's written instructions; manufactured from UV-stabilized PVC; and complying with ASTM D 1784, manufacturer's standard cell class for use intended, and ASTM C 1063.

PART 3 - EXECUTION

3.1 EIFS INSTALLATION

A. Comply with ASTM C 1397, ASTM E 2511, and EIFS manufacturer's written instructions for installation of EIFS as applicable to each type of substrate indicated.

B. Board Insulation: Adhere insulation to substrate in compliance with ASTM C 1397 and the following:

1. Apply adhesive to insulation by notched-trowel method, with notches oriented vertically to produce drainage channels that remain functional after the insulation is adhered to substrate.
2. Coordinate installation of flashing and insulation to produce wall assembly that does not allow water to penetrate behind flashing and water-resistive barrier.

C. Expansion Joints: Install at locations indicated and where required by EIFS manufacturer.

D. Waterproof Adhesive/Base Coat: To exposed surfaces of insulation, apply in minimum thickness recommended in writing by EIFS manufacturer over sloped surfaces, windowsills, parapets.

E. Base Coat: Apply to exposed surfaces of insulation and foam build-outs in minimum thickness recommended in writing by EIFS manufacturer.

F. Reinforcing Mesh: Embed reinforcing mesh in wet base coat to produce wrinkle-free installation with mesh continuous at corners, overlapped not less than 2-1/2 inches (64 mm) or otherwise treated at joints to comply with ASTM C 1397 and EIFS manufacturer's written instructions. Do not lap reinforcing mesh within 8 inches (204 mm) of corners. Completely embed mesh, applying additional base-coat material if necessary, so reinforcing-mesh color and pattern are invisible.

G. Additional Reinforcing Mesh: Apply strip reinforcing mesh around openings, extending 4 inches (100 mm) beyond perimeter. Apply additional 9-by-12-inch (230-by-300-mm) strip reinforcing mesh diagonally at corners of openings (re-entrant corners). Apply 8-inch- (200-mm-) wide, strip reinforcing mesh at both inside and outside corners unless base layer of mesh is lapped not less than 4 inches (100 mm) on each side of corners.

H. Primer: Apply over dry base coat according to EIFS manufacturer's written instructions.

I. Finish Coat: Apply over dry primed base coat, maintaining a wet edge at all times for uniform appearance, in thickness required by EIFS manufacturer to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.

3.2 FIELD QUALITY CONTROL

A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:

1. As stipulated in Ch. 17 of the IBC.
2. According to ICC-ES AC24.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. EIFS Tests and Inspections: According to ASTM E 2359 ICC-ES AC24.

D. EIFS will be considered defective if it does not pass tests and inspections.

END OF SECTION 072419

SECTION 072600 - VAPOR BARRIER

PART 1 – GENERAL

1.1 SUMMARY

A. Products supplied under this section:

1. Vapor barrier and installation accessories for installation under concrete slabs.

B. Related sections:

2. Section 03 30 00 Cast-in-Place Concrete

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM E1745-17 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Granular Fill Under Concrete Slabs.
2. ASTM E1643-11 Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Granular Fill Under Concrete Slabs.

B. Technical Reference - American Concrete Institute (ACI):

1. ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.
2. ACI 302.1R-15 Guide to Concrete Floor and Slab Construction.

1.3 SUBMITTALS

A. Quality control/assurance:

1. Summary of test results per paragraph 9.3 of ASTM E1745.
2. Manufacturer’s samples and literature.
3. Manufacturer’s installation instructions for placement, seaming, penetration prevention and repair, and perimeter seal per ASTM E1643.
4. All mandatory ASTM E1745 testing must be performed on a single production roll per ASTM E1745 Section 8.1.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Vapor barrier shall have all the following qualities:

1. Maintain permeance of less than 0.01 Perms [grains/(ft^2 · hr · inHg)] as tested in accordance with mandatory conditioning tests per ASTM E1745 Section 7.1 (7.1.1-7.1.5).
2. Other performance criteria:

    a. Strength: ASTM E1745 Class A.
    b. Thickness: 15 mils minimum

3. Provide third party documentation that all testing was performed on a single production roll per ASTM E1745 Section 8.1

B. Vapor barrier products:

1. Basis of Design: Stego Wrap Vapor Barrier (15-mil) by Stego Industries LLC., (877) 464-7834.
2. Alternative manufacturers meeting specification will be accepted. Entire system shall be by single manufacturer.

2.2 ACCESSORIES

A. Seams:

1. Stego Tape

B. Sealing Penetrations of Vapor barrier:

1. Stego Mastic
2. Stego Tape

C. Perimeter/edge seal:

1. Stego Crete Claw
2. Stego Term Bar
3. StegoTack Tape

PART 3 – EXECUTION

3.1 PREPARATION

A. Ensure that subsoil is approved by Architect or Geotechnical Engineer.

1. Level and compact base material.

3.2 INSTALLATION

A. Install vapor barrier in accordance ASTM E1643.

1. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.

2. Extend vapor barrier to the perimeter of the slab. If practicable, terminate it at the top of the slab, otherwise (a) at a point acceptable to the structural engineer or (b) where obstructed by impediments, such as dowels, waterstops, or any other site condition requiring early termination of the vapor barrier. At the point of termination, seal vapor barrier to the foundation wall, grade beam or slab itself.

    a. Seal vapor barrier to the entire perimeter wall or footing/grade beam with double sided StegoTack Tape, or both Stego Term Bar and StegoTack Tape, per manufacturer's instructions. Ensure the concrete is clean and dry prior to adhering tape.

3. Overlap joints 6 inches and seal with manufacturer's seam tape.
4. Apply seam tape/Crete Claw to a clean and dry vapor barrier.
5. Seal all penetrations (including pipes) per manufacturer's instructions.
6. For interior forming applications, avoid the use of non-permanent stakes driven through vapor barrier. Use blunt-end and/or threaded nail stakes (screed pad posts) and insert them into Beast Foot. Ensure Beast Foot's peel-and-stick adhesive base is fully adhered to the vapor barrier.
7. If non-permanent stakes must be driven through vapor retarder, repair as recommended by vapor retarder manufacturer.
8. Use reinforcing bar supports with base sections that eliminate or minimize the potential for puncture of the vapor barrier.
9. Repair damaged areas with vapor barrier material of similar (or better) permeance, puncture and tensile.
10. For vapor barrier-safe concrete screeding applications, install Beast Screed (vapor barrier-safe screed system) per manufacturer's instructions prior to placing concrete.

END OF SECTION 072600

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SECTION 072726.01 – FLUID APPLIED VAPOR PERMEABLE AIR BARRIER MEMBRANE

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. This Specification shall be read as a whole by all parties concerned. Each Section may contain more or less than the complete Work of any trade. The Contractor is solely responsible to make clear to the Subcontractors the extent of their Work.

1.2 DESCRIPTION

A. Supply labor, materials and equipment to complete the Work as shown on the Drawings and as specified herein to bridge and seal the following air leakage pathways and gaps:

1. Connections of the walls to the roof air barrier.
2. Connections of the walls to the foundations.
3. Seismic and expansion joints.
4. Openings and penetrations of window and door frames, store front, curtain wall.
5. Piping, conduit, duct and similar penetrations.
6. Masonry ties, screws, bolts and similar penetrations.
7. All other air leakage pathways in the building envelope.

B. Materials and installation methods of the primary water-resistive vapor permeable air barrier membrane system and accessories.

1.3 PERFORMANCE REQUIREMENTS

A. Provide an asphalt base water-resistive vapor permeable air barrier membrane system constructed to perform as a continuous air barrier, and as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. Membrane system shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air sealant materials at such locations, changes in substrate, perimeter conditions and penetrations. Joints and seals shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to resist positive and negative pressure from wind, stack effect and mechanical ventilation.

B. Water-resistive vapor permeable air barrier membrane system to be applied to the minimum uniform thickness specified and as utilized in the referenced Standard Test Methods.

1.4 RELATED SECTIONS

A. Masonry: Section 040500

B. Insulation: Section 072100

C. Sealants: Section 079000

D. Flashing: Section 076000

E. Gypsum Sheathing: Section 092000

1.5 REFERENCES

A. The following standards are applicable to this section:

1. ASTM E 2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
2. ASTM E 2178: Standard Test Method for Air Permeance of Building Materials.
3. ASTM E 283: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
4. ASTM E 96: Water Vapor Transmission of Materials.
5. AATCC 127 Water Resistance Hydrostatic Pressure Test.
6. ASTM D 1970: Sealability.
7. ICC-ES AC 212: Acceptance Criteria for Water Resistive Coatings.
8. ASTM E 84: Test for Surface Burning Characteristics of Building Materials

1.6 SUBMITTALS

A. Submit documentation from an approved independent testing laboratory certifying the air leakage rates of the air barrier membranes assembly, including primary membrane, primer and sealants have been tested to meet ASTM E 2357.

B. Submit documentation from an approved independent testing laboratory certifying the air leakage and vapor permeance rates of the air barrier membranes, including primary membrane and transition sheets, exceed the requirements of the Massachusetts Energy Code and in accordance with ASTM E 2178.

1. Test report submittals shall include test results on porous substrate and include sustained wind load and gust load air leakage results.

C. Submit manufacturers' current product data sheets for the air barrier membrane system.

1.7 QUALITY ASSURANCE

A. Submit document stating the applicator of the primary water-resistive vapor permeable air barrier membranes specified in this section is qualified by the manufacturer as suitable for the execution of the Work.

B. Perform Work in accordance with manufacturer's written instructions and this specification.

C. Maintain one copy of manufacturer's written instructions on site.

D. Allow access to Work site by the air barrier membrane manufacturer's representative.

E. Components used shall be sourced from one manufacturer, including sheet membrane, water-resistive vapor permeable air barrier sealants, primers, mastics, and adhesives.
F. Single-Source Responsibility:

1. Obtain water-resistive vapor permeable air barrier materials from a single manufacturer regularly engaged in manufacturing the product.
2. Provide products which comply with all federal, state and local regulations controlling use of volatile organic compounds (VOCs).

1.8 MOCK-UP

A. Construct mock-up in accordance with Section 01 43 39 – Mock-ups.

B. Provide mock-up of water-resistive vapor permeable air barrier materials under provisions of Section 01 33 23 - Shop Drawings, Product Data and Samples.

1.9 DELIVERY, STORAGE AND HANDLING

A. Refer to current Product MSDS for proper storage and handling.

B. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.

C. Store role materials on end in original packaging. Protect rolls from direct sunlight until ready for use.

D. Store water-resistive vapor permeable air barrier membranes, adhesives and primers at temperatures of 40 degrees F and rising.

E. Keep solvent away from open flame or excessive heat.

F. Wasted Management and Disposal.

1. Separate and recycle waste materials in accordance with Section [01355 - Waste Management and Disposal], and with the Waste Reduction Work Plan.

G. Contractor to verify compliance for Volatile Organic Compounds (VOC) limitations of products to comply with all federal, state and local regulations controlling use of volatile organic compounds (VOCs).

1.10 COORDINATION

A. Ensure continuity of the specified membranes throughout the scope of this section.

1. Air barrier membrane to include liquid applied water-resistive vapor permeable air barrier, transition membranes and sealant at penetrations.
2. Drainage plane to include water resistive barrier and flexible flashings to exterior.

1.11 WARRANTY

A. Provide a written warranty from the manufacturer against defects of materials for a period of two (2) years, beginning with date of substantial completion of the project.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Air barrier membrane components and accessories must be obtained as a single-source to ensure total system compatibility and integrity.

1. Acceptable system by Sika Corp
201 Polito Avenue
Lyndhurst, NJ
800 933 SIKA (7452)
www.Sikausa.com

2.2 MEMBRANES (Basis-of-Design)

A. Primary vapor permeable air and rain barrier membrane for temperatures above 40 degrees F and rising shall be Sikagard® 530 Liquid Applied Acrylic Vapor Permeable Air Barrier by Sika Corp, a low VOC one component elastomeric acrylic membrane that may be trowel, brush, roller or spray applied. Membrane shall have the following physical properties:

1. Color: Yellow.
2. Air permeability: 0.0001CFM/ft2 @ 1.6 lbs/ft2 to ASTM E 2178.
3. Tested to ASTM E 2357 for Air Leakage of Air Barrier Assemblies.
4. Water vapor permeance (21 mil dry thickness): 11 perms to ASTM E 96 Method B.
5. Nominal wet film thickness: 40 mils.
6. Recycled Content by weight: 25%.
7. VOC: <50g/l.
8. Fastener Sealability: Pass to ASTM D 1970.
9. Water Resistance: Pass to AATCC 127.
10. May be exposed for up to 6 months.
11. FSI of 20 & SDI of 25 to ASTM E 84.

B. Self-adhering membrane for all window jambs, headers, door openings, inside and outside corners, joint treatment and other transitions shall be SikaMultiSeal® 515 Self-Adhered Transition Seam Tape by Sika Corp, a self-adhering polyester-backed, synthetic butyl rubber based adhesive membrane for wall construction, specifically designed to be water resistant. Membrane shall have the following physical properties:

1. Membrane Thickness: 0.0394 inches (40 mils).
2. Low temperature flexibility: -30 degrees F.
3. Elongation: 500% to ASTM D 412-modifed.

2.3 LIQUID SEAM AND PENETRATION SEALANTS

A. Liquid seam sealant shall be Sikaflex® 110 Liquid Seam Sealant by Sika Corp, a moisture cure, medium modulus polyether sealing compound having the following physical properties:

1. Compatible with air barrier, roofing and waterproofing membranes and substrate.
2. Set Time: 1 hour @ 72 degrees, 40% RH.
3. Solids: 100%.
4. Elongation: 200% to ASTM D 412/C1135.
5. Joint Movement 12.5%+/- ASTM C 719.
6. Seals construction joints.

B. Penetration sealant shall be Sikasil WS 290 by Sika Corp, a one-part, neutral-curing, ultra low-modulus silicone sealant that cures to a durable, flexible building sealant and having the following physical properties:

1. Compatible with air barrier, roofing and waterproofing membranes and substrate.
2. Tensile Properties (ASTM D-412) at 21 days.
3. Tensile Stress: 165 psi (1.14 MPa).
4. Elongation at Break: 1200%.
5. Modulus of Elasticity: 100% 42 psi (0.29 MPa).

2.4 PRIMER AND SURFACE CONDITIONER

A. Primer for self-adhering transition and flashing membrane at all temperatures shall be Sikagard® 510 Transition Seam Tape Primer by Sika Corp, a high tack adhesive primer, quick setting, having the following physical properties:

1. Color: White.
2. Solids by weight: 37%.
3. Drying time (initial set): 30 minutes.

B. Surface conditioner for self-adhering transition and flashing membrane at temperatures above 40 degrees F shall be Sikagard® 530 Liquid Air Barrier Membrane having the following physical properties:

1. Color: Yellow.
2. Solids by weight: 64%.
3. Application Rate: 160 sq.ft/gallon to a uniform wet film thickness of 10 mils.
4. Drying time (initial set): 60 minutes.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and conditions are ready to accept the Work of this section. Notify engineer in writing of any discrepancies. Commencement of the Work or any parts thereof shall mean acceptance of the prepared substrates.

B. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill voids, gaps and spalled areas in substrate to provide an even plane. Strike masonry joints flush.

C. Where curing compounds are used they must be clear resin based without oil, wax or pigments.

D. Do not proceed with application of air barrier membrane when rain is expected within 24 hours.

E. Condition materials to room temperature prior to application to facilitate handling.

3.2 SURFACE PREPARATION

A. Ensure all preparatory Work is complete prior to applying primary air barrier membrane.

B. Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing and fastened into solid backing.

C. Mechanical penetrations (piping, conduit & vents) shall be secured solid and fastened into solid backing.

D. New concrete should be cured for no less than 14 days prior to the application of primer and self-adhered transition seam tape.

E. Thoroughly mix primary vapor permeable air and rain barrier membrane prior to installation.

3.3 INSTALLTION OF AIR BARRIER SYSTEM

A. JOINT TREATMENT

1. Seal joints ¼ inch and less between panels of exterior grade gypsum, DensGlass Gold, plywood, OSB or cementitious panels with liquid seam sealant.
   a. Fill joint between sheathing with approved liquid seam sealant ensuring contact with all edges of sheathing board.

2. Seal gaps and voids or irregular joints greater than ¼ inch between panels of exterior grade gypsum, DensGlass Gold, plywood, OSB or cementitious panels with a strip of self-adhering transition membrane lapped a minimum of 3 inches on both sides of the joint.
   a. Prepare and/or prime surfaces as appropriate to achieve surface adhesion and allow to dry prior to placement of self-adhering transition membrane.
   b. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all end and side laps of membrane.
   c. Roll all laps and membrane with a counter top roller to ensure seal.

B. INSIDE AND OUTSIDE CORNERS

1. Seal inside and outside corners with a strip of self-adhering transition membrane extending a minimum of 3 inches on either side of the corner detail.
   a. Prepare and/or prime surfaces as appropriate to achieve surface adhesion and allow to dry prior to placement of self-adhering transition membrane.
   b. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all end and side laps of membrane.
   c. Roll all laps and membrane with a counter top roller to ensure seal.

C. TRANSITON AREAS

1. Tie-in to structural beams, columns, floor slabs and intermittent floors, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials as indicated in drawings with self-adhering transition membrane.
   a. Prime surfaces as per manufacturers' instructions and as appropriate to achieve surface adhesion and allow to dry prior to placement of self-adhering transition membrane.
   b. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Provide minimum 3 inch lap to all substrates.
   c. Ensure minimum 2 inch overlap at all end and side laps of membrane.
   d. Roll all laps and membrane with a counter top roller to ensure seal.
2. Tie-in to PVC roofing Systems as indicated in drawings with specified liquid acrylic air barrier membrane.
   a. Apply by brush, roller or spray a complete and continuous unbroken film of liquid vapor permeable air and rain barrier membrane to the top of the wall and/or roof parapet.
   b. Allow liquid acrylic vapor permeable air and rain barrier membrane to fully dry.
   c. Align and position roof flashing & transition membrane over the outside face of the wall and extend a minimum 3 inch to lap over air barrier membrane and wall substrate.
   d. Secure PVC roofing membrane with acceptable termination bar as detailed.

D. WINDOWS AND ROUGH OPENINGS

1. Wrap jamb of rough openings with specified self-adhering transition membrane as detailed.
2. Extend specified self-adhering transition membrane into rough window openings sufficient to provide a connection to interior vapor retarder.
   a. Prepare and/or prime surfaces as appropriate to achieve surface adhesion and allow to dry prior to placement of self-adhering transition membrane.
   b. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inches overlap at all side laps and minimum 3 inches overlap at all end laps of membrane.
   c. Roll all laps and membrane with a counter top roller to ensure seal.

E. PRIMARY AIR BARRIER

1. Apply by brush, roller, spray or flat trowel a complete and continuous unbroken film of

liquid vapor permeable air and rain barrier membrane.

a. For temperatures above 40 degrees F and rising, apply one component acrylic water-resistive vapor permeable air barrier membrane at a rate of 40 sq.ft/gallon to a uniform wet film thickness of 40 mils.

2. Spray apply or brush around all projections and penetrations ensuring a complete and continuous air barrier membrane.
3. Allow air barrier membrane to dry as per manufacturers recommendations prior to placement of cladding materials.
4. Subject to porosity of substrate, recommend to back roll spray applications.

3.4 APPLICATION OF PENETRATION SEALANT

A. Seal membrane terminations, heads of mechanical fasteners, masonry tie fasteners, around penetrations, duct work, electrical and other apparatus extending through the primary vapor permeable air and rain barrier membrane and around the perimeter edge of membrane terminations at window and door frames with specified penetration sealant.

B. Seal the leading edge of membrane terminations and reverse laps.

3.5 FIELD QUALITY CONTROL

A. Make notification when sections of work are complete to allow review prior to covering water-resistive vapor permeable air barrier system.

B. Owner to engage independent consultant to observe substrate and membrane installation prior to placement of cladding systems and provide written documentation of observations.

3.6 PROTECTION

A. Damp substrates must not be inhibited from drying out. Drying time vary depending on interior and exterior temperature, and interior and exterior relative humidity. Do not expose the backside of the substrate to moisture or rain.

B. Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane. Protect uncured air barrier Work against wet weather conditions for a minimum of 24 hours. Protect air barrier membrane from damage and inclement weather during the construction phase.

C. Air barrier membranes are not designed for permanent exposure. Good practice calls for covering as soon as possible. Membrane exposure to UV not to exceed 6 months.

END OF SECTION 072726

SECTION 075423 – THERMOPLASTIC POLYOLEFIN (TPO) MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Induction welded TPO membrane roofing system.

B. Cover board.

C. Roof insulation.

1.2 RELATED SECTIONS

A. Division 06 Section "Miscellaneous Rough Carpentry" for wood nailers, cants, curbs, and blocking (and for wood-based, structural-use roof deck panels).

B. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counter flashings.

C. Division 22 Section "Storm Drainage Piping Specialties" for roof drains.

1.3 REFERENCES

A. Roofing Terminology: Refer to the following publications for definitions of roofing work related terms in this Section:

1. ASTM D 1079 “Standard Terminology Relating to Roofing and Waterproofing.”
2. Glossary of NRCA’s “The NRCA Roofing and Waterproofing Manual.”
3. Roof Consultants Institute “Glossary of Building Envelope Terms.”

B. Sheet Metal Terminology and Techniques: SMACNA “Architectural Sheet Metal Manual.”

1.4 DESIGN CRITERIA

A. General: Installed roofing membrane system shall remain watertight; and resist specified wind uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Roofing materials shall be compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.

C. Installer must comply with current code requirements based on authority having jurisdiction.

D. Wind Uplift Performance: Roofing system shall be identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressure calculated in accordance with ASCE 7.

E. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.

1.5 SUBMITTALS

A. Product Data: Manufacturer's data sheets for each product to be provided.

B. Detail Drawings: Provide roofing system plans, elevations, sections, details, and details of attachment to other Work, including:

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Crickets, saddles, and tapered edge strips, including slopes.
4. Insulation fastening patterns.

C. Verification Samples: Provide for each product specified.

D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

E. Maintenance Data: Refer to Johns Manville's latest published documents on www.JM.com.

F. Guarantees: Provide manufacturer's current guarantee specimen.

G. Prior to beginning the work of this section, roofing sub-contractor shall provide a copy of the final System Assembly Letter issued by Johns Manville Roofing Systems indicating that the products and system to be installed shall be eligible to receive the specified manufacturer's guarantee when installed by a certified JM contractor in accordance with our application requirements, inspected and approved by a JM Technical Representative.

H. Prior to roofing system installation, roofing sub-contractor shall provide a copy of the Guarantee Application Confirmation document issued by Johns Manville Roofing Systems indicating that the project has been reviewed for eligibility to receive the specified guarantee and registered.

1. Swaim Associates Ltd. must be listed as the Specifier/Consultant of record in the appropriate fields on the Guarantee Application Confirmation.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive the specified manufacturer's guarantee.

B. Manufacturer Qualifications: Qualified manufacturer that has UL listing for roofing system identical to that used for this Project.

C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 329.

D. Test Reports:

1. Roof drain and leader test or submit plumber’s verification.

E. Source Limitations: Obtain all components from the single source roofing manufacturer guaranteeing the roofing system. All products used in the system must be labeled by the single source roofing manufacturer issuing the guarantee.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when current and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written instructions and guarantee requirements.

1.9 GUARANTEE

A. Provide manufacturer's system guarantee equal to Johns Manville's Peak Advantage No Dollar Limit Roofing System Guarantee.

1. Single-Source special guarantee includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, cover board, walkway products,

manufacturer's edge metal products, and other single-source components of roofing system marketed by the manufacturer.
2. Guarantee Period: **20** years from date of Substantial Completion.
3. Contractor is required to list Swaim Associates Ltd. as the Specifier/Consultant of record in the appropriate fields ("Specifier Account") when applying for the manufacturer's warranty.

B. Installer's Guarantee: Submit roofing Installer's guarantee, including all components of roofing system for the following guarantee period:

1. Guarantee Period: Two years from date of Substantial Completion.

C. Existing Guarantees: Guarantees on existing building elements should not be affected by scope of work.

1. Installer is responsible for coordinating with building owner's representative to verify compliance.

PART 2 - PRODUCTS

2.1 THERMOPLASTIC POLYOLEFIN ROOFING MEMBRANE - TPO

A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: ASTM D 6878, uniform, flexible sheet formed from a thermoplastic polyolefin, internally fabric or scrim reinforced. Basis of Design: JM TPO

1. Membrane Thickness: 60 mils (1.52 mm), nominal
2. Exposed Face Color: White

B. Equal Product: GAF TRBN160 – Ever Guard TPO – 60 mil

C. Other: Equal products by prior approval prior to bid.

2.2 AUXILIARY ROOFING MATERIALS – SINGLE PLY

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.

B. Sheet Flashing (Self-Adhered): 60 mil (1.5 mm) thick, manufacturer's internally reinforced or scrim reinforced with weldable selvage edges on each side of roll, one encapsulated edge and self-adhering capabilities in a wide installation temperature range. Basis of Design: JM TPO SA – Flashing Membrane

1. Serviceable Installation Temperature: 20°F (-7°C) and above.

C. Self-Adhered Primer: One-part penetrating primer solution to enhance the adhesion of self-adhering membranes. SA Primer

D. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, with anchors. Basis of Design: JM Termination Systems

E. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer. Basis of Design: High Load Fasteners

F. Induction Welding Plate: A round specially coated Galvalume® plate with a recessed center and raised flat bonding surface specifically designed for induction welding application. Basis of Design: JM TPO RhinoPlates

G. Miscellaneous Accessories: Provide pourable sealers, primers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, cover strips, and other accessories required for full installation. Basis of Design: JM TPO Pourable Sealer A & B, JM TPO Pipe Boots, JM TPO Universal Corners, JM TPO Edge Sealant, JM TPO T-Joint Patch, JM TPO Membrane Cleaner, JM TPO Membrane Primer, JM TPO Membrane Primer (Low VOC), JM TPO Sealing Mastic, JM TPO Cover Tape, JM TPO Detail Membrane, JM TPO Peel & Stick 10" RPS, JM TPO Peel & Stick 6" RTS, JM TPO-Coated Metal, JM TPO Curb Flashing and JM Single Ply Caulk

2.3 AUXILIARY ROOFING SYSTEM COMPONENTS

A. Coping System: Manufacturer’s factory fabricated coping consisting of a base piece and a snap-on cap. Provide product from single-source roofing system supplier that is included in the No Dollar Limit guarantee. Basis of Design: Presto-Lock Coping

B. Fascia System: Manufacturer’s factory fabricated fascia consisting of a base piece and a snap-on cover. Provide product from single-source roofing system supplier that is included in the No Dollar Limit guarantee. Basis of Design: Presto-Tite Fascia

C. Metal Edge System: Manufacturer’s factory fabricated metal edge system used to terminate the roof at the perimeter of the structure. Provide product from single-source roofing system supplier that is included in the No Dollar Limit guarantee. Basis of Design: JM TPO-Coated Metal

D. Metal Flashing Sheet: Metal flashing sheet is specified in Division 07 Section "Sheet Metal Flashing and Trim."

2.4 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads sourced from membrane roofing system manufacturer. Basis of Design: JM TPO Walkpad

2.5 COVER BOARD

A. High-Density Polyisocyanurate: ASTM C 1289, Type II, Class 4, Grade 3, High-density Polyisocyanurate technology bonded in-line to mineral-surfaced, fiber glass reinforced facers with greater than 140 lbs of compressive strength. Basis of Design: Invinsa Roof Board

2.6 ROOF INSULATION

A. General: Preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2 (20 psi), Basis of Design: ENRGY 3

1. Provide insulation package with minimum R Value: 5
2. Provide insulation package with minimum thickness: 1”
3. Provide insulation package in multiple layers.
4. Minimum Long-Term Thermal Resistance (LTTR): 5.7 per inch.
   a. Determined in accordance with CAN/ULC S770 at 75ºF (24ºC)

2.7 TAPERED INSULATION

A. Tapered Insulation: ASTM C 1289, Type II, Class 1, Grade 2 (20 psi), provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48), unless otherwise indicated. Basis of Design: Tapered ENRGY 3

2.8 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

B. Provide factory preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated. Basis of Design: Diamondback Pre-Cut Cricket, Tapered Fesco Edge Strip

C. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and furnished by roofing system manufacturer. Basis of Design: UltraFast Fasteners and Plates

D. Wood Nailer Strips: Comply with requirements in Division 06 Section **"**Miscellaneous Rough Carpentry**."**

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions for compliance with the requirements affecting performance of roofing system.

1. General:
   a. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
   b. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

2. Wood Decks:
   a. Verify that wood decking is visibly dry and free of moisture according to manufacturer's approved method.
   b. Verify that wood has ability to provide minimum fastener pull-out resistance.
      1) Provide documentation of pull out resistance values using manufacturer's approved procedures.

3. Ensure general rigidity and proper slope for drainage.

4. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units more than 1/16 inch (1.6 mm) out of plane relative to adjoining deck.

B. Unacceptable panels should be brought to the attention of the General Contractor and Project Owner's Representative and must be corrected prior to installation of roofing system.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean and remove from substrate sharp projections, dust, debris, moisture, and other substances detrimental to roofing installation in accordance with roofing system manufacturer's written instructions.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSULATION INSTALLATION

A. Coordinate installation of roof system components so insulation and cover board is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system manufacturer's written instructions for installation of roof insulation and cover board.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation boards with long joints in a continuous straight line. Joints should be staggered between rows, abutting edges and ends per manufacturer’s written instructions. Fill gaps exceeding 1/4 inch (6 mm) with like material.

E. Install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.

F. Trim surface of insulation boards where necessary at roof drains so completed surface is flush and does not restrict flow of water.

G. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

H. Preliminarily Fastened Insulation**:** Install insulation with fasteners at rate required by roofing system manufacturer or applicable authority, whichever is more stringent.
   1. Fasten top layer to resist uplift pressure at corners, perimeter, and field of roof.

I. Proceed with installation only after unsatisfactory conditions have been corrected.

3.4 COVER BOARD INSTALLATION

A. Coordinate installing membrane roofing system components so cover board is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system manufacturer's written instructions for installing roof cover board.

C. Install cover board with long joints in a continuous straight line. Joints should be staggered between rows, abutting edges and ends per manufacturer’s written instructions. Fill gaps exceeding 1/4 inch (6 mm) with cover board.

   1. Cut and fit cover board within 1/4 inch (6 mm) of nailers, projections, and penetrations.

D. Trim surface of cover board where necessary at roof drains so completed surface is flush and does not restrict flow of water.

   1. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

E. Preliminarily Fastened Insulation for Mechanically Fastened Systems: Install cover board with fasteners at rate required by roofing system manufacturer or applicable authority, whichever is more stringent.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.5 ROOFING MEMBRANE INSTALLATION, GENERAL

A. Install roofing membrane in accordance with roofing system manufacturer's written instructions, applicable recommendations of the roofing manufacturer and requirements in this Section.

B. Cooperate with testing and inspecting agencies engaged or required to perform services for installing roofing system.

C. Coordinate installing roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is imminent.

1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation.
2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
3. Remove and discard temporary seals before beginning work on adjoining roofing.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.6 INDUCTION WELDED ROOFING MEMBRANE INSTALLATION

A. Install roofing membrane over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.

B. Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

C. Always install membrane laps perpendicular to the steel deck flutes. “Picture Frame” installation method is not permitted.

D. Apply roofing membrane with side laps shingled with roof slope, where possible.

E. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.
2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.

    a. Remove and repair any unsatisfactory sections before proceeding with Work.

3. Repair tears, voids, and lapped seams in roofing membrane that do not meet requirements.

F. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.

G. Induction Welding Installation:

1. Perform calibration and set-up as detailed by the Induction Welder Owner's Manual
2. Center the Induction Welder over the first plate in pattern and activate the weld.

   a. Induction Welder must be centered over the plate to create a 100% bond.
   b. If an error occurs during activation, refer to the induction welder owner's manual for corrective action.

3. Prior to every use, clean face of Heat Sink Magnet.
4. Place Heat Sink Magnet over the welded plate.

   a. Keep Heat Sink Magnet in place at least 45 seconds while the assembly cools.

5. Repeat process for each plate.

H. Proceed with installation only after unsatisfactory conditions have been corrected.

3.7 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates per membrane roofing system manufacturer's written instructions.

B. Self-Adhere membrane to smooth approved substrates, when substrate temperatures are 40°F (4.5°C) and rising.

1. The use of SA Primer or SA LVOC Primer is required for flashing applications on curbs and parapet walls for temperatures between 40°F (4.5°C) and 20°F (-7°C).
2. The use of SA Primer or SA LVOC Primer is required for flashing applications over approved substrates with a porous or rough surface, including: Dens Deck Prime, Dens Deck, DEXcell, concrete and smooth faces CMU.

C. Flash penetrations and field-formed inside and outside corners per manufacturer's installation instructions.

D. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.8 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Heat weld and adhere walkway products to substrate according to roofing system manufacturer's written instructions.

B. Roof-Paver Walkways: Install walkway roof pavers per manufacturer's written instructions in locations indicated, to form walkways. Leave 3 inches (75 mm) of space between adjacent roof pavers.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.

B. Final Roof Inspection: Arrange for roofing system manufacturer's Registered Roof Observer (RRO) to inspect roofing installation on completion and submit report to Architect.

1. Notify Architect or Owner 48 hours in advance of date and time of inspection.

C. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.10 PROTECTION AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075423

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manufactured reglets with counterflashing.
2. Formed roof-drainage sheet metal fabrications.
3. Formed low-slope roof sheet metal fabrications.
4. Formed wall sheet metal fabrications.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Distinguish between shop- and field-assembled work.
3. Include identification of finish for each item.
4. Include pattern of seams and details of termination points, expansion joints and expansion-joint covers, direction of expansion, roof-penetration flashing, and connections to adjoining work.

C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Product test reports.

C. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1.6 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressure:

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Metallic-Coated Steel Sheet: Provide aluminum-zinc alloy-coated steel sheet according to ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation, Grade 40 (Grade 275); prepainted by coil-coating process to comply with ASTM A 755/A 755M.

1. Surface: Manufacturer's standard clear acrylic coating on both sides.
2. Exposed Coil-Coated Finish:
   a. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

3. Color: As selected by Architect from manufacturer's full range.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

    a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
    b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
    c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

C. Solder:

1. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.4 MANUFACTURED REGLETS

A. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions and with interlocking counterflashing on exterior face, of same metal as reglet.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product:

    a. Cheney Flashing Company.
    b. Fry Reglet Corporation.
    c. Heckmann Building Products, Inc.
    d. Hickman, W. P. Company.
    e. Hohmann & Barnard, Inc.
    f. Keystone Flashing Company, Inc.
    g. National Sheet Metal Systems, Inc.
    h. Sandell Manufacturing.

3. Material: Aluminum, 0.024 inch (0.61 mm) thick.
4. Finish: With manufacturer's standard color coating.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Obtain field measurements for accurate fit before shop fabrication.
2. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
3. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

C. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

E. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

F. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer.

2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- (2400-mm-) long sections. Furnish flat-stock gutter brackets and gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.

B. Downspouts: Fabricate round downspouts to dimensions indicated, complete with mitered elbows.

1. Structural steel per details

C. Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, 4-inch- (100-mm-) wide wall flanges to interior, and base extending 4 inches (100 mm) beyond cant or tapered strip into field of roof. Fabricate from the following materials:

1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.

D. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape required, complete with outlet tubes. Fabricate from the following materials:

1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof Edge Flashing (Gravel Stop and Fascia Cap: Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long sections. Furnish with 6-inch- (150-mm-) wide, joint cover plates. Shop fabricate interior and exterior corners.

1. Fabricate from the Following Materials:

a. Aluminum: 0.050 inch (1.27 mm) thick.
b. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm).

B. Copings: Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and interior leg. Miter corners, fasten and seal watertight. Shop fabricate interior and exterior corners.

1. Fabricate from the Following Materials:

a. Aluminum: 0.050 inch (1.27 mm) thick.
b. Aluminum-Zinc Alloy-Coated Steel: 0.040 inch (1.02 mm) thick.

C. Base Flashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Aluminum: 0.040 inch (1.02 mm) thick.
2. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.

D. Counterflashing and Flashing Receivers: Fabricate from the following materials:

1. Aluminum: 0.032 inch (0.81 mm) thick.
2. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) thick.

E. Roof-Penetration Flashing: Fabricate from the following materials:

1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.

2.8 WALL SHEET METAL FABRICATIONS

A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long, sections, under copings, and at shelf angles. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches (150 mm) beyond each side of wall openings; and form with 2-inch- (50-mm-) high, end dams. Fabricate from the following materials:
1. Stainless Steel: 0.016 inch (0.40 mm) thick.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by

painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of uncoated-aluminum sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches (38 mm); however, reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder metallic-coated steel and aluminum sheet.
2. Do not use torches for soldering.
3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
4. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.
5. Copper Soldering: Tin edges of uncoated sheets, using solder for copper.

H. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

3.2 ROOF-DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Parapet Scuppers: Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.

3.3 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate.

C. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.

D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.

E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints minimum of 4 inches (100 mm).

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with butyl sealant and clamp flashing to pipes that penetrate roof.

3.4 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

3.5 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

END OF SECTION 076200

SECTION 077200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof curbs.
2. Equipment supports.
3. Roof hatches.
4. Safety railing.
5. Ladder up safety post.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of roof accessory indicated.

B. Shop Drawings: For roof accessories.

C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items.

B. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 METAL MATERIALS

A. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, AZ50 (AZM150) coated.
   1. Exposed Coil-Coated Finish: Two-coat fluoropolymer finish; AAMA 621; system consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight

2.2 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWPA C2; not less than 1-1/2 inches (38 mm) thick.

C. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners.

D. Sealants: As recommended by roof accessory manufacturer for installation indicated.

2.3 ROOF HATCH

A. Roof Hatches: Metal roof-hatch units with lids and insulated double-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, stepped integral metal cant raised the thickness of roof insulation, and integrally formed deck-mounting flange at perimeter bottom.

   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   2. Basis-of-Design Product: Subject to compliance with requirements, provide J.L. Industries RHG-STH Series or comparable product by one of the following:

      a. AES Industries, Inc.
      b. Babcock-Davis.
      c. Bilco Company (The).
      d. Bristolite Skylights.
      e. Custom Solution Roof and Metal Products.
      f. Dur-Red Products.
      g. Hi Pro International, Inc.
      h. J. L. Industries, Inc.
      i. Metallic Products Corp.
      j. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
      k. Naturalite Skylight Systems; Vistawall Group (The).
      l. Nystrom.

m. O'Keeffe's Inc.
n. Pate Company (The).
o. Precision Ladders, LLC.

B. Type and Size: Single-leaf lid, 30 by 36 inches (750 by 900 mm).

C. Loads: Minimum 40-lbf/sq. ft. (1.9-kPa) internal uplift load.

D. Hatch Material: Aluminum-zinc alloy-coated steel sheet, 0.079 inch (2.01 mm) thick.

1. Finish: Two-coat fluoropolymer.
2. Color: As selected by Architect from manufacturer's full range.

E. Construction:

1. Insulation: Polyisocyanurate board.
2. Hatch Lid: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.
3. Hatch Lid: Glazed, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.
4. Curb Liner: Manufacturer's standard, of same material and finish as metal curb.
5. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
6. Fabricate curbs to minimum height of 12 inches (300 mm) unless otherwise indicated.

F. Hardware: Galvanized-steel spring latch with turn handles, butt- or pintle-type hinge system, and padlock hasps inside and outside.

1. Provide two-point latch on lids larger than 84 inches (2130 mm).
2. Provide remote-control operation.

G. Safety Railing System: Roof-hatch manufacturer's standard system including rails, clamps, fasteners, safety barrier at railing opening, and accessories required for a complete installation; attached to roof hatch and complying with 29 CFR 1910.23 requirements and authorities having jurisdiction.

H. Ladder-Assist Post: Roof-hatch manufacturer's standard device for attachment to roof-access ladder. Post locks in place on full extension; release mechanism returns post to closed position.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Verify dimensions of roof openings for roof accessories. Install roof accessories according to manufacturer's written instructions.

1. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.

3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of uncoated aluminum roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene sheet.

C. Seal joints with sealant as required by roof accessory manufacturer.

3.2 REPAIR AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780.

B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

C. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077200

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Nonstaining silicone joint sealants.
3. Urethane joint sealants.
4. Mildew-resistant joint sealants.
5. Latex joint sealants.

1.2 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples: For each kind and color of joint sealant required.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Preconstruction laboratory test reports.

C. Preconstruction field-adhesion-test reports.

D. Field-adhesion-test reports.

E. Sample warranties.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.5 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following:

1. Architectural sealants shall have a VOC content of 250 g/L or less.
2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
3. Sealants and sealant primers for nonporous substrates shall have a VOC content of 775 g/L or less.

B. Low-Emitting Interior Sealants: Sealants and sealant primers shall comply with the testing and product requirements of the California Department of Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Silicone, S, NS, 100/50, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. GE Construction Sealants; SCS2700 SilPruf LM .
b. Sika Corporation U.S.; Sikasil WS-290.

B. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Dow Corning Corporation; 791.
    b. GE Construction Sealants; SCS2000 SilPruf.
    c. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 265 LTS.
    d. Pecora Corporation; PCS.
    e. Sika Corporation U.S.; Sikasil WS-295.

C. Silicone, S, NS, 35, NT: Single-component, nonsag, plus 35 percent and minus 35 percent movement capability. nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 35, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. GE Construction Sealants; SWS.

D. Silicone, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Dow Corning Corporation; 758.
    b. GE Construction Sealants; SCS2350.
    c. Polymeric Systems, Inc.; PSI-631.
    d. Schnee-Morehead, Inc., an ITW company; SM5731 Poly-Glaze Plus.

E. Silicone, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Dow Corning Corporation; NS.
    b. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; [Bondaflex Sil 728 NS].

F. Silicone, S, NS, 50, T, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Uses T and NT.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Dow Corning Corporation; 799.
    b. Soudal USA; RTV 50.

G. Silicone, S, NS, 25, T, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Uses T and NT.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 199 PG
    b. Sika Corporation U.S.; Sikasil-N Plus US.

H. Silicone, S, P, 100/50, T, NT: Single-component, pourable, plus 100 percent and minus 50 percent movement capability traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade P, Class 100/50, Uses T and NT.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 728 SG.

I. Silicone, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade P, Class 25, Uses T and NT.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 200 SC.

J. Silicone, M, P, 100/50, T, NT: Multicomponent, pourable, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type M, Grade P, Class 100/50, Uses T and NT.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 728 RCS.

2.3 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.

B. Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 290 FPS-NB.
    b. Pecora Corporation; 890FTS/TXTR.
    c. Tremco Incorporated; Spectrem 1.

C. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; 756 SMS.
b. GE Construction Sealants; SilPruf NB.
c. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 295 FPS NB.
d. Pecora Corporation; 864NST.
e. Tremco Incorporated; Spectrem 2.

D. Silicone, Nonstaining, S, NS, 100/50, T, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; 790.

E. Silicone, Nonstaining, M, NS, 50, NT: Nonstaining, multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type M, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Tremco Incorporated; Spectrem 4-TS.

2.4 URETHANE JOINT SEALANTS

A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. BASF Construction Chemicals, LLC, Building Systems; Sonalastic TX1.
b. Bostik, Inc.; Chem-Calk GPS1.
c. ER Systems, an ITW Company; Pacific Polymers Elasto-Thane 230 MP.
d. Pecora Corporation; Dynatrol I-XL.
e. Polymeric Systems, Inc.; Flexiprene 1000.
f. Schnee-Morehead, Inc., an ITW company; Permathane SM7108.
g. Sherwin-Williams Company (The); Stampede-1.
h. Sika Corporation U.S.; Sikaflex Textured Sealant.
i. Tremco Incorporated; Dymonic.

B. Urethane, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Sika Corporation U.S.; Sikaflex 15LM.

2.5 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Dow Corning Corporation; 786-M White.
    b. GE Construction Sealants; SCS1700 Sanitary.
    c. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 100 WF.
    d. Soudal USA; RTV GP.
    e. Tremco Incorporated; Tremsil 200.

2.6 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. BASF Construction Chemicals, LLC, Building Systems; Sonolac.
    b. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex 600.
    c. Pecora Corporation; AC-20.
    d. Sherwin-Williams Company (The); 850A.
    e. Tremco Incorporated; Tremflex 834.

2.7 JOINT-SEALANT BACKING

A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:

    a. BASF Construction Chemicals, LLC, Building Systems.
    b. Construction Foam Products, a division of Nomaco, Inc.

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.8 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove laitance and form-release agents from concrete.
2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

3.2 INSTALLATION OF JOINT SEALANTS

A. General: Comply with ASTM C 1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.

2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

1. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.3 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

a. Perform five tests for the first 2**00 feet** of joint length for each kind of sealant and joint substrate.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.4 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

1. Joint Locations:

a. Isolation and contraction joints in cast-in-place concrete slabs.

2. Joint Sealant: Urethane, M, P, 50, T, NT.>.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Control and expansion joints in unit masonry.

2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:

a. Isolation joints in cast-in-place concrete slabs.

2. Joint Sealant: Urethane.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.

1. Joint Locations:

a. Control joints on exposed interior surfaces of exterior walls.
b. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Acrylic latex.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
b. Tile control and expansion joints where indicated.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

F. Joint-Sealant Application: Concealed mastics.

1. Joint Locations:

a. Aluminum thresholds.
b. Sill plates.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Butyl-rubber based.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

SECTION 079219 - ACOUSTICAL JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes acoustical joint sealants.

1.2 ACTION SUBMITTALS

A. Product Data: For each acoustical joint sealant.

B. Samples: For each kind and color of acoustical joint sealant required.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Sample warranties.

1.4 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace acoustical joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E 90.

B. VOC Content of Interior Sealants: Sealants and sealant primers shall comply with the following:

1. Acoustical sealants and sealant primers shall have a VOC content of 250 g/L or less.

C. Low-Emitting Interior Sealants: Acoustical sealants and sealant primers shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the

California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 ACOUSTICAL JOINT SEALANTS

A. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C 834.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Accumetric LLC; BOSS 826 Acoustical Sound Sealant.
b. GE Construction Sealants; RCS20 Acoustical.
c. Grabber Construction Products; Acoustical Sealant GSC.
d. Henkel Corporation; OSI Pro-Series SC-175 Acoustical Sound Sealant.
e. Pecora Corporation; AC-20 FTR.
f. Serious Energy Inc.; Quiet Seal Pro.
g. Tremco, Incorporated; Tremco Acoustical Sealant.
h. USG Corporation; SHEETROCK Acoustical Sealant.

2. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors.

B. Primer: Material recommended by acoustical-joint-sealant manufacturer where required for adhesion of sealant to joint substrates.

C. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.

D. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.

B. Joint Priming: Prime joint substrates where recommended by acoustical-joint-sealant manufacturer.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

3.2 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.

B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C 919, ASTM C 1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.

C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

END OF SECTION 079219

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes hollow-metal work.

1.2 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include elevations, door edge details, frame profiles, metal thicknesses, preparations for hardware, and other details.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each type of exposed finish required.

E. Schedule: Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Product test reports.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Amweld International, LLC.
2. Apex Industries, Inc.
3. Ceco Door Products; an Assa Abloy Group company.
4. Commercial Door & Hardware Inc.
5. Curries Company; an Assa Abloy Group company.
6. Fleming-Baron Door Products.

7. Gensteel Doors Inc.
8. Hollow Metal Inc.
9. Karpen Steel Custom Doors & Frames.
10. National Custom Hollow Metal.
11. Premier Products, Inc.
12. Republic Doors and Frames.
13. Rocky Mountain Metals, Inc.
14. Security Metal Products Corp.
15. Steelcraft; an Ingersoll-Rand company.
16. Titan Metal Products, Inc.
17. Trillium Steel Doors Limited.

2.2 REGULATORY REQUIREMENTS

A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 INTERIOR DOORS AND FRAMES

A. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3.

1. Physical Performance: Level A according to SDI A250.4.
2. Doors:

    a. Type: As indicated in the Door and Frame Schedule.
    b. Thickness: 1-3/4 inches (44.5 mm).
    c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.053 inch (1.3 mm).
    d. Edge Construction: Model 2, Seamless.
    e. Core: Vertical steel stiffener.

3. Frames:

    a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch (1.3 mm).
    b. Construction: Full profile welded.

4. Exposed Finish: Prime.

2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

A. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3.

1. Physical Performance: Level A according to SDI A250.4.
2. Doors:

    a. Type: As indicated in the Door and Frame Schedule.
    b. Thickness: 1-3/4 inches (44.5 mm).
    c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A40 (ZF120) coating.
    d. Edge Construction: Model 2, Seamless.
    e. Core: Vertical Steel Stiffener.

3. Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than 2.1 deg F x h x sq. ft./Btu (0.370 K x sq. m/W) when tested according to ASTM C 1363.
4. Frames:

    a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A40 (ZF120) coating.
    b. Construction: Full profile welded.

5. Exposed Finish: Prime.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (51 mm) wide by 10 inches (254 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch (1.0 mm), and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at finish floor surface.

2.6 MATERIALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

C. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

E. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

F. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

G. Power-Actuated Fasteners in Concrete: From corrosion-resistant materials.

H. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.

I. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing).

J. Glazing: Section 088000 "Glazing."

K. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat.

2.7 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Doors:

1. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
2. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated.

C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.

2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
5. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 16 inches (406 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c., to match coursing, and as follows:

        1) Two anchors per jamb up to 60 inches (1524 mm) high.
        2) Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
        3) Four anchors per jamb from 90 to 120 inches (2286 to 3048 mm) high.
        4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 120 inches (3048 mm) high.

    b. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:

        1) Three anchors per jamb up to 60 inches (1524 mm) high.
        2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
        3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
        4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.

    c. Compression Type: Not less than two anchors in each frame.
    d. Postinstalled Expansion Type: Locate anchors not more than 6 inches (152 mm) from top and bottom of frame. Space anchors not more than 26 inches (660 mm) o.c.

6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers.

    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

D. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

E. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow-metal work.
5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.8 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: SDI A250.10.

2.9 ACCESSORIES

A. Louvers: Provide sightproof louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.020-inch- (0.5-mm-) thick, cold-rolled steel sheet set into 0.032-inch- (0.8-mm-) thick steel frame.

1. Fire-Rated Automatic Louvers: Movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated.

B. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

C. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

a. At fire-rated openings, install frames according to NFPA 80.
b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
c. Install frames with removable stops located on secure side of opening.
d. Install door silencers in frames before grouting.

e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

   a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
8. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

   a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

9. Door Jamb Clearance at floor. Set jambs 1/8” above concrete.

B. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Steel Doors:

   a. Between Door and Frame Jambs and Head: 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
   b. Between Edges of Pairs of Doors: 1/8 inch (3.2 mm) to 1/4 inch (6.3 mm) plus or minus 1/32 inch (0.8 mm).
   c. At Bottom of Door: 3/4 inch (19.1 mm) plus or minus 1/32 inch (0.8 mm).
   d. Between Door Face and Stop: 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.

C. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

3.2 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow-metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

E. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-core doors with wood-veneer faces.
2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:
1. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of door. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:

1. Dimensions and locations of blocking.
2. Dimensions and locations of mortises and holes for hardware.
3. Dimensions and locations of cutouts.
4. Undercuts.
5. Requirements for veneer matching.
6. Doors to be factory finished and finish requirements.
7. Fire-protection ratings for fire-rated doors.

C. Samples: For factory-finished doors.

1.3 INFORMATIONAL SUBMITTALS

A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is a certified participant in AWI's Quality Certification Program.

B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Algoma Hardwoods, Inc.
2. Eggers Industries.
3. Graham Wood Doors; an Assa Abloy Group company.
4. Haley Brothers, Inc.
5. Marlite.
6. Marshfield Door Systems, Inc.
7. Mohawk Doors; a Masonite company.
8. VT Industries, Inc.

2.2 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."

1. Provide AWI Quality Certification Labels indicating that doors comply with requirements of grades specified.

B. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that do not contain urea formaldehyde.

C. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. WDMA I.S.1-A Performance Grade:

1. Extra Heavy Duty: All Areas.

E. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252.

1. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
2. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
3. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

F. Particleboard-Core Doors:

1. Particleboard: ANSI A208.1, Grade LD-1, made with binder containing no urea-formaldehyde].
2. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Grade: Premium, with Grade AA faces.
2. Species: Select white birch.
3. Cut: Plain sliced (flat sliced).
4. Match between Veneer Leaves: Slip match.
5. Assembly of Veneer Leaves on Door Faces: Balance match.
6. Core: Particleboard.
7. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.
8. Construction: Seven plies, either bonded or nonbonded construction.

2.4 LIGHT FRAMES AND LOUVERS

A. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch- (1.2-mm-) thick, cold-rolled steel sheet; with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating indicated.

B. Metal Louvers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Air Louvers, Inc.
   b. Anemostat; a Mestek company.
   c. L & L Louvers, Inc.
   d. Louvers & Dampers, Inc.; a division of Mestek, Inc.
   e. McGill Architectural Products.
2. Metal and Finish: Extruded aluminum with light bronze, Class II, color anodic finish, AA-M12C22A32/A34.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied.

C. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
3. Louvers: Factory install louvers in prepared openings.

2.6 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

B. Factory finish doors that are indicated to receive transparent finish.

C. Use only paints and coatings that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Transparent Finish:

1. Grade: Premium.
2. Finish: WDMA TR-6 catalyzed polyurethane.
3. Staining: As selected by Architect from manufacturer's full range.
4. Sheen: Satin.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Hardware: For installation, see Section 087100 "Door Hardware" and Section 087111 "Door Hardware (Descriptive Specification)."

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

1. Install fire-rated doors according to NFPA 80.
2. Install smoke- and draft-control doors according to NFPA 105.

C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.

1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or

covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold unless otherwise indicated.

a. Comply with NFPA 80 for fire-rated doors.

D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

END OF SECTION 081416

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Access doors and frames for walls and ceilings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each door face material.

D. Schedule: Types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 tested according to the following test method:

1. NFPA 252 or UL 10B for fire-rated access door assemblies installed vertically.
2. NFPA 288 for fire-rated access door assemblies installed horizontally.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated or comparable product by one of the following:

1. Access Panel Solutions.
2. Acudor Products, Inc.
3. Alfab, Inc.
4. Babcock-Davis.
5. Cendrex Inc.
6. Jensen Industries; Div. of Broan-Nutone, LLC.

7. J. L. Industries, Inc.; Div. of Activar Construction Products Group.
8. Karp Associates, Inc.
9. Larsen's Manufacturing Company.
10. Milcor Inc.

C. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.

D. Flush Access Doors with Exposed Flanges:

1. Assembly Description: Fabricate door to fit flush to frame. Provide manufacturer's standard-width exposed flange, proportional to door size.
2. Locations: Wall and ceiling.
3. Door Size: As required.
4. Metallic-Coated Steel Sheet for Door: Nominal 0.064 inch (1.63 mm), 16 gage.

    a. Finish: Factory finish.

5. Frame Material: Same material, thickness, and finish as door.
6. Hinges: Manufacturer's standard.
7. Hardware: Lock.

E. Hardware:

1. Lock: Cylinder.

    a. Lock Preparation: All locks keyed alike.

2.3 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

C. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

E. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.

F. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

G. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of Alloy 5005-H15; with minimum sheet thickness according to ANSI H35.2 (ANSI H35.2M).

H. Frame Anchors: Same type as door face.

I. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.4 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.

D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.

1. For recessed doors with plaster infill, provide self-furring expanded metal lath attached to door panel.

E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

1. For cylinder locks, furnish two keys per lock and key all locks alike.
2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

F. Extruded Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

2.5 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Steel and Metallic-Coated-Steel Finishes:

1. Factory Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry-film thickness of 1 mil (0.025 mm) for topcoat.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

SECTION 083323 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Insulated service doors.

2. Open grille.

B. Related Section:

1. Section 055000 "Metal Fabrications" for miscellaneous steel supports.

1.2 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data. Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Show locations of replaceable fusible links.
3. Wiring Diagrams: For power, signal, and control wiring.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 2 - PRODUCTS

2.1 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within slat faces.
2. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face.

B. Bottom Bar for Service Doors: Consisting of two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch (38 by 38 by 3 mm) thick; fabricated from metal to match curtain slats and finish.

C. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.

1. Removable Posts and Jamb Guides for Counter Doors: Manufacturer's standard.

2.2 HOOD

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

1. Include automatic drop baffle on fire-rated doors to guard against passage of smoke or flame.
2. Exterior-Mounted Doors: Fabricate hood to act as weather protection and with a perimeter sealant-joint-bead profile for applying joint sealant.

2.3 LOCKING DEVICES

A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.

1. Lock Cylinders: Provide cylinders specified in Section 087100 "Door Hardware".

B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.4 CURTAIN ACCESSORIES

A. Smoke Seals: Equip each fire-rated door with smoke-seal perimeter gaskets for smoke and draft control as required for door listing and labeling by a qualified testing agency.

B. Weatherseals: Equip each exterior door with weather-stripping gaskets fitted to entire perimeter of door for a weathertight installation, unless otherwise indicated.

C. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door. Provide pull-down pole hooks for doors more than 84 inches (2130 mm) high.

2.5 COUNTERBALANCING MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.6 ELECTRIC DOOR OPERATORS

A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

1. Comply with NFPA 70.
2. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24 V, ac or dc.

B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.

C. Electric Motors: Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Section 110513 "Common Motor Requirements for Equipment" unless otherwise indicated.

1. Electrical Characteristics:

   a. Phase: Single phase.
   b. Volts: 115 V.
   c. Hertz: 60.

2. Motor Type and Controller: Reversible motor and controller (disconnect switch) for motor exposure indicated.

3. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. (203 mm/s) and not more than 12 in./sec. (305 mm/s), without exceeding nameplate ratings or service factor.
4. Operating Controls, Controllers (Disconnect Switches), Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.

D. Obstruction Detection Device: Equip motorized door with indicated external automatic safety sensor capable of protecting full width of door opening. For non-fire-rated doors, activation of device immediately stops and reverses downward door travel.

1. Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable. Provide self-monitoring capability designed to interface with door operator control circuit to detect damage to or disconnection of sensing device.

E. Remote-Control Station: Momentary-contact, three-button control station with push-button controls labeled "Open," "Close," and "Stop."

1. Interior units, full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
2. Exterior units, full-guarded, standard-duty, surface-mounted, weatherproof type, NEMA ICS 6, Type 4 enclosure, key operated.

F. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf (111 N).

G. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

H. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

I. Audible and Visual Signals: Audible alarm and visual indicator lights in compliance with regulatory requirements for accessibility.

J. Radio-Control System: Consisting of three-channel universal coaxial receiver to open, close, and stop door; two per operator.

2.7 DOOR ASSEMBLY

A. Insulated Service Door:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ACME Rolling Doors.
b. Cookson Company.
c. Dynamic Closures Corp.
d. Lawrence Roll-Up Doors, Inc.
e. McKeon Rolling Steel Door Company, Inc.
f. Overhead Door Corporation.
g. Raynor.
h. Southwestern Steel Rolling Door Co.
i. Wayne-Dalton Corp.

B. Operation Cycles: Not less than 50,000.

C. Curtain R-Value: 6.0 deg F x h x sq. ft./Btu (1.057 K x sq. m/W).

D. Door Curtain Material: Pre-finished Metal.

E. Door Curtain Slats: Flat profile slats of 1-7/8-inch (48-mm) center-to-center height.

1. Insulated-Slat Interior Facing: Metal.

F. Curtain Jamb Guides: Stainless steel with exposed finish matching curtain slats. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise.

G. Hood: Match curtain material and finish.

1. Shape: Square.
2. Mounting: As shown on Drawings.

H. Integral Frame, Hood, and Fascia for Counter Door: Stainless steel.

1. Mounting: Between jambs.

I. Sill Configuration for Counter Door: No sill.

J. Locking Devices: Equip door with locking device assembly.

1. Locking Device Assembly: locking bars, operable from inside and outside with cylinders.

K. Electric Door Operator: (Large Overhead Doors)

1. Usage Classification: Heavy duty, 60 to 90 cycles per hour.
2. Motor Exposure: Interior.
3. Emergency Manual Operation: Crank type.
4. Obstruction-Detection Device: Automatic electric sensor edge on bottom bar.
5. Remote-Control Station: Interior.

L. Door Finish:

1. Stainless-Steel Finish: No. 4 (polished directional satin). (Counter Shutter)

2. Pre-finished Steel. (Service Door)

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion. Lubricate bearings and sliding parts as recommended by manufacturer. Adjust seals to provide weathertight fit around entire perimeter.

3.2 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323

SECTION 083326 - OVERHEAD COILING GRILLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes open-curtain overhead coiling grille located in the pharmacy.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for miscellaneous steel supports, angle-framing of grille opening, corner guards, and bollards.

1.2 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling grille and accessory.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
2. Show locations of controls, locking devices, and other accessories.
3. Include diagrams for power, signal, and control wiring.

C. Samples: For each exposed product and for each color and texture specified.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Overhead coiling grilles shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.2 OPEN-CURTAIN GRILLE ASSEMBLY

A. Open-Curtain Grille: Overhead coiling grille with a curtain having a network of horizontal rods that interconnect with vertical links.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide Overhead Door Corporation Model 670 or comparable product by one of the following:

a. ACME Rolling Doors.
b. Alpine Overhead Doors, Inc.
c. AlumaTek, Inc.
d. City-Gates.
e. Cookson Company.
f. Cornell Iron Works, Inc.
g. Dynamic Closures Corp.
h. Lawrence Roll-Up Doors, Inc.
i. Mahon Door Corporation.
j. McKeon Rolling Steel Door Company, Inc.
k. Metro Door.
l. Overhead Door Corporation.
m. Raynor.

B. Operation Cycles: Grille components and operators capable of operating for not less than 20,000.

C. Grille Curtain Material: Aluminum.

1. Rod Spacing: Approximately 1-1/2 inches (38 mm.
2. Link Spacing: Approximately 3 inches (76 mm straight in-line.
3. Spacers: Metal tubes matching curtain material.

D. Bottom Bar: Continuous channel or doubled angles, fabricated from aluminum extrusion and finished to match grille.

E. Curtain Jamb Guides: Aluminum with exposed finish matching curtain slats. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise.

F. Hood: Match curtain material and finish.

1. Mounting: Between jambs.

G. Locking Devices: Equip grille with slide bolt for padlock.

1. Locking Device Assembly: locking bars, operable from inside and outside with cylinders.

H. Electric Grille Operator:

1. Usage Classification: Heavy duty, 25 or more cycles per hour and more than 90 cycles per day.
2. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use.
3. Motor Exposure: Interior.
4. Emergency Manual Operation: Crank type.
5. Obstruction-Detection Device: Automatic electric sensor edge on bottom bar.
6. Control Station: Interior mounted.

I. Curtain Accessories: Equip grille with poll hook.

J. Grille Finish:

1. Aluminum Finish: Anodized color as selected by Architect from full range of industry colors and color densities.

2.3 MATERIALS, GENERAL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.4 GRILLE CURTAIN MATERIALS AND CONSTRUCTION

A. Open-Curtain Grilles: Fabricate metal grille curtain as an open network of horizontal rods, spaced at regular intervals, that are interconnected with vertical links, which are formed and spaced as indicated and are free to rotate on the rods.

B. Bottom Bar: Manufacturer's standard continuous shape unless otherwise indicated, finished to match grille.

1. Astragal: Equip grille bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.
2. Provide motor-operated grilles with combination bottom astragal and sensor edge.

C. Grille Curtain Jamb Guides: Manufacturer's standard shape having curtain groove with return lips or bars to retain curtain. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise; with removable stops on guides to prevent overtravel of curtain.

1. Removable Posts and Jamb Guides: Manufacturer's standard.

2.5 HOODS AND ACCESSORIES

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

B. Removable Metal Soffit: Formed or extruded from same metal and with same finish as curtain if hood is mounted above ceiling, unless otherwise indicated.

C. Push/Pull Handles: Equip push-up-operated or emergency-operated grille with lifting handles on each side of grille, finished to match grille.

D. Pull-Down Strap: Provide pull-down straps for grilles more than 84 inches (2130 mm) high.

E. Pole Hooks: Provide pole hooks and poles for grilles more than 84 inches (2130 mm) high.

2.6 LOCKING DEVICES

A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.

B. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.

1. Lock Cylinders: Cylinders standard with manufacturer and keyed to building keying system.
2. Keys: Three for each cylinder.

C. Safety Interlock Switch: Equip power-operated grilles with safety interlock switch to disengage power supply when grille is locked.

2.7 COUNTERBALANCING MECHANISM

A. General: Counterbalance grilles by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.8 ELECTRIC GRILLE OPERATORS

A. General: Electric grille operator assembly of size and capacity recommended and provided by grille manufacturer for grille and operation cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking grille, and accessories required for proper operation.

1. Comply with NFPA 70.
2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.

B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each grille.

C. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated.

1. Electrical Characteristics:

a. Phase: Single phase.
b. Volts: 208 V.
c. Hertz: 60.

2. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate grille in either direction from any position, at a speed not less than 8 in./sec. (203 mm/s) and not more than 12 in./sec. (305 mm/s), without exceeding nameplate ratings or service factor.
3. Operating Controls, Controllers (Disconnect Switches), Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.

D. Obstruction-Detection Device: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of grille opening. Activation of sensor immediately stops and reverses downward grille travel.

1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in grille opening without contact between grille and obstruction.

a. Self-Monitoring Type: Designed to interface with grille operator control circuit to detect damage to or disconnection of sensing device. When self-monitoring feature is activated, grille closes only with sustained or constant pressure on close button.

2. Electric Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.

a. Self-Monitoring Type: Four-wire configured device designed to interface with grille operator control circuit to detect damage to or disconnection of sensor edge.

3. Pneumatic Sensor Edge: Automatic safety sensor edge, located within astragal mounted to bottom bar. Contact with sensor activates device.

E. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."

1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
2. Exterior-Mounted Units: Full-guarded, standard-duty, surface-mounted, weatherproof type; NEMA ICS 6, Type 4 enclosure, key operated.

F. Emergency Manual Operation: Equip electrically powered grille with capability for emergency manual operation. Design manual mechanism so required force for grille operation does not exceed 25 lbf (111 N).

G. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

H. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

I. Audible and Visual Signals: Audible alarm and visual indicator lights in compliance with regulatory requirements for accessibility.

J. Emergency-Egress Release: Flush, wall-mounted handle mechanism, for accessibility-code-compliant egress feature, not dependent on electric power. The release allows an unlocked grille to partially open without affecting limit switches to permit passage, and it automatically resets motor drive upon return of handle to original position.

K. Self-Opening Mechanism: Automatic release mechanism triggered by emergency push-button station, fire alarm or power failure. When activated, the grille self-opens by means of a fail-safe operator to the fully open position without the need for power operation or battery backup systems. When the emergency push-button is reset, and the alarm is cleared and power is restored, the grille will operate normally.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install overhead coiling grilles and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports, according to manufacturer's written instructions and as specified.

B. Power-Operated Grilles: Install automatic garage grille openers according to UL 325.

C. Adjust hardware and moving parts to function smoothly, so that grilles operate easily, free of warp, twist, or distortion. Lubricate bearings and sliding parts as recommended by manufacturer.

3.2 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling grilles.

END OF SECTION 083326

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior and interior storefront framing.
2. Storefront framing for window walls.
3. Storefront framing for punched openings.
4. Exterior and interior manual-swing entrance doors and door-frame units.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include plans, elevations, sections, full-size details, and attachments to other work.

1. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

C. Samples: For each exposed finish required.

D. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.

1.3 INFORMATIONAL SUBMITTALS

A. Energy Performance Certificates: NFRC-certified energy performance values from manufacturer.

B. Product test reports.

C. Field quality-control reports.

D. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.

C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
2. Failure also includes the following:

a. Thermal stresses transferring to building structure.
b. Glass breakage.
c. Noise or vibration created by wind and thermal and structural movements.
d. Loosening or weakening of fasteners, attachments, and other components.

e. Failure of operating units.

B. Structural Loads:

1. Wind Loads: As indicated on Drawings.

C. Deflection of Framing Members: At design wind pressure, as follows:

1. Deflection Normal to Wall Plane: Limited to [edge of glass in a direction perpendicular to glass plane not exceeding 1/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19.1 mm), whichever is less.
2. Deflection Parallel to Glazing Plane: Limited to [1/360 of clear span or 1/8 inch (3.2 mm), whichever is smaller.

D. Structural: Test according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

E. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:

1. Fixed Framing and Glass Area:

a. Maximum air leakage of 0.06 cfm/sq. ft. (0.30 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa)] [6.24 lbf/sq. ft. (300 Pa).

2. Entrance Doors:

a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. (5.08 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).
b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. (2.54 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).

F. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).

G. Energy Performance: Certify and label energy performance according to NFRC as follows:

1. Thermal Transmittance (U-factor):
   a. Summer U = 0.27
   b. Winter U = 0.29
2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.25 as determined according to NFRC 200.

3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 15 as determined according to NFRC 500.
4. Glass – 1" Insulated Solarban Z75.

H. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide Arcadia 2"x4-1/2", 1" Glazed or comparable product by one of the following:

1. Arcadia, Inc.
2. Arch Aluminum & Glass Co., Inc.
3. Commercial Architectural Products, Inc.
4. EFCO Corporation.
5. Kawneer North America.
6. Oldcastle BuildingEnvelope.
7. United States Aluminum.

2.3 FRAMING

A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Thermally broken.
2. Glazing System: Retained mechanically with gaskets on four sides.
3. Glazing Plane: Center set.
4. Finish: Clear anodic finish.
5. Fabrication Method: Field-fabricated stick system.

B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Materials:

1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

a. Sheet and Plate: ASTM B 209.

b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
d. Structural Profiles: ASTM B 308/B 308M.

2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.4 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.

1. Door Construction: 1-3/4-inch (44.5-mm) overall thickness, with minimum 0.125-inch-(3.2-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
2. Door Design: Wide stile; 5-inch (127-mm) nominal width.
3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.

a. Provide nonremovable glazing stops on outside of door.

2.5 ENTRANCE DOOR HARDWARE

A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware."

2.6 GLAZING

A. Glazing: Comply with Section 088000 "Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

C. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L.

D. Sealants used inside the weatherproofing system shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.7 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing from exterior.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.

5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

F. Install glazing as specified in Section 088000 "Glazing."

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

END OF SECTION 084113

SECTION 084229 - SLIDING AUTOMATIC ENTRANCES

PART I – GENERAL

1.01 SUMMARY

A. WORK INCLUDED: Furnish complete automatic aluminum door system, as specified, that has been manufactured, fabricated and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.

B. RELATED WORK:
1. Concrete: Division 03, applicable sections.
2. Masonry: Division 04, applicable sections.
3. Thermal and Moisture Protection: Division 07, applicable sections.
4. Electrical: Division 26, applicable sections.

1.02 REFERENCES

A. AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA) 101: Appendix Dissimilar Materials.

B. AMERICAN ASSOCIATION OF AUTOMATIC DOOR MANUFACTURERS (AAADM).

C. AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA) 1303.5: Voluntary Specifications for Forced-Entry Resistant Aluminum Sliding Glass Doors

D. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI):
1. ANSI Z97.1: Safety Glazing Materials Used in Buildings - Methods of Test.
2. ANSI A156.10: For Power Operated Pedestrian Doors; Sliding Doors section.
3. ANSI A156.5: Standard for Auxiliary Locks and Associated Products

E. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM);
1. ASTM B221: Aluminum-Alloy Extruded Bars, Rods, Shapes and Tubes.

F. BUILDING OFFICIALS AND CODE ADMINISTRATORS INTERNATIONAL (BOCA)

G. INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS / UNIFORM BUILDING CODE (ICBO/UBC)

H. INTERNATIONAL CODE COUNCIL / INTERNATIONAL BUILDING CODE (ICC/IBC)

I. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 101:
1. NFPA 101: Code for Safety to Life from Fire in Buildings & Structures.
2. NFPA 70: National Electrical Code (NEC).

J. THE ALUMINUM ASSOCIATION (AA) Aluminum Finishes Manual.

K. UNDERWRITERS LABORATORY, INC. (USA & CANADA) UL 325: Electrical Door, Drapery, Gate, Louver, and Window Operators and Systems.

1.03 SUBMITTALS

A. PRODUCT DATA: Submit manufacturer's complete product and installation data.

B. SHOP DRAWINGS: Submit drawings showing layout, profiles, product components including anchorage, accessories, finish and glazing details (where required).

C. CLOSEOUT SUBMITTALS: Submit the following:
1. Owner’s Manual.
2. Warranty document as specified herein.
3. AAADM inspection compliance form completed and signed by certified AAADM inspector prior to doors being placed in operation as proof of compliance with ANSI A156.10.

1.04 QUALITY ASSURANCE AND PERFORMANCE REQUIREMENTS

A. INSTALLERS QUALIFICATIONS: Installer shall be factory trained, certified by AAADM, and experienced to perform work of this section.

B. MANUFACTURER’S QUALIFICATIONS: Manufacturer to have minimum (5) five years successful experience in the fabrication of automatic doors of the type required for this project. Manufacturer capable of providing field service representation during installation, approving acceptable installer and approving application method.

C. CERTIFICATIONS: Automatic sliding door systems and options shall be factory certified to meet performance design criteria in accordance with the following standards:
1. ANSI A156.10: For Power Operated Pedestrian Doors; Sliding Doors section.
2. NFPA 101: Code for Safety to Life from Fire in Buildings & Structures.
3. UL 325: Electrical Door, Drapery, Gate, Louver, and Window Operators and Systems.
4. BOCA: Means of Egress, Power Operated Doors
5. ICBO/UBC: Egress Through Lobbies
6. ICC/IBC: Egress Section

D. OPENING FORCE REQUIREMENTS FOR EMERGENCY EGRESS:
1. Slide-swing panels shall require no more than 50 lbf. (222 N) of force to swing open. Slide-swing panels shall be capable of swinging out 90° from any position of slide movement.
2. Slide-swing panels and swing-out sidelites shall have torsion spring designed to re-close panel if pushed open in the direction of egress.
3. If power fails, slide panels can be manually slid open with no more than 15 lbf (222 N) of force.
4. Units are UL listed as an exit way and are compliant with NFPA 101.

E. CLOSING FORCE REQUIREMENTS: Maximum force required to prevent sliding panel from closing = 28 lbf. (124.5 N) Adjustable Reversing Circuit will reopen door unit if closing path is obstructed.

F. HEADER CAPACITY: Header shall be capable of supporting:
   1. Biparting: Up to 300 lbs. (136 kg) per slide panel over spans up to 16’-0” (4877mm) without intermediate supports.

1.05 WARRANTIES

A. MANUFACTURER'S WARRANTY: Units to be warranted against defect in material and workmanship for a period of two years from the Date of Substantial Completion. Manufacturer's warranty is in addition to, and not a limitation of, other rights owner may have under Contract Documents.

B. DISTRIBUTOR'S WARRANTY: Two year warranty: Labor & transportation charges for defective parts replacement.

1.06 PROJECT CONDITIONS

FIELD MEASUREMENTS: Verify actual dimensions/openings by field measurements before fabrication and record on shop drawings. Coordinate with fabrication and construction schedule to avoid construction delays.

1.07 DELIVERY, STORAGE AND HANDLING

A. ORDERING AND DELIVERY: Comply with factory's ordering instructions and lead time requirements. Delivery shall be in factory's original, unopened, undamaged containers with identification labels intact.

B. STORAGE AND PROTECTION: Provide protection from exposure to harmful weather conditions and vandalism.

PART II – PRODUCTS

2.01 MANUFACTURER

BASIS OF DESIGN: HORTON AUTOMATICS, a division of Overhead Door Corporation, shall manufacture automatic sliding door(s) of type(s) and size(s) specified on plans and door schedule.

2.02 EQUIPMENT

A. MANUFACTURED DOOR UNITS: Shall include operator, header with roller track, carrier assemblies, framing jambs, sliding door panel(s), sidelite(s), activation, safety devices and accessories required for complete installation.
   1. Configuration: Biparting
   2. Mounting Type:
      a. Perimeter mounted within rough opening with sliding panel(s) sliding along sidelite.
   3. Door Type:
      a. Type 110: Slide-swing panel(s) ‘SX’ shall slide along exterior side.

B. OPERATOR: The Electric Operating Mechanism shall be HD-Slide® Series 2001 Belt Drive. Maximum current draw shall not exceed 3.15 amps. The heavy duty operator shall be mounted and concealed within the header.

1. Operating force shall be accomplished through a 1/8 HP DC permanent magnet motor with heavy duty worm gear transmission and 1800 RPM working with reinforced drive belt, attached 1/4" thick steel door hangers, and idler pulley (1/4 HP motor required for door panels weighing 500 lbs). Drive belt to be steel reinforced nylon, 1" (25.4 mm) wide. Idler pulley to be reinforced, metallic material.
2. Master Control shall be 16 bit microprocessor controller with dual on-board seven-segment alphanumeric diagnostic display and position encoder. The encoder shall monitor revolutions of the operator shaft and send signals to microprocessor controller to define door position and speed. The control shall have minimum of 28 programmable parameters including the following functions as required by ANSI A156.10:
   a. Adjustable opening and closing speeds.
   b. Adjustable back-check and latching.
   c. Adjustable braking.
   d. Adjustable hold-open time between 1 to 30 seconds.
   e. Adjustable Reversing Circuit will reopen door unit if closing path is obstructed.
   f. Separate day and night modes of operation with security over-ride.
3. Finger Safety: When unit slides open, strike rail of sliding panel will stop short of adjacent sidelite; resulting opening is net slide.
4. On/Off Switch shall be supplied. When switched OFF, unit reverts to free manual operation (likewise during electrical power failure).

C. SECURITY AND SAFETY POWER FAIL OPTIONS:

1. Automatic lock: Automatically locks slide function of door when in closed position. Additional power supply for autolock not acceptable.
   a. Autolock Fail Safe: If power fails the lock disengages.
2. Monitored Power Fail Options (battery back-up):
   a. Software Selectable Power Fail Close: If power fails the door slides closed.

D. HD-SLIDE® HEADER: Shall be 6" (152 mm) deep by 8" (203 mm) high, heavy duty aluminum construction with removable face plate and extruded support brackets for dead load and lateral strength.

E. CARRIER ASSEMBLIES AND HEADER ROLLER TRACK: Carrier assemblies shall support door panels with minimum four rollers per panel. Rollers will be non-metallic high quality ball bearing wheels 2" (51 mm) diameter. Anti-Derailing shall be accomplished by means of a continuous aluminum extrusion full length of slide panel travel. Overhead header roller track shall be continuous aluminum and replaceable.

F. SLIDING PANEL(S) AND SIDELITE(S): Shall be aluminum, 1-3/4" (44 mm) deep with narrow stile rails. An intermediate, horizontal rail (muntin bar), 2 1/4" (57 mm) wide, shall be furnished for safety and division of glass (optional on 010 units). Standard bottom rail shall be 4" (102mm) tall. Sliding panels shall have concealed bottom guides to stabilize slide travel.

1. Weather-stripping to be along perimeter of sliding panel(s) and swing-out sidelite(s). Weatherstripping material captured in extruded aluminum door panel. Surface applied self-

adhesive weatherstripping not acceptable. Adjustable spring-loaded double astragal weather-stripping at lead edge, double mohair at interlock rails

2. Standard glazing prep to be for 1/4” (6 mm) glass.
3. Sliding Panel and Sidelite Options shall be:
   a. Medium stile construction: 3 3/4” (95mm) wide vertical rails with 6 1/2” (165mm) tall bottom rail. Note: Medium stile construction will reduce slide opening.
   b. Wide stile construction: 5” (127mm) wide vertical rails with 6 1/2” (165mm) tall bottom rail. Note: Wide stile construction will reduce slide opening.
   c. Surface applied push bar 1 1/2” (32mm) wide in lieu of standard muntin bar.
   d. Custom horizontal muntins from 1/2” (13mm) to 10” (254mm) wide.
   e. Custom bottom rails up to 10” (254mm) tall.
   f. Additional and/or extra wide sidelites of size and type indicated.
   g. Recessed sidelite and track and non-threshold application.
   h. Prep for glazing 5/16" (16mm) to 1" (25mm).

G. BREAKOUT PANELS: Slide-swing panels can swing out 90° from any position of slide movement and require no more than 50 lbf. (222 N) of force applied at the lock stile to open. Slide-swing panels and swing-out sidelites shall utilize spring loaded ball detent.
   1. Slide-swing panels and swing-out sidelites shall have torsion spring designed to re-close panel if pushed open in the direction of egress.
   2. Breakout mechanism shall provide support across full width of the door, in normal operating mode. In breakout mode, torsion assembly shall support weight of the door to minimize drop during emergency egress.
   3. Slide-swing panels shall include intermediate horizontal rail.
   4. Units with breakout feature are UL listed as an exit away and are compliant with NFPA 101.

H. JAMBS/FRAME: Shall be aluminum. Jamb dimensions to be 1 3/4" (44mm) deep by 4 1/2" (114mm) wide.

I. THRESHOLD: Shall be aluminum, 1/4" (12.5 mm) tall by 7” (178 mm) wide.

J. HARDWARE: ANSI A156.5, Grade 1, 2-Point Locking provided and installed in strike rail shall include:
   1. Hookbolt Latch, 5/8” laminated stainless steel, latching into jamb or adjacent strike rail.
   2. 3/8” hex-bolt into breakout carrier frame.
   3. Keyed 1 5/32" (29 mm) Cylinder mounted on exterior side with 31/32" (25 mm) backset
   4. Thumbturn mounted on interior side.
   5. Hardware Options:
      a. 3-Point locking for biparting doors
      b. Flush Panic Exit Device recessed in 6 ½” muntin bar for door types 110 and 310.
      c. Lock Position Indicator.
      d. Cylinder Guard.
      e. Cylinder Escutcheon.

2.03 RELATED EQUIPMENT

BASIC SENSOR SYSTEM: Shall be 24 VDC, class ll circuit and shall be adjusted and installed in compliance with ANSI A156.10. System shall include the following:

A. ACTIVATION SENSORS: Microwave or active infrared sensor shall be header-mounted each side of door unit for detection of traffic from each direction.

B. THRESHOLD PRESENCE SENSORS:
   1. Header mounted sensors shall provide active infrared presence detection on each side of the door unit and shall remain active throughout the entire door opening and closing cycle.
   2. Hold-open beams: Two pulsed infrared photoelectric beams to be mounted in vertical rails of sidelite or in jambs. Sender/receiver arrangement parallels door opening.

2.04 RELATED WORK REQUIREMENTS

A. ELECTRICAL: 120 VAC, 50/60 cycle, single phase, dedicated 20 amp circuit per operator. Non-North American voltages can be 240 VAC 50/60 cycle (operator must have 240 volt power supply).

B. GLASS AND GLAZING: Glass stops, glazing vinyl and setting blocks for field glazing as per Safety Glazing standard ANSI Z97.1.2. Contractor to coordinate acquisition of glass in thickness and type in accordance with manufacturer's recommendations for prescribed design.

2.05 MATERIALS, FINISHES AND FABRICATION

A. EXTRUDED ALUMINUM: ASTM B221, 6063-T5 alloy and temper, anodized:
   1. Structural Header Sections: Minimum 3/16" (5 mm) thickness.
   2. Structural Frame Sections: Minimum 1/8" (3 mm) thickness.
   3. Structural Panel Sections: Commercial grade.

B. FINISHES (for all exposed aluminum surfaces): Shall be 204-R1 Clear: Arch. Class 2 Clear Anodized Coating, AA-MI2C22A31.

C. PANEL CONSTRUCTION:
   1. Corner block type with 3/16” steel backup plate construction, mechanically secured with minimum of four hardened steel screws. Sash consists of snap-in glass stops, snap-in glazing beads and vinyl gaskets.
   2. Slide-swing doors to be supplied with adjustable glass setting block to allow for adjusting of door to meet site conditions eliminating the need for additional shims.

D. FRAME CONSTRUCTION: Butt joints, mechanically secured with screws and formed alum. corner brackets.

E. OPERATOR CONSTRUCTION: Electromechanical, modular type construction.

PART III - EXECUTION

3.01 EXAMINATION

SITE VERIFICATION OF CONDITIONS: Installer must verify that base conditions previously installed under other sections are acceptable for product installation according to with manufacturer's instructions. Notify the Contractor in writing of conditions detrimental to the proper and timely completion of work. Do not start work until all negative conditions are corrected in a manner acceptable to the installer and manufacturer.

3.02 INSTALLATION

A. GENERAL: Installer shall be factory trained, certified by AAADM, and experienced to perform work of this section. Install door units plumb, level and true to line, without warp or rack of frames or sash with manufacturer's prescribed tolerances. Provide support and anchor in place.

B. DISSIMILAR MATERIALS: Comply with AAMA 101, Appendix Dissimilar Materials by separating aluminum materials and other corrodible surfaces from sources of corrosion or electrolytic action contact points.

C. WEATHER-TIGHT CONSTRUCTION: Install header and framing members in a bed of sealant or with joint filler or gaskets. Coordinate installation with wall flashings and other components of construction.

D. ELECTRICAL: General or electrical contractor to install all wiring to operator on a separate circuit breaker routed into header. General or electrical contractor also to install all necessary power and low voltage wiring for proper operation of associated security systems.

3.03 CLEANING, ADJUSTMENT AND PROTECTION

A. CLEANING: After installation, installer to take following steps:
   1. Remove temporary coverings and protection of adjacent work areas.
   2. Remove construction debris from construction site and legally dispose of debris.
   3. Repair or replace damaged installed products.
   4. Clean product surfaces and lubricate operating equipment for optimum condition and safety.

B. ADJUSTMENT: AAADM certified technician to inspect and adjust installation. Comply with ANSI A156.10.

C. ADVISE CONTRACTOR: Of precautions required through the remainder of the construction period, to ensure that doors will be without damage or deterioration (other than normal weathering) at the time of acceptance.

END OF SECTION 084229

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SECTION 086250 - TUBULAR DAYLIGHTING DEVICE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Tubular daylighting device, consisting of roof dome, reflective tube, and diffuser assembly; configuration as indicated on the drawings.

B. Accessories.

1.2 RELATED SECTIONS

A. Section 075423 – TPO Roofing.

1.3 REFERENCES

A. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008a.

C. ASTM A 463/A 463M - Standard Specification for Steel Sheet, Aluminum Coated, by the Hot Dip Process; 2006.

D. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc Coated (Galvanized), by the Hot Dip Process; 2007.

E. ASTM A792/A 792M – Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process

F. ASTM E 283 - Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004.

G. ASTM E 308 - Standard Practice for Computing the Colors of Objects by Using the CIE System; 2006.

H. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls and Doors; 2002.

I. ASTM E 547 - Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain walls by Cyclic Air Pressure Difference; 2000.

J. ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.

K. ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricane

L. ASTM D 635 - Test Method for Rate of Burning and/or Extent of Time of Burning of Self-Supporting Plastics in a Horizontal Position; 2006.

M. ASTM D-1929 - Test Method for Ignition Properties of Plastics; 1996 (2001).

N. UL 181 - Factory Made Air Ducts and Air Connectors

O. ICC AC-16 - Acceptance Criteria for Plastic Skylights; 2008.

P. Florida Building Code TAS 201 – Impact Test Procedures.

1.4 PERFORMANCE REQUIREMENTS

A. Completed tubular daylighting device assemblies shall be capable of meeting the following performance requirements:
   1. Air Infiltration Test: Air infiltration will not exceed 0.30 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E 283.
   2. Water Resistance Test: No uncontrolled water leakage at 10.5 psf pressure differential with water rate of 5 gallons/hour/sf when tested in accordance with ASTM E 547.
   3. Uniform Load Test:
      a. No breakage, permanent damage to fasteners, hardware parts, or damage to make daylighting system inoperable or cause excessive permanent deflection of any section when tested at a Positive Load of 150 psf (7.18 kPa) or Negative Load of 70 psf (3.35 kPa).
      b. All units shall be tested with a safety factor of (3) for positive pressure and (2) for negative pressure, acting normal to plane of roof in accordance with ASTM E 330.
   4. Fire Testing:
      a. When used with the Dome Edge Protection Band, all domes meet fire rating requirements as described in the 2006 International Building Code.
      b. Self-Ignition Temperature - Greater than 650 degrees F per ASTM D-1929.
      c. Smoke Density - Rating no greater than 450 per ASTM Standard E 84 in way intended for use. Classification C.
      d. Rate of Burn and/or Extent - Maximum Burning Rate: 2.5 inches/min (62 mm/min) Classification CC-2 per ASTM D 635.

e. Rate of Burn and/or Extent - Maximum Burn Extent: 1 inch (25 mm) Classification CC-1 per ASTM D 635.

1.5 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Shop Drawings. Submit shop drawings showing layout, profiles and product components, including anchorage, flashings and accessories.

D. Verification Samples: As requested by Architect.

E. Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Engaged in manufacture of tubular daylighting devices for minimum 15 years.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 WARRANTY

A. Daylighting Device: Manufacturer's standard warranty for 10 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Solatube International, Inc.; 2210 Oak Ridge Way, Vista, CA 92081. ASD. Tel. Toll Free: 888-765-2882. Tel: (760) 477-1120. Fax: (760) 597-4488. Email: commsales@solatube.com. Web: www.solatube.com.

B. Equal products by Velux Tubular Daylighting approved.

C. Substitutions: By Prior Approval Only.

D. General Contractor will bear responsibility for costs associated with substitution review.

E. Requests for substitutions will be considered provided a lighting layout with photometric data is supplied to demonstrate light levels will meet original design intent.

2.2 TUBULAR DAYLIGHTING DEVICES

A. Tubular Daylighting Devices General : Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICC AC-16.

B. SolaMaster Series: Solatube Model 750 DS-O Open Ceiling and Model 750 DS-C, Grid Ceiling, 21 inch (530 mm) Daylighting Systems:
   1. Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.
      a. Outer Dome Glazing: Type DA, 0.125 inch (3.2 mm) minimum thickness injection molded acrylic classified as CC2 material; UV inhibiting (100 percent UV C, 100 percent UV B and 98.5 percent UV A), impact modified acrylic blend.
      b. Raybender 3000: Variable prism optic molded into outer dome to capture low angle sunlight and limit high angle sunlight
      c. Inner Dome Glazing: Type DAI, 0.115 inch (3 mm) minimum thickness acrylic classified as CC2 material.
   2. Roof Flashing Base:
      a. One Piece: One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube. Sheet steel, corrosion resistant conforming to ASTM A 653/A 653M or ASTM A 463/A 463M or ASTM A792/A 792M, 0.028 inch (0.7 mm) plus or minus .006 inch (.015 mm) thick.
         1) Base Style: Type F11, Self mounted, 11 inches (279 mm) high.
   3. Flashing Insulator: Type FI, Thermal isolation material for use under flashing.
   4. Curb Insulator: Type CI, Thermal isolation material for use at curb base.
   5. Dome Edge Protection Band: Type PB, For fire rated roofs with turret height less than 8 inches (203 mm). Galvanized steel. Nominal thickness of 0.039 inch (1 mm).
   6. Roof Flashing Turret Extensions: Provide manufacturer's standard extensions for applications as requiring:
      a. Type T12: Additional lengths of 12 inches (300 mm) extension.
      b. Type T24: Additional lengths of 24 inches (600 mm) extension.

c. Type T36: Additional lengths of 36 inches (900 mm) extension.
d. Type T48: Additional lengths of 48 inches (1200 mm) extension.

7. Tube Ring: Attached to top of base section; 0.090 inch (2.3 mm) nominal thickness injection molded high impact PVC; to prevent thermal bridging between base flashing and tubing and channel condensed moisture out of tubing.
8. Tube Ring Seal: Attached to the base of the dome ring; butyl glazing rope 0.24 inch (6 mm) diameter; to minimize air infiltration
9. Dome Seal: Adhesive backed weatherstrip, 0.63 inch (16 mm) tall by 0.28 inch (7 mm) wide.
10. Reflective Tubes: Aluminum sheet, thickness 0.018 inch (0.5 mm).
    a. General:
        1) Interior Finish: Spectralight Infinity high reflectance specular finish on exposed reflective surface. Specular reflectance for visible spectrum (400 nm to 760 nm) greater than 99 percent. Total solar spectrum reflectance (400 nm to 2500 nm) less than 80.2 percent.
        2) Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
    b. Top Tube Angle Adapter, Type TA:
        1) Reflective 45 degree adjustable Top Tube Angle Adapter, 16 inches (406 mm) long.
    c. Bottom Tube Angle Adapter, Type BA:
        1) Reflective 45 degree adjustable Bottom Tube Angle Adapter, 16 inches (406 mm) long
    d. Top Tube Angle Adapter and Bottom Tube Angle Adapter Kit, Type AK:
        1) Reflective 45 degree adjustable top and bottom angle adapters (one each), 16 inches (406 mm) long
    e. Extension Tube:
        1) Reflective extension tube, Type EXX, Notched for Open Ceiling diffuser attachment, 24 inches (610 mm) or 48 inches (1220 mm) long.
    f. Reflective 90 degree Adjustable tube:
        1) Extension Tube Angle Adapter: Provide manufacturer's standard adapters for applications requiring:
            (a) Type A1 one 0 to 90 degree extension tube angle adapter.
            (b) Type A2 two 0 to 90 degree extension tube angle adapters.
11. Diffuser Assemblies for Tubes Not Penetrating Ceilings (Open Ceiling): Solatube Model 750 DS-O. 21 inch (530 mm) diameter diffuser attached directly to bottom of tube.
    a. Lens: Type L1 OptiView Fresnel lens design to maximize light output and diffusion. Visible Light Transmission shall be greater than 90 percent at 0.022 inch (0.6 mm) thick. Classified as CC2.
    b. Diffuser Seal: Open cell foam, acrylic adhesive backed, 0.75 in (19 mm) wide by 0.125 in (3.2 mm) thick to minimize condensation and bug, dirt and air infiltration per ASTM E 283.

c. Diffuser Trim Ring: Injection molded acrylic. Nominal wall thickness 0.172 inches (4.4 mm)

12. Accessories:
    a. Security Bar: Type B Security Bar 0.375 inch (95 mm) stainless steel bar across flashing diameter opening.
    b. Open ceiling trim ring: Type R, ABS Plastic, White; nominal thickness of 0.04 inch (1 mm).
    c. Wire Suspension Kit: Type E, Use the wire suspension kit when additional bracing to the structure is required.
    d. Security Kit: Type SK Dome Security Kit, rivets with nylon spacers to replace dome screws.

2.3 ACCESSORIES

A. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.

B. Suspension Wire: Steel, annealed, galvanized finish, size and type for application and ceiling system requirement.

C. Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's printed instructions.

B. After installation of first unit, field test to determine adequacy of installation. Conduct water test in presence of Owner, Architect, or Contractor, or their designated representative. Correct if needed before proceeding with installation of subsequent units.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 086250

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SECTION 087100 - FINISH HARDWARE

PART 1 GENERAL

1.1 SUMMARY

A. SECTION INCLUDES

1. Finish hardware for doors.
2. Electronic hardware.
3. Thresholds & weatherstripping.
4. Keying System.
5. Templates.
6. Hardware Schedule.

1.2 RELATED SECTIONS

1. 081100 - Hollow metal doors and frames.
2. 081400 - Wood doors.
3. 084100 - Entrances and Storefronts.
4. 260000 - Electrical

1.3 REFERENCES

A. Publications of agencies and organizations listed below form a part of this specification section to the extent referenced.

1. DHI - Recommended Locations for Builders' Hardware.
2. NFPA 80 - Standards for Fire Doors and Windows.
3. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures.
4. UL - Building Material Directory.
5. DHI - Door and Hardware Institute
6. WHI - Warnock Hersey
7. BHMA - Builders Hardware Manufacturers Association
8. ANSI – American National Standards Institute
9. IBC - International Building Code Edition as adopted and amended by local building code authorities

1.4 SUBMITTALS

A. Schedules: Submit detailed finish hardware schedule and product data in accordance with section 01 33 00.

1. 1. Furnish a typewritten schedule in vertical format complete with catalog cuts. Schedule shall be complete, including type, manufacturers name and number, and finish of each item required. Include complete schedule of keying system.

B. Samples: If requested, submit sample of each type of finish hardware proposed for the project. If approved, samples may be used on project.

C. Templates: Furnish templates required for fabrication of hollow metal doors and frames, aluminum and glass doors, or other items related to hardware

1.4 QUALITY ASSURANCE

A. Supplier: Hardware supplier shall have a minimum of three years experience in supplying hardware for projects of this size and scope and shall have in his employ a certified Architectural Hardware Consultant (AHC) to prepare submittals and coordinate proper preparation for and installation of hardware.

B. Substitutions: Manufacturers and model numbers listed are to establish a standard of quality. Similar items of approved manufacturers that are equal in design, function and quality will be accepted upon prior approval by the architect and provided required data and physical samples are submitted in accordance with Section 01 25 00.

C. Regulatory requirements: Conform to code requirements applicable to fire rated doors and frames and to accessibility for the physically handicapped.

1.5 DELIVERY, STORAGE AND HANDLING

A. Package each item of hardware in original containers and mark each to correspond with heading numbers on the hardware schedule.

B. Include necessary instructions, templates, drawings and fasteners for proper installation.

C. Store off the floor in a clean dry area out of the way of work in progress

1.6 WARRANTY

A. Provide warranty of hardware items for one year.

1. Provide a ten year warranty for door locks.
2. Provide a three year warranty for exit devices.
3. Provide a thirty year warranty for door closers.
4. Provide a one year warranty for electrified locks, exit device, and door closers.

PART 2 - PRODUCTS

MANUFACTURERS

A. Catalog numbers of manufacturers listed in the first column have been used to establish the quality required. Manufacturers listed in the other columns are the only substitutions approved for listed products. Prior owner approval required.

Hinges	Ives	
Locks	Schlage	
Exit Device	Von Duprin	
Closers	LCN	Horton
Flat goods	Ives	
Stops & misc.	Ives	
Overhead holders	Glynn Johnson	
Thresholds & W.S.	Zero	

2.02 MATERIALS

A. Screws and Fasteners: Furnish all exposed fasteners to match item being secured. Make all fasteners of the same material as item being fastened except provide stainless steel or brass for securing aluminum items.

B. Hinges:

1. Full mortise template hinges, ball bearing type.
2. Non-removable pin and heavy weight at exterior doors.
3. Furnish quantity of hinges as follows:
    a. Doors to 60" high: 2 hinges
    b. Doors over 60" to 90" high: 3 hinges
    c. Doors over 90" to 120": 4 hinges
4. Furnish hinge sizes as follows:
    a. For 1 3/8" doors: 4" x 4"
    b. For 1 3/4" doors to 3'0" wide: 4.5" x 4.5"
    c. For 1 3/4" doors over 3'0" wide: 5 x 4.5"
    d. Width of hinges adjusted to clear adjacent trim.

C. Locksets and Latchsets

1. Bored type locksets complying with ANSI 156.2 Series 4000 Grade 1.
2. Provide 2 3/4" backsets unless job conditions dictate otherwise.

3. Provide strikes with extended lip where required to protect trim from damage by latchbolt.
4. Schlage ND Series Rhodes design levers specified as the standard of quality.
5. Mortised type locksets complying with ANSI 156.13 Series 1000 Grade 1.
6. Provide 2 3/4" backsets unless job conditions dictate otherwise.
7. Schlage L Series 06A design levers specified as the standard of quality.

D. Exit Devices

1. All to be U.L. approved for casualty. All fire doors to be equipped with rated exit devices meeting fire label requirements.
2. Provide all exit devices from one manufacturer.
3. Von Duprin 98 series specified as the standard of quality.
4. Provide cylinders as required by exit device for proper operation

E. Door Closers

1. Bodies to be close grained malleable iron or aluminum with three separate control valves, including backcheck, ANSI Grade 1.
2. All closers shall be mounted on the inside of rooms.
3. Provide all closers with thru bolts.
4. All closers to comply with Americans with Disabilities Act requirements.
5. LCN 4040XP Series specified as the standard of quality.
6. LCN 4600 Series or Horton 4800LE specified as the standard of quality.

F. Kick Plates

1. Provide .050 x 10" high x 2" less than door width for single doors and 1" less than door width for pairs.
2. Ives 8400 series specified as the standard of quality.

G. Push Plates

1. Provide .050 x 4" x 16" push plates unless conditions dictate otherwise.
2. Ives 8200 series specified as the standard of quality.

H. Pull Plates

1. Provide .050 x 4" x 16" plate with 10" c/c pull.
2. Ives 8305 series specified as the standard of quality.

I. Flush Bolts

1. Manual flush bolts equal to Ives FB458 with 12" rods.
2. Provide extension rods where conditions dictate.

J. Door Stops

1. Wall stops shall be used whenever possible. Use FS439/FS18S type floor stops where wall stops cannot be used.
2. Ives WS406/WS407 specified as the standard of quality.

J. Silencers

1. Provide 3 for each single door and 2 for each pair of doors. Not required on door having weatherstripping or gasketting.

K. Thresholds and Weatherstripping

1. Provide as listed in hardware sets.

2.03 FINISHES

A. Provide matching finishes for hardware items at each door opening to the greatest extent possible, except as otherwise indicated.

B. Provide finishes which comply with those established by BHMA listed in "Materials and Finishes Standard 1301".

C. Finishes for this project are as follows:

1.	Hinges	652/630
2.	Locksets	626
3.	Exit Devices	US26D
4.	Flat Goods	630
5.	Stops	630
6.	Closers	689

2.04 KEYING

A Key all locks into existing master key system in accordance with owners instructions.

1. Provide 2 change keys per lock.
2. Provide 6 master keys

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine doors, frames and related items for conditions that would prevent proper application of finish hardware. Do not proceed until defects have been corrected.

3.02 INSTALLATION

A. Install each item in accordance with manufacturer's instructions and recommendations. Set units level, plumb and true to line and location. Do not install surface mounted items until finishes have been completed on substrate.

3.03 ADJUST AND CLEAN

A. At final completion hardware shall be left clean and free from disfigurement. Make a final adjustment to closers and other items of hardware. Where hardware is found defective repair or replace or otherwise correct as required.

3.04 HARDWARE SETS

A. A. While the following hardware sets are intended to cover all doors and establish a type and standard of quality, it is the responsibility of the hardware supplier to examine the plans and specifications and furnish proper hardware for all openings. The hardware supplier shall review the entire specification versus the door schedule and notify the architect of any errors, inconsistencies, or omissions during the bid period.

↯ = Hardware Item Requiring Electrical Coordination

HARDWARE GROUP NO. 100

DOOR NUMBER(S): HW SET NOT USED

HARDWARE GROUP NO. 102

DOOR NUMBER(S): HW SET NOT USED

HARDWARE GROUP NO. 103

FOR USE ON MARK/DOOR #(S):
304 409B 444 800A 800B

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
3 EA	HINGE	5BB1HW 5 X 4.5 NRP		630	IVE
1 EA	POWER TRANSFER	EPT10 CON	↯	689	VON
1 EA	EU MORTISE LOCK	L9092TEU 06A RX CON	↯	626	SCH

1 EA	PERMANENT CORE	23-030		626	SCH
1 EA	LOCK GUARD	LG12		630	IVE
1 EA	SURFACE CLOSER	4040XP EDA		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	FLOOR STOP	FS18S		BLK	IVE
1 EA	GASKETING	8303AA		628	ZER
1 EA	DOOR SWEEP	39A		719	ZER
1 EA	THRESHOLD	8655A-223 MSLA-10		719	ZER
1 EA	RAIN DRIP	142A		719	ZER
1 EA	WIRE HARNESS	CON-XXP SIZE AS REQUIRED	✓		SCH
1 EA	MULTITECH READER	BY SECURITY VENDOR	✓	BLK	SCE
1 EA	DOOR CONTACT	BY SECURITY VENDOR	✓	WHT	SCE
1 EA	POWER SUPPLY	BY SECURITY VENDOR	✓	LGR	SCE
1 EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY SECURITY VENDOR)	✓		

DOOR NORMALLY CLOSED AND LOCKED
PRESENT CREDENTIAL TO CARD READER FOR ENTRY OR BY KEY OVERRIDE
FREE EGRESS AT ALL TIMES
RX IN LOCKSET TO SHUNT DPS UPON EGRESS

HARDWARE GROUP NO. 104

FOR USE ON MARK/DOOR #(S):
160 161

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
3 EA	HINGE	5BB1HW 5 X 4.5 NRP		630	IVE
1 EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1 EA	PERMANENT CORE	23-030		626	SCH
1 EA	SURFACE CLOSER	4040XP EDA		689	LCN
1 EA	CRASH STOP	CS115 25 1/2"		626	IVE
1 EA	GASKETING	8303AA		628	ZER
1 EA	DOOR SWEEP	39A		719	ZER
1 EA	THRESHOLD	8655A-223 MSLA-10		719	ZER
1 EA	DOOR CONTACT	BY SECURITY VENDOR	✓	WHT	SCE

HARDWARE GROUP NO. 105

DOOR NUMBER(S): HW SET NOT USED

HARDWARE GROUP NO. 106

DOOR NUMBER(S): HW SET NOT USED

HARDWARE GROUP NO. 107

FOR USE ON MARK/DOOR #(S):
803

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
3 EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1 EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1 EA	PERMANENT CORE	23-030		626	SCH
1 EA	LOCK GUARD	LG12		630	IVE
1 EA	SURFACE CLOSER	4040XP EDA		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	CRASH STOP	CS115 25 1/2"		626	IVE
1 EA	GASKETING	8303AA		628	ZER
1 EA	DOOR SWEEP	39A		719	ZER
1 EA	THRESHOLD	8655A-223 MSLA-10		719	ZER
1 EA	RAIN DRIP	142A		719	ZER
1 EA	DOOR CONTACT	BY SECURITY VENDOR	↙	WHT	SCE

HARDWARE GROUP NO. 108

DOOR NUMBER(S): HW SET NOT USED

HARDWARE GROUP NO. 200

FOR USE ON MARK/DOOR #(S):
107

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1HW 5 X 4.5	652	IVE
1 EA	LONG DOOR PULL	PR 9266F 36" N	630-316	IVE
1 EA	CONCEALED CLOSER	2030 WMS	689	LCN
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED	626	IVE
1 EA	GASKETING	188S-BK	BLK	ZER

HARDWARE GROUP NO. 201

FOR USE ON MARK/DOOR #(S):

113	116	117	122	126	127A
128	129	134	135	137A	141
142	241	259	406	407	408
412	413	414			

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 5 X 4.5	652	IVE
1 EA	PASSAGE SET	ND53S RHO	626	SCH
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED	626	IVE
1 EA	GASKETING	188S-BK	BLK	ZER

PROVIDE 4.5" HINGES FOR OPENINGS 36" WIDTH.

HARDWARE GROUP NO. 202

FOR USE ON MARK/DOOR #(S):

256A	257A	404	405	442	654

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 5 X 4.5	652	IVE
1 EA	PASSAGE SET	ND10S RHO	626	SCH
1 EA	SURFACE CLOSER	4040XP	689	LCN
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED	626	IVE
1 EA	GASKETING	188S-BK	BLK	ZER

PROVIDE 4.5" HINGES FOR OPENINGS 36" WIDTH.

HARDWARE GROUP NO. 203

FOR USE ON MARK/DOOR #(S):

306	607	660

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1 EA	PRIVACY LOCK	L9040 06A L583-363 W/OCC INDICATOR	626	SCH
1 EA	SURFACE CLOSER	4040XP EDA	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED	626	IVE
1 EA	GASKETING	188S-BK	BLK	ZER

HARDWARE GROUP NO. 204

FOR USE ON MARK/DOOR #(S):

110	251	255	416	454	461
518	604	617	632	700C	741
752	753	764	802		

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 EA	PRIVACY LOCK	L9040 06A L583-363 W/OCC INDICATOR	626	SCH
1 EA	SURFACE CLOSER	4040XP	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED	626	IVE
1 EA	GASKETING	188S-BK	BLK	ZER

PROVIDE 5" HW HINGES FOR OPENINGS OVER 36" WIDTH

HARDWARE GROUP NO. 205

FOR USE ON MARK/DOOR #(S):
415

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 EA	PRIVACY LOCK	L9040 06A L583-363 W/OCC INDICATOR	626	SCH
1 EA	SURFACE CLOSER	4040XP	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED	626	IVE
1 EA	GASKETING	485A	719	ZER
1 EA	DOOR BOTTOM	364AA	628	ZER
1 EA	COVER PLATE	601CPA-NH	719	ZER

HARDWARE GROUP NO. 206

FOR USE ON MARK/DOOR #(S):

118A	203	204	206	207	208
211	212	214	215	216	217
218	219	221	222	223	233
234	235	236	238	239	243
244	245	246	247	302	303
312	314	315	316	401	402
432	433	434	435	436	437
438	439	440	441	448	449
453	503	504	508	509	511
513	521	524	525	530	602
605	608	612	613	614	615
619	620	623	624	625	626
627	628	629	631	637	638
640	641	642	645	649	651
652	653	657	658	661	662
663	667	668	669	670	673
674	675	676	702A	702B	703A
703B	704A	704B	707	708	709
710	712	713	714	715	717
718	719	720	721	722	723
724	725	726	727	728	729
730	731	732	733	734	735
737	738	739	740	742	743
744	745	746	747	748	751
755	759	760	761	762	763
765	767	801			

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 EA	ENTRANCE LOCK	ND53TD RHO	626	SCH
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED	626	IVE
3 EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 207

FOR USE ON MARK/DOOR #(S):

248	317	611	648

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 5 X 4.5	652	IVE

1 EA	ENTRANCE LOCK	ND53TD RHO	626	SCH
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED	626	IVE
3 EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 208

FOR USE ON MARK/DOOR #(S):
100Q 636

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 EA	ENTRANCE LOCK	ND53TD RHO	626	SCH
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	OH STOP	90S	630	GLY
3 EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 209

FOR USE ON MARK/DOOR #(S):

256B	257B	446	447	451	456
457	502	507A	507B	650	773A
774A	775A	776A			

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 EA	ENTRANCE LOCK	ND53TD RHO	626	SCH
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	SURFACE CLOSER	4040XP	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
3 EA	SILENCER	SR64	GRY	IVE

PROVIDE 5" HINGES FOR OPENINGS OVER 36" WIDTH.

HARDWARE GROUP NO. 210

FOR USE ON MARK/DOOR #(S):
301B

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1 EA	ENTRANCE LOCK	ND53TD RHO	626	SCH
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	SURFACE CLOSER	4040XP EDA	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
3 EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 211

FOR USE ON MARK/DOOR #(S):
410 411 418A 418B

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 EA	KEYPAD LOCK	DL2775 IC - S	626	ALA
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	SURFACE CLOSER	4040XP	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED	626	IVE
3 EA	SILENCER	SR64	GRY	IVE

DOOR NORMALLY CLOSED AND LOCKED
ENTER CODE AT KEYPAD FOR ENTRY OR BY KEY OVERRIDE.
FREE EGRESS BY INSIDE LEVER

HARDWARE GROUP NO. 212

FOR USE ON MARK/DOOR #(S):
409A

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 5 X 4.5 NRP	652	IVE
1 EA	KEYPAD LOCK	DL2775 IC - S	626	ALA
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	SURFACE CLOSER	4040XP EDA	689	LCN

1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED	626	IVE
1 EA	GASKETING	188S-BK	BLK	ZER

DOOR NORMALLY CLOSED AND LOCKED
ENTER CODE AT KEYPAD FOR ENTRY OR BY KEY OVERRIDE.
FREE EGRESS BY INSIDE LEVER

HARDWARE GROUP NO. 213

FOR USE ON MARK/DOOR #(S):

152A	305	307A	422	516	519
520	768A				

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 EA	CLASSROOM LOCK	ND70TD RHO	626	SCH
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	SURFACE CLOSER	4040XP	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	GASKETING	188S-BK	BLK	ZER

PROVIDE 5" HINGES FOR OPENINGS OVER 36" WIDTH.

HARDWARE GROUP NO. 214

FOR USE ON MARK/DOOR #(S):

249	528B	665

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1 EA	CLASSROOM LOCK	ND70TD RHO	626	SCH
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	SURFACE CLOSER	4040XP EDA	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	GASKETING	188S-BK	BLK	ZER

PROVIDE 5" HINGES FOR OPENINGS OVER 36" WIDTH.

HARDWARE GROUP NO. 215

FOR USE ON MARK/DOOR #(S):
644

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 EA	STOREROOM LOCK	ND80TD RHO	626	SCH
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	OH STOP	100S	630	GLY
1 EA	SURFACE CLOSER	4040XP EDA	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	GASKETING	188S-BK	BLK	ZER

HARDWARE GROUP NO. 216

FOR USE ON MARK/DOOR #(S):

111	112	114	123	127B	132
136	137C		150	151	250
254	311	403	445	455	512
514	515	523	527B	533	616
639	659	754	758	770	771
772	804				

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 EA	STOREROOM LOCK	ND80TD RHO	626	SCH
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	SURFACE CLOSER	4040XP	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED	626	IVE
1 EA	GASKETING	188S-BK	BLK	ZER

PROVIDE 5" HW HINGES FOR OPENINGS OVER 36" WIDTH

HARDWARE GROUP NO. 217

FOR USE ON MARK/DOOR #(S):
127D 313 621 671 809

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1 EA	STOREROOM LOCK	ND80TD RHO	626	SCH
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	SURFACE CLOSER	4040XP EDA	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED	626	IVE
1 EA	GASKETING	188S-BK	BLK	ZER

PROVIDE 5" HW HINGES FOR OPENINGS OVER 36" WIDTH

HARDWARE GROUP NO. 218

FOR USE ON MARK/DOOR #(S):
200B 400B 430A 609 646

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
3 EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1 EA	POWER TRANSFER	EPT10 CON	✓	689	VON
1 EA	STOREROOM LOCK	ND80TDEU RHO RX	✓	626	SCH
1 EA	PERMANENT CORE	23-030		626	SCH
1 EA	ELECTRIC STRIKE	6211 FSE	✓	630	VON
1 EA	LOCK GUARD	LG14		630	IVE
1 EA	SURFACE CLOSER	4040XP EDA		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED		626	IVE
1 EA	GASKETING	188S-BK		BLK	ZER
1 EA	WIRE HARNESS	CON-XXP SIZE AS REQUIRED	✓		SCH
1 EA	MULTITECH READER	BY SECURITY VENDOR	✓	BLK	SCE
1 EA	DESK MOUNT BUTTON	660-PB	✓	628	SCE
1 EA	DOOR CONTACT	BY SECURITY VENDOR	✓	WHT	SCE
1 EA	POWER SUPPLY	BY SECURITY VENDOR	✓	LGR	SCE
1 EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY SECURITY VENDOR)	✓		
1	LOW VOLTAGE POWER	BY SECURITY CONTRACTOR			

PROVIDE 5" HW HINGES FOR OPENINGS OVER 36" WIDTH

DOOR NORMALLY CLOSED AND LOCKED
PRESENT CREDENTIAL TO CARD READER FOR ENTRY OR BY KEY OVERRIDE.
PUSH BUTTON AT RECEPTION DESK FOR NON-CREDENTIAL PERSONNEL BUZZ-IN.
FREE EGRESS AT ALL TIMES WITH INSIDE LEVER.
RX IN LOCKSET TO SHUNT DPS UPON EGRESS.

HARDWARE GROUP NO. 219

FOR USE ON MARK/DOOR #(S):
500B

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
3 EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1 EA	POWER TRANSFER	EPT10 CON	✓	689	VON
1 EA	STOREROOM LOCK	ND80TDEU RHO RX	✓	626	SCH
1 EA	PERMANENT CORE	23-030		626	SCH
1 EA	ELECTRIC STRIKE	6211 FSE	✓	630	VON
1 EA	SURFACE CLOSER	4040XP		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED		626	IVE
1 EA	GASKETING	188S-BK		BLK	ZER
1 EA	WIRE HARNESS	CON-XXP SIZE AS REQUIRED	✓		SCH
1 EA	MULTITECH READER	BY SECURITY VENDOR	✓	BLK	SCE
1 EA	DESK MOUNT BUTTON	660-PB	✓	628	SCE
1 EA	DOOR CONTACT	BY SECURITY VENDOR	✓	WHT	SCE
1 EA	POWER SUPPLY	BY SECURITY VENDOR	✓	LGR	SCE
1 EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY SECURITY VENDOR)	✓		
1	LOW VOLTAGE POWER	BY SECURITY CONTRACTOR			

DOOR NORMALLY CLOSED AND LOCKED
PRESENT CREDENTIAL TO CARD READER FOR ENTRY OR BY KEY OVERRIDE.
PUSH BUTTON AT RECEPTION DESK FOR NON-CREDENTIAL PERSONNEL BUZZ-IN.
FREE EGRESS AT ALL TIMES WITH INSIDE LEVER.
RX IN LOCKSET TO SHUNT DPS UPON EGRESS.

HARDWARE GROUP NO. 220

FOR USE ON MARK/DOOR #(S):
230A

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
3 EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1 EA	POWER TRANSFER	EPT10 CON	✓	689	VON
1 EA	STOREROOM LOCK	ND80TDEU RHO RX	✓	626	SCH
1 EA	PERMANENT CORE	23-030		626	SCH
1 EA	ELECTRIC STRIKE	6211 FSE	✓	630	VON
1 EA	LOCK GUARD	LG14		630	IVE
1 EA	OH STOP	100S		630	GLY
1 EA	SURFACE CLOSER	4040XP EDA		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED		626	IVE
1 EA	GASKETING	188S-BK		BLK	ZER
1 EA	WIRE HARNESS	CON-XXP SIZE AS REQUIRED	✓		SCH
1 EA	MULTITECH READER	BY SECURITY VENDOR	✓	BLK	SCE
1 EA	DESK MOUNT BUTTON	660-PB	✓	628	SCE
1 EA	DOOR CONTACT	BY SECURITY VENDOR	✓	WHT	SCE
1 EA	POWER SUPPLY	BY SECURITY VENDOR	✓	LGR	SCE
1 EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY SECURITY VENDOR)	✓		
1	LOW VOLTAGE POWER	BY SECURITY CONTRACTOR			

DOOR NORMALLY CLOSED AND LOCKED
PRESENT CREDENTIAL TO CARD READER FOR ENTRY OR BY KEY OVERRIDE.
PUSH BUTTON AT RECEPTION DESK FOR NON-CREDENTIAL PERSONNEL BUZZ-IN.
FREE EGRESS AT ALL TIMES WITH INSIDE LEVER.
RX IN LOCKSET TO SHUNT DPS UPON EGRESS.

HARDWARE GROUP NO. 221

FOR USE ON MARK/DOOR #(S):

115	118B	124	140	220	417
460	522	526	527A	634B	643
655	769				

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1 5 X 4.5 NRP	652	IVE

1 EA	POWER TRANSFER	EPT10 CON	✓	689	VON
1 EA	STOREROOM LOCK	ND80TDEU RHO RX	✓	626	SCH
1 EA	PERMANENT CORE	23-030		626	SCH
1 EA	SURFACE CLOSER	4040XP		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED		626	IVE
1 EA	GASKETING	188S-BK		BLK	ZER
1 EA	WIRE HARNESS	CON-XXP SIZE AS REQUIRED	✓		SCH
1 EA	MULTITECH READER	BY SECURITY VENDOR	✓	BLK	SCE
1 EA	DOOR CONTACT	BY SECURITY VENDOR	✓	WHT	SCE
1 EA	POWER SUPPLY	BY SECURITY VENDOR	✓	LGR	SCE
1 EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY SECURITY VENDOR)	✓		

PROVIDE 4.5" HINGES FOR OPENINGS 36" WIDTH.

DOOR NORMALLY CLOSED AND LOCKED
PRESENT CREDENTIAL TO CARD READER FOR ENTRY OR BY KEY OVERRIDE
FREE EGRESS BY INSIDE LEVER
RX IN LOCKSET TO SHUNT DPS UPON EGRESS

HARDWARE GROUP NO. 222

FOR USE ON MARK/DOOR #(S):
301A 307B 517A

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
3 EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1 EA	POWER TRANSFER	EPT10 CON	✓	689	VON
1 EA	STOREROOM LOCK	ND80TDEU RHO RX	✓	626	SCH
1 EA	PERMANENT CORE	23-030		626	SCH
1 EA	LOCK GUARD	LG12		630	IVE
1 EA	SURFACE CLOSER	4040XP EDA		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED		626	IVE
1 EA	GASKETING	188S-BK		BLK	ZER
1 EA	WIRE HARNESS	CON-XXP SIZE AS REQUIRED	✓		SCH
1 EA	MULTITECH READER	BY SECURITY VENDOR	✓	BLK	SCE
1 EA	DOOR CONTACT	BY SECURITY VENDOR	✓	WHT	SCE
1 EA	POWER SUPPLY	BY SECURITY VENDOR	✓	LGR	SCE
1 EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY SECURITY VENDOR)	✓		

PROVIDE 5" HW HINGES FOR OPENINGS OVER 36" WIDTH.

DOOR NORMALLY CLOSED AND LOCKED
PRESENT CREDENTIAL TO CARD READER FOR ENTRY OR BY KEY OVERRIDE
FREE EGRESS BY INSIDE LEVER
RX IN LOCKSET TO SHUNT DPS UPON EGRESS

HARDWARE GROUP NO. 223

FOR USE ON MARK/DOOR #(S):
101 103

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
6 EA	HINGE	5BB1HW 5 X 4.5 NRP		652	IVE
2 EA	POWER TRANSFER	EPT10 CON	✓	689	VON
1 EA	ELEC PANIC HARDWARE	RX-9850WDC-EO-LBL-CON-SNB	✓	626	VON
1 EA	ELEC PANIC HARDWARE	RX-QEL-9850WDC-L-NL-06-LBL-CON-SNB	✓	626	VON
1 EA	RIM CYLINDER	20-057 ICX		626	SCH
1 EA	PERMANENT CORE	23-030		626	SCH
2 EA	SURFACE CLOSER	4040XP EDA		689	LCN
2 EA	PROTECTION PLATE	8400 10" X 1" LDW B-CS		630	IVE
2 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED		626	IVE
1 EA	GASKETING	188S-BK		BLK	ZER
2 EA	WIRE HARNESS	CON-12P	✓		SCH
1 EA	MULTITECH READER	BY SECURITY VENDOR	✓	BLK	SCE
2 EA	DOOR CONTACT	BY SECURITY VENDOR	✓	WHT	SCE
1 EA	POWER SUPPLY	BY SECURITY VENDOR	✓	LGR	SCE
1 EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY SECURITY VENDOR)	✓		

PROVIDE 8 HINGES FOR OPENINGS OVER 7'6" HEIGHT.

DOOR NORMALLY LOCKED
PRESENT CREDENTIAL TO CARD READER FOR RELEASING ELECTRIC LATCH RETRACTION FOR ENTRY OR BY KEY OVERRIDE.
FREE EGRESS AT ALL TIMES

HARDWARE GROUP NO. 224

FOR USE ON MARK/DOOR #(S):
706A

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
3 EA	HINGE	5BB1HW 5 X 4.5 NRP		652	IVE
1 EA	POWER TRANSFER	EPT10 CON	✓	689	VON
1 EA	PANIC HARDWARE	98-L-06		626	VON
1 EA	ELEC PANIC HARDWARE	RX-QEL-98-L-06-CON	✓	626	VON
1 EA	RIM CYLINDER	20-057 ICX		626	SCH
1 EA	PERMANENT CORE	23-030		626	SCH
1 EA	SURFACE CLOSER	4040XP EDA		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED		626	IVE
1 EA	GASKETING	188S-BK		BLK	ZER
1 EA	WIRE HARNESS	CON-12P	✓		SCH
1 EA	MULTITECH READER	BY SECURITY VENDOR	✓	BLK	SCE
1 EA	DOOR CONTACT	BY SECURITY VENDOR	✓	WHT	SCE
1 EA	POWER SUPPLY	BY SECURITY VENDOR	✓	LGR	SCE
1 EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY SECURITY VENDOR)	✓		
1	LOW VOLTAGE POWER	BY SECURITY CONTRACTOR			

DOOR NORMALLY LOCKED
PRESENT CREDENTIAL TO CARD READER FOR RELEASING ELECTRIC LATCH RETRACTION FOR ENTRY OR BY KEY OVERRIDE.
FREE EGRESS AT ALL TIMES

HARDWARE GROUP NO. 225

FOR USE ON MARK/DOOR #(S):
253B

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGE	5BB1HW 5 X 4.5 NRP	652	IVE
1 EA	PANIC HARDWARE	98-L-06	626	VON
1 EA	RIM CYLINDER	20-057 ICX	626	SCH
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	SURFACE CLOSER	4040XP EDA	689	LCN

1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED	626	IVE
1 EA	GASKETING	188S-BK	BLK	ZER

HARDWARE GROUP NO. 226

DOOR NUMBER(S): HW SET NOT USED

HARDWARE GROUP NO. 227

FOR USE ON MARK/DOOR #(S):
119F 459

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
6 EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
2 EA	MANUAL FLUSH BOLT	FB458	626	IVE
1 EA	DUST PROOF STRIKE	DP1/DP2 AS REQUIRED	626	IVE
1 EA	STOREROOM LOCK	ND80TD RHO	626	SCH
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	OH STOP	90S	630	GLY
1 EA	SURFACE CLOSER	4040XP EDA	689	LCN
2 EA	PROTECTION PLATE	8400 10" X 1" LDW B-CS	630	IVE
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED	626	IVE
1 EA	ASTRAGAL	47A	719	ZER
2 EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. AL-01

FOR USE ON MARK/DOOR #(S):

100C	100M	127C	137B	242	258
517B	634A	656	677	706B	766

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
1 EA	PIVOT SET	7226 SET	626	IVE
1 EA	INTERMEDIATE PIVOT	7226 INT	626	IVE

1 EA	POWER TRANSFER	EPT10 CON	✓	689	VON
1 EA	ELEC PANIC HARDWARE	RX-QEL-98-L-06-CON	✓	626	VON
1 EA	RIM CYLINDER	20-057 ICX		626	SCH
1 EA	PERMANENT CORE	23-030		626	SCH
1 EA	CONCEALED CLOSER	2030 WMS		689	LCN
1 EA	FLOOR STOP	FS18S		BLK	IVE
1 EA	DOOR SWEEP	39A		719	ZER
1 EA	THRESHOLD	544A-223 MSLA-10		719	ZER
1 EA	RAIN DRIP	142A		719	ZER
1 EA	WIRE HARNESS	CON-12P	✓		SCH
1 EA	MULTITECH READER	BY SECURITY VENDOR	✓	BLK	SCE
1 EA	DOOR CONTACT	BY SECURITY VENDOR	✓	WHT	SCE
1 EA	POWER SUPPLY	BY SECURITY VENDOR	✓	LGR	SCE
1 EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY SECURITY VENDOR)	✓		
1		WEATHERSTRIP/SEALS BY DOOR MANUFACTURER			

DOOR NORMALLY CLOSED AND LOCKED
PRESENT CREDENTIAL TO CARD READER FOR ENTRY OR BY KEY OVERRIDE
FREE EGRESS AT ALL TIMES
RX IN PUSH BAR TO SHUNT DPS UPON EGRESS

HARDWARE GROUP NO. AL-02

FOR USE ON MARK/DOOR #(S):
622 768B

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
1 EA	PIVOT SET	7226 SET		626	IVE
2 EA	INTERMEDIATE PIVOT	7226 INT		626	IVE
1 EA	POWER TRANSFER	EPT10 CON	✓	689	VON
1 EA	ELEC PANIC HARDWARE	RX-QEL-98-L-06-CON	✓	626	VON
1 EA	RIM CYLINDER	20-057 ICX		626	SCH
1 EA	PERMANENT CORE	23-030		626	SCH
1 EA	CONCEALED CLOSER	2030 WMS		689	LCN
1 EA	FLOOR STOP	FS18S		BLK	IVE
1 EA	DOOR SWEEP	39A		719	ZER

1 EA	THRESHOLD	544A-223 MSLA-10		719	ZER
1 EA	RAIN DRIP	142A		719	ZER
1 EA	WIRE HARNESS	CON-12P	✓		SCH
1 EA	MULTITECH READER	BY SECURITY VENDOR	✓	BLK	SCE
1 EA	DOOR CONTACT	BY SECURITY VENDOR	✓	WHT	SCE
1 EA	POWER SUPPLY	BY SECURITY VENDOR	✓	LGR	SCE
1 EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY SECURITY VENDOR)	✓		
1		WEATHERSTRIP/SEALS BY DOOR MANUFACTURER			

DOOR NORMALLY CLOSED AND LOCKED
PRESENT CREDENTIAL TO CARD READER FOR ENTRY OR BY KEY OVERRIDE
FREE EGRESS AT ALL TIMES
RX IN PUSH BAR TO SHUNT DPS UPON EGRESS

HARDWARE GROUP NO. AL-03

FOR USE ON MARK/DOOR #(S):
138A 138B 139A 139B

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
1 EA	PIVOT SET	7226 SET	626	IVE
1 EA	INTERMEDIATE PIVOT	7226 INT	626	IVE
1 EA	PANIC HARDWARE	98-L-06-WH	626	VON
1 EA	RIM CYLINDER	20-057 ICX	626	SCH
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	CONCEALED CLOSER	2030 WMS	689	LCN
1 EA	FLOOR STOP	FS439	630	IVE
1 EA	DOOR SWEEP	111AA	628	ZER
1 EA	THRESHOLD	544A-223 MSLA-10	719	ZER
1 EA	DOOR CONTACT	BY SECURITY VENDOR	✓ WHT	SCE
1		WEATHERSTRIP/SEALS BY DOOR MANUFACTURER		

OMIT FLOOR STOP AT 139A & B, PROVIDE WALL STOP.

HARDWARE GROUP NO. AL-04

DOOR NUMBER(S): HW SET NOT USED

HARDWARE GROUP NO. AL-05

FOR USE ON MARK/DOOR #(S):
119D 119E 253A

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
1 EA	PIVOT SET	7226 SET		626	IVE
2 EA	INTERMEDIATE PIVOT	7226 INT		626	IVE
1 EA	PANIC HARDWARE	98-L-06		626	VON
1 EA	RIM CYLINDER	20-057 ICX		626	SCH
1 EA	PERMANENT CORE	23-030		626	SCH
1 EA	CONCEALED CLOSER	2030 BUMP WMS		689	LCN
1 EA	FLOOR STOP	FS18S		BLK	IVE
1 EA	DOOR SWEEP	39A		719	ZER
1 EA	THRESHOLD	544A-223 MSLA-10		719	ZER
1 EA	DOOR CONTACT	BY SECURITY VENDOR	↯	WHT	SCE
1		WEATHERSTRIP/SEALS BY DOOR MANUFACTURER			

HARDWARE GROUP NO. AL-06

DOOR NUMBER(S): HW SET NOT USED

HARDWARE GROUP NO. AL-07

FOR USE ON MARK/DOOR #(S):
104A

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
1 EA	PIVOT SET	7226 SET		626	IVE
2 EA	INTERMEDIATE PIVOT	7226 INT		626	IVE
1 EA	POWER TRANSFER	EPT10 CON	↯	689	VON

1 EA	ELEC PANIC HARDWARE	RX-QEL-98-NL-OP-110MDCON	✓	626	VON
1 EA	RIM CYLINDER	20-057 ICX		626	SCH
2 EA	PERMANENT CORE	23-030		626	SCH
1 EA	MORTISE CYLINDER	26-091		626	SCH
1 EA	90 DEG OFFSET PULL	8190HD 10" STD		630	IVE
1 EA	SURF. AUTO OPERATOR	4642 TBWMS	✓	689	LCN
1 EA	WEATHER RING	8310-801		PLA	LCN
2 EA	ACTUATOR, WALL MOUNT	8310-853T	✓	630	LCN
2 EA	FLUSH MOUNT BOX	8310-867F		689	LCN
1 EA	FLOOR STOP	FS18S		BLK	IVE
1 EA	DOOR SWEEP	39A		719	ZER
1 EA	THRESHOLD	544A-223 MSLA-10		719	ZER
1 EA	WIRE HARNESS	CON-12P	✓		SCH
1 EA	KEY SWITCH	653-04 L2	✓	630	SCE
1 EA	DOOR CONTACT	BY SECURITY VENDOR	✓	WHT	SCE
1 EA	POWER SUPPLY	BY SECURITY VENDOR	✓	LGR	SCE
1 EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY SECURITY VENDOR)	✓		
1	LOW VOLTAGE POWER	BY SECURITY CONTRACTOR			
1		WEATHERSTRIP/SEALS BY DOOR MANUFACTURER			

KEY SWITCH TO TURN ON / OFF OUTSIDE ACTUATOR DURING NON-BUSINESS HOURS.

HARDWARE GROUP NO. AL-08

FOR USE ON MARK/DOOR #(S):
NOT USED

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
2 EA	PIVOT SET	7226 SET		626	IVE
4 EA	INTERMEDIATE PIVOT	7226 INT		626	IVE
1 EA	PANIC HARDWARE	CD-9849-EO	✓	626	VON
1 EA	PANIC HARDWARE	CD-9849-L-NL-06	✓	626	VON
1 EA	RIM CYLINDER	20-057 ICX		626	SCH
3 EA	PERMANENT CORE	23-030		626	SCH
2 EA	MORTISE CYLINDER	26-091 ICX XQ11-948		626	SCH
2 EA	CONCEALED CLOSER	2030 WMS		689	LCN
2 EA	FLOOR STOP	FS18S		BLK	IVE

2 EA	DOOR SWEEP	39A		719	ZER
1 EA	THRESHOLD	8655A-223 MSLA-10		719	ZER
2 EA	DOOR CONTACT	BY SECURITY VENDOR	↯	WHT	SCE
1		WEATHERSTRIP/SEALS BY DOOR MANUFACTURER			

HARDWARE GROUP NO. AL-09

FOR USE ON MARK/DOOR #(S):
152B 300A 773B 774B 775B 776B

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
1 EA	PIVOT SET	7226 SET		626	IVE
1 EA	INTERMEDIATE PIVOT	7226 INT		626	IVE
1 EA	DEADLOCK	MS1850S		628	ADA
1 EA	MORTISE CYL TURN	09-900 NH 118 XB11-720		626	SCH
1 EA	PERMANENT CORE	23-030		626	SCH
1 EA	EXIT INDICATOR	4089		130	ADA
1 EA	PUSH/PULL BAR	9190HD-10"-NO		630	IVE
1 EA	CONCEALED CLOSER	2030 WMS		689	LCN
1 EA	FLOOR STOP	FS18S		BLK	IVE
1 EA	DOOR SWEEP	39A		719	ZER
1 EA	THRESHOLD	544A-223 MSLA-10		719	ZER
1 EA	RAIN DRIP	142A		719	ZER
1 EA	DOOR CONTACT	BY SECURITY VENDOR	↯	WHT	SCE
1		WEATHERSTRIP/SEALS BY DOOR MANUFACTURER			

HARDWARE GROUP NO. AL-10

DOOR NUMBER(S): HW SET NOT USED

HARDWARE GROUP NO. AL-11

FOR USE ON MARK/DOOR #(S):
104 105

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
2 EA	PIVOT SET	7226 SET		626	IVE
2 EA	INTERMEDIATE PIVOT	7226 INT		626	IVE
2 EA	HEADER / THRESHOLD BOLT	4015 X 4085		628	ADA
1 EA	DEADLOCK	MS1850S		628	ADA
1 EA	MORTISE CYL TURN	09-900 NH 118 XB11-720		626	SCH
1 EA	PERMANENT CORE	23-030		626	SCH
1 EA	EXIT INDICATOR	4089		130	ADA
2 EA	PUSH/PULL BAR	9190HD-10"-NO		630	IVE
2 EA	CONCEALED CLOSER	2030 BUMP WMS		689	LCN
2 EA	DOOR SWEEP	39A		719	ZER
1 EA	THRESHOLD	544A-223 MSLA-10		719	ZER
1 EA	RAIN DRIP	142A		719	ZER
2 EA	DOOR CONTACT	BY SECURITY VENDOR	↯	WHT	SCE
1		WEATHERSTRIP/SEALS BY DOOR MANUFACTURER			

DOORS TO BE UNLOCKED DURING BUSINESS HOURS

HARDWARE GROUP NO. AL-12

FOR USE ON MARK/DOOR #(S):
119A 119B 119C

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
2 EA	PIVOT SET	7226 SET	626	IVE
4 EA	INTERMEDIATE PIVOT	7226 INT	626	IVE
1 EA	PANIC HARDWARE	CD-9849-EO-LBL	626	VON
1 EA	PANIC HARDWARE	CD-9849-L-06-LBL	626	VON
1 EA	RIM CYLINDER	20-057 ICX	626	SCH
3 EA	PERMANENT CORE	23-030	626	SCH
2 EA	MORTISE CYLINDER	26-091 ICX XQ11-948	626	SCH
2 EA	CONCEALED CLOSER	2030 BUMP WMS	689	LCN

1	WEATHERSTRIP/SEALS BY DOOR MANUFACTURER			

HARDWARE GROUP NO. AL-13

FOR USE ON MARK/DOOR #(S):
100F 100J

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
1 EA	PIVOT SET	7226 SET		626	IVE
1 EA	INTERMEDIATE PIVOT	7226 INT		626	IVE
1 EA	PANIC HARDWARE	98-L-BE-06		626	VON
1 EA	CONCEALED CLOSER	2030 WMS		689	LCN
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED		626	IVE
1	WEATHERSTRIP/SEALS BY DOOR MANUFACTURER				

HARDWARE GROUP NO. AL-14

FOR USE ON MARK/DOOR #(S):
105A 105B 106B

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
2 EA	PIVOT SET	7226 SET		626	IVE
4 EA	INTERMEDIATE PIVOT	7226 INT		626	IVE
2 EA	POWER TRANSFER	EPT10 CON	✓	689	VON
1 EA	ELEC PANIC HARDWARE	RX-9849-EO-LBL-CON	✓	626	VON
1 EA	ELEC PANIC HARDWARE	RX-QEL-9849-L-NL-06-LBL-CON	✓	626	VON
1 EA	RIM CYLINDER	20-057 ICX		626	SCH
1 EA	PERMANENT CORE	23-030		626	SCH
2 EA	CONCEALED CLOSER	2030 WMS		689	LCN
2 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED		626	IVE
2 EA	WIRE HARNESS	CON-12P	✓		SCH
1 EA	MULTITECH READER	BY SECURITY VENDOR	✓	BLK	SCE
2 EA	DOOR CONTACT	BY SECURITY VENDOR	✓	WHT	SCE

1 EA	POWER SUPPLY	BY SECURITY VENDOR	✓	LGR	SCE
1 EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY SECURITY VENDOR)	✓		

DOOR NORMALLY LOCKED
PRESENT CREDENTIAL TO CARD READER FOR RELEASING ELECTRIC LATCH RETRACTION FOR ENTRY OR BY KEY OVERRIDE.
FREE EGRESS AT ALL TIMES

HARDWARE GROUP NO. AL-15

FOR USE ON MARK/DOOR #(S):
100N 100P 310

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
1 EA	PIVOT SET	7226 SET	626	IVE
1 EA	INTERMEDIATE PIVOT	7226 INT	626	IVE
1 EA	DEADLOCK	MS1850S	628	ADA
1 EA	MORTISE CYL TURN	09-900 NH 118 XB11-720	626	SCH
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	EXIT INDICATOR	4089	130	ADA
1 EA	PUSH/PULL BAR	9190HD-10"-NO	630	IVE
1 EA	CONCEALED CLOSER	2030 WMS	689	LCN
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED	626	IVE
1		WEATHERSTRIP/SEALS BY DOOR MANUFACTURER		

HARDWARE GROUP NO. AL-16

FOR USE ON MARK/DOOR #(S):
200A 230B 430B 600 700A

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
1 EA	PIVOT SET	7226 SET	626	IVE
1 EA	INTERMEDIATE PIVOT	7226 INT	626	IVE
1 EA	DEADLOCK	MS1850S	628	ADA
1 EA	MORTISE CYL TURN	09-900 NH 118 XB11-720	626	SCH
2 EA	PERMANENT CORE	23-030	626	SCH
1 EA	MORTISE CYLINDER	26-091	626	SCH

1 EA	EXIT INDICATOR	4089		130	ADA
1 EA	PUSH/PULL BAR	9190HD-10"-NO		630	IVE
1 EA	SURF. AUTO OPERATOR	4642 TBWMS	✓	689	LCN
2 EA	ACTUATOR, JAMB MOUNT	8310-818T	✓	630	LCN
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED		626	IVE
1 EA	KEY SWITCH	653-04 L2	✓	630	SCE
1		WEATHERSTRIP/SEALS BY DOOR MANUFACTURER			

KEY SWITCH TO TURN ON/OFF AUTO OPERATOR AND ACTUATORS.
DOORS TO BE UNLOCKED DURING BUSINESS HOURS.

HARDWARE GROUP NO. AL-17

FOR USE ON MARK/DOOR #(S):
500A

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
1 EA	PIVOT SET	7226 SET		626	IVE
1 EA	INTERMEDIATE PIVOT	7226 INT		626	IVE
1 EA	DEADLOCK	MS1850S		628	ADA
1 EA	MORTISE CYL TURN	09-900 NH 118 XB11-720		626	SCH
2 EA	PERMANENT CORE	23-030		626	SCH
1 EA	MORTISE CYLINDER	26-091		626	SCH
1 EA	EXIT INDICATOR	4089		130	ADA
1 EA	PUSH/PULL BAR	9190HD-10"-NO		630	IVE
1 EA	SURF. AUTO OPERATOR	4631 WMS	✓	689	LCN
2 EA	ACTUATOR, JAMB MOUNT	8310-818T	✓	630	LCN
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED		626	IVE
1 EA	KEY SWITCH	653-04 L2	✓	630	SCE
1		WEATHERSTRIP/SEALS BY DOOR MANUFACTURER			

KEY SWITCH TO TURN ON/OFF AUTO OPERATOR AND ACTUATORS.
DOORS TO BE UNLOCKED DURING BUSINESS HOURS.

HARDWARE GROUP NO. AL-18

FOR USE ON MARK/DOOR #(S):
700B

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER		FIN	MFR
1 EA	PIVOT SET	7226 SET		626	IVE
1 EA	INTERMEDIATE PIVOT	7226 INT		626	IVE
1 EA	POWER TRANSFER	EPT10 CON	✓	689	VON
1 EA	STOREROOM LOCK	ND80TDEU RHO RX	✓	626	SCH
1 EA	PERMANENT CORE	23-030		626	SCH
1 EA	ELECTRIC STRIKE	6211AL FSE	✓	630	VON
1 EA	CONCEALED CLOSER	2030 WMS		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS406/407CCV/FS439 AS REQUIRED		626	IVE
1 EA	GASKETING	188S-BK		BLK	ZER
1 EA	WIRE HARNESS	CON-XXP SIZE AS REQUIRED	✓		SCH
1 EA	MULTITECH READER	BY SECURITY VENDOR	✓	BLK	SCE
1 EA	DESK MOUNT BUTTON	660-PB	✓	628	SCE
1 EA	DOOR CONTACT	BY SECURITY VENDOR	✓	WHT	SCE
1 EA	POWER SUPPLY	BY SECURITY VENDOR	✓	LGR	SCE
1 EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY SECURITY VENDOR)	✓		
1	LOW VOLTAGE POWER	BY SECURITY CONTRACTOR			

DOOR NORMALLY CLOSED AND LOCKED
PRESENT CREDENTIAL TO CARD READER FOR ENTRY OR BY KEY OVERRIDE.
PUSH BUTTON AT RECEPTION DESK FOR NON-CREDENTIAL PERSONNEL.
FREE EGRESS AT ALL TIMES WITH INSIDE LEVER.
RX IN LOCKSET TO SHUNT DPS UPON EGRESS.

HARDWARE GROUP NO. AL-19

FOR USE ON MARK/DOOR #(S):
528A

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
1 EA	PIVOT SET	7226 SET	626	IVE

1 EA	INTERMEDIATE PIVOT	7226 INT		626	IVE
1 EA	POWER TRANSFER	EPT10 CON	✓	689	VON
1 EA	STOREROOM LOCK	ND80TDEU RHO RX	✓	626	SCH
1 EA	PERMANENT CORE	23-030		626	SCH
1 EA	CONCEALED CLOSER	2030 BUMP WMS		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	GASKETING	188S-BK		BLK	ZER
1 EA	WIRE HARNESS	CON-XXP SIZE AS REQUIRED	✓		SCH
1 EA	MULTITECH READER	BY SECURITY VENDOR	✓	BLK	SCE
1 EA	DOOR CONTACT	BY SECURITY VENDOR	✓	WHT	SCE
1 EA	POWER SUPPLY	BY SECURITY VENDOR	✓	LGR	SCE
1 EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY SECURITY VENDOR)	✓		
1	LOW VOLTAGE POWER	BY SECURITY CONTRACTOR			

DOOR NORMALLY CLOSED AND LOCKED
PRESENT CREDENTIAL TO CARD READER FOR ENTRY OR BY KEY OVERRIDE.
FREE EGRESS AT ALL TIMES WITH INSIDE LEVER.
RX IN LOCKSET TO SHUNT DPS UPON EGRESS.

HARDWARE GROUP NO. G-01

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
2 EA	GATE HINGE	2060.100	600	GGH
1 EA	PANIC HARDWARE	CDSI-98-L-NL-06	626	VON
1 EA	RIM CYLINDER	20-057 ICX	626	SCH
2 EA	PERMANENT CORE	23-030	626	SCH
1 EA	MORTISE CYLINDER	26-091 ICX XQ11-948	626	SCH
1 EA	GATE CLOSER	4040XPT SRI	689	LCN
1 EA	MOUNTING PLATE	4040XP-18 SRI	689	LCN
1		REMAINDER OF HARDWARE BY DOOR MANUFACTURER		

90 DEGREES ANGLE STOP BY GATE MANUFACTURER

HARDWARE GROUP NO. G-02

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
4 EA	GATE HINGE	2060.100	600	GGH
1 EA	REMOVABLE MULLION	BY GATE MFGR		GEN
2 EA	PANIC HARDWARE	CDSI-98-NL-WH	626	VON
2 EA	RIM CYLINDER	20-057 ICX	626	SCH
4 EA	PERMANENT CORE	23-030	626	SCH
2 EA	MORTISE CYLINDER	26-091 ICX XQ11-948	626	SCH
2 EA	GATE CLOSER	4040XPT SRI	689	LCN
2 EA	MOUNTING PLATE	4040XP-18 SRI	689	LCN
1		REMAINDER OF HARDWARE BY DOOR MANUFACTURER		

90 DEGREES ANGLE STOP BY GATE MANUFACTURER

HARDWARE GROUP NO. G-03

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
1		ALL HARDWARE BY DOOR MANUFACTURER		

HARDWARE GROUP NO. G-04

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
3 EA	HINGES	BY GATE MANUFACTURER	Z	
1 EA	PADLOCK L/CYL-FSIC	KS43F3200	606	SCH
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	PADLOCK ACCESSORIES	SECURITY CHAIN, 3'3" X 1/2" 999461		SCH

HARDWARE GROUP NO. G-05

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
6 EA	HINGES	BY GATE MANUFACTURER	Z	
1 EA	CANE BOLT	BY GATE MANUFACTURER	Z	
1 EA	PADLOCK L/CYL-FSIC	KS43F3200	606	SCH
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	PADLOCK ACCESSORIES	SECURITY CHAIN, 3'3" X 1/2" 999461		SCH

HARDWARE GROUP NO. RU-01

FOR USE ON MARK/DOOR #(S):
300B 300C 800C

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	MORTISE CYLINDER	26-098	626	SCH
1		REMAINDER OF HARDWARE BY DOOR MANUFACTURER		

HARDWARE GROUP NO. SL-01

FOR USE ON MARK/DOOR #(S):
100B 100D 100E 100G 100H 100K
100L 400A

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	MORTISE CYLINDER	26-098	626	SCH
1		REMAINDER OF HARDWARE BY DOOR MANUFACTURER		

HARDWARE GROUP NO. SL-02

FOR USE ON MARK/DOOR #(S):
100A

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
1 EA	PERMANENT CORE	23-030	626	SCH
1 EA	MORTISE CYLINDER	26-098	626	SCH
1 EA	MULTITECH READER	BY SECURITY VENDOR	BLK	SCE
1		REMAINDER OF HARDWARE BY DOOR MANUFACTURER		

HARDWARE GROUP NO. MISC

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FIN	MFR
1 EA	KEY CABINET	1200 SERIES		LUN

END OF SECTION 087100

SECTION 087113 - AUTOMATIC DOOR OPERATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes power-assist door operators for swinging doors.

1.2 DEFINITIONS

A. AAADM: American Association of Automatic Door Manufacturers.

B. Double-Egress (Doors): A pair of doors that simultaneously swing with the two doors moving in opposite directions with no mullion between them.

C. Double-Swing (Doors): A pair of doors that swing with the two doors moving in opposite directions with a mullion between them; each door functioning as a single-swing door.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For automatic door operators.

1. Include plans, elevations, sections, hardware mounting heights, and attachment details.
2. Include diagrams for power, signal, and control wiring.

C. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Field quality-control reports.

C. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer for installation and maintenance of units required for this Project.

B. Certified Inspector Qualifications: Certified by the AAADM.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of automatic door operators that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Besam Entrance Solutions; Subsidiary of ASSA ABLOY Entrance Systems.
2. Door Motion Technologies, Inc.
3. DORMA Architectural Hardware; Div. of DORMA Group North America.
4. DORMA Automatics; Div. of DORMA Group North America.
5. Horton Automatics; a division of Overhead Door Corporation.
6. Hunter Automatics Inc.
7. LCN Closers; an Ingersoll-Rand company.
8. Nabco Entrances Inc.
9. record-usa.
10. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
11. Stanley Access Technologies, LLC; Div. of Stanley Security Solutions.

2.2 AUTOMATIC DOOR OPERATORS, GENERAL

A. General: Provide operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for occupancy type indicated; and according to UL 325. Coordinate operator mechanisms with door operation, hinges, and activation and safety devices.

1. Emergency Breakaway: Where indicated for center-pivoted doors, provide emergency breakaway feature for reverse swing of doors. Equip system to discontinue power to automatic door operator when door is in emergency breakaway position, to return door to closed position after breakaway, and to automatically reset.

B. Electromechanical Operating System: Self-contained unit powered by permanent-magnet dc motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor, connections for power and activation- and safety-device wiring, and manual operation including spring closing when power is off.

C. Housing for Overhead Concealed Operators: Fabricated from minimum 0.125-inch- (3.2-mm-) thick, extruded or formed aluminum and extending full width of door opening including door jambs to conceal door operators and controls. Provide hinged or removable access panels for service and adjustment of door operators and controls. Secure panels to prevent unauthorized access.

D. Cover for Surface-Mounted Operators: Fabricated from 0.125-inch- (3.2-mm-) thick, extruded or formed aluminum; continuous over full width of door opening including door jambs; with enclosed end caps, provision for maintenance access, and fasteners concealed when door is in closed position.

E. Brackets and Reinforcements: Fabricated from aluminum with nonstaining, nonferrous shims for aligning system components.

F. Fire-Door Package: Consisting of UL-listed latch mechanism, power-reset box, and caution signage for fire-rated doors. Latch mechanism shall allow door to swing free during automatic operation; when fire is detected, latch actuator shall cause exit hardware to latch when door closes. Provide latch actuators with fail-secure design.

G. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 LOW-ENERGY DOOR OPERATORS

A. Standard: BHMA A156.19.

B. Performance Requirements:

1. Opening Force if Power Fails: Not more than 15 lbf (67 N) required to release a latch if provided, not more than 30 lbf (133 N) required to manually set door in motion, and not more than 15 lbf (67 N) required to fully open door.
2. Entrapment-Prevention Force: Not more than 15 lbf (67 N) required to prevent stopped door from closing or opening.

C. Configuration: Operator to control single swinging door.

1. Traffic Pattern: Two way.
2. Operator Mounting: Overhead concealed.

D. Configuration: Operator to control pair of swinging doors.

1. Traffic Pattern: Two way.
2. Mounting: Overhead concealed.

E. Operation: Power opening and power-assisted spring closing. When not in automatic mode, door operator shall function as manual door closer, with or without electrical power.

F. Operating System: Electromechanical.

G. Microprocessor Control Unit: Solid-state controller.

H. Features:

1. Adjustable opening and closing speed.
2. Adjustable opening and closing force.
3. Adjustable backcheck.
4. Adjustable hold-open time from zero to 30 seconds.
5. Adjustable time delay.
6. Adjustable acceleration.
7. Obstruction recycle.
8. On-off/hold-open switch to control electric power to operator.

I. Activation Device: Push-button switch on each side of door to activate door operator.

J. Exposed Finish: Class I, color anodic finish.

1. Color: Clear.

2.4 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Extrusions: ASTM B 221 (ASTM B 221M).
2. Sheet: ASTM B 209 (ASTM B 209M).

B. Fasteners and Accessories: Corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

2.5 CONTROLS

A. General: Provide controls according to BHMA standards for condition of exposure and for long-term, maintenance-free operation under normal traffic load for occupancy type indicated. Coordinate devices with door operation and door operator mechanisms.

B. Push-Plate Switch: Momentary-contact door control switch with flat push-plate actuator with contrasting-colored, engraved message.

1. Configuration: Round push plate with 4-by-4-inch (100-by-100-mm) junction box.

a. Mounting: Recess mounted, semiflush in wall.

C. Push-Button Switch: Momentary-contact door control switch with one red-button actuator; enclosed in nominal 2-by-4-inch (50-by-100-mm) junction box.

1. Provide faceplate engraved with "Press to Open" text and with international symbol of accessibility in contrasting color.
2. Mounting: Recess mounted in wall.
3. Faceplate Material: Stainless steel as selected by Architect from manufacturer's full range.

D. Electrical Interlocks: Unless units are equipped with self-protecting devices or circuits, provide electrical interlocks to prevent activation of operator when door is locked, latched, or bolted.

2.6 FABRICATION

A. Factory fabricate automatic door operators to comply with indicated standards.

B. Fabricate exterior components to drain condensation and water passing joints within operator enclosure to the exterior.

C. Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws, finished to match operator.

2.7 ACCESSORIES

A. Signage: As required by cited BHMA standard for type of door and its operation.

1. Application Process: Operator manufacturer's standard process.
2. Provide sign materials with instructions for field application when operators are installed.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install automatic door operators according to manufacturer's written instructions and cited BHMA standard for type of door operation and direction of pedestrian travel, including signage, controls, wiring, remote power units if any, and connection to building's power supply.

B. Verify that full-height finger guards are installed at each door with pivot hinges where door has a clearance at hinge side greater than 1/4 inch (6 mm) and less than 3/4 inch (19 mm) with door in any position.

C. Controls: Install devices according to manufacturer's written instructions and cited BHMA standard for operator type and direction of pedestrian travel.

D. Signage: Apply on both sides of each door as required by cited BHMA standard for type of door operator and direction of pedestrian travel.

E. Adjusting: Adjust automatic door operators to function smoothly and for weathertight closure, and lubricate as recommended by manufacturer; comply with requirements of applicable BHMA standards.

1. Readjust automatic door operators and controls after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles).

F. Demonstration: Engage factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain automatic door operators.

3.2 FIELD QUALITY CONTROL

A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Test and inspect each automatic door operator installation, using AAADM inspection forms, to determine compliance of installed systems with applicable BHMA standards.

B. Automatic door operators will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION 087113

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Glass for windows, doors, interior borrowed lites, storefront framing.
2. Glass for reception area.
3. Glazing sealants and accessories.

1.2 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.

C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Preconstruction adhesion and compatibility test report.

1.5 QUALITY ASSURANCE

A. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.6 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: Five years from date of Substantial Completion.

C. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Glass Product: Subject to compliance with requirements, provide product indicated in glass schedules or comparable product by one of the following:

1. AGC Glass Company North America, Inc.
2. Glaz-Tech Industries.
3. Guardian Industries Corp.
4. Northwestern Industries, Inc.
5. Oldcastle BuildingEnvelope.
6. Pilkington North America Inc.
7. PPG Industries, Inc.
8. Trulite Glass & Aluminum Solutions.
9. Viracon, Inc.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the International Building Code and ASTM E 1300.

1. Design Wind Pressures: As indicated on Drawings.
2. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

B. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
2. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: "Glazing Manual."
2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR A7, "Sloped Glazing Guidelines."
3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of **the SGCC**. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

B. Tinted Annealed Float Glass: ASTM C 1036, Type I, Class 2 (tinted), Quality-Q3.

C. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

D. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

2.5 LAMINATED GLASS

A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Construction: Laminate glass with polyvinyl butyral interlayer or cast-in-place and cured-transparent-resin interlayer to comply with interlayer manufacturer's written instructions.
2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
3. Interlayer Color: Clear unless otherwise indicated.

B. Windborne-Debris-Impact-Resistant Laminated Glass: Comply with requirements specified above for laminated glass except laminate glass with one of the following to comply with interlayer manufacturer's written instructions:

1. Polyvinyl butyral interlayer.
2. Polyvinyl butyral interlayers reinforced with polyethylene terephthalate film.
3. Ionomeric polymer interlayer.
4. Cast-in-place and cured-transparent-resin interlayer.
5. Cast-in-place and cured-transparent-resin interlayer reinforced with polyethylene terephthalate film.

2.6 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.

1. Sealing System: Dual seals.
2. Spacer: Manufacturer's standard spacer material and construction. Thermally broken aluminum.

2.7 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Field-applied sealants shall have a VOC content of not more than 250 g/L.
4. Sealants shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; 790.
b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
c. May National Associates, Inc.; Bondaflex Sil 290.
d. Pecora Corporation; 890NST.
e. Sika Corporation U.S.; Sikasil WS-290.
f. Tremco Incorporated; Spectrem 1.

2.8 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.9 MISCELLANEOUS GLAZING MATERIALS

A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

B. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

C. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

D. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

E. Reception Desk Glass Shoe: Manufactured by CRL, Product #W5B10 or 20D.

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

PART 3 - EXECUTION

3.1 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

3.2 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Apply heel bead of elastomeric sealant.

F. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

G. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.3 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.4 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

3.5 MONOLITHIC GLASS SCHEDULE

A. Glass Type GL-1: Clear fully tempered float glass.

1. Minimum Thickness: 6 mm.
2. Safety glazing required.

3.6 LAMINATED GLASS SCHEDULE

A. Glass Type: Clear laminated glass with two plies of annealed float glass.

1. Minimum Thickness of Each Glass Ply: 6 mm.
2. Interlayer Thickness: 0.030 inch (0.76 mm).
3. Safety glazing required.

3.7 INSULATING GLASS SCHEDULE

A. Glass Type: Low-E-coated, tinted insulating glass. (Exterior)

1. Basis-of-Design Product: PPG Solarban Z75.
2. Overall Unit Thickness: 1 inch (25 mm).
3. Minimum Thickness of Each Glass Lite: 1/4”.
4. Outdoor Lite: Tinted heat-strengthened float glass.
5. Tint Color: Gray.
6. Interspace Content: Air.
7. Indoor Lite: Clear fully tempered float glass.
8. Low-E Coating: Pyrolytic on third surface.
9. Winter Nighttime U-Factor: 0.29 maximum.
10. Summer Daytime U-Factor: 0.27 maximum.
11. Visible Light Transmittance: 48 percent minimum.
12. Solar Heat Gain Coefficient: 0.24 maximum.
13. Safety glazing required.

B. Glass Type: Clear Insulating Glass (Interior)
1. Overall Unit Thickness: 1 inch (25 mm).
2. Minimum Thickness of Each Glass: 1/4".
3. Interspace Content: Air.
4. Safety glazing required.

END OF SECTION 088000

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
2. Suspension systems for interior gypsum ceilings and soffits.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: Provide materials and construction identical to those tested according to ASTM E 119.

B. STC-Rated Assemblies: Provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413.

2.2 FRAMING SYSTEMS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

B. Steel Studs and Runners: ASTM C 645. Use either steel studs and runners or dimpled steel studs and runners of equivalent minimum base-metal thickness.

1. Minimum Base-Metal Thickness: As indicated on Drawings.
2. Depth: As indicated on Drawings.

C. Slip-Type Head Joints: Where indicated, provide one of the following in thickness not less than indicated for studs and in width to accommodate depth of studs:

1. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes due to deflection of structure above.

a. Products: Subject to compliance with requirements, provide one of the following:

1) Dietrich Metal Framing; SLP-TRK Slotted Deflection Track.

2) MBA Building Supplies; Slotted Deflecto Track.
3) Steel Network Inc. (The); VertiClip SLD Series.
4) Superior Metal Trim; Superior Flex Track System (SFT).
5) Telling Industries; Vertical Slip Track.

D. Firestop Tracks: Manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Fire Trak Corp.; Fire Trak System attached to studs with Fire Trak Posi Klip.
b. Grace Construction Products; FlameSafe FlowTrak System.
c. Metal-Lite, Inc.; The System.

E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base-Metal Thickness: 0.027 inch (0.68 mm).

F. Cold-Rolled Channel Bridging: Steel, 0.053-inch (1.34-mm) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: As indicated on Drawings.
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.

G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base-Metal Thickness: As indicated on Drawings.
2. Depth: As indicated on Drawings.

H. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.

1. Configuration: hat shaped.

I. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: As indicated on Drawings.
2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch (0.8 mm).
3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

J. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (31.8 mm), wall attachment flange of 7/8 inch (22 mm), minimum uncoated-metal thickness of 0.018 inch (0.45 mm), and depth required to fit insulation thickness indicated.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

B. Hanger Attachments to Concrete:

1. Anchors: Capable of sustaining a load equal 5 times that imposed as determined by ASTM E 488.

    a. Type: Postinstalled, chemical anchor.

2. Powder-Actuated Fasteners: Capable of sustaining, a load equal to 10 times that imposed as determined by ASTM E 1190.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.

D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch (1.34 mm) and minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: As indicated on Drawings.

E. Furring Channels (Furring Members):

1. Cold-Rolled Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
2. Steel Studs and Runners: ASTM C 645. Use either steel studs and runners or dimpled steel studs and runners of equivalent minimum base-metal thickness.

    a. Minimum Base-Metal Thickness: As indicated on Drawings.
    b. Depth: As indicated on Drawings.

3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.

    a. Minimum Base-Metal Thickness: As indicated on Drawings.

4. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.

    a. Configuration: hat shaped.

2.4 AUXILIARY MATERIALS

A. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide foam gasket.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.2 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:

    a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches (150 mm) o.c.

E. Direct Furring:

1. Screw to wood framing.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

F. Z-Furring Members:

1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.3 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
3. Do not attach hangers to steel roof deck.
4. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
5. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
6. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Exterior gypsum board for ceilings and soffits.
3. Tile backing panels.
4. Texture finishes.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples:

1. Textured Finishes: For each textured finish indicated and on same backing indicated for Work.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

C. Low Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 INTERIOR GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Gypsum.

2. CertainTeed Corp.
3. Georgia-Pacific Gypsum LLC.
4. National Gypsum Company.
5. PABCO Gypsum.
6. USG Corporation.

B. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch (15.9 mm).
2. Long Edges: Tapered.

C. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

1. Core: 5/8 inch (15.9 mm), Type X.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

D. Soundbreak XP: ASTM E 90.

1. Core: 5/8 inch, Type X with Viscoelastic damping polymer and high density gypsum board.
2. Mold Resistant.

2.3

A. Glass-Mat Interior Gypsum Board: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.

1. Products: Subject to compliance with requirements, provide the following:

a. Georgia-Pacific Gypsum LLC; DensArmour Plus.

2. Core: 5/8 inch (15.9 mm), Type X.
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 EXTERIOR GYPSUM BOARD FOR CEILINGS AND SOFFITS

A. Exterior Gypsum Soffit Board: ASTM C 1396/C 1396M, with manufacturer's standard edges.

1. Manufacturers: Subject to compliance with requirements provide products by one of the following:

a. American Gypsum.
b. CertainTeed Corp.
c. Georgia-Pacific Gypsum LLC.
d. National Gypsum Company.
e. PABCO Gypsum.

f. USG Corporation.

2. Core: 5/8 inch (15.9 mm), Type X.

B. Glass-Mat Gypsum Sheathing Board: ASTM C 1177/C 1177M, with fiberglass mat laminated to both sides and with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corp.; GlasRoc Sheathing.
b. Georgia-Pacific Gypsum LLC; Dens-Glass Gold.
c. National Gypsum Company; Gold Bond, e(2)XP.
d. USG Corporation; Securock Glass Mat Sheathing.

2. Core: 5/8 inch (15.9 mm), Type X.

2.5 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corp.; GlasRoc Tile Backer.
b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.

2. Core: 5/8 inch (15.9 mm), Type X.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.

B. Exterior Trim: ASTM C 1047.

1. Material: Hot-dip galvanized steel sheet, or rolled zinc.

C. Aluminum Trim: ASTM B 221 (ASTM B 221M), Alloy 6063-T5.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.

3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

2.8 AUXILIARY MATERIALS

A. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Laminating adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing).

1. Recycled Content of Blankets: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 20 percent.

D. Acoustical Joint Sealant: ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings as demonstrated by testing according to ASTM E 90.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
b. Grabber Construction Products; Acoustical Sealant GSC.
c. Pecora Corporation; AC-20 FTR.
d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
e. USG Corporation; SHEETROCK Acoustical Sealant.

2. Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Acoustical joint sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

F. Vapor Retarder: As specified in Section 072100 "Thermal Insulation."

2.9 TEXTURE FINISHES

A. Primer: As recommended by textured finish manufacturer.

1. Texture: Light Hawk & Trowel.

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS

A. Comply with ASTM C 840.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

D. Install trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

1. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

E. Prefill open joints, rounded or beveled edges, and damaged surface areas.

F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile.
3. Level 3: Where indicated on Drawings.
4. Level 4: All exposed locations with Light Hawk and Trowel Texture.
5. Level 5: Where indicated on Interior Finish Drawings for application of wall coverings.

a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

H. Texture Finish Application: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.

I. Protect adjacent surfaces from drywall compound and texture finishes and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

J. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 092900

SECTION 093013 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Porcelain tile.
2. Metal edge strips.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples:

1. Each type and composition of tile and for each color and finish required.
2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 5 percent of amount installed for each type, composition, color, pattern, and size indicated.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide Standard-grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

2.2 TILE PRODUCTS: Refer to Finish plans for additional information.

A. FT-GP-1: Daltile Koncrete
12”x24” Wall tile

B. FT-1: Daltile Koncrete
12”x24”

C. FT-2: Daltile Koncrete
2”x2” Floor tile

D. WT-1A through 5A: Daltile Glazed Ceramic Semi Gloss and Matte

2.3 THRESHOLDS

A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

1. Steel transition strips by Schulter. Refer to Finish plans.

2.4 SETTING MATERIALS

A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.

B. Polymer Modified Cement Mortar (Thinset): ANSI A118.4.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide TEC Super Flex Ultra Premium Thinset Mortar or comparable product by one of the following:

a. Ardex Americas.
b. Boiardi Products Corporation; a QEP company.
c. Bonsal American; an Oldcastle company.
d. Bostik, Inc.

e. C-Cure.
f. Custom Building Products.
g. Jamo Inc.
h. Laticrete International, Inc.
i. MAPEI Corporation.
j. Merkrete Systems; Parex USA, Inc.
k. Southern Grouts & Mortars, Inc.
l. Summitville Tiles, Inc.
m. TEC; H. B. Fuller Construction Products Inc.

3. Provide prepackaged, Mix 7.
4. For wall applications, provide nonsagging mortar.

C. Water-Cleanable, Tile-Setting Epoxy: ANSI A118.3, with a VOC content of 65 g/L or less.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide TEC AccuColor EFX Epoxy Mortar or comparable product by one of the following:

a. Atlas Minerals & Chemicals, Inc.
b. Bonsal American; an Oldcastle company.
c. Bostik, Inc.
d. C-Cure.
e. Custom Building Products.
f. Jamo Inc.
g. Laticrete International, Inc.
h. MAPEI Corporation.
i. Merkrete Systems; Parex USA, Inc.
j. Southern Grouts & Mortars, Inc.
k. Summitville Tiles, Inc.
l. TEC; H. B. Fuller Construction Products Inc.

2.5 GROUT MATERIALS

A. High-Performance Tile Grout: ANSI A118.7.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide TEC InColor Advanced Performance Grout or comparable product by one of the following:

a. Ardex Americas.
b. Boiardi Products Corporation; a QEP company.
c. Bonsal American; an Oldcastle company.
d. Bostik, Inc.
e. C-Cure.
f. Custom Building Products.
g. Jamo Inc.
h. Laticrete International, Inc.

i. MAPEI Corporation.
j. Southern Grouts & Mortars, Inc.
k. Summitville Tiles, Inc.
l. TEC; H. B. Fuller Construction Products Inc.

B. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide TEC AccuColor EFX Epoxy Grout or comparable product by one of the following:

a. Atlas Minerals & Chemicals, Inc.
b. Boiardi Products Corporation; a QEP company.
c. Bonsal American; an Oldcastle company.
d. Bostik, Inc.
e. C-Cure.
f. Custom Building Products.
g. Jamo Inc.
h. Laticrete International, Inc.
i. MAPEI Corporation.
j. Merkrete Systems; Parex USA, Inc.
k. Southern Grouts & Mortars, Inc.
l. Summitville Tiles, Inc.
m. TEC; H. B. Fuller Construction Products Inc.

2.6 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide or comparable product by one of the following:

a. Blanke Corporation.
b. Ceramic Tool Company, Inc.
c. Schluter Systems L.P.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 CERAMIC TILE INSTALLATION

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:

a. Exterior tile floors.
b. Tile floors in wet areas.
c. Tile floors consisting of rib-backed tiles.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Where accent tile differs in thickness from field tile, vary setting bed thickness so that tiles are flush.

F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths: Refer to Finish Plans.

H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

J. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

K. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

L. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

3.4 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

1. Ceramic Tile Installation: TCNA F113; thinset mortar.

a. Ceramic Tile Type: CT-1.
b. Thinset Mortar: Polymer modified portland cement mortar.
c. Grout: High-performance unsanded grout.

B. Interior floor installation, depressed concrete slabs.

1. Ceramic tile installation: TCNA F 114
   a. Unbonded mortar bed.
   b. Ceramic tile.
   c. Epoxy coat.

C. Interior Wall Installations, Wood or Metal Studs or Furring:

2. Ceramic Tile Installation: TCNA W245 or TCNA W248; thinset mortar on glass-mat, water-resistant gypsum backer board.

   a. Ceramic Tile Type: CT-3.
   b. Thinset Mortar: Polymer modified mortar.
   c. Grout: High-performance unsanded grout.

END OF SECTION 093013

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes acoustical panels and exposed suspension systems for ceilings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Evaluation reports.

C. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to NVLAP.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
2. Smoke-Developed Index: 50 or less.

2.2 ACOUSTICAL PANEL CEILINGS, GENERAL

A. Low-Emitting Materials: Acoustical panel ceilings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Glass-Fiber-Based Panels: Made with binder containing no urea formaldehyde.

C. Acoustical Panel Standard: Comply with ASTM E 1264.

D. Metal Suspension System Standard: Comply with ASTM C 635.

E. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

2.3 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING

A. Refer to finish plans for tile locations:

1. ACT 1 – Armstrong Mesa #680.
2. ACT 2 – Armstrong Fine Fissured #1754.
3. ACT K – Armstrong Kitchen Zone #673.

2.4 ADHESIVE APPLIED 12X12 CEILING TILE

A. Armstrong Fine Fissured, 12x12 #746 with prefinished continuous metal edge trim.

2.5 METAL SUSPENSION SYSTEM

A. Manufacturers: Subject to compliance with requirements, products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following: Refer to finish plans.

1. Armstrong World Industries, Inc.
2. CertainTeed Corp.
3. Chicago Metallic Corporation.
4. USG Interiors, Inc.; Subsidiary of USG Corporation.

C. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

1. Arrange directionally patterned acoustical panels as indicated on reflected ceiling plans.

END OF SECTION 095113

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Resilient base.
2. Resilient molding accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches (300 mm) long.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 THERMOSET-RUBBER BASE

A. Manufacturers: Subject to compliance with requirements: Basis of design: Johnsonite Traditional Vinyl Wall Base

1. Burke Mercer Flooring Products, Division of Burke Industries Inc.
2. Flexco.
3. Johnsonite
4. Roppe Corporation, USA.

B. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).

1. Style and Location:

a. Style B, Cove.

C. Thickness: 0.125 inch (3.2 mm).

D. Height: 4 inches (102 mm).

E. Lengths: Coils in manufacturer's standard length.

F. Outside Corners: Preformed.

G. Inside Corners: Preformed.

H. Colors: As selected by Architect from full range of industry colors.

2.3 RUBBER MOLDING ACCESSORY

A. Manufacturers: Subject to compliance with requirements provide products by one of the following:

1. Roppe Corporation, USA.
2. VPI, LLC, Floor Products Division.

B. Description: Rubber carpet edge for glue-down applications nosing for resilient flooring, reducer strip for resilient flooring, joiner for tile and carpet, transition strips.

C. Profile and Dimensions: As indicated.

D. Locations: Provide rubber molding accessories in areas indicated.

E. Colors and Patterns: As selected by Architect from full range of industry colors.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

1. Adhesives shall have a VOC content of 50 g/L or less.
2. Adhesives shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Proceed with installation only after substrates pass testing according to manufacturer's written recommendations, but not less stringent than the following:

    a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
    b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install resilient products until they are the same temperature as the space where they are to be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.2 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Preformed Corners: Install preformed corners before installing straight pieces.

H. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.

    a. Form without producing discoloration (whitening) at bends.

2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.

    a. Miter or cope corners to minimize open joints.

3.3 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Stair Accessories:

1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
2. Tightly adhere to substrates throughout length of each piece.
3. For treads installed as separate, equal-length units, install to produce a flush joint between units.

C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

SECTION 096519 – VINYL SHEET AND TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid vinyl floor tile.
2. Sheet vinyl.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: Full-size units of each color and pattern of floor tile required.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

B. FloorScore Compliance: Resilient tile flooring shall comply with requirements of FloorScore certification.

C. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 VINYL FLOORING

A. Products: Subject to compliance with requirements, provide the following. Refer to finish plans for locations. Basis of Design:

1. SH-F1 – Gerflor Mipolam Symbioz.

2. SH-A1 - Gerflor Mipolam Symbioz.
3. WD-PL – Surfacelinx Wood Vinyl Planking/LVT Quite Comfort Binder, Trade Zone.
4. SD-VCT – Armstrong Static Dissipative VCT.

B. Colors and Patterns: Per finish plans.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

1. Adhesives shall comply with the following limits for VOC content:

a. Vinyl Composition Tile Adhesives: 50 g/L or less.
b. Rubber Floor Adhesives: 60 g/L or less.

2. Adhesives shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:

a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor tiles until they are the same temperature as the space where they are to be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.2 FLOORING INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles square with room axis.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

H. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.3 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Cover floor tile until Substantial Completion.

END OF SECTION 096519

SECTION 096726 - QUARTZ FLOORING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section includes the following:

1. Quartz flooring system as shown on the drawings and in schedules.

B. Related sections include the following:

1. Cast-in-Place Concrete, section 033000
2. Concrete Curing, section 033900

1.3 SYSTEM DESCRIPTION

A. The work shall consist of preparation of the substrate, the furnishing and application of an epoxy based multi roller applied flooring system with Q28 or Q11 colored quartz aggregate and urethane topcoat. The system shall have the color and texture as specified by the Owner with a nominal thickness of 1/8 inch. It shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.
B. Cove base (if required) to be applied where noted on plans and per manufacturers standard details unless otherwise noted.

1.4 SUBMITTALS

A. Product Data: Latest edition of Manufacturer's literature including performance data and installation procedures.
B. Manufacturer’s Safety Data Sheet (SDS) for each product being used.
C. Samples: A 3 x 3 inch square sample of the proposed system. Color, texture, and thickness shall be representative of overall appearance of finished system subject to normal tolerances.

1.5 QUALITY ASSURANCE

A. The Manufacturer shall have a minimum of 10 years experience in the production, sales, and technical
support of epoxy and urethane industrial flooring and related materials.
B. The Applicator shall have experience in installation of the flooring system as confirmed by the manufacturer in all phases of surface preparation and application of the product specified.

C. No requests for substitutions shall be considered that would change the generic type of the specified System.
D. System shall be in compliance with requirements of United States Department of Agriculture (USDA),
Food, Drug Administration (FDA), and local Health Department.
E. System shall be in compliance with the Indoor Air Quality requirements of California section 01350 as verified by a qualified independent testing laboratory.
F. System shall be certified "High Traction" by the National Floor Safety Institute (NFSI)
F. A pre-installation conference shall be held between Applicator, General Contractor and the Owner to review and clarification of this specification, application procedure, quality control, inspection and acceptance criteria and production schedule.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping

1. All components of the system shall be delivered to the site in the Manufacturer's packaging, clearly identified with the product type and batch number.

B. Storage and Protection

1. The Applicator shall be provided with a storage area for all components. The area shall be between 60 F and 90 F, dry, out of direct sunlight and in accordance with the Manufacturer's recommendations and relevant health and safety regulations.
2. Copies of Safety Data Sheets (SDS) for all components shall be kept on site for review by the Engineer or other personnel.

C. Waste Disposal

1. The Applicator shall be provided with adequate disposal facilities for non-hazardous waste generated during installation of the system.

1.7 PROJECT CONDITIONS

A. Site Requirements

1. Application may proceed while air, material and substrate temperatures are between 60 F and 90 F providing the substrate temperature is above the dew point. Outside of this range, the Manufacturer shall be consulted.
2. The relative humidity in the specific location of the application shall be less than 85 % and the surface temperature shall be at least 5 F above the dew point.
3. The Applicator shall ensure that adequate ventilation is available for the work area.
4. The Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.

B. Conditions of new concrete to be coated with epoxy material.

1. Concrete shall be moisture cured for a minimum of 7 days and have fully cured a minimum of twenty
   eight days in accordance with ACI-308 prior to the application of the coating system pending moisture tests.
2. Concrete shall have a flat rubbed finish, float or light steel trowel finish (a hard steel trowel finish is neither necessary or desirable).
3. Sealers and curing agents should not to be used.
4. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system.

C. Safety Requirements

1. All open flames and spark-producing equipment shall be removed from the work area prior to commencement of application.
2. "No Smoking" signs shall be posted at the entrances to the work area.
3. The Owner shall be responsible for the removal of foodstuffs from the work area.
4. Non-related personnel in the work area shall be kept to a minimum.

1.8 WARRANTY

A. Dur-A-Flex, Inc. warrants that material shipped to buyers at the time of shipment substantially free from material defects and will perform substantially to Dur-A-Flex, Inc. published literature if used in accordance with the latest prescribed procedures and prior to the expiration date.
B. Dur-A-Flex, Inc. liability with respect to this warranty is strictly limited to the value of the material purchase.

PART 2 – PRODUCTS

2.1 FLOORING

A. Dur-A-Flex, Inc, Dur-A-Quartz, Epoxy-Based seamless flooring system.
   1. System Materials:
      a. Primer: Dur-A-Flex, Inc, Dur-A-Glaze #4 WB resin and hardener.
      b. Broadcast Coats: Dur-A-Flex, Inc, Dur-A-Glaze #4 resin and hardener.
      c. The quartz aggregate shall be Dur-A-Flex, Inc. Q-28 or Q-11 colored quartz aggregate.
      d. Grout Coat: Dur-A-Flex, Inc. Dur-A-Glaze #4 resin and Water Clear hardener.
      e. Topcoat: Dur-A-Flex, Inc. Armor Top resin, hardener and grit.

   2. Patch Materials
      a. Shallow Fill and Patching: Use Dur-A-Flex, Inc. Dur-A-Glaze #4 Cove-Rez.
      b. Deep Fill and Sloping Material (over ¼ inch): Use Dur-A-Flex, Inc. Dur-A-Crete.

2.2 MANUFACTURER

A. Dur-A-Flex, Inc., 95 Goodwin Street, East Hartford, CT 06108, Phone: (860) 528-9838, Fax: (860) 528-2802.

B. Manufacturer of Approved System shall be single source and made in the USA.

2.3 PRODUCT REQUIREMENTS

A. Primer		Dur-A-Glaze #4 WB
1. Percent Solids		56 %
2. VOC		2 g/L
3. Bond Strength to Concrete ASTM D 4541		550 psi, substrates fails
4. Hardness, ASTM D 3363		3H
5. Elongation, ASTM D 2370		9 %
6. Flexibility (1/4: Cylindrical mandrel), ASTM D 1737		Pass
7. Impact Resistance, MIL D-2794		>160
6. Abrasion Resistance ASTM D 4060, CS 17 wheel, 1,000 g Load		30 mg loss

B. Broadcast, and Grout Coat		Dur-A-Glaze #4
1. Percent Solids		100 %
2. VOC		3.8 g/L
3. Compressive Strength, ASTM D 695		17,500 psi
4. Tensile Strength, ASTM D 638		2,100 psi
5. Flexural Strength, ASTM D 790		5,100 psi
6. Abrasion Resistance, ASTM D 4060 C-10 Wheel, 1,000 gm load, 1,000 cycles		29 mg loss
7. Flame Spread/NFPA-101, ASTM E 84		Class A
8. Impact Resistance MIL D-24613		0.0007 inches, no cracking or delamination
9. Water Absorption. MIL D-24613		Nil
10. Potlife @ 70 F		20 minutes

C. Topcoat			Armor Top
1. Percent Solids			95 %
2. VOC			0 g/L
3. Tensile Strength, ASTM D 2370			7,000 psi
4. Adhesion, ASTM 4541			Substrate Failure
5. Hardness, ASTM D 3363			4H
6. 60^0 Gloss ASTM D 523			70
7. Abrasion Resistance, ASTM D4060 CS 17 wheel (1,000 g load) 1,000 cycles	Gloss	Satin	
	4	8	mg loss with grit
	10	12	mg loss without grit
8. Pot Life, 70 F, 50% RH			2 Hours
9. Full Chemical Resistance			7 days

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas and conditions, with Applicator present, for compliance with requirements for maximum moisture content, installation tolerances and other conditions affecting flooring performance.
   1. Verify that substrates and conditions are satisfactory for flooring installation and comply with requirements specified.

3.2 PREPARATION

A. General
   1. New and existing concrete surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, and bituminous products.
   2. Moisture Testing: Perform tests recommended by manufacturer and as follows.
.
      a. Perform relative humidity test using is situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75% relative humidity level measurement.
      b. If the relative humidity exceeds 75% then Dur-A-Flex, Inc Dur-A-Glaze MVP Primer moisture mitigation system must be installed prior to resinous flooring installation. Slab-on grade substrates without a vapor barrier may also require the moisture mitigation system.
   3. There shall be no visible moisture present on the surface at the time of application of the system. Compressed oil-free air and/or a light passing of a propane torch may be used to dry the substrate.
   4. Mechanical surface preparation
      a. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum profile of CSP 4-5 as described by the International Concrete Repair Institute.
      b. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.
      c. Where the perimeter of the substrate to be coated is not adjacent to a wall or curb, a minimum 1/4 inch
      key cut shall be made to properly seat the system, providing a smooth transition between areas. The
      detail cut shall also apply to drain perimeters and expansion joint edges.
      d. Cracks and joints (non-moving) greater than 1/8 inch wide are to be chiseled or chipped-out and repaired per manufacturer's recommendations.
   5. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and patch per manufactures recommendations.

3.3 APPLICATION

A. General
   1. The system shall be applied in seven distinct steps as listed below:
      a. Substrate preparation
      b. Priming
      c. First broadcast coat application with first aggregate broadcast
      d. Second broadcast coat with second aggregate broadcast
      e. Grout coat application, sand floor (if required)
      f. First topcoat application
      g. Second topcoat application
   2. Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.
   3. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.
   4. The system shall follow the contour of the substrate unless pitching or other leveling work has been specified by the Architect.
   5. A neat finish with well-defined boundaries and straight edges shall be provided by the Applicator.

B. Primer
   1. The primer shall consist of a liquid resin and hardener that is mixed at the ratio of 1 part resin to 4 parts hardener per the manufacturer’s instructions.
   2. The primer shall be applied by 1/8 inch notched squeegee and back rolled at the rate of 200 sf/gal to yield a dry film thickness of 4 mils.

C. Broadcast Coat
   1. The broadcast coat shall be applied as a double broadcast system as specified by the Architect.
   2. The broadcast coat shall be comprised of two components, a resin, and hardener as supplied by the Manufacturer and mixed in the ratio of 2 parts resin to 1 part hardener.
   3. The resin shall be added to the hardener and thoroughly mixed by suitably approved mechanical means.
   4. The broadcast coat shall be applied over horizontal surfaces using “v” notched squeegee and back rolled at the rate of 90-100 sf/gal.
   5. Colored quartz aggregate shall be broadcast to excess into the wet material at the rate of 0.5 lbs/sf.
   6. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.
   7. Apply a second coat of resin with a coverage rate of 90 sf/gal (Q28) or 50 sf/gal (Q11). and broadcast aggregate to excess at the rate of 0.5 lbs/sf.
   8. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.

D. Grout Coat
   1. The grout coat shall be comprised of liquid components, combined at a ratio of 2 parts resin to 1 part hardener by volume and shall be thoroughly blended by mechanical means such as a high speed paddle mixer.
   2. The grout coat shall be squeegee applied with a coverage rate of 90 sf/gal (Q28) or 50 sf/gal (Q11).

3. The grout coat will be back rolled and cross rolled to provide a uniform texture and finish.

*** Specifier's Note *** If an orange-peel texture is desired, sand screen the floor and apply a second grout coat of epoxy. The epoxy shall be applied by squeegee and back-roll with a coverage rate of 200 sf/gal (Q28) or 70 sf/gal (Q11).

E. Topcoat
1. The topcoat of Armor Top shall be roller applied at the rate of 500 sf/gal to yield a dry film thickness of 3 mils.
2. The topcoat shall be comprised of a liquid resin, hardener and grit that is mixed per the manufacturer's instructions.
3. The finish floor will have a nominal thickness of 1/8 inch.

3.4 FIELD QUALITY CONTROL

A. Tests, Inspection

1. The following tests shall be conducted by the Applicator:
   a. Temperature
      1. Air, substrate temperatures and, if applicable, dew point.
   b. Coverage Rates
      1. Rates for all layers shall be monitored by checking quantity of material used against the area covered.

3.5 CLEANING AND PROTECTION

A. Cure flooring material in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.
B. Remove masking. Perform detail cleaning at floor termination, to leave cleanable surface for subsequent work of other sections.

END OF SECTION 096726

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes modular carpet tile.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Type of subfloor.
3. Type of installation.
4. Pattern of installation.
5. Pattern type, location, and direction.
6. Pile direction.

C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104.

1.7 FIELD CONDITIONS

A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

1.8 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, loss of tuft bind strength, loss of face fiber, and delamination.
3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Products: Subject to compliance with requirements, provide the following. Refer to finish plans.

1. Shaw Contract – Walk off Matt, Style : Bon Jour, 1Tile 5T032.

B. Color: As selected by Architect from manufacturer's full range, up to four colors will be selected.

C. Size: 24 by 24 inches (610 by 610 mm).

D. Applied Soil-Resistance Treatment: Manufacturer's standard material.

E. Antimicrobial Treatment: Manufacturer's standard material.

F. Performance Characteristics: As follows:

1. Appearance Retention Rating: Heavy traffic, 3.0 minimum according to ASTM D 7330.
2. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm.
3. Dry Breaking Strength: Not less than 100 lbf (445 N) according to ASTM D 2646.
4. Tuft Bind: Not less than 6.2 lbf (28 N) according to ASTM D 1335.
5. Delamination: Not less than 3.5 lbf/in. (15 N/mm) according to ASTM D 3936.
6. Dimensional Tolerance: Within 1/32 inch (0.8 mm) of specified size dimensions, as determined by physical measurement.
7. Dimensional Stability: 0.2 percent or less according to ISO 2551 (Aachen Test).
8. Resistance to Insects: Comply with AATCC 24.
9. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.
10. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) according to AATCC 16, Option E.

11. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.
12. Electrostatic Propensity: Less than 3.5 kV according to AATCC 134.
13. Emissions: Provide carpet tile that complies with testing and product requirements of CRI's "Green Label Plus" program.
14. Emissions: Provide carpet tile that complies with the product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Installation Method: Glue free tactile.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Preparation: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.

E. Installation: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.

F. Installation Method: Glue free tactile.

G. Maintain dye lot integrity. Do not mix dye lots in same area.

H. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

I. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

J. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.

K. Install pattern parallel to walls and borders, non-directional.

L. Perform the following operations immediately after installing carpet tile:

1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
2. Remove yarns that protrude from carpet tile surface.
3. Vacuum carpet tile using commercial machine with face-beater element.

M. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."

END OF SECTION 096813

SECTION 098322 - ACOUSTIC DRAPERY

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section including the following.

1. Acoustic drapery.

1.2 SUBMITTALS

A. Product Data: Submit for each product indicating materials, dimensions, profiles, textures and colors. Include installation instructions.

B. Shop Drawings: Submit shop drawings indicating plans, elevations, details of construction, and relationship with adjacent construction.

C. Verification Samples: Submit representative sample of felt in color specified.

1.3 QUALITY ASSURANCE

A. Manufacturer: Minimum of 2 years manufacturing similar products.

B. Installer: Minimum of 2 years installing similar products.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials in manufacturer’s original, unopened, undamaged containers with identification labels intact.

B. Storage and Handling: Comply with manufacturer's recommendations for storage and handling. Protect from weather damage.

1.5 WARRANTY

A. Warranty: Provide manufacturer's standard limited warranty against defects in manufacturing.

PART 2 - PRODUCTS

2.1 DRAPERY

A. Basis-of-Design: Polka 90 Light Drapery by FilzFelt, www.filzfelt.com/polka-90-light-drapery; utilizes positive and negative space to create pattern.

1. Material: 100% Wool Design Felt, 100 percent biodegradable.
2. Color: As selected from manufacturer's standard colors.
3. Custom Size: Refer to Drawings.

4. Pattern: 3 inch (762 mm) diameter circles cut from the center of 5 inch (1270 mm) diameter circles, set in a 90 degree grid. Refer to Drawings for Open & Closed Pattern.
5. Hanging Method: Single and Multiple Track Channels.
6. Grommet Size: 3 inch (76 mm).
7. Properties:

    a. Colorfastness to Light Class: 4–5 (40 hours).
    b. Colorfastness to Crocking: Class 3–4 (wet), Class 4–5 (dry).
    c. Environmental: Global GreenTag GreenRate Level B (100% Wool Design Felt), Oeko-Tex Standard 100 Certified Product Class II (100% Wool Design Felt).
    d. Flammability: NFPA 701: Pass (flame treated).

8. Track:

    a. Hanging Panel Track System.
    b. Multiple Channels per Drawings.
    c. Sliding.
    d. Attachment Options: Grommet.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine existing conditions to determine that they are suitable for installation. Proceed with installation only when unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Clean substrates of projections and substances detrimental to application.

B. Install units in accordance with manufacturer's instructions, approved submittals, and in proper relationship to adjacent construction.

3.3 ADJUSTING AND CLEANING

A. Adjust units for proper position, uniform appearance and operation.

B. Clean exposed and semi-exposed surfaces using materials acceptable to manufacturer.

END OF SECTION 098322

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Concrete.
2. Concrete masonry units (CMU).
3. Steel.
4. Galvanized metal.

1.2 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

E. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

F. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples: For each type of paint system and each color and gloss of topcoat.

C. Product List: For each product indicated. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 10 gallons of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles for the paint category indicated.

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

D. Colors: As selected by Architect from manufacturer's full range.

1. 30 percent of surface area will be painted with deep tones.

2.3 BLOCK FILLERS

A. Block Filler, Latex, Interior/Exterior: MPI #4.

1. Dunn Edwards
Concrete Block Filler W 315

2.4 METAL PRIMERS

A. Primer, Alkyd, Anti-Corrosive for Metal: MPI #79.

1. Dunn Edwards
Block Rust 43-4

2.5 WATER-BASED PAINTS

A. Acrylic, Exterior Eggshell.

1. Dunn Edwards
   Spartashell W7400

2.6 SOLVENT-BASED PAINTS

A. Alkyd, Exterior, Semi-Gloss (Gloss Level 5): MPI #94.

1. Dunn Edwards
   Syn-Lustro 9

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (Clay and CMU): 12 percent.
3. Wood: 15 percent.
4. Portland Cement Plaster: 12 percent.
5. Gypsum Board: 12 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

B. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."

B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

A. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

A. CMU Substrates:

1. Acrylic System:

a. Prime Coat: Block filler, latex, interior/exterior rolled and back rolled, MPI #4.
b. Intermediate Coat: Acrylic, exterior, matching topcoat. W7400.
c. Topcoat: Acrylic, exterior flat (Gloss Level 1), W7400.

B. Steel Substrates:

1. Alkyd System:

a. Prime Coat: Primer, alkyd, anticorrosive for metal**,** MPI #79.
b. Prime Coat: Shop primer specified in Section where substrate is specified.
c. Intermediate Coat: Exterior alkyd enamel matching topcoat.
d. Topcoat: Alkyd, exterior, semi-gloss (Gloss Level 5), MPI #94. Syn-Lustro 9.

END OF SECTION 099113

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Concrete.
2. Steel.
3. Gypsum board.

1.2 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Product List: For each product indicated. Include printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 10 percent, but not less than 2 gal. (3.8 L) of each material and color applied.

1.5 QUALITY ASSURANCE

A. Provide Draw Down sheet for each color selected.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles for the paint category indicated.

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. Colors: As selected by Architect from manufacturer's full range.

1. 20 percent of surface area will be painted with deep tones.

2.3 PRIMERS/SEALERS

A. Primer Sealer, Interior, Institutional Low Odor: MPI #149.

1. Dunn Edwards
Vinylastic W101

B. Primer, Bonding, Waterborne Epoxy.

1. Dunn Edwards
Intergard 270

2.4 METAL PRIMERS

A. Primer, Alkyd, Anti-Corrosive, for Metal: MPI #79.

1. Dunn Edwards
   Corroban 43-5

2.5 WATER-BASED PAINTS

A. 100% Acrylic, Interior, Semi Gloss.

1. Dunn Edwards
   Decoglo W450

B. Waterborne Epoxy Gloss: MPI #141.

1. Dunn Edwards
   Intergard 735

2.6 SOLVENT-BASED PAINTS

A. Alkyd, Interior, Semi-Gloss (Gloss Level 5): MPI #47.

1. Dunn Edwards
   Syn-Lustro 9

2.7 FLOOR COATINGS

A. Sealer, Water Based, for Concrete Floors:

1. Seal-Krete: Clear-Seal

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (Clay and CMU): 12 percent.
3. Wood: 15 percent.
4. Gypsum Board: 12 percent.
5. Plaster: 12 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

A. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 INTERIOR PAINTING SCHEDULE

A. Steel Substrates:

1. Alkyd System:

a. Prime Coat: Primer, alkyd, anti-corrosive, for metal, MPI #79 or primer, alkyd, quick dry, for metal, MPI #76.

b. Intermediate Coat: Alkyd, interior, matching topcoat.

B. Gypsum Board Substrates:

1. Institutional Low-Odor/VOC Acrylic System:

a. Prime Coat: Primer sealer, interior, institutional low odor/VOC.
b. Intermediate Coat: Acrylic, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Acrylic, interior, institutional low odor/VOC, (Gloss Level 2).

2. Waterborne Epoxy Primer System:

a. Prime Coat: Primer sealer.
b. Intermediate Coat: Waterborne Epoxy, interior, matching topcoat.
c. Topcoat: Waterborne Epoxy, interior, (Gloss Level 3).

END OF SECTION 099123

SECTION 101416 - PLAQUES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes plaques.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For plaques.

1. Include fabrication and installation details and attachments to other work.
2. Show plaque mounting heights, locations of supplementary supports to be provided by others, and accessories.
3. Show message list, typestyles, graphic elements, and layout for each plaque at least half size.

C. Samples: For each exposed product and for each color and texture specified.

D. Plaque Schedule: Use same designations specified or indicated on Drawings or in a plaque or sign schedule.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of plaques that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in ICC A117.1 for signs.

2.2 PLAQUES

A. Cast Plaque: Plaque with background texture, border, and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide ARK Ramos Cast Dedication Plaque & ARK Etched Plaques or comparable product by one of the following:

    a. Allen Markings International.
    b. APCO Graphics, Inc.
    c. A. R. K. Ramos Signage Systems.
    d. Gemini Incorporated.
    e. Matthews International Corporation; Bronze Division.
    f. Metal Arts; Division of L & H Mfg. Co.
    g. Metallic Arts.
    h. Nelson-Harkins Industries.
    i. Southwell Company (The).

3. Plaque Material: Cast aluminum.
4. Plaque Thickness: 0.25 inch (6.35 mm).
5. Finishes:

    a. Integral Aluminum Finish: Clear anodized.
    b. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard, in color as selected by Architect from manufacturer's full range.
    c. Overcoat: Manufacturer's standard baked-on clear coating.

6. Background Texture: Matte.
7. Integrally Cast Border Style: Raised flat band.
8. Mounting: Countersunk tamper resistant through fasteners.

2.3 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of plaques, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.
2. For exterior exposure, furnish stainless-steel devices unless otherwise indicated.
3. Exposed Metal-Fastener Components, General:

    a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.

4. Plaque Mounting Fasteners:

    a. Through Fasteners: Exposed metal fasteners matching plaque finish, with type of head indicated, installed in predrilled holes.

2.4 FABRICATION

A. General: Provide manufacturer's standard plaques according to requirements indicated.

1. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
2. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
3. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match plaque finish.
4. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install plaques using mounting methods indicated and according to manufacturer's written instructions.

1. Install plaques level, plumb, true to line, and at locations and heights indicated, with plaque surfaces free of distortion and other defects in appearance.
2. Install plaques so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that plaque surfaces are clean and free of materials or debris that would impair installation.
4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

B. Mounting Methods:

1. Through Fasteners: Drill holes in substrate using predrilled holes in plaque as template. Countersink holes in plaque if required. Place plaque in position and flush to surface. Install through fasteners and tighten.
2. Brackets: Remove loose debris from substrate surface and install bracket supports in position so that plaque is correctly located and aligned.

C. Remove temporary protective coverings and strippable films as plaques are installed.

END OF SECTION 101416

SECTION 101419 - DIMENSIONAL LETTER SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fabricated channel dimensional characters.
2. Cast dedication plaques.
3. Interior plastic signage.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For dimensional letter signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
3. Show message list, typestyles, graphic elements, and layout for each sign at least half size.
4. Show locations of electrical service connections.
5. Include diagrams for power, signal, and control wiring.

C. Samples: For each exposed product and for each color and texture specified.

D. Sign Schedule: Use same designations specified or indicated on Drawings or in a sign schedule.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Thermal Movements: For exterior fabricated channel dimensional characters, allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 180 deg F (100 deg C), material surfaces.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 DIMENSIONAL CHARACTERS

A. Fabricated Channel Characters: Metal face and side returns, formed free from warp and distortion; with uniform faces, sharp corners, and precisely formed lines and profiles; internally braced for stability and for securing fasteners; and as follows.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide A. R. K. Ramos or comparable product by one of the following:

a. APCO Graphics, Inc.
b. A. R. K. Ramos Signage Systems.
c. ASI Sign Systems, Inc.
d. Metallic Arts.
e. Nelson-Harkins Industries.
f. Steel Art Company.

3. Character Material: Sheet or plate aluminum.
4. Character Height: As indicated.
5. Character Depth: 1 ½ inch.
6. Finishes:

a. Integral Aluminum Finish: Clear anodized.

7. Mounting: Projecting studs.

a. Hold characters flush with wall surface.

2.3 DIMENSIONAL CHARACTER MATERIALS

A. Brass Castings: Lead-free alloy.

2.4 PLASTIC SIGNAGE: PHOTOPOLYMER MATERIAL

A. Basis of Design Inpro Boston Collection

1. Braille required.

2.5 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.
2. For exterior exposure, furnish stainless-steel devices unless otherwise indicated.
3. Exposed Metal-Fastener Components, General:

a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.

4. Sign Mounting Fasteners:

a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.
b. Projecting Studs: Threaded studs with sleeve spacer, welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.
c. Through Fasteners: Exposed metal fasteners matching sign finish, with type of head indicated, installed in predrilled holes.

2.6 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
2. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
4. Internally brace signs for stability and for securing fasteners.
5. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
6. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
3. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

B. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.

a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.

2. Projecting Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.

a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place spacers on studs, place sign in position, and push until spacers are pinched between sign and substrate, embedding the stud ends in holes. Temporarily support sign in position until adhesive fully sets.
b. Thin or Hollow Surfaces: Place spacers on studs, place sign in position with spacers pinched between sign and substrate, and install washers and nuts on stud ends projecting through opposite side of surface, and tighten.

END OF SECTION 101419

SECTION 102113.19 - PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes solid-plastic toilet compartments configured as toilet enclosures and urinal screens.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For toilet compartments. Include plans, elevations, sections, details, and attachment details.

C. Samples for each type of toilet compartment material indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Product certificates.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 450 or less.

B. Regulatory Requirements: Comply with applicable provisions in ICC A117.1 for toilet compartments designated as accessible.

2.2 SOLID-PLASTIC TOILET COMPARTMENTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide Polly (HDPE) by Metpar or comparable product by one of the following:

1. Accurate Partitions Corporation.
2. American Sanitary Partition Corporation.
3. Bradley Corporation; Mills Partitions.
4. General Partitions Mfg. Corp.
5. Global Steel Products Corp.
6. Hadrian Manufacturing Inc.
7. Knickerbocker Partition Corporation.
8. Marlite.
9. Metpar Corp.
10. Partition Systems Incorporated of South Carolina; Columbia Partitions.
11. Scranton Hiny Hiders

C. Toilet-Enclosure Style: Overhead braced.

D. Urinal-Screen Style: Post to ceiling.

E. Door, Panel, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch (25 mm) thick, seamless, with eased edges, no-sightline system, and with homogenous color and pattern throughout thickness of material.

1. Integral Hinges: Configure doors and pilasters to receive integral hinges.
2. Color and Pattern: as selected by Architect from manufacturer's full range.

F. Pilaster Shoes and Sleeves (Caps): Manufacturer's standard design; stainless steel.

G. Urinal-Screen Post: Manufacturer's standard post design of 1-3/4-inch- (44-mm-) square, aluminum tube with satin finish; with shoe and sleeve (cap) matching that on the pilaster.

H. Brackets (Fittings):

1. Stirrup Type: Ear or U-brackets, stainless steel.
2. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

I. Overhead Cross Bracing for Ceiling-Hung Units: As recommended by manufacturer and fabricated from solid polymer.

2.3 HARDWARE AND ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard operating hardware and accessories.

1. Material: Stainless steel.
2. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.

B. Hardware and Accessories: Manufacturer's heavy-duty stainless-steel operating hardware and accessories.

1. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.

C. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.

D. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless-steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.4 FABRICATION

A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.

B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.

C. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

D. Ceiling-Hung Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for connection to structural support above finished ceiling. Provide assemblies that support pilasters from structure without transmitting load to finished ceiling. Provide sleeves (caps) at tops of pilasters to conceal anchorage.

E. Urinal-Screen Posts: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at tops and bottoms of posts. Provide shoes and sleeves (caps) at posts to conceal anchorage.

F. Door Size and Swings: Unless otherwise indicated, provide 24-inch- (610-mm-) wide, in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide, out-swinging doors with a minimum 32-inch- (813-mm-) wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. Maximum Clearances:

a. Pilasters and Panels: 1/2 inch (13 mm).
b. Panels and Walls: 1 inch (25 mm).

2. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.

a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
b. Align brackets at pilasters with brackets at walls.

3.2 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 102113.19

SECTION 102123 - CUBICLE CURTAINS AND TRACK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Curtain tracks and carriers.
2. Curtains.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show layout of cubicles, sizes of curtains, number of carriers, anchorage details, and accessories.

C. Samples: For each type of curtain.

D. Schedule: Use same designations indicated on Drawings.

1.3 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Curtains: Provide curtain fabrics with the following characteristics:

1. Launderable to a temperature of not less than 160 deg F (71 deg C).
2. Flame resistant and identical to those that have passed NFPA 701 when tested by a testing and inspecting agency acceptable to authorities having jurisdiction.

2.2 CURTAIN AND SUPPORT-SYSTEM MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product InPro Corp, Optitrac CE5038. Curtains – RX – Privacy Curtains, NS Collection, Pattern, Tree, run vertical.

1. ADC Hospital Equipment; Division of Automatic Devices Company.
2. C/S General Cubicle.
3. Cubicle Curtain Factory, Inc.
4. Imperial Fastener Company, Inc.
5. InPro Corporation.
6. A. R. Nelson Co.
7. Salsbury Industries.
8. RX Privacy Curtains.

2.3 CURTAIN SUPPORT SYSTEMS

A. Extruded-Aluminum Curtain Track: Not less than 1-1/4 inches wide by 3/4 inch high (32 mm wide by 19 mm high); with manufacturer's standard wall thickness.

1. Curved Track: Factory-fabricated, 12-inch- (305-mm-) radius bends.
2. Finish: Clear anodized.

B. Curtain Track Accessories: Fabricate from same material and with same finish as track.

C. Curtain Carriers: Two nylon rollers and nylon axle with chrome-plated steel hook.

D. Exposed Fasteners: Stainless steel.

E. Concealed Fasteners: Hot-dip galvanized.

2.4 CURTAINS

A. Cubicle Curtain Fabric: Curtain manufacturer's standard, 100 percent polyester, inherently and permanently flame resistant, stain resistant, and antimicrobial.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. RX Privacy Curtain NS Collection Fabric, Architek. If not naming products, consider inserting additional fabric characteristics such as fiber content and width.
   b. Pattern: Tree Pattern.
2. Color: As selected by Architect from manufacturer’s full range.

B. Mesh Top: Not less than 20-inch- (508-mm-) high mesh top of No. 40 nylon mesh.

C. Curtain Tieback: Nickel-plated brass chain; one at each curtain termination.

D. Fabricate curtains as follows:

1. Width: Equal to track length from which curtain is hung plus 10 percent added fullness, but not less than 12 inches (305 mm) added fullness.
2. Length: Equal to floor-to-ceiling height, minus depth of track and carrier at top, and minus clearance above the finished floor as follows:

   a. Cubicle Curtains: 12 inches (305 mm).

E. Vertical Seams: Not less than 1/2 inch (13 mm) wide, double turned and double stitched.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install tracks level and plumb, according to manufacturer's written instructions.

B. Up to 20 feet (6.0 m) in length, provide track fabricated from single continuous length.

1. Curtain Track Mounting: Surface.
2. IV Track Mounting: Surface.

C. Surface-Track Mounting: Fasten tracks to ceilings at intervals recommended by manufacturer. Fasten tracks to structure at each splice and tangent point of each corner. Center fasteners in track to ensure unencumbered carrier operation.

D. Track Accessories: Install splices, end caps, connectors, end stops, coupling and joining sleeves, and other accessories as required for a secure and operational installation.

E. Curtain Carriers: Provide curtain carriers adequate for 6-inch (152-mm) spacing along full length of curtain plus an additional carrier.

F. Curtains: Hang curtains on each curtain track.

END OF SECTION 102123

SECTION 102239 - FOLDING PANEL PARTITIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Manually operated, acoustical panel partitions.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For operable panel partitions.

   1. Include plans, elevations, sections, and attachment details.
   2. Indicate stacking and operating clearances. Indicate location and installation requirements for hardware and track, blocking, and direction of travel.
   3. Include diagrams for power, signal, and control wiring.

C. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale and coordinated with each other, using input from installers of the items involved.

B. Setting Drawings: For embedded items and cutouts required in other work, including support-beam, mounting-hole template.

C. Seismic Qualification Certificates: For operable panel partitions, tracks, accessories, and components, from manufacturer.

D. Product Certificates: For each type of operable panel partition.

E. Product test reports.

F. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of operable panel partitions that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Operable panel partitions shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the partition panels will remain in place without separation of any parts when subjected to the seismic forces specified."

B. Acoustical Performance: Provide operable panel partitions tested by a qualified testing agency for the following acoustical properties according to test methods indicated:

1. Sound-Transmission Requirements: Operable panel partition assembly tested for laboratory sound-transmission loss performance according to ASTM E 90, determined by ASTM E 413, and rated for not less than the STC indicated.
2. Noise-Reduction Requirements: Operable panel partition assembly, identical to partition tested for STC, tested for sound-absorption performance according to ASTM C 423, and rated for not less than the NRC indicated.

C. Fire-Test-Response Characteristics: Provide panels with finishes complying with one of the following as determined by testing identical products by a testing and inspecting agency acceptable to authorities having jurisdiction:

1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency.

a. Flame-Spread Index: 25 or less.
b. Smoke-Developed Index: 450 or less.

2. Fire Growth Contribution: Complying with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol.

D. Fire Resistance: Provide fire-rated operable panel partition assemblies including pass doors complying with NFPA 80, based on testing according to UL 10B for fire-rated door assemblies.

1. Pass doors in fire-rated operable panel partition assemblies shall meet positive-pressure requirements.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 OPERABLE ACOUSTICAL PANELS

A. Operable Acoustical Panels: Partition system, including panels, seals, finish facing, suspension system, operators, and accessories.

1. Modern fold acousti-seal paired panels, Model #932 or equal.

B. Panel Operation: Manually operated, paired panels.

C. Panel Construction: As required to support panel from suspension components and with reinforcement for hardware attachment. Fabricate panels with tight hairline joints and concealed fasteners. Fabricate panels so finished in-place partition is rigid; level; plumb; aligned, with tight joints and uniform appearance; and free of bow, warp, twist, deformation, and surface and finish irregularities.

D. Dimensions: Fabricate operable acoustical panel partitions to form an assembled system of dimensions indicated and verified by field measurements.

E. STC: Not less than 52.

F. Panel Materials:

1. Steel Frame: Steel sheet, manufacturer's standard thickness.
2. Steel Face/Liner Sheets: Tension-leveled steel sheet, manufacturer's standard thickness.
3. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use, corrosion resistance, and finish indicated; manufacturer's standard strengths and thicknesses for type of use.
4. Gypsum Board: ASTM C 1396/C 1396M.
5. Cement Board: ASTM C 1288.
6. Particleboard: ANSI A208.1.
7. Medium-Density Fiberboard: ANSI A208.2.
8. Plywood: DOC PS 1.

G. Panel Closure: Manufacturer's standard.

H. Hardware: Manufacturer's standard as required to operate operable panel partition and accessories; with decorative, protective finish.

I. Finish Facing: ~~High-pressure decorative laminate.~~

WALL COVERING

2.3 SEALS

A. Description: Seals that produce operable panel partitions complying with performance requirements and the following:

1. Seals made from materials and in profiles that minimize sound leakage.
2. Seals fitting tight at contact surfaces and sealing continuously between adjacent panels and between operable panel partition perimeter and adjacent surfaces, when operable panel partition is extended and closed.

B. Horizontal Bottom Seals: Resilient, mechanical, retractable, constant-force-contact seal exerting uniform constant pressure on floor when extended, ensuring horizontal and vertical sealing and resisting panel movement.
1. Automatically Operated for Acoustical Panels: Extension and retraction of bottom seal automatically operated by movement of partition, with operating range not less than 1 inch (25 mm) between retracted seal and floor finish.

2.4 PANEL FINISH FACINGS

A. Description: Finish facings for panels that comply with indicated fire-test-response characteristics and that are factory applied to operable panel partitions with appropriate backing, using mildew-resistant nonstaining adhesive as recommended by facing manufacturer's written instructions.

B. High-Pressure Decorative Laminate: NEMA LD 3, Horizontal grade.

1. Color/Pattern: As selected by Architect from manufacturer's full range.

C. Trimless Edges: Fabricate exposed panel edges so finish facing wraps uninterrupted around panel, covering edge and resulting in an installed partition with facing visible on vertical panel edges, without trim, for minimal sightlines at panel-to-panel joints.

2.5 SUSPENSION SYSTEMS

A. Tracks: Steel or aluminum with adjustable steel hanger rods for overhead support, designed for operation, size, and weight of operable panel partition indicated. Size track to support partition operation and storage without damage to suspension system, operable panel partitions, or adjacent construction. Limit track deflection to no more than 0.10 inch (2.54 mm) between bracket supports. Provide a continuous system of track sections and accessories to accommodate configuration and layout indicated for partition operation and storage.

B. Carriers: Trolley system as required for configuration type, size, and weight of partition and for easy operation; with ball-bearing wheels.

C. Track Intersections, Switches, and Accessories: As required for operation, storage, track configuration, and layout indicated for operable panel partitions, and compatible with partition assembly specified. Fabricate track intersections and switches from steel or aluminum.

2.6 ACCESSORIES

A. Pass Doors: Swinging door built into and matching panel materials, construction, acoustical qualities, finish and thickness, complete with frames and operating hardware. Hinges finished to match other exposed hardware.

1. Accessibility Standard: Fabricate doors to comply with applicable provisions in the ABA standards of ICC A117.1
2. Single Pass Door: 36 by 84 inches (914 by 2134 mm).
3. Pass-Door Hardware: Equip pass door with the following:

a. Door Seals: Mechanically operated floor seal on panels containing pass doors.
b. Panic hardware.
c. Concealed door closer.
d. Door Viewer: Installed with view in direction of swing.
e. Latchset: Passage set.
f. Lock: Key-operated lock with cylinder, keyed to master key system, operable from both sides of door. Include two keys per lock.
g. Lock: Deadlock to receive cylinder, operable from both sides of door. See Section 087111 "Door Hardware (Descriptive Specification)" for lock cylinder and keying requirements.

B. Storage Pocket Door: Full height at end of partition runs to conceal stacked partition; of same materials, finish, construction, thickness, and acoustical qualities as panels; complete with operating hardware and acoustical seals at soffit, floor, and jambs. Hinges in finish to match other exposed hardware.

1. Manufacturer's standard method to secure storage pocket door in closed position.
2. Rim Lock: Key-operated lock cylinder, keyed to master key system, to secure storage pocket door in closed position. Include two keys per lock.
3. Rim Lock: Deadlock to receive cylinder, to secure storage pocket door in closed position. See Section 087111 "Door Hardware (Descriptive Specification)" for lock cylinder and keying requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install operable panel partitions and accessories after other finishing operations, including painting, have been completed in area of partition installation.

B. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.

C. Broken, cracked, deformed, or unmatched gasketing or gasketing with gaps at butted ends is not acceptable.

D. Light-Leakage Test: Illuminate one side of partition installation and observe vertical joints and top and bottom seals for voids. Adjust partitions for alignment and full closure of vertical joints and full closure along top and bottom seals.

3.2 ADJUSTING

A. Adjust pass doors and storage pocket doors to operate smoothly and easily, without binding or warping.

B. Verify that safety devices are properly functioning.

3.3 DEMONSTRATION

Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain operable panel partitions.

END OF SECTION 102239

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Underlavatory guards.
3. Custodial accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify products using designations indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.6 WARRANTY

A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PUBLIC-USE WASHROOM ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.
5. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
6. Tubular Specialties Manufacturing, Inc.

C. Toilet Tissue Dispenser:

1. Basis-of-Design Product: Bobrick B-2888.
2. Mounting: Surface mounted.
3. Material and Finish: Stainless steel.
4. Size: Holds (2) rolls.

D. Paper Towel (Roll) Dispenser:

1. Basis-of-Design Product: Provided and installed by Owner.

E. Waste Receptacle:

1. Basis-of-Design Product: Provided and installed by Owner.

F. Liquid-Soap Dispenser:

1. Basis-of-Design Product: Provided and installed by Owner.

G. Grab Bar:

1. Basis-of-Design Product: Bobrick B-6106 Series.
2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch (1.3 mm) thick.

    a. Finish: Smooth, No. 4 finish (satin).

4. Outside Diameter: 1-1/4 inches (32 mm).
5. Configuration and Length: As indicated on Drawings.

H. Sanitary-Napkin Disposal Unit:

1. Basis-of-Design Product: Bobrick B-270.
2. Mounting: Surface mounted.

3. Door or Cover: Self-closing, disposal-opening cover and hinged face panel with tumbler lockset.
4. Receptacle: Removable.
5. Material and Finish: Stainless steel, No. 4 finish (satin).

I. Mirror Unit:

1. Basis-of-Design Product: Bobrick B-280 Series.
2. Frame: Stainless-steel channel.

   a. Corners: Welded and ground smooth.

3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.

   a. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.

4. Size: As indicated on Drawings.

Addendum 01
J. Wall Mounted Changing Table
1.Basis-of-Design Product: Koala Kare KB200-00.
2.Mounting: Surface mounted.

~~J. Wall Mounted Changing Table:~~

~~1. Basis-of-Design Product: Model #100-555-SM, 62 inches long.~~
~~2. Mounting: Surface mounted.~~

K. Toilet Seat Cover Dispenser:

1. Basis-of-Design Product: Bobrick Model #B-221.

2.2 UNDERLAVATORY GUARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Plumberex Specialty Products, Inc.
2. Truebro by IPS Corporation.

C. Underlavatory Guard:

1. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping; allow service access without removing coverings.
2. Material and Finish: Antimicrobial, molded plastic, white.

2.3 CUSTODIAL ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.
5. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
6. Tubular Specialties Manufacturing, Inc.

C. Utility Shelf/Mop Handler:

1. Basis-of-Design Product: Bobrick B-239.
2. Description: With exposed edges turned down not less than 1/2 inch (13 mm) and supported by two triangular brackets welded to shelf underside.
3. Size: 34 inches long by 8 inches (152 mm) deep.
4. Material and Finish: Not less than nominal 0.05-inch- (1.3-mm-) thick stainless steel, No. 4 finish (satin).

2.4 FABRICATION

A. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F 446.

END OF SECTION 102800

SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes fire-protection cabinets for portable fire extinguishers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For fire-protection cabinets.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.4 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

2.2 FIRE-PROTECTION CABINET

A. Cabinet Type: Suitable for fire extinguisher.

1. Products: Subject to compliance with requirements, provide one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide J.L. Industries Ambassador Vertical Duo with safety lock or comparable product by one of the following:

    a. Fire-End & Croker Corporation.
    b. Guardian Fire Equipment, Inc.

c. JL Industries, Inc.; a division of the Activar Construction Products Group.
d. Larsens Manufacturing Company.
e. Modern Metal Products, Division of Technico Inc.
f. Nystrom, Inc.
g. Potter Roemer LLC.

B. Cabinet Construction: Nonrated.

C. Cabinet Material: Cold-rolled steel sheet.

D. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

1. Rolled-Edge Trim: 2-1/2-inch (64-mm) backbend depth.

E. Surface-Mounted Cabinet: Cabinet box fully exposed and mounted directly on wall with no trim.

F. Cabinet Trim Material: Steel sheet.

G. Door Material: Steel sheet.

H. Door Style: Vertical duo panel with frame.

I. Door Glazing: Acrylic sheet.

1. Acrylic Sheet Color: Clear transparent acrylic sheet.

J. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

K. Accessories:

1. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.
2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location..

a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."

1) Location: Applied to cabinet door.
2) Application Process: Silk-screened.
3) Lettering Color: Red.
4) Orientation: Vertical.

L. Materials:

1. Cold-Rolled Steel: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

a. Finish: Baked enamel or powder coat.

b. Color: As selected by Architect from full range of industry colors and color densities.

2. Transparent Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), 1.5 mm thick, with Finish 1 (smooth or polished).

2.3 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

B. Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

C. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

D. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide J.L Industries Cosmic 5E & Saturn Class K Wet Chemical (Kitchen) or comparable product by one of the following:

    a. Amerex Corporation.
    b. Ansul Incorporated.
    c. Guardian Fire Equipment, Inc.
    d. JL Industries, Inc.; a division of the Activar Construction Products Group.
    e. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
    f. Larsens Manufacturing Company.
    g. Potter Roemer LLC.

3. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.

B. Multipurpose Dry-Chemical Type: UL-rated nominal capacity, with monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.

C. Class K – Wet Chemical: 2 ½ gallon.

2.3 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide J.L. Industries MB810A or comparable product by one of the following:

    a. Amerex Corporation.
    b. Ansul Incorporated.
    c. Guardian Fire Equipment, Inc.
    d. JL Industries, Inc.; a division of the Activar Construction Products Group.
    e. Larsens Manufacturing Company.
    f. Potter Roemer LLC.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

a. Orientation: Vertical.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

1. Mounting Brackets: 54 inches (1372 mm) above finished floor to top of fire extinguisher.

C. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

SECTION 107516 - GROUND-SET FLAGPOLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes ground-set flagpoles made from aluminum.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, operating characteristics, fittings, accessories, and finishes for flagpoles.

B. Delegated-Design Submittal: For flagpoles.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flagpoles to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain flagpoles as complete units, including fittings, accessories, bases, and anchorage devices, from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design flagpole assemblies.

B. Structural Performance: Flagpole assemblies, including anchorages and supports, shall withstand design loads indicated within limits and under conditions indicated.

1. Wind Loads: Determine according to NAAMM FP 1001. Basic wind speed for Project location is 90 MPH.

2.3 ALUMINUM FLAGPOLES

A. Aluminum Flagpoles: Cone tapered flagpoles fabricated from seamless extruded tubing complying with ASTM B 241/B 241M, Alloy 6063, with a minimum wall thickness of 3/16 inch (4.8 mm).

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. American Flagpole.
   b. Concord Industries, Inc.
   c. U.S. Flag & Flagpole Supply, LP.

B. Exposed Height: 45 feet (13.5 m)

C. Metal Foundation Tube: Manufacturer's standard corrugated-steel foundation tube, 0.060-inch (1.52-mm) wall thickness with 3/16-inch (4.8-mm) steel bottom plate and support plate; 3/4-inch- (19-mm-) diameter, steel ground spike; and steel centering wedges welded together. Galvanize foundation tube after assembly. Furnish loose hardwood wedges at top of foundation tube for plumbing pole.

D. Sleeve for Aluminum Flagpole: Fiberglass or PVC pipe foundation sleeve, made to fit flagpole, for casting into concrete foundation.

2.4 FITTINGS

A. Finial Ball: Flush-seam ball, sized as indicated or, if not indicated, to match flagpole-butt diameter.

1. 0.063-inch (1.6-mm) spun aluminum, finished to match flagpole.

B. External Halyard: Ball-bearing, nonfouling, revolving truck assembly of cast metal with continuous 5/16-inch- (8-mm-) diameter, braided polypropylene halyard and 9-inch (228-mm) cast-metal cleats with fasteners. Finish exposed metal surfaces to match flagpole.

1. Halyards and Cleats: One at each flagpole.
2. Halyard Flag Snaps: Chromium-plated bronze swivel snap hooks. Furnish two per halyard.

2.5 MISCELLANEOUS MATERIALS

A. Drainage Material: Crushed stone, or crushed or uncrushed gravel; coarse aggregate.

B. Sand: ASTM C 33/C 33M, fine aggregate.

C. Elastomeric Joint Sealant: Multicomponent nonsag urethane joint sealant complying with requirements in Section 079200 "Joint Sealants."

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

2.6 ALUMINUM FINISHES

A. Natural Satin Finish: AA-M32, fine, directional, medium satin polish; buff complying with AA-M20; seal aluminum surfaces with clear, hard-coat wax.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare uncoated metal flagpoles that are set in foundation tubes by painting below-grade portions with a heavy coat of bituminous paint.

B. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete. Place and compact drainage material at excavation bottom.

C. Foundation Tube: Place foundation tube, center, and brace to prevent displacement during concreting. Place concrete. Plumb and level foundation tube and allow concrete to cure.

D. Sleeves: Locate and secure sleeves in forms by bracing to reinforcement and forms.

E. Place concrete, as specified in Section 033000 "Cast-in-Place Concrete." Compact concrete in place by using vibrators. Moist-cure exposed concrete for no fewer than seven days or use nonstaining curing compound.

F. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

3.2 FLAGPOLE INSTALLATION

A. General: Install flagpoles where indicated and according to manufacturer's written instructions.

B. Foundation Tube: Place flagpole in tube, seated on bottom plate between steel centering wedges, and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch (50-mm) layer of elastomeric joint sealant and cover with flashing collar.

END OF SECTION 107516

SECTION 114000 - FOOD SERVICE EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

A. SUMMARY: The below information is provided for reference only. It may not be totally inclusive for each specific trade. It is the responsibility of each trade to ensure that it covers all elements of its work that may affect the final foodservice equipment installation. Arizona Restaurant Supply, Inc (ARS) does not assume any responsibility for the placement or replacement of equipment, its utilities, or any structural impact on the project where the equipment is furnished by others, including the Owner or where existing equipment is reused by the Owner or others, or where equipment has been specifically identified as NIC (not in contract).

B. The General Conditions, Supplementary Conditions and any applicable portions of Division 1 of the specifications are part of this section.

C. Furnish and install includes, but is not limited to the work as follows:

1) Furnish all labor, materials and services necessary for the assembly and setting in place of the equipment in strict compliance with the contract documents.
2) Coordinate requirements for all wall backing and any other special support locations.
3) Coordinate the cutting of the holes in the equipment for other trades as required for proper installation.
4) Repair any damage to equipment or to work of other trades resulting from installation.
5) Remove all debris resulting from this installation.
6) Make all necessary adjustments to equipment and test for proper operation.

PART 2 RELATED WORK IN OTHER SECTIONS PERFORMED BY OTHER TRADES:

A. All electrical, gas, steam, water, and waste service to rough in points at fixture locations and final connections to fixtures are to be provided by other trades. This includes all material and labor necessary to pipe or wire the fixture complete; the extension of all indirect waste lines to floor sinks or standpipes; the continuance of pipe or wiring from utility distribution systems; the continuance of piping to water troughs with the appropriate controls, and piping through solenoid valves and vacuum breakers; the continuance of wiring from junction box to lights, door heaters, vents, and refrigeration equipment; and the continuance of wiring to light fixtures in appliances. The term fixture includes all items listed as new, existing, reused and/or vendor furnished.

1) Provide and install all control wiring for remote refrigeration systems.
2) All ventilating work ducts above finished ceiling. All exhaust fans and make-up air units and all final connections of such. All fire wrap.
3) All concrete work, and including curbs, gutters, raised bases, floor depressions, cement finishing and tile overlay, including cold storage room floors and coved bases.
4) Finish floor sealing or covering.

5) Roof penetrations, roof curbs, roof sealing of penetrations, core drilling and fire caulking.
6) Color and pattern selections of paints, stains, and plastic laminate material.

PART 3 GUARANTEE AND WARRANTY:

A. Warrant all equipment per manufacturer's standard warranty for parts and labor.

B. Fully guarantee all equipment against defect in workmanship and material for 1 year from date of substantial completion. Make all repairs and replacements without charge.

PART 4 EQUIPMENT ACCESS:

A. Verify all building conditions and coordinate with the General Contractor to assure proper access of large equipment to the building. Costs for any specific items of equipment required for the movement of large, heavy or bulky equipment including rigging, are the full responsibility of the K.E.C.

PART 5 SUBMITTALS:

A. Provide shop drawings and rough-in drawings detailing rough-in utility requirements and dimensions.

B. Shop Drawings: Submit six (6) bond sets of shop drawings of all fabricated equipment at minimum 3/4" = 1'-0" scale. Include with all custom fabrication drawings dimensions, fabrication methods, materials, thickness, details of construction, installation, method of field joints noted, and a full Bill of Materials (BOM). Shop details must indicate reinforcements, methods of anchorage and quality of finishing. KEC shall verify all field dimensions.

C. Rough-in Drawings: Submit six (6) bond sets of complete and detailed rough-in drawings. Drawings must be professionally drawn and be at a scale of ¼" = 1'-0". Rough-in drawings shall show and tag every piece of equipment, show all dimensions for rough-in points for electrical, plumbing, steam, exhaust, gas, concrete curbs, sleeves, and supports.

D. Cut Sheet Book: Assemble and bind six (6) sets of Equipment Brochure books as part of the submittal. Each item shall have a cover sheet, which will show all specified accessories, utility requirements and all other pertinent information on equipment cuts. Every item of equipment will have a cut sheet. 'See Drawing' is not acceptable. Improperly prepared or incomplete cut sheet books will be returned without review for correction and resubmittal.

PART 6 START-UP DEMONSTRATION AND MANUALS:

A. Provide factory-trained personnel for start-up and demonstration of equipment.

B. Within ten (10) working days of Final Punch, provide General Contractor six (6) service/parts and maintenance manuals (O&M'S) for all equipment supplied as part of

this contract.

C. Prepare a list of service agencies authorized by each manufacturer Include a telephone number for reference purposes. One copy of the Service Agency list will be included in each manual.

PART 7 GENERAL REQUIREMENTS OF FABRICATION:

A. Fabrication methods shall conform to all generally accepted methods and requirements of the food service industry and shall meet or exceed the latest National Sanitation Foundation (NSF) standards.

B. Fabricated equipment approved as an alternate to specified factory manufactured equipment must be constructed to match the specified equipment.

PART 8 MATERIALS:

A. Stainless steel Type 304, polished to No. 4 finish. All tops and sinks to be 14 gauge, bottom and middle shelves to be 16 gauge; wall shelves 16 gauge minimum, cabinet body to be 18 gauge minimum. Coat underside of dishtable and drainboard tops with a minimum 1/16" thick sound deadening material.

B. Galvanized Steel: Galvanized Steel shall be of 14 gauge. Galvanized steel may be used in non-exposed areas. Use of galvanized steel will be subject to final approval during submittal process. Fabrication drawings must clearly identify location(s) of all galvanized components.

C. Insulation Materials: For normal temperature applications, such as custom fabricated under- counter refrigerators, use extruded polystyrene material 2" thick, bonded at all joints.

D. For heated-type applications, use block-type rock wool, minimum 1" thick.

E. For low temperature applications, such as ice bins, cold pans, or custom fabricated under counter freezers, use urethane rigid foam board or foamed-in-place, not less than 2" thick, except that vertical surfaces of cold pans and ice bins may be 1" thick. Bond insulation at joints to prevent condensation.

PART 9 FOOD SERVICE CABINETS, LAMINATE CLAD:

A. Fabricate woodwork to dimensions and details indicated on drawings.

B. Complete fabrication, assembly, finishing, hardware application and other work before shipment to project site to maximum extent possible. Where necessary for fitting at site, provide ample allowance for scribing, trimming and fitting.

C. Fabricate millwork counters with pre-cut openings to receive food service equipment, plumbing fixtures, etc.

D. Quality Standard: Comply with AWI Section 400 and its Division 400B.

E. Laminate Clad Cabinets:

1) Grade: Premium
2) Type of Cabinet Construction: Flush overlay.
3) Colors, Pattern and Finishes: As selected by Architect.

F. All plywood shall be marine grade.

PART 10 METAL FABRICATION:

A. Metal tops to be one-piece 14-gauge stainless steel welded construction including field joints. Tops to be secured to a full perimeter galvanized steel channel frame. For drain boards and dish tables channel frames shall be stainless steel and cross-braced not farther than 30" on center. Fasten top with stud bolts or tack welds. Coat underside of dish table and drain board tops with a minimum 1/16" thick approved sound-deadening, mastic material. Apply all coatings by spreading after top has been secured to frame.

PART 11 ENCLOSED CABINET BASES:

A. Fabricate bases from 18 gauge minimum stainless steel reinforced by forming metal ends and shelves. Partitions to be constructed of stainless steel. The ends and vertical partitions can be of single wall construction, with a 2" face partition. Sides shall be welded at intersections and be flush with the bottom edge of the bottom shelf.

B. Unexposed backs and structural members may be constructed of galvanized steel.

PART 12 LEGS AND CROSS RAILS:

A. Legs and cross rails to be of 1 5/8" diameter 16 gauge seamless stainless steel tubing. All cross rails to be continuously welded, ground and polished. Tack welds or other methods of connection are not acceptable. Bottoms of legs to be wedged inward and fitted with a stainless steel bullet-type foot with not less than 2" adjustment.

B. Stainless steel gussets shall be a minimum of 3" long. Outer shell to be 16 gauge stainless steel reinforced with 12 gauge mild steel insert welded to interior of shell. Gusset to be large enough to accommodate a 1-5/8" tube and shall have an Allen screw fastener.

C. Low counter legs shall be constructed of stainless steel exterior and shall be 5-3/4" minimum height with 3-1/2" square plate with four countersunk holes, welded to the top for fastening.

D. Adjustable feet to be constructed of stainless steel ½" diameter tapered at the bottom to 1" diameter, fitted with a ¾" cold-rolled rod threaded for minimum of ½" for fitting into a threaded plug welded to leg.

E. When legs are fastened to equipment, the following methods must be used:

1) Sinks - Gussets shall be welded to triangular stainless steel plates which in turn shall be welded to the underside of sink.
2) Metal Top Table or Dishtable: Gussetts shall be welded to 14 gauge or heavier channel reinforcing.
3) Food Top: Gusset shall be welded to a stainless steel channel of not less than 14 gauge stainless steel, secured to the top with screws through slotted holes.

PART 13 SHELVES:

A. When shelves are part of the fixture, the following must take place:

1) Open base type shelf shall be notched around the leg and continuously welded to the leg.
2) Cabinet base type shelf shall be turned-up 2" on the backside with a minimum of ¼" radius to insure a tight fit to enclosure panels.

PART 14 SINKS, STEAM TABLES AND BAIN MARIES:

A. Partitions between compartments to be double thickness, continuous and welded.

B. Where sink bowls are exposed, the exterior shall be polished to a number 4 finish.

C. Furnish drains, wastes and faucets manufactured by T &S Mfg. loose for installation by Contractor.
D. Basket strainer drains shall be provided with all sinks not specified with rotary drains.

E. Rotary drains shall T & S Model B-3950 rotary type waste. Valve to be 2" chrome plated.

F. Furnish faucets for all sinks, Bain maries, water stations and other fixtures as specified.

G. Provide vacuum breakers on equipment requiring them as furnished under this contract in accordance with governing codes.

PART 15 OTHER CUSTOM FABRICATED COMPONENTS:

A. Casters: Shall be heavy-duty type, ball-bearing, solid or disc wheel with non-marking greaseproof rubber, neoprene or polyurethane tires.

B. Wheels shall be 5 in. diameter or as specified, minimum width of tread 2-1/2" with a minimum capacity per caster of 250 lbs.

C. Solid material wheels shall be provided with stainless steel rotating wheel guards.

D. Doors: Metal doors shall be double-pan stainless steel. Outer pan shall be 18 gauge stainless steel with corners welded, ground smooth and polished. Inner pan shall be 20

gauge stainless steel fitted tightly into outer pan with a sound-deadening material such as Celotex or extruded polystyrene used as a core. The two pans shall be tack-welded together and joints solder-filled. Doors shall be finished approximately ¾" thick, and be fitted with flush recessed type stainless steel door pulls.

E. Sliding doors shall be easy closing, mounted on large, quiet ball-bearing rollers in 14 gauge stainless steel overhead tracks and be removable without the use of tools. Bottom of cabinet to have stainless steel guide-pins for doors.

F. Wood doors to be custom fabricated as detailed. All sides and edges shall be laminated.

G. Hinged doors to be mounted on heavy-duty N.S.F. approved hinges, Model #2970-1010- 1250 by Standard Keil or as noted on plans or specifications.

H. Hardware: Shall be solid, heavy-duty type.

I. Identify manufacturer's name and number so that broken or worn parts may be replaced.

J. Submit samples for approval, when requested.

K. Pulls shall be Kason Hardware, or approved equal.

L. Drawer Assemblies: Assemblies shall consist of removable drawer body mounted in a ball bearing slide assembly.

M. Slide assembly shall consist of one pair of stainless steel roller bearing extension slides with side and back enclosure panels, front spacer angle, two drawer carrier angles secured to slides and stainless steel front.

N. Drawer bodies for general storage shall be 20" X 20".

PART 16 ELECTRICAL WORK - GENERAL REQUIREMENTS:

A. Before ordering equipment, confirm with the Contractor, all pertinent electrical requirements such as actual voltages available, number of phases and number of wires in the system.

B. Electrical work for custom fabricated equipment shall be easily accessible, mounted on the equipment.

C. Components and assemblies shall bear the U.L. label or be approved by the prevailing authority.

D. Provide custom fabricated and standard refrigerated units with vapor tight receptacles, shatterproof lamps and automatic switches. All wiring to be concealed.

E. Electrical Contractor shall provide all code conforming electrical receptacles serving applicable Section 11400 Foodservice Equipment.

PART 17 CONVENIENCE AND POWER OUTLETS:

A. Make cut-outs and install appropriate boxes or outlets in custom fabricated fixtures complete with wiring conduit, outlet and cover plate.

B. All outlets and plugs shall conform to N.E.M.A. standards.

PART 18 PLUGS AND CORDS:

A. Where cords and plugs are used, they must comply with National Electrical Manufacturer's Association (N.E.M.A.) requirements.

PART 19 HEATING EQUIPMENT:

A. Electric and heating equipment to be installed in a manner that makes it readily cleanable or easily removable for cleaning.

B. Steam-heated custom fabricated equipment shall be of self-contained assembly complete with control valves located in an accessible position.

C. Heated drop in units to be provided with insulation barrier to prevent the transfer of heat to top of cabinet.

PART 20 STARTERS, SWITCHES AND CONTROLS:

A. Furnish all starters, motor controls, remote controls and transformers as required.

B. Locate all switches out of heat zone.

PART 21 REFRIGERATION:

A. Refrigeration systems shall include start-up and 1 year parts and labor warranty plus an additional four-year warranty on all compressors.

B. All refrigeration condensing units shall include pre-wiring, pre-piping, crankcase regulator, head pressure regulator, factory-installed suction line accumulator, phased loss protection, structural steel frame and weather-proof carbon steel body panel with epoxy paint finish.

PART 22 COLD PANS

A. Ice pans, refrigerated pans and cabinets to be provided with breaker strips where adjoining top or cabinet face materials, to prevent transfer of cold.

PART 23 VENTILATION OF REFRIGERATED EQUIPMENT:

A. Adequate air supply and exhaust shall be provided for all self-contained or remote refrigeration condensing units.

B. If additional ventilation is required to ensure correct operating temperatures, so state in a letter to the Contractor for evaluation and decision before purchase/fabrication.

PART 24 BY VENDOR, BY OWNER, OR EXISTING EQUIPMENT:

A. Any and all food service equipment and equipment systems noted as “by vendor” “by owner” or “existing” in food service construction documents are presented *for reference only*. It will be the general contractor’s responsibility to further verify and coordinate all necessary information pertaining to this equipment including, local health department regulations, local sanitation code requirements, mechanical, structural, plumbing and electrical requirements.

PART 25 BEVERAGE SYSTEM CONDUIT:

A. Beverage system line runs of any kind and at any configuration, size, or length will be required to run through an authorized conduit system properly planned and executed through coordination with the appropriate divisions.

B. The conduit system shall be furnished and installed by the electrical division in strict coordination with and through direction from the appropriate design team members and project participants. Beverage system for-construction drawings and specifications will be generated by the electrical division with approval required by the selected beverage system provider. Conduit system shall consist of 4” 6”, 8” or 10” diameter (as required) corrosion- resistant aluminum tubing. Conduit bends shall be long sweep type, of the same grade and coated in the same manner as the conduit lines. Minimum centerline radius of all bends shall be 24” for 4” O.D., 30” for 6” O.D. 32” for 8” O.D. and 32 for 10” O.D. No segmented elbows or short radius plumping elbows shall be permitted. All joints shall be made with a liquidate mechanical bolted coupling system or liquidate slip coupling system. Edges of tubing and bends must be de-burred and smoothed prior to forming joints. Expansion sleeves with a moisture barrier must be provide where the conduit crosses building expansion joints.

PART 26 MISCELANOUS METALS:

A. Kitchen Equipment Contractor will provide and install 22ga stainless steel wall flashing from the top of floor cove base to under the lowest point of the exhaust hood(s). Flashing will extend the full width of the exhaust hood. Corner Guards (14ga Stainless Steel, 48’ high, 2” x 2”, broke at 90°, with a 5°return brake) will be installed at all outside corners of the foodservice areas, as indicated on floor plan. 90°brake angle will be adjusted to match the actual angle of the walls. Base of the corner guards will be at the top of the floor cove base.
K.E.C. will provide and install all necessary trim panels and closures, including cosmetic coverings. Equipment closures will match the individual equipment finishes.

PART 27 EQUIPMENT CONNECTIONS:

A. Equipment shall be complete with connections terminals for other to make plumbing, electrical, ventilation, and refrigeration connections.

B. The kitchen equipment contractor shall install the hoods or exhaust ventilators in the locations indicated. The H.V.A.C. shall be reasonable for bringing all ducts to the

hoods or ventilators and welding the transitions in accordance with all codes.

C. Indirect waste lines for buy-out and fabricated items shall be furnished and installed by the plumbing contractor.

D. All utility lines, exposed above work surface, valves, gauges, tubing, and conduit including mounting brackets, shall be chrome plated, stainless steel or sheathed in stainless steel.

PART 28 TRIMMING AND SEALING OF EQUIPMENT:

A. Any space between units to walls, ceilings, floors and adjoining non-portable units shall be completely sealed against entrance of food particles or vermin by means of trim strips, welding, soldering, or commercial joint material suitable to the nature of the equipment and acceptable to Architect or owner.

B. Sealer, when not exposed to extreme heat, shall be single part neutral curing silicone sealant.

C. Ends of hollow sections shall be closed.

PART 29 CUTTING AND FITTING:

A. Do all cutting and fitting required on the equipment during installation and hook up. Should any repairs to food service equipment be required due to neglect of other contractors, all

extra charges are to be approved and all repairs are to be noted in writing before work is performed, stipulating the price and to whom the extra expense is to be paid by.

B. No cutting, notching, drilling, or altering of any kind will be done to the building by any one without first obtaining permission from the Contractor.

PART 30 PROTECTION OF EQUIPMENT:

A. All items delivered to the job site prior to final acceptance shall be signed for, as delivered, by the Contractor. Responsibility for safekeeping will rest with the General contractor or owner in coordination with the General Contractor's requirements

B. Pre-fabricated walk-in boxes, on-site and installed in advance of the rest of the equipment, are not to be used for general storage by other trades and shall be locked by this Contractor before leaving the site. It is the Contractor's responsibility to insure proper ventilation is provided during the cleaning and curing of masonry wearing floors inside the walk-in boxes.

PART 31 STATEMENT OF CLARIFICATION OF WORK RESPONSIBILITY PERTAINING TO THE INSTALLATION OF FOOD SERVICE EQUIPMENT:

A. Clarifications regarding areas of work performance and responsibility by the various trades.

1) General Contractor:

   a. The General Contractor is responsible for creating depressions, adding insulation under the floor, adding redwood screeds within the floor for the purpose of installing Walk-In Coolers and Freezers. This includes all concrete work pertaining to walk-ins and providing a level slab.
   b. The General Contractor is responsible for roof curbs pertaining to any roof top equipment. Curbs should be finished with water tight metal sheeting and sealed/finished with standard roofing material as required.
   c. The General Contractor is responsible for any or all wall penetrations for refrigeration lines, etc. that may be required.
   d. The General Contractor is responsible for the roof penetrations or wall penetrations for exhaust ducts or make-up air ducts for the exhaust ventilators.
   e. The General Contractor is responsible for creating fire retention chambers around exhaust ducts, hoods or ventilators that require closures by code.
   f. The General Contractor shall install all internal wall support for shelves, cantilever brackets, cabinets, utensil racks, etc. as shown on plans.

2) Kitchen Equipment Contractor:

   a. The K.E.C. shall deliver, uncrate and set-in-place all equipment.
   b. The K.E.C. shall install all custom stainless steel items including tables, sinks, hoods and ventilators, shelving, and all walk-in coolers and freezers.
   c. The K.E.C. shall deliver to the General Contractor items such as hands sinks, floor troughs, janitor sinks, faucets, drains, lever wastes, hose reels, hose reel piping assemblies, filters or any other miscellaneous items that are part of the Kitchen Equipment Specifications but are to be installed by other trades.
   d. The K.E.C. shall install the exhaust ventilators including hanger rods, channel supports and leave ready for the final duct connections by other trades.
   e. The K.E.C. shall erect the Walk-in coolers and freezers, install the cooling coils, and complete the interconnections to the refrigeration systems. The K.E.C. supplies all lighting fixtures for walk-ins. The Electrical Contractor shall be

      responsible for installing all light fixtures and for completing the conduit and wiring.
   f. The K.E.C. or his sub-contractor shall install the fire suppression systems for all exhaust hoods. This includes piping, fittings, remote pulls and tanks. The Electrical Contractor shall be responsible for installing gas valves in line with gas piping.
   g. The K.E.C shall set the dish machine in place and provide stainless steel exhaust ducts that extended from the vent cowls of the dish machine to approximately 2” to 4” above the finish ceiling line. The H.V.A.C. shall then bring the exhaust duct system to this point and make the final connections. In cases where the exhaust duct systems is in place before the hood is installed, the K.E.C shall coordinate duct locations or allow the H.V.A.C. to cut exhaust

penetrations as required. The
H.V.A.C. will be responsible for all final connections of ducts to hoods.

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3) Plumbing Contractor:

a. The Plumbing Contractor shall install all drains, traps and fittings from hand sinks, prep sinks, pots sinks, ice machines, steamers, and in all appliances requiring drains except those specifically called out in the specifications to be pre-plumbed.
b. The Plumbing Contractor shall provide incoming water lines as required on all appliances in hard copper without reduction in size to the faucets. All water lines are to be provided with stops upstream from the appliance.
c. The Plumbing Contractor shall install water filters or special valves, strainers, dampers, vacuum breakers etc. that may be supplied as part of the appliance or by the K.E.C. separately.
d. The Plumbing Contractor shall install all faucets supplied with the appliance or furnished separately by the K.E.C.
e. The Plumbing Contractor shall extend the water supply line through the disposer solenoid to trough inlets or cone hopper inlets complete with a control valve.
f. The Plumbing Contractor shall be responsible for running hard copper drain lines from the cooler and freezer coil drain pan to a floor sink.
g. The Plumbing Contractor shall provide all backflow prevention devices required by code.

3. Electrical Contractor:

a. The Electrical Contractor shall make all the final connections to all kitchen appliances in the project unless specified to the contrary.
b. The Electrical Contractor shall supply all disconnects, shunt trips, and control switches required for individual appliances including conduit, flex and fitting as necessary.
c. The Electrical Contractor shall complete the wiring from source through the control panel and solenoid valve to disposers.
d. The Electrical Contractor shall install all loose light fixtures supplied for the Walk-ins. All light bulbs shall be supplied and installed by the Electrical Contractor.
e. The Electrical Contractor shall furnish all special receptacles that may be required that are not furnished with the appliances.
f. The Electrical Contractor shall furnish all Ground Fault receptacles that may be required by code.
g. The Electrical Contractor shall supply all switch and receptacles plates in stainless steel and moisture resistant covers where necessary or as specified.
h. The Electrical Contractor shall if necessary, rework or shorten and install all loose electrical cords supplied with the appliances.
i. The Electrical Contractor shall—when pulling wire, leave an additional four to six feet beyond the junction box in order to make a continuous connection to an appliance, particularly those requiring heavy loads.
j. The Electrical Contractor shall make all wiring connections between

the remote condensing units and evaporator coils, including any necessary wiring for the time clocks and other refrigeration controls.

k. The Electrical Contractor shall provide and install all walk-in freezer drain line heat tape.

l. The Electrical Contractor shall wire exhaust hood controls so that in case of a fire situation the exhaust fan remains running and the make-up-air fan shuts down. The Electrical Contractor shall interconnect control wiring and lighting to exhaust hoods so they operate simultaneously.

SECTION 114000 – FOOD SERVICE GENERAL:

- All fasteners will be stainless steel, and fastener heads will be burr free.
- Equipment will be set in place per plan, and be fully operational unless otherwise directed.
- Equipment listed as existing will be thoroughly cleaned and inspected for functional serviceability. Defects will be noted and reported to owner for disposition.
- Equipment that attaches to walls, and has legs, will be attached to the wall under the backsplash with 'Z' clips every 32" or closer. All wall-mounted equipment must have wall backing at the mounting points. The General Contractor will provide suitable wall backing located by the K.E.C. on the Building Conditions Plan Sheet(s).
- Gas connections will be 3/4" rear entry unless otherwise noted.
- All items are to be supplied per the specified manufacturer and model number. Requests for alternates equal to or greater than the specified products must be made in writing to Arizona Restaurant Supply, Inc. Alternates will be subject to the approval of Arizona Restaurant Supply, Inc. Any utility changes or additional drawings required for substitutions will be the expense of the Kitchen Equipment Contractor requesting a change in manufacturer or model number.

SECTION 114000 - ITEMIZED SPECIFICATIONS:

Reference floor plan and schedule for all manufacturers make and model numbers as well as accessories.

END OF SECTION

SECTION 115213 - PROJECTION SCREENS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Electrically operated, front-projection screens and controls.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show layouts and types of front-projection screens. Include the following:

1. Location of seams in viewing surfaces.
2. Anchorage details, including connection to supporting structure for suspended units.
3. Location of wiring connections for electrically operated units.
4. Wiring diagrams for electrically operated units.

PART 2 - PRODUCTS

2.1 ELECTRICALLY OPERATED, FRONT-PROJECTION SCREENS

A. General: Manufacturer's standard units consisting of case, screen, motor, controls, mounting accessories, and other components necessary for a complete installation.

1. Controls: Remote, key-operated, three-position control switch.

a. Provide locking cover plates for switches.
b. Provide key-operated, power-supply switch.
c. Provide video interface control for connecting to projector. Projector provides signal to raise or lower screen.

2. Motor in Roller: Instant-reversing motor of size and capacity recommended by screen manufacturer; with permanently lubricated ball bearings, automatic thermal-overload protection, and positive-stop action to prevent coasting.
3. Screen Mounting: Top edge securely anchored to rigid metal roller and bottom edge formed into a pocket holding a 3/8-inch- (9.5-mm-) diameter metal rod with ends of rod protected by plastic caps.
4. Tab Tensioning: Provide units that have a durable low-stretch cord, such as braided polyester, on each side of screen that is connected to edge of screen by tabs to pull screen flat horizontally.

B. Suspended, Electrically Operated Screens with Automatic Ceiling Closure and with Tab Tensioning: Motor-in-roller units designed and fabricated for suspended mounting; with bottom of case composed of two panels, fully enclosing screen, motor, and wiring; one panel hinged and designed to open and close automatically when screen is lowered and fully raised, the other removable or openable for access to interior of case.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Da-Lite Screen Company; Tensioned Large Advantage Deluxe Electrol or equal by the following:
b. Draper Inc.
c. Stewart Filmscreen Corporation.

2. Provide screen case constructed to be installed with ceiling finish applied to underside.

2.2 FRONT-PROJECTION SCREEN MATERIAL

A. Da-Lite Tensioned Large Advantage Electrol: Peak gain of not less than 0.9, and half-gain angle of at least 85 degrees from the axis of the screen surface.

1. Products: Subject to compliance with requirements, provide the following:

a. Da-Lite Tensioned Large Advantage Electrol.

B. Seamless Construction: Provide screens, in sizes indicated, without seams.

C. Edge Treatment: Black masking borders.

D. Size of Viewing Surface: 120 by 72 inches and 192 by 108 inches. Refer to drawings for locations.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install front-projection screens at locations indicated to comply with screen manufacturer's written instructions.

B. Install front-projection screens with screen cases in position and in relation to adjoining construction indicated. Securely anchor to supporting substrate in a manner that produces a smoothly operating screen with vertical edges plumb and viewing surface flat when screen is lowered.

1. Install low-voltage controls according to NFPA 70 and complying with manufacturer's written instructions.

a. Wiring Method: Install wiring in raceway except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Use

UL-listed plenum cable in environmental air spaces, including plenum ceilings. Conceal raceway and cables except in unfinished spaces.

2. Test electrically operated units to verify that screen controls, limit switches, closures, and other operating components are in optimum functioning condition.

END OF SECTION 115213

SECTION 122113 - HORIZONTAL LOUVER BLINDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Horizontal louver blinds with aluminum slats.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For horizontal louver blinds, include fabrication and installation details.

1. Motorized Operators: Include details of installation in headrails and include diagrams for power, signal, and control wiring.

C. Samples: For each exposed product and for each color and texture specified, 12 inches (300 mm) long.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

PART 2 - PRODUCTS

2.1 HORIZONTAL LOUVER BLINDS, ALUMINUM SLATS

A. Levelor

B. Slats: Aluminum; alloy and temper recommended by producer for type of use and finish indicated; with crowned profile and radius corners.

1. Width: 1-3/8 inches (35 mm).
2. Thickness: Not less than 0.008 inch (0.20 mm).
3. Features:

a. Lift-Cord Rout Holes: Minimum size required for lift cord and located near back (outside) edge of slat to maximize slat overlap and minimize light gaps between slats.

C. Headrail: Formed steel or extruded aluminum; long edges returned or rolled. Headrails fully enclose operating mechanisms on three sides.

1. Manual Lift Mechanism:

a. Lift-Cord Lock: Variable; stops lift cord at user-selected position within blind full operating range.
b. Operator: Extension of lift cord(s) through lift-cord lock mechanism to form cord pull.

2. Manual Tilt Mechanism: Enclosed worm-gear mechanism and linkage rod that adjusts ladders.

a. Tilt: Full.

3. Manual Lift-Operator and Tilt-Operator Lengths: Manufacturer's standard.
4. Manual Lift-Operator and Tilt-Operator Locations: Manufacturer's standard.

D. Bottom Rail: Formed-steel or extruded-aluminum tube that secures and protects ends of ladders and lift cords and has plastic- or metal-capped ends.

1. Type: Manufacturer's standard.

E. Ladders: Braided cord.

F. Valance: Manufacturer's standard.

G. Mounting Brackets: With spacers and shims required for blind placement and alignment indicated.

H. Hold-Down Brackets and Hooks or Pins: Manufacturer's standard.

I. Side Channels and Perimeter Light Gap Seals: Manufacturer's standard.

J. Colors, Textures, Patterns, and Gloss:

1. Slats: Refer to finish plans.

2.2 HORIZONTAL LOUVER BLIND FABRICATION

A. Product Safety Standard: Fabricate horizontal louver blinds to comply with WCMA A 100.1 including requirements for corded, flexible, looped devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):

1. Outside of Jamb Installation: Width and length as indicated, with terminations between blinds of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install horizontal louver blinds level and plumb, aligned and centered on openings, and aligned with adjacent units according to manufacturer's written instructions.

1. Locate so exterior slat edges are not closer than 1 inch (25 mm) from interior faces of glass and not closer than 1/2 inch (13 mm) from interior faces of glazing frames through full operating ranges of blinds.
2. Install mounting and intermediate brackets to prevent deflection of headrails.
3. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.

B. Electrical Connections: Connect motorized operators to building electrical system.

C. Adjust horizontal louver blinds to operate free of binding or malfunction through full operating ranges.

D. Clean horizontal louver blind surfaces after installation according to manufacturer's written instructions.

END OF SECTION 122113

SECTION 122414 - MOTOR OPERATED ROLLER WINDOW SHADE SYSTEM

PART 1 GENERAL

1.1 SUMMARY

A. Related Sections:

1. Section 06 10 00 - Rough Carpentry: Blocking and backing for attachment of shades to wood substrate.
2. Section 09 22 00 - Supports for Plaster and Gypsum Board: Blocking and backing for attachment of shades to metal substrate.
3. Division 26 - Power panels and circuits of sufficient size to accommodate roller shade motor requirements; and conduit with pull wire in all areas become inaccessible after wall and ceiling finishes are complete.

1.2 REFERENCES:

A. ASTM International (ASTM):

1. G 21 Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. American Type Culture Collection (ATCC):

1. 9642, 9644, 9645 Fungi, Yeast and Yeast Genetic Stock.

C. Glass Association of North America:

1. Glazing Manual.

D. National Fire Protection Association (NFPA):

1 NFPA 70 National Electrical Code.
2. NFPA 701-1999 Fire Tests for Flame Propagation of Textiles and Film

E. State of California Code of Regulations:
1. Title 19 Public Safety, State Fire Marshal.

1.3 SUBMITTALS

A. Product Data:

1. Submit manufacturer's product data for each type shade provided under this Section.

B. Shop Drawings: If required, provide shop drawings, prepared after field measurements are taken, showing location and extent of motor operated roller shades.

1. Provide elevations, sections, and details. Show tube and bracket sizes for each condition.

2. Show size and location of blocking and backing required for installation of shades. Show mounting details and method of attachment of shades to backing.

C. Schedule: Provide schedule of motor operated roller shades. Use the same designations as indicated on drawings. If necessary, indicate tube diameter for each shade.

D. Samples:

1. Shade Material: Not less than 3 inches square, with specified treatments applied. Illustrate complete range of colors and textures available for selection.

2. Valance/Fascia: Submit 3" samples of specified finish.

3. Head Box/Pocket: Submit 3" samples of specified finish.

E. Installation Instructions: Submit complete manufacturer's installation instructions.

F. Qualification Data: If required, submit a letter indicating that installer is authorized by the manufacturer to install specified product.

G. Installer's Experience Record: Submit a list of at least five 5 installations that have been installed for a minimum of 3 years of window shades similar in size, type and scope as described in this document. Include contact names and phone numbers.

H. Maintenance Data: Submit manufacturer's recommended cleaning and maintenance data. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning. Include precautions about cleaning materials that could damage or discolor the shade fabric.

1.4 QUALITY ASSURANCE

A. Installers shall be specially trained in the installation of motor operated roller shades. Installers shall have completed at least 5 commercial installations of motor operated roller shades similar to those specified in this Section.

1.5 SUBSTITUTIONS:

A. Refer to bidding requirements for substitute procedures.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials in manufacturer's unopened packages, labeled to show manufacturer's name and product name.

B. Storage:

1. Store materials in a clean area, free of corrosive fumes, dust, and away from construction activities.

3. Cover stacks with tarpaulins or plastic such that ventilation is provided for, and such that contaminants are prevented from contacting surfaces.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete. Air conditioning system shall be operating, and ambient temperature shall be between 60 degrees F. and 85 degrees F. Relative humidity shall be between 45 percent and 65 percent.

B. Field Measurements: Verify dimensions of adjoining construction by field measurements before fabrication. Allow clearances for operable glazed units operation hardware.

C. Before Installation Begins of Motor Operated Roller Shades

1. Roof shall tight, windows and frames installed and glazed, and interior doors hung.

3. Wet work including concrete, masonry, plaster, stucco, and terrazzo, shall be complete and dry.

4. Application of gypsum wallboard, joint treatment, taping and sanding shall be complete and dry.

5. Ceilings, window pockets, electrical, and mechanical work above the product shall be complete.

6. Flooring materials such as carpet, tile, etc. must be completed.

1.8 WARRANTY

A. Manufacturer's Limited Warranty: Provide Manufacturer's 25 year limited warranty against product defects.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURER:

B.D.D. Inc.
5815 S. 25th St.
Phoenix, Az 85712
(800) 456-0540
FAX (602) 2431561
www.bddinc.com

2.2 SYSTEM DESCRIPTION:

A. Motor operated roller shade system shall consist of a roller, brackets to support the roller, a flexible fabric carried by the roller, a means of attaching the material to the roller, a bottom bar, motor operator to lift and lower the shade or group of shades, and motor controller to start and stop the operation.

2.3 MATERIALS

A. Fabric: [PVC-coated fiberglass] [PVC-coated polyester] [PVC-coated fiberglass and polyester blends] [PVC free Polyester and acrylic blend].

1. Pattern:

2. Style:

3. Colors: As selected from manufacturer's full range

4. Material Solar-Optical Properties:

a Material Openness Factor: 3 percent.

b. Material UV Blockage: percent.

5. Fire-Test-Response Characteristics: Material shall pass the following:

Small scale vertical burn: NFPA 701-1999, Test Method No. 1, and California Title 19

Large scale vertical burn: NFPA 701-1999, Test Method No. 2.

Fire rating: NFPA Class A

6. Anti-Microbial Characteristics: Shade cloth shall conform to requirements for 'No Growth' in accordance with ASTM G 21 results for fungi, using fungus samples ATCC 9642, 9644, and 9645.

B. Spring Loaded Idle End Cap: The idle end of motor shall be spring loaded to provide secure anchorage into end bracket.

C. Edge Light Gap: Motor side edge light gap shall not exceed 1". Idle side edge light gap shall not exceed 1".

D. Tube Mechanism: Extruded T6 aluminum with a wall thickness not less than 0.062 inch. Each tube shall have at least three Secure Grip Spline fabric fixing slots to increase the rigidity of the tube and eliminate sagging when the shade is operated. T5 aluminum is not acceptable.

1. Tube sizes shall be as proposed by manufacturer for each condition, and as indicated on approved submittals.

2. Spline Mounting System: Secure Grip Spline Method, consisting of flexible PVC extrusion RF (radio frequency) or impulse welded to the shade fabric. The spline shall be inserted into a slot on the extruded aluminum tube. The spline shall provide a positive mechanical attachment of the shade band to the tube. The spline shall be designed to allow fabric to be easily removed and re-installed on the roller shade tube without having to remove the roller tube from the brackets. Splines that slide in the tube mechanism from the edge are not acceptable. Double-sided tape or glue methods of fabric attachment are not acceptable.

F. Hembars:

1. Wrapped Hembar: Aluminum extruded piece to which the bottom of the shade fabric is attached with a mylar spline system. End caps will be set to the open ends of the wrapped hembar securing the fabric in place.

G. Tube Mounting Brackets: Universal type, capable of attachment at top, face, and with left hand or right hand controls. Size shall be as required for each condition, and as indicated on approved submittals.

H. Valance/Fascia: Provide an aluminum fascia in [square] [round] profile to conceal the roller shade tube mechanism. Valance/fascia shall have a wall thickness of 5/16", with paint finish in color as selected. The fascia shall be attached to the tube mounting brackets by snapping it into place on a hinge rib clip. Size shall be as required to conceal the roller tube and rolled-up shade fabric. Color shall be as selected as [Alabaster] [Black] [Bronze] [Clear Anodized] [White].

Where ends of fascia are exposed, provide end caps.

I. Head Box/Pocket: Provide single and dual shade pocket with closure plate to encase and conceal the roller shade tube mechanism. The head box shall be capable of installation either in a ceiling pocket, to the ceiling, or to the wall. Where exposed, provide aluminum end caps attached at each exposed end of the extrusion. Color shall be satin finish clear anodized aluminum.

J. Side & Sill Channels: For room darkening shades or blackout shades, provide 2-piece extruded aluminum side and sill channels to eliminate left, right, and bottom edge light gaps. One-piece side channels will not be acceptable.

2.4 FABRICATION

A. Shades shall be fabricated square, and free of sharp edges, burrs or other defects.

B. Shade Units Installed Between [Inside] Jambs: Edge of shade not more than 1/4 inch from face of jamb. Length equal to head to sill dimension of opening in which each shade is installed.

C. Shade Units Installed Outside Jambs: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Inspect substrates and conditions affecting work of this Section. Do not proceed until unsatisfactory conditions have been corrected.

B. Verify that room temperature is a minimum of 65 degrees F. and that painting and other dust-producing operations are complete.

3.2 INSTALLATION

A. Install shades in accordance with manufacturer's recommended installation procedures except as otherwise specified herein.

B. Install shades with adequate clearance to permit smooth operation of shades and any sash operators. Hold roller shades 1/4" clear from each side of window opening on inside mount unless other clearance is indicated.

1. Install located so shade band is not closer than 2 inches to interior face of glass. Allow proper clearances for window operation hardware.

3.3 CLEANING

A. Clean soiled shades surfaces with a mild soap solution. Do not use steam, hot water, bleach or any abrasive or solvent-based cleaners. Do not machine wash. To ensure proper drying, provide adequate ventilation for shades.

3.4 PROTECTION

B. Replace damaged and defective motor operated clutch roller shades in accordance with to satisfaction of Architect.

END OF SECTION 122414

SECTION 123553.14 - METAL PHARMACY CASEWORK, SHELVING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal pharmacy casework.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For casework. Include plans, elevations, sections, and attachment details.

C. Samples for Verification: For each type of cabinet finish.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports for Casework: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of laboratory casework with requirements of specified product standard.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements:

1. Lozier. www.lozier.com

a. RX Open Storage Unit #RXOPS.

b. RX Bottle Drawer Unit #RXBDRP.

c. RX Printer Unit #RXPRNTIDWRRP

d. Hang Rod Assembly with 16” D straight bracket and end caps.

e. Wall standards for hang rod assembly.

f. Cross bar hook – single prong LXBH.

2. Tennsco Products: Pharmacy Shelving.

a. 8 Shelf Q-Line Closed Shelving: 20 gauge 36” x 48” W x 12” Deep.

i. Model # QCH*-3612AB and Model # QCH8-4812AB.

ii. Provide end panels where needed. Refer to drawings for configuration.

b. 8 Drawer Prescription Cabinet: 15” x 28” x 53”. Color to be selected.

B. Source Limitations: Obtain pharmacy casework from single source from single manufacturer unless otherwise indicated.

2.2 CASEWORK, GENERAL

A. Casework Product Standard: Comply with SEFA 8 M, "Laboratory Grade Metal Casework."

2.3 METAL CABINET MATERIALS

A. Metal: Cold-rolled, commercial steel (CS) sheet, complying with ASTM A 1008/A 1008M; matte finish; suitable for exposed applications.

2.4 METAL CABINETS

A. Fabrication: Assemble and finish units at point of manufacture. Use precision dies for interchangeability of like-size drawers, doors, and similar parts. Perform assembly on precision jigs to provide units that are square. Reinforce units with angles, gussets, and channels. Except where otherwise specified, integrally frame and weld cabinet bodies to form dirt- and vermin-resistant enclosures. Where applicable, reinforce base cabinets for sink support. Maintain uniform clearance around door and drawer fronts of 1/16 to 3/32 inch (1.5 to 2.4 mm).

B. Flush Doors: Outer and inner pans that nest into box formation, with full-height channel reinforcements at center of door. Fill doors with noncombustible, sound-deadening material.

C. Drawers: Fronts made from outer and inner pans that nest into box formation, with no raw metal edges at top. Sides, back, and bottom fabricated in one piece with rolled or formed top of sides for stiffening and comfortable grasp for drawer removal.

D. Utility-Space Framing: Steel framing units consisting of two steel slotted channels that are connected at top and bottom by U-shaped brackets.

E. Filler and Closure Panels: Provide where indicated and as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets and with hemmed or flanged edges unless otherwise indicated.

2.5 METAL CABINET FINISH

A. Finish: Pharmacy casework manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).

B.

1. Colors for Metal Casework Finish: As selected by Architect from manufacturer's full range.

2.6 HARDWARE

A. General: Provide casework manufacturer's standard, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.

B. Hinges: Epoxy-coated-steel, five-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips.

C. Hinged Door and Drawer Pulls: Epoxy-coated-steel, back-mounted pulls.

D. Door Catches: Nylon-roller spring catches.

PART 3 - EXECUTION

3.1 INSTALLATION OF CABINETS

A. Comply with installation requirements in SEFA 2.3. Install level, plumb, and true; shim as required, using concealed shims. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.

B. Base Cabinets: Fasten cabinets to utility-space framing, partition framing, wood blocking, or reinforcements in partitions, with fasteners spaced not more than 16 inches (400 mm) o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform.

1. Where base cabinets are installed away from walls, fasten to floor at toe space at not more than 24 inches (600 mm) o.c. and at sides of cabinets with not less than two fasteners per side.

C. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.

D. Adjust laboratory casework and hardware so doors and drawers align and operate smoothly without warp or bind and contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

3.2 CLEANING AND PROTECTING

A. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

END OF SECTION 123553.14

SECTION 123623.13 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes plastic-laminate countertops.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, including panel products and high-pressure decorative laminate.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

C. Samples:

1. Plastic laminates, for each color, pattern, and surface finish.

1.3 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install countertops until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE COUNTERTOPS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades indicated for construction, installation, and other requirements.

B. Grade: Premium.

C. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGS.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Abet Laminati, Inc.
b. Formica Corporation.
c. Lamin-Art, Inc.
d. Panolam Industries International, Inc.
e. Wilsonart International; Div. of Premark International, Inc.

D. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As indicated by manufacturer's designations.
2. Match Architect's sample.
3. As selected by Architect from manufacturer's full range in the following categories:

a. Patterns, matte finish.

E. Edge Treatment: 3-mm PVC edging.

F. Core Thickness: 1-1/8 inch (29 mm).

G. Backer Sheet: Provide plastic-laminate backer sheet, NEMA LD 3, Grade BKL, on underside of countertop substrate.

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.

1. Wood Moisture Content: 5 to 10 percent.

B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.

1. Recycled Content of Medium-Density Fiberboard and Particleboard: Postconsumer recycled content plus one-half of preconsumer recycled content not less than percent.
2. Composite Wood and Agrifiber Products: Products shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
3. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.
4. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea formaldehyde.
5. Softwood Plywood: DOC PS 1.

2.3 ACCESSORIES

A. Grommets for Cable Passage through Countertops: 2-inch (51-mm) OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Product: Subject to compliance with requirements, provide "OG series" by Doug Mockett & Company, Inc.

2.4 MISCELLANEOUS MATERIALS

A. Adhesives: Do not use adhesives that contain urea formaldehyde.

B. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. VOC Limits for Installation Adhesives and Sealants: Use products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Wood Glues: 30 g/L.
2. Multipurpose Construction Adhesives: 70 g/L.
3. Structural Wood Member Adhesive: 140 g/L.
4. Architectural Sealants: 250 g/L.

2.5 FABRICATION

A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch (25 mm) over base cabinets. Ease edges to radius indicated for the following:

1. Solid-Wood (Lumber) Members: 1/16 inch (1.5 mm) unless otherwise indicated.

B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

C. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

1. Seal edges of openings in countertops with a coat of varnish.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.

3.2 INSTALLATION

A. Grade: Install countertops to comply with same grade as item to be installed.

B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.

1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items.
2. Seal edges of cutouts by saturating with varnish.

C. Field Jointing: Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required.

1. Secure field joints in plastic-laminate countertops with concealed clamping devices located within 6 inches (150 mm) of front and back edges and at intervals not exceeding 24 inches (600 mm). Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.

D. Install countertops level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).

E. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

F. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. Install countertops with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
2. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

END OF SECTION 123623.13

SECTION 123661 - SIMULATED STONE COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-surface-material countertops and backsplashes.

1.2 ACTION SUBMITTALS

A. Product Data: For countertop materials and sinks.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

C. Samples: For each type of material exposed to view.

PART 2 - PRODUCTS

2.1 SOLID-SURFACE-MATERIAL COUNTERTOPS

A. Configuration: Provide countertops with the following front and backsplash style:

1. Front: Slightly eased at top.
2. Backsplash: Straight, slightly eased at corner.
3. Endsplash: Matching backsplash.

B. Countertops: 3/4-inch- (19-mm-) thick, solid surface material with front edge built up with same material.

C. Backsplashes: 3/4-inch- (19-mm-) thick, solid surface material.

2.2 COUNTERTOP MATERIALS

A. Certified Wood Materials: Fabricate countertops with wood and wood-based products produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

B. Composite Wood and Agrifiber Products: Provide products that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

C. Particleboard: ANSI A208.1, made with binder containing no urea formaldehyde.

D. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

E. Adhesives: Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

F. Solid Surface Material: Homogeneous solid sheets of filled plastic resin complying with ANSI SS1.

1. SCT-2 – Silestone – Quartz Silestone.

2. SS-1 – Wilsonart – Milk Glass Spectra.

3. SS-2D – Wilsonart – Cashmere Mirage.

4. Colors and Patterns: Refer to finish plans.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

END OF SECTION 123661

SECTION 133123 – PRE-ENGINEERED SHADE CANOPIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 DESCRIPTION OF WORK

A. The work covered by this section includes, but is not limited to, the:

1. Preparation and submittal of shop drawings for the pre-engineered shade canopies.
2. Acquisitions of permits as required for shade canopy / structure construction.
3. Supply and installation of the pre-engineered shade canopies.

B. The extent of the work is shown on the drawings and details.

1.3 RELATED WORK

A. Related work includes, but is not limited to, the:

1. Supply and installation of playground structures and resilient surfacing.
2. Construction of landscape, hardscape, and irrigation improvements.

1.4 COORDINATION

A. The Contractor shall coordinate his work with the Owner's Representative. Work that is completed or in-progress shall be protected during the installation of pre-engineered shade canopies. The Contractor shall notify the Owner's Representative of field conditions which prevent the installation of the shade canopies as shown.

1.5 REQUIRED LICENSURE

A. All work shall be performed by a Contractor licensed by the State of Arizona Registrar of Contractors. The commercial license classification held by the Contractor shall be appropriate for the work to be performed.

1.6 COMPLIANCE WITH APPLICABLE REGULATIONS

A. The Contractor shall comply with all local, state, and federal regulations regarding materials, methods of work, and disposal of excess and waste materials. The Contractor shall obtain and pay for all required inspections, permits, and fees and shall provide notices required by governmental authorities.

1.7 REFERENCE SPECIFICATIONS

A. Reference Specifications: The following specifications are, by reference, made a part of these specifications. To the extent applicable, all project work shall be implemented in accordance with the specifications listed below.

B. American Society for Testing and Materials

1. ASTM-F-1487-11: Standard Consumer Product Safety Performance Specification for Playground Equipment for Public Use
2. ASTM-E-84-15: Standard Test Method for Surface Burning Characteristics of Building Materials
3. ASTM-193-M-15: Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications

C. National Fire Protection Association (NFPA)

1. NFPA-701-2015: Standard Methods of Fire Tests for Flame Propagation of Textiles and Films

D. Pima Association of Governments

1. Pima Association of Governments (PAG) – Standard Specifications for Public Improvements (2014 or most recent edition)
2. Pima Association of Governments (PAG) – Standard Details for Public Improvements (2014 or most recent edition)

1.8 APPLICABLE CODES

A. Applicable Codes: Except as modified by the project drawings, or other project specific documents, the pre-engineered shade canopies and tensioned fabric shade-structures shall be designed and constructed to comply with:

1. International Building Code. 2012 or most recent edition adopted by Pima County including all amendments adopted by Pima County.

1.9 SUBMITTAL REQUIREMENTS

A. General: The Contractor shall make the submittals identified below. Submittals shall be made and approved prior to the delivery of materials to the site and its incorporation into the work.

B. Shop Drawings: The Contractor shall obtain from the pre-engineered shade canopy manufacturer complete shop drawings for the proposed shade structure. The shop drawings shall be sealed by an Arizona Registered Professional Structural Engineer and shall be submitted to the Owner for review and approval. The information to be included on the Shop Drawings shall include, but may not be limited to, the items listed below:

1. Structural Notes: The shop drawings shall include general notes related to the anchoring of the fabrics to the building.
2. Shade Canopy Elevations: The shop drawings shall include scaled, dimensioned elevations of the proposed shade canopy.

3. Anchoring Plan: The shop drawings shall include plans and details showing the hardware to be used for anchoring the fabric to the building.
4. Shade Fabric Information: The shop drawings shall include information related to the shade fabric and its connection to the building structural supports.
5. Structural Calculations: The shop drawings shall be provided with structural calculations for the shade canopy.

C. Color Samples: The Contractor shall submit color samples for the shade fabric. Where the colors have been noted on the project plans, the samples shall be for the Owner's verification. Where colors have not been noted on the project plans, a complete set of standard color options shall be submitted for the Owner's review and selection.

1.10 BUILDING PERMITS

A. Permits for Shade Canopies: The Contractor shall be responsible for submitting shop drawings, structural calculations, and other information as required to obtain the permits necessary for the installation of the shade canopies.

1. Inspections: The Contractor shall be responsible for scheduling and coordinating all required inspections. Inspections, approvals, and documentation shall be as required by the subject building permit.

PART 2 - PRODUCTS

2.1 SHADE CANOPIES – GENERAL REQUIREMENTS

A. Shade Canopy Fabricator: The shade canopy fabricator shall be SHADE Industries (www.shadeindustries.com), or approved equal.

B. Shade Canopy Size: The length, width, and height shall be as noted on the project plans.

C. Shade Canopy Configuration: The shade canopy configuration attachment to the supporting building shall be as noted on the project plans.

2.2 SHADE FABRIC

A. Shade Fabric: The shade fabric shall be constructed from 100% high density polyethylene (HDPE) monofilament and tape yarns and shall have a lock-stitch construction that is fray and tear resistant. The fabric shall be flame retardant, ultraviolet (UV) stabilized, and heat set to provide dimensional stability and to minimize shrinkage. The fabric shall meet the following standards:

1.	Break Strength:	Warp = 173 lbs	Weft = 414 lbs
2.	Tear Resistance:	Warp = 39 lbs	Weft = 35 lbs
3.	Burst Force:	Face = 432 lbs	
4.	Bursting Pressure:	432 lbs	
5.	Fire Compliance:	ASTM E-84-15 and NFPA 701-2015	
6.	Construction:	Knitted	

B. Shade Fabric Edges: Shade fabric edges shall be strengthened with a non-tear vinyl material.

C. Fabric Sleeves and Pockets and Corners: All fabric sleeves and pockets shall be reinforced with protective webbing.

D. Shade Fabric Color: The shade fabric color shall be as noted on the project plans or as selected by the Owner's Representative.

2.3 HARDWARE

A. Hardware: Hardware shall be in accordance with the approved shop drawings.

PART 3 - EXECUTION

3.1 FABRICATION

A. All components shall be fabricated in accordance with the approved shop drawings.

3.2 BLUE STAKING:

A. Blue Staking: The Contractor shall request that the project site be Blue Staked prior to the start of pre-engineered shade canopy and/or tensioned fabric shade structure construction. Blue Staking shall be kept current during the course of the project. All utilities damaged by the Contractor shall be repaired or replaced by the Contractor, as directed by the Owner or appropriate utility company, at the Contractor's expense.

3.3 LAYOUT

A. Layout: The Contractor shall lay out the location of the pre-engineered shade canopy for the Owner's review and approval. The Contractor shall confirm that the height of the canopy above the play structure(s) is in accordance with ASTM-F-1487-11.

3.4 ON-SITE ASSEMBLY AND ERECTION OF SHADE CANOPY

A. Installer Qualifications: The installation work shall be supervised and performed by qualified individuals with experience on similar projects.

B. Installation of the Shade Canopy: The shade canopy shall be installed in accordance with the approved shop drawings and in accordance with the manufacturer's recommendations. Care shall be taken to protect existing site improvements during the installation process.

C. Protection of Fabric: The shade fabric shall be protected during installation. Shade fabric that is damaged or torn during transport, storage, or installation shall be removed and replaced.

3.5 GUARANTEE

A. Guarantee: The shade canopy shall be guaranteed to be free from defects in materials and workmanship for guarantee period listed below:

Guarantee for Fabric: 10 Years

The guarantee for the fabric shall cover significant fading, tearing, ripping, and/or discoloration. A written letter of guarantee shall be submitted to the Owner's Representative prior to Final Acceptance of the Work.

The letter shall include the name, mailing address, phone number, and email address of the representative to be contacted regarding guarantee issues. The letter shall specifically state that the manufacturer / fabricators will make all necessary repairs during the guarantee period at no cost to the Owner. The Contractor shall be responsible for obtaining the manufacturer's Letter of Guarantee and for submitting this information to the Owner.

B. Notification of Deficiencies: The Owner will provide written notification to the manufacturer / fabricator of deficiencies that occur during the guarantee period.

C. Manufacturer's Response to Written Notification: The manufacturer / fabricator shall perform repair or replacement work or provide the Owner with an acceptable schedule for completion of the repair work within ten (10) calendar days of receipt of written notice. If the manufacturer / fabricator fails to respond and perform the required repair work within the specified period, The Owner shall have the right to have the work performed by others and to invoice the manufacturer / fabricator for the cost of the work. The manufacturer / fabricator agrees to pay all such charges.

END OF SECTION 133123

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SECTION 211100 – FIRE PROTECTION

PART 1 – GENERAL:

1.1 GENERAL

A. This Document covers water based fire protection systems, materials, and equipment.

1.2 DOCUMENT INCLUDES

A. Fire Protection Piping
B. Fire Protection Fittings
C. Fire Protection Specialties
D. System Drains
E. Heat tracing

1.3 WET-PIPE FIRE SPRINKLER SYSTEM

A. Design, furnish and install a complete, fully automatic wet pipe sprinkler system throughout all areas of new construction as indicated on the drawings. The work shall begin at a point 5'-0" outside the exterior wall of the building as indicated in the drawings.

B. Alternate #4 – Design, furnish and install a complete and fully automatic clean agent fire extinguishing system for MDF #526. For additional details and requirements see Document 212200 – Clean Agent Fire Extinguishing Systems

C. The fire sprinkler system shall include all items of a minor nature necessary to complete the installation.

D. The following items are depicted in the drawings:

1. Design criteria.
2. Location of the sprinkler riser.
3. Location of the fire department connection.
4. Location of the exterior alarm bell.
5. Location of underground piping including connection to public utility.

E. The design shall be based on hydraulic calculations for the hazard occupancies noted on the drawings or as determined by local authorities. The hydraulic calculations shall provide a minimum of 5 psi or 10 percent (whichever is greater) "cushion" between the system demand and the available water supply. In addition, a 5 psi fixed pressure loss shall be included in the hydraulic calculations at the base of the sprinkler riser for a possible future backflow preventer installation.

F. Use the drawings for reference only. Any items such as coverage of the building, pipe sizes, head spacing and any other requirements of the authorities having jurisdiction shall be included, whether specifically shown on the drawings or mentioned in the specifications or not.

G. The design of the sprinkler system shall comply with NFPA-13, 2010 Edition, 2012 IBC Chapter 9, and the requirements specified hereinafter.

1.4 RELATED DOCUMENTS

A. Document 212200 – Clean Agent Fire Extinguishing Systems

B. Document 23 05 00 - Basic Mechanical Materials and Methods

C. Document 28 31 00 - Communications: Fire Alarm and Detection Systems

1.5 REFERENCES

A. National Fire Protection Association (NFPA):

1. NFPA-13 Installation of Sprinkler Systems, 2016.
2. NFPA-24 Installation of Private Fire Service Mains and Their Appurtenances, 2016.
3. NFPA-25 Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems, 2017.
4. NFPA-291 Recommended Practice for Fire Flow Testing and Marking of Fire Hydrants, 2016.

B. Factory Mutual Research Corporation (FM):

1. Loss Prevention Data for the Fire Service
2. FM Approval Guide, Latest Edition

C. Underwriters Laboratories Inc. (UL):

1. UL Fire Protection Equipment Directory, Latest Edition

D. International Fire Code, 2012.

E. International Building Code, 2012.

1.6 PERMITS AND FEES

A. The Fire Protection Contractor shall secure and pay for, as part of this Contract, any permits, fees, changes, taxes, or inspections required for the installation of the sprinkler system over and above the permit required for the entire building project.

1.7 PROJECT/SITE CONDITIONS

A. In addition to the requirements in Document 230500, take pressure readings at or near the site to verify the results of the flow test included in the design criteria. Any discrepancy observed in water pressures shall be reported immediately to the architect prior to the preparation of shop drawings.

1.8 SUBMITTALS

A. Material Data:

1. Submit copies of equipment literature in accordance with Document 230500 on the following items:

a. Sprinkler heads - all types and escutcheons
b. Valves (control, alarm, check, drain, test)
c. Flow switch
d. Tamper switch

e. Pipe
f. Fittings
g. Hangers and bracing materials
h. Fire Department Connection
i. Alarm bell

B. Shop Drawings:

1. Prior to fabrication of material, submit a minimum of one electronic copy of the shop drawings and hydraulic calculations to the Architect.

2. Shop drawings and calculations shall be submitted to the authority having jurisdiction. Approved shop drawings shall be maintained at the construction site. Submit an additional electronic copy of the approved shop drawings and hydraulic calculations to the Architect.

1.9 SPECIFICATIONS FOR OTHER DIVISIONS

A. Some work performed by the Division 22 contractor is specified under Division 23. Division 22 contractor shall be responsible for complying with all Division 22 and 23 specifications.

PART 2 – PRODUCTS:

2.1 GENRAL

A. Materials and equipment shall conform to the requirements of the Underwriters Laboratories, Inc. (UL) or the Factory Mutual Research Corporation (FM) for systems of the type indicated. The contractor shall submit proof that the items furnished under this specification conform to such requirements. The UL label or seal, or listing in the UL Fire Protection Equipment Directory will be acceptable evidence that the items conform to the requirements of UL. The FM label or seal, or listing in the FM Approval Guide will be acceptable evidence that the items conform to the requirements of the FM.

B. All materials, equipment and system components shall be new and installed in accordance with the manufacturer's recommendations, the UL listing and/or FM approval guide.

C. The naming of manufacturers in these specifications shall not be construed as eliminating the materials, products or services of other manufacturers and suppliers providing approved equivalent items.

D. The dimensions and ratings of equipment herein specified, or indicated on drawings, are intended to establish the desired outlines and characteristics of such equipment. Minor deviations will be permitted to allow manufacturers' equipment accommodation. Deviations of physical dimensions of equipment, which impact upon space allocated to work areas of other equipment, shall not be permitted.

2.2 FIRE PROTECTION PIPING

A. Pipe shall be new black or galvanized steel, designed for 175 psi working pressure, conforming to the ASTM specifications, and have the manufacturer's name and brand, along with the applicable ASTM standard, marked on each length of pipe

1. Standard Wall: Overhead pipe shall be black steel and must comply with ASTM A 795 for black pipe, and hot dipped zinc coated galvanized welded and seamless steel pipe. Galvanized pipe shall be used for any exposed canopies or construction. Dimensions for all overhead pipe must be in accordance with the American Standard for Wrought Steel and Wrought Iron Pipe ANSI B36.10 for pressure up to 300 psi. Schedule 40 pipe is considered "standard wall" pipe. Schedule 30 pipe is acceptable in 8-inch sizes and larger. Pipe ends shall be welded, threaded or cut grooved.

2. Thin Wall: Overhead pipe may be UL listed, FM approved, and compliant with NFPA-13, thin wall pipe approved for pressures up to 300 psi. Pipe shall meet ASTM A795, Type E, Grade A, and/or ASTM A-135, Grade A. Allied Dyna-Flow and Dyna-Thread are approved. Allied Dyna-Flow ends shall be roll grooved or welded in accordance with NFPA 13. Allied Dyna-Thread ends shall be joined by screwed joints in accordance with ANSI B 2.1 (ANSI b 1.20.1 - 1983) per NFPA 13, or welded joints in accordance with ANSI 31.1 as amended by NFPA 13 or approved mechanical fittings.

3. Pipe less than Schedule 40 shall not be threaded or cut grooved.

4. All sprinkler drain and test piping, fire department connection piping, etc., exposed to weather, shall be galvanized.

5. Steel pipe shall have a corrosion resistance ratio (C.R.R.) equal to or greater than that of Schedule 40 pipe (1.00).

B. Underground piping from the building to 5'-0" outside the building shall be AWWA Class 51 cement lined ductile iron pipe with approved fittings.

C. Underground piping inside the private property line to 5'-0" outside the building shall be C-900 PVC class 150 plastic pipe, meeting AWWA C-900, UL listed and FM approved. Underground pipe fittings shall be approved for use with the pipe utilized and shall be properly restrained per NFPA-24.

2.3 FIRE PROTECTION FITTINGS

A. Screwed fittings shall be cast iron, 125 pound class, black, and in accordance with ANSI B 16.4 or malleable iron, 150 pound class, black and in accordance with ANSI B 16.3.

B. Flanged fittings shall be cast iron, short body, Class 125, black and in accordance with ANSI B 16.1. Gaskets shall be full-face of 1/8-inch minimum thickness red sheet rubber. Flange bolts shall be hexagon head machine bolts with heavy semi-finished hexagon head nuts, cadmium plated, having dimensions in accordance with ANSI B 18.3.

C. Weld fittings shall be steel, standard weights, black, and in accordance with ANSI B 16.9, ANSI B 16.25, ANSI B 16.5, ANSI B 16.11, and ASTM A 234.

D. Grooved couplings and mechanical fittings shall be ductile iron in accordance with ASTM A-536, 350 psi working pressure. The couplings' gasket material shall be Grade “E” EPDM. Grooved couplings and mechanical fittings shall be listed by UL and approved by FM for wet and dry (oil free air) sprinkler systems. Victaulic FireLock or equivalent.

E. Fittings shall be suitable for use in sprinkler systems and defined in NFPA 13. Fittings exposed to outside atmosphere shall be galvanized. Bushings shall not be used.

F. Plain end fittings with ductile iron or malleable iron housing, pressure responsive gasket, and hardened steel locking lugs with retainers; Victaulic FIT, Gruvlok or approved equal.

G. Push-on or "roustabout" fittings shall not be used.

H. Grooved fittings, valves and pipe shall be joined using rubber gasketed couplings produced by the manufacturer of the fitting and/or valves. Gaskets shall be listed for use for the appropriate application. Rigid grooved couplings shall be used where horizontal piping runs require more than two couplings per run.

I. Couplings may be of the rolled groove type or the mechanical locking type, and they shall be dimensionally compatible with the pipe. Pipe end preparation for the mechanical locking type couplings shall be in accordance with the manufacturer's recommendations.

2.4 FIRE PROTECTION SPECIALTIES

A. Sprinkler Heads:

1. Automatic sprinklers shall be standard or quick response automatic closed type with a minimum ½ inch nominal size orifice. Temperature ratings of fusible elements shall be in accordance with NFPA-13. In areas of above normal temperatures, high temperature sprinklers suitable for the temperature conditions involved shall be provided.

2. Sprinklers shall be Viking, Grinnell, Star, Reliable, Central or approved equal, upright, pendent, or sidewall.

3. In areas with suspended, gypsum board or finished ceilings, recessed pendent type glass bulb sprinkler heads with satin chrome finish including (2) piece adjustable escutcheons with matching finish shall be provided.

4. Unless otherwise indicated in the drawings, all unfinished spaces and spaces without suspended, gypsum board or finished ceilings shall be protected with upright sprinkler heads with brass finish.

5. Provide protective wire guards for all heads which might be subject to physical damage, including all heads which are seven (7) feet or less above the floor.

6. Furnish spare automatic sprinklers, representative of and in proportion to the number of each type and temperature rating of the sprinklers installed. They shall be packed in a suitable metal cabinet in accordance with NFPA-13. The contractor shall furnish at least one special sprinkler head wrench for each spare head cabinet or for each sprinkler type, whichever is greater.

7. Higher temperature heads shall be installed where location dictates (i.e., near unit heaters, blowers, ovens, etc.).

8. When used, sidewall sprinkler heads shall be provided with satin chrome finish including 2-piece recessed, adjustable escutcheons with matching finish.

9. Any sprinklers connected to a wet pipe fire sprinkler system and subjected to the elements shall be Victaulic VicFlex style VS1 Dry sprinkler or equivalent. Flexible piping shall be installed per manufacturer's installation instructions with the maximum number of bends. Barrel length shall be coordinated with factory.

B. Flow Switch:

1. Provide and install, in locations shown on the drawings, U.L. listed, two pole, paddle type flow alarm switches with instantly recycling pneumatic retard, adjustable from 10 to 90 seconds, for actuation of alarm circuit. The water flow switch shall close contacts when flow is detected. Locate flow switch minimum of 12 inches from a fitting that changes the direction of flow and not less than 24 inches from a drain connection, or 10 pipe diameters from a gate, check or alarm valve. Wiring connections shall be coordinated with and provided by Division 28.

C. Tamper Switches:

1. Provide and install, in locations shown on the drawings, UL listed tamper switches which will close contacts when valve tampering occurs. Wiring connections shall be coordinated with and provided by Division 28.

D. Alarm Bell:

1. Alarm bell shall be vibrating [20/1/60 U.L. FM approved. Wiring connections shall be coordinated with and provided by Division 28.

E. Fire Department Connection:

1. The fire department connection shall be Potter Roemer #5021 flush mounted or equivalent as indicated on the drawings. The connection shall be polished brass or as selected by architect during the submittal review process with a matching identification plate, two 2-1/2 inch inlet connections threaded to match those of local fire department, and equipped with matching plugs and chains. Identification plate shall have integral raised letters "Automatic Sprinkler". The fire department connection shall be provided with a UL listed check valve.

F. Valves:

1. All valves to be UL and FM approved 175 psig WWP.

2. Provide identification sign, enamel on metal, on all valves in accordance with NFPA-13. Each sign shall have the area served specified on the back of the sign.

3. All test and drain valves must be installed within seven feet of the floor in accessible locations (chases, pipe shafts, etc.) as required by code and to provide economical maintenance services. When provided within walls, access panels shall be provided. Access panels shall have equivalent fire ratings. Ceiling area locations shall not be used for valve locations unless approved by the architect.

G. Hangers:

1. Support sprinkler piping from building structure with hangers and supports in accordance with NFPA-13. The placement and number of hangers shall be

adequate to maintain the piping in a level position without sags or low points. Vertical Documents of piping shall be supported at each floor level and shall be plumb with the structure. Power driven studs shall not be used.

H. System Drains:

1. Provide drain valves on system risers, valved Documents, and at any other locations where 5 gallons or more trapped water occurs. Provide with brass hose connection and brass cap.

2. All drain valves shall be globe style, slow close, of appropriate size per NFPA-13. All drains shall be connected to main drain or shall spill outside building, at grade, over splash block at a 45 degree angle. Discharge shall be located where water drained will not damage stock, equipment, vehicles, planted areas, or discharge onto public sidewalks. Drain terminations inside of the building are not acceptable except that auxiliary drains may terminate into a properly sized drain receptacle when approved by the Architect.

3. Automatic ball drips shall be UL or FM approved 3/4" cast brass in line with both ends threaded with iron pipe threads. Ball drips shall drain to outside per paragraph (2) above.

I. Inspector Test:

1. Test valve to be globe style, nominal 1", with a restriction equal to the smallest orifice sprinkler installed in the system.

2. Test valve to discharge to outside per specification 2.04-H.2. Test valve shall not exceed 7'-0" above floor

PART 3 – EXCUTION

3.1 GENERAL

A. The fire protection system shall be designed, fabricated and installed by a fire sprinkler contractor licensed in the State of Arizona and experienced in this type of system design and installation with a minimum five (5) years experience.

B. Where suspended ceilings are present, the sprinkler piping shall be concealed unless otherwise noted. Notify the Architect in writing if piping cannot be concealed. Exposed sprinkler piping will not be permitted without the Architect's written approval.

C. Coordinate closely with the fire alarm contractor for all alarm tie-ins for a fully supervised system.

D. Locate heads 12" from a ceiling "T" on 3 sides or in center of 2 x 4 ceiling tile. Final head layout requires Architect's approval.

E. Sprinkler head locations shall be coordinated with light fixtures and HVAC. Unless noted otherwise, priority of location is given to light fixtures and HVAC. Cutting of structural members for the passage of sprinkler piping or for pipe hanger fastenings will not be permitted without the Architect's and Structural Engineer's approval.

F. Arrange, phase, and perform work to assure adequate services for the owner at all times.

G. Fire Protection Contractor shall:

1. Carry on his work with sufficient manpower and supervision so as to not impede the work of other trades and accomplish the timely completion of the construction of the building.

2. Provide a job foreman at the job at all times during its progress, with authority to act for and to supervise the installation of the work and to consult with other trades as to the proper execution and conduct of the work.

3. Provide all necessary rigging, scaffolding, tools, tackle, and labor which may be necessary for the completion of the work.

4. Install and connect all appliances and equipment with acceptable engineering practice and in accordance with the manufacturers' instructions and recommendations.

5. Avoid cutting and/or drilling of the work of other trades, finished or otherwise. Avoid sprinkler lines from passing through grouped refrigeration lines and conduit. Cutting or drilling of structural elements of the building or air handling ducts shall be approved by the Architect and Structural Engineer in writing. Patching, repairing, and painting of concrete, masonry, metal, tile, plaster, wood flooring, etc. as necessary to make good after such cutting or drilling is the responsibility of the Fire Protection Contractor.

6. Remove to the site dumpsters refuse materials or rubbish caused by this work. At the completion of the work, remove all surplus materials, tools, etc., and leave the premises clean.

7. Participate in all job site safety meetings and cause his workers to observe safety work rules established for the construction.

H. In determining sprinkler location, special attention shall be given to sprinkler clearance to avoid obstruction of discharge patterns, particularly with respect to duct work, structural supports, light fixtures, refrigeration coils in coolers/freezers and grouped refrigeration piping or electrical conduits passing below sprinklers heads.

3.2 BRACING AND CLAMPING

A. Piping above grade shall be braced as required in NFPA-13 and the local fire department requirements.

B. All sprinkler piping must be supported from building structure and only approved types of hangers shall be used.

C. Below steel deck and joist construction, use beam clamps to hang piping from top chord of joist. Do not hang piping from bottom chord, or bridging.

3.3 SYSTEM FLUSHING

A. Before connecting sprinkler system to underground supply connections, each supply connection shall be flushed out thoroughly in accordance with requirements of NFPA-13.

3.4 SPRINKLER SYSTEM RISERS

A. Each system riser shall be equipped with all necessary equipment such as drains, valves, pressure gauges, etc., properly installed and with suitable identification. Riser pressure gauges are to be piped to the riser with at least 6-inch vertical separation to the main drain and are not to be installed on the main drain piping under any condition.

3.5 CEILING AND WALL SLEEVES AND PLATES

A. Sleeves are to be installed at all pipes passing through masonry floors or walls. Install chrome finished ceiling and wall plates wherever exposed sprinkler piping passes through finished ceilings or walls.

3.6 TESTS

A. Perform hydrostatic tests as required by NFPA-13 and 24. Hydrostatically test piping system at 200 PSI for not less than two (2) hours. Upon completion of test and when satisfactory results have been obtained, certify in writing that all required tests have been performed and that approval of system has been obtained from authorities having jurisdiction over work. The tests shall be performed in the presence of [Arizona State Fire Marshal / fire department inspector], General Contractor and Architects representative. Furnish the Architect/Engineer with 3 copies of the certificate.

3.7 DOCUMENTATION

A. Furnish two copies of NFPA-25 - Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems to the owner's service maintenance personnel as directed by the Architect/Engineer.

B. Furnish a complete set of "as-built" drawings in a waterproof bag or container at the location of the spare sprinkler head box.

C. Furnish a permanently marked weatherproof metal hydraulic calculation data information plate affixed to the sprinkler riser. The sign shall include the following information:

1. Location of the design area or areas.
2. Discharge densities of the design area or areas.
3. Required flow and residual pressure demand at the base of riser.
4. Hose stream demand included in addition to the sprinkler demand.

3.8 MATERIALS DELIVERY

A. The Fire Protection Contractor shall be responsible for the safe and secure storage of materials on job site, including furnishing of any storage facilities or structures required.

B. The Fire Protection Contractor shall be responsible for on-site handling of materials and equipment.

3.9 JOB CONDITIONS

A. Protect all unfinished work to prevent damage and furnish protection of all surrounding areas, where necessary.

B. All Fire Protection Work shall be protected against damage by frost, dirt, water, chemicals, and mechanical means during the course of construction.

C. Leak Damage: The Contractor shall be responsible during the installation and testing periods of the sprinkler system for any damage to the work of others, to the building or its contents caused by leaks in any equipment, by unplugged or disconnected pipes or fittings, or by overflow, and shall pay for the necessary replacements or repairs to work of others damage by such leakage. Water shall not be introduced into the system during conditions where there is danger of freezing.

3.10 GUARANTEE

A. The Fire Protection Contractor shall guarantee to repair or replace any defect in material, equipment or workmanship for a period of one (1) year beginning with the date of final acceptance by the Architect. Such date will be established by written communication of Architect. The Fire Protection Contractor shall be responsible during the design, installation, testing, and guarantee periods for any damage caused by the Fire Protection Contractor's work, materials, or equipment.

B. The Fire Protection Contractor shall provide emergency repair service for the sprinkler system within four (4) hours of a request for such service by the Owner during the warranty period. This service shall be available on a 24-hour per day, 7-day per week basis.

END OF DOCUMENT 211100

SECTION 212200 – CLEAN AGENT FIRE EXTINGUSHING SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 21 11 00 – Fire Protection

C. Section 23 05 00 - Basic Mechanical Materials and Methods

D. Section 28 31 00 - Communications: Fire Alarm and Detection Systems

1.2 APPLICABLE STANDARDS AND PUBLICATIONS

A. The design, installation, testing and maintenance of the Clean Agent Extinguishing System shall be in accordance with the applicable requirements set forth in the latest edition of the following codes, standards, and third party approval agencies:

1. NFPA 2001: Standard on Clean Agent Fire Extinguishing Systems
2. NFPA 70: National Electrical Code
3. NFPA 72: National Fire Alarm and Signaling Code
4. Factory Mutual (FM)
5. Underwriters Laboratories (UL)
6. Requirements of the local Authority Having Jurisdiction (AHJ)

1.3 SUMMARY

A. Section Includes:

1. Piping and piping specialties.
2. Extinguishing-agent containers.
3. Extinguishing agent.
4. Releasing control panel.
5. Accessories.
6. Connection devices for and wiring between system components.
7. Connection devices for power and integration into building's fire-alarm system.

1.4 DEFINITIONS

A. AHJ: Authority Having Jurisdiction.

B. ATS: Acceptance Testing Specifications.

C. EPO: Emergency Power Off.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Prepared by persons with the following qualifications:

   a. Trained and certified by the manufacturer of the Clean Agent Suppression system.
   b. NICET certified Fire-Alarm Technician, Level III minimum.

2. Comply with recommendations in the "Working Plans" Section of the "System Design" Chapter in NFPA 2001.
3. Comply with the recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.
4. Include plans, elevations, sections, details, and attachments to other work.
5. Include design calculations: Enclosure volume, agent quantity, backup battery, voltage drop, detector spacing, etc.
6. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
7. Submittals shall be approved by the Owner and Architect prior to submitting them to the Authority Having Jurisdiction.

C. Delegated-Design Submittal:

1. Indicate compliance with performance requirements and design criteria, including analysis data.
2. Include design calculations for selecting the spacing and sensitivity of detection devices, complying with NFPA 72.
3. Include design calculations for weight, volume, and concentration of extinguishing agent required for each hazard area.
4. Include design calculations for enclosure pressure relief/venting as required to avoid structural damage to the hazard enclosure, equipment, or building.
5. Indicate the following on design drawings:

   a. Ceiling penetrations and ceiling-mounted items.
   b. Method of attaching hangers to building structure.
   c. Other ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, and access panels.
   d. Controls and alarms.
   e. Extinguishing-agent containers, piping and discharge nozzles, detectors, and accessories.
   f. Equipment and furnishings.
   g. Other equipment located in the ceiling space that is being protected including sprinkler piping, HVAC equipment, raceways, or conduit.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For special agent system to include in emergency, operation, and maintenance manuals.

B. Deliver copies to Authorities Having Jurisdiction and include the following:

1. Comply with the “Records” Section of the “Inspections, Testing and Maintenance” Chapter of NFPA 72.
2. Provide “Record of Completion Documents” according to NFPA 72 article “Permanent Records” in the “Records” section of the “Inspection, Testing and Maintenance” Chapter in NFPA 72.
3. Record copy of site-specific software.
4. Provide “Maintenance, Inspection and Testing Records” according to NFPA 72 article of the same name and include the following:

    a. Frequency of testing of installed components.
    b. Frequency of inspection of installed components.
    c. Requirements and recommendations related to results of maintenance.
    d. Manufacturer’s user training manuals.

5. Manufacturer’s required maintenance related to system warranty requirements.
6. Abbreviated operating instructions for mounting at the control panel.
7. Copy of NFPA 25.

C. As-built Drawings: Indicate actual installation configuration at time of project completion including all equipment locations, pipe routing, conduit routing, room configurations, etc.

1.7 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. FM Global Compliance: Provide components that are FM Approved and that are listed in FM Global's "Approval Guide."

C. UL Compliance: Provide equipment listed in UL's "Fire Protection Equipment Directory."

D. All devices, components, and equipment shall be new, standard products of the manufacturer’s latest design and suitable to perform the functions intended. The name of the manufacturer, part number, and serial number shall appear on all major components.

E. Locks for all cabinets shall be keyed alike.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Approved manufacturers:

1. Fike
2. Chemetron Fire Systems; a UTC Fire & Security company.
3. Ansul.
4. Pem All Fire Extinguisher Corporation; a division of Pem Systems Inc.

B. Description: Clean-agent fire-extinguishing systems shall be installed to protect the (MDF room, UPS room, server room. The system shall be an engineered system for total flooding of the hazard area.

C. Delegated Design: Design clean-agent fire-extinguishing system and obtain approval from authorities having jurisdiction. Design system for Class A, B, and C fires as appropriate for areas being protected, and include safety factor. Use clean agent indicated and in concentration suitable for normally occupied areas.

D. Performance Requirements: (HFC-227ea per NFPA 2001).

1. Minimum design concentration: 9.0% by volume in all areas and/or protected spaces at the minimum anticipated temperature within the protected area.
2. Per NFPA 2001, the system design shall not exceed a maximum exposure limit concentration level of 10.5% by volume, unless provisions for room evacuation before agent release are provided. All personnel should be able to leave the protected space prior to the discharge or at least within 5 minutes of the commencement of discharge.

E. Seismic Performance: Fire-suppression piping and containers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

F. Single Detector Release: Devices located in a single zone. Sound alarm on activating single-detection device, and discharge extinguishing agent.

2.2 SYSTEM OPERATING SEQUENCE

A. System Operating Sequence: Single Detector Release.

1. Actuating First Detector (Pre-discharge):

a. Visual and audible indication on control panel.
b. Visual indication on optional annunciator panel.
c. Energize audible and visual alarms inside the protected hazard area (unique pattern).
d. Transfer relays to shut down air-conditioning and ventilating systems serving protected area, close doors in protected area, and send signal to fire-alarm system.
e. Transfer relays to shut down power to protected equipment.
f. Start time delay for extinguishing-agent discharge for 30 seconds.
g. Initiate system abort sequence.

2. Extinguishing-agent discharge (Release):

a. Visual and audible indication on control panel.
b. Visual indication on optional annunciator panel.
c. Energize audible and visual alarms inside and outside the protected area (unique pattern).

d. Discharge extinguishing agent upon expiration of the discharge time delay.
e. Release pre-action valve to allow water to fill sprinkler system.

B. Supervisory signal initiation shall be by one or more of the following devices and systems:

1. Clean agent container low pressure switch.

C. Trouble signal initiation shall be by one or more of the following devices and actions:

1. Open circuits, shorts, and grounds in designated circuits.
2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at fire-alarm control unit.
4. Ground or a single break in fire-alarm control unit internal circuits.
5. Abnormal AC voltage at fire-alarm control unit.
6. Break in standby battery circuitry.
7. Failure of battery charging.
8. Abnormal position of any switch at fire-alarm control unit or annunciator.

D. System Supervisory and Trouble Signal Actions:

1. Visual and audible indication on control panel.
2. Visual indication on optional annunciator panel.
3. Transfer relays to send signal to fire-alarm system.

E. Operating manual release switches will cause the immediate discharge of the extinguishing agent, overriding the system's discharge time delay and abort functions. Panel operation shall duplicate the extinguishing-agent discharge sequence described in the previous paragraphs.

1. Electric manual release switches shall be located at each hazard exit.

F. Operating abort switches will delay extinguishing-agent discharge while being activated. Release of hand pressure on the switch will cause agent discharge if the discharge time delay has expired.

G. Low-Agent Pressure Switch: Initiate trouble alarm if sensing less than set pressure.

2.3 PIPING MATERIALS

A. Piping, Valves, and Discharge Nozzles: Comply with types and standards listed in NFPA 2001, Section 4.2 "Distribution," for charging pressure of system.

2.4 PIPE AND FITTINGS

A. Steel Pipe: Schedule 40.

1. Threaded Fittings:

a. Malleable-Iron Fittings: ASME B16.3, Class 300.

b. Flanges and Flanged Fittings: ASME B16.5, Class 300.
c. Fittings Working Pressure: 416 psig (2868 kPa) minimum.
d. Threaded malleable or ductile iron: Class 300
e. Flanged Joints: Class 300 minimum.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel.

D. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

E. Steel, Keyed Couplings: UL 213, AWWA C606, approved or listed for clean-agent service, and matching steel-pipe dimensions. Include ASTM A 536, ductile-iron housing, rubber gasket, and steel bolts and nuts.

2.5 VALVES

A. General Valve Requirements:

1. UL listed or FM Approved for use in fire-protection systems.
2. Compatible with type of clean agent used.
3. Automatic excessive pressure relief provision.
4. Low pressure gauge.

B. Container Valves: With fast acting rupture disc with solenoid actuator and manual-release lever, capable of immediate and total agent discharge and suitable for intended flow capacity.

C. Valves in Sections of Closed Piping and Manifolds: Fabricate to prevent entrapment of liquid, or install valve and separate pressure relief device.

D. Valves in Manifolds: Check valve; installed to prevent loss of extinguishing agent when container is removed from manifold.

2.6 EXTINGUISHING-AGENT CONTAINERS

A. Description: High strength alloy steel tanks complying with ASME Boiler and Pressure Vessel Code: Section VIII, for unfired pressure vessels. Include minimum working-pressure rating that matches system charging pressure, valve, pressure switch, and pressure gage.

1. Finish: Manufacturer's standard color, enamel or epoxy paint.
2. Manifold: Fabricate with valves, pressure switches, and connections for multiple storage containers.
3. Storage-Tank Brackets: Factory- or field-fabricated retaining brackets consisting of steel straps and channels; suitable for container support, maintenance, and tank refilling or replacement.

B. Location: Located within hazard area, or as near as possible to reduce the required amount of pipe and fittings.

2.7 FIRE-EXTINGUISHING CLEAN AGENT

A. HFC-227ea Clean Agent: Heptafluoropropane (FM-200).

1. Basis-of-Design Product: Subject to compliance with requirements, provide Fike®; HFC-227ea or comparable product by one of the following:

a. DuPont.
b. Great Lakes Chemical Corporation; a Chemtura company.

2.8 DISCHARGE NOZZLES

A. Equipment manufacturer's standard one-piece brass or aluminum alloy of type, size, discharge pattern, and capacity required for application.

2.9 CONTROL PANELS

A. Description: FM Approved or NRTL listed, including equipment and features required for testing, supervising, and operating fire-extinguishing system. Listed and approved for releasing service, and suitable for deluge/pre-action sprinkler service.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Fike®; SHP-PRO® or comparable product.

B. Power Requirements: 120-V ac; with electrical contacts for connection to system components and fire-alarm system, and transformer or rectifier as needed to produce power at voltage required for initiating devices, notification appliances, trouble signals, supervisory signals, digital alarm communicator transmitter, and auxiliary power.

1. Alarm current draw of the entire clean agent suppression system shall not exceed 80 percent of the control panel’s power supply rating.

C. Enclosure: NEMA ICS 6, Type 1, steel cabinet.

1. Mounting: Surface.
2. Finish: Red baked on enamel finish

D. Supervised Circuits: Wired NFPA 72, Class A or B as specified in Division 28.

1. Two detection circuits; capable of cross zone; sequential; single detector release actuation methods.
2. Three initiating device circuits; capable of monitoring contact closure devices.
3. Three notification appliance circuits.
4. Agent release circuit capable of actuating suppression system.
5. Solenoid release circuit capable of actuating suppression system or sprinkler solenoids.
6. Auxiliary power circuit (resettable/non-resettable) for field devices.
7. Three Form-C relay contacts for auxiliary control functions.

8. Eight additional Form-C relay contacts with addition of supplemental relay cards.

E. Control-Panel Features:

1. Microprocessor controlled.
2. Ten LED indicators to provide positive indication of system status.
3. Diagnostic LED indicator to display system and trouble events.
4. Configurable via dip-switches.
5. Automatic switchover to standby power at loss of primary power.
6. Storage container, low-pressure indicator.
7. Service disconnect to interrupt system operation for maintenance with visual status indication on the panel.
8. Silence and reset switch.
9. 120 VAC or 240 VAC power input.
10. Five optional abort types.
11. Simultaneous monitoring and release of clean agent and sprinkler suppression systems.

F. Annunciator Panel: Graphic type showing protected, hazard-area plans, as well as locations of detectors and abort, EPO, and manual stations. Include lamps to indicate device-initiating alarm, electrical contacts for connection to control panel, and stainless-steel or aluminum enclosure.

G. Standby Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.

1. Batteries: Sealed lead calcium, sized to operate system for 24 hours and alarm for minimum of 15 minutes.

H. Optional Cards: Cards mount directly to and receive their operational power from the SHP PRO® control board.

1. Class A Input Module: Converts all five initiating devices circuits to NFPA 72, Class A wiring.
2. Class A Output Module: Converts all three notification appliance and releasing circuits to NFPA 72, Class A wiring.
3. Relay Module: Provides four additional Form-C relay contacts for auxiliary control functions.

2.10 SWITCHES

A. General Description: Surface FM Approved or NRTL listed, low voltage, includes contacts for connection to control panel.

B. Manual Release Switch: Unit can manually discharge extinguishing agent with operating device that remains engaged until unlocked.

1. Stainless steel faceplate.
2. Dual-action requiring two distinct operations to initiate suppression system release.
3. Red plastic release button, keyed reset.
4. "MANUAL RELEASE" caption.

C. Abort Switch: Unit can manually prevent the release of the suppression system while pressed.

1. Stainless steel faceplate.
2. Red plastic abort button, momentary contact (dead-man type).
3. Available with key-operated switch.
4. "SYSTEM ABORT" caption.

D. Low-Agent Pressure Switches: Installed on extinguishing agent container; pneumatic operation.

E. Suppression Disconnect Switches: Unit enables releasing circuit (i.e., clean agent or sprinkler) to be disconnected from the control panel.

1. Stainless steel faceplate.
2. Key operated selector switch (armed/disarmed).
3. LEDs to provide indication of switch status (armed/disarmed).
4. “SUPPRESSION DISCONNECT” caption.

F. Discharge Pressure Switches: Installed on suppression piping to provide indication of manual actuation of the clean agent suppression system back to the control panel.

2.11 INFORMATIONAL SIGNAGE

A. Provide informational signs as required to comply with NFPA 2001 for the specific agent.

2.12 ANNUNCIATOR PANEL

A. Description: Annunciator shall provide a graphic display of the protected area, and shall provide LEDs to indicate the location of system detectors.

1. Mounting: Steel enclosure; black finish; flush or surface mounted.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with hazard-area leakage requirements, installation tolerances, and other conditions affecting work performance.

1. The general contractor shall be responsible for sealing and securing the protected enclosure against agent loss and/or leakage during the required agent “hold’ period.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PIPING APPLICATIONS

A. Flanged pipe and fittings and flanged joints may be used to connect to specialties and accessories and where required for maintenance.

B. NPS 2 (DN 50) and Smaller: Schedule 40, steel pipe; malleable-iron threaded fittings; and threaded joints.

C. NPS 2-1/2 (DN 65) and Larger: Schedule 40, steel pipe; steel, grooved-end fittings; steel, keyed couplings; and grooved joints.

3.3 CLEAN-AGENT PIPING INSTALLATION

A. Install clean-agent extinguishing piping and other components level and plumb, according to manufacturers' written instructions.

B. Each pipe section shall be cleaned internally after preparation and before assembly by means of swabbing, using a suitable nonflammable cleaner. Pipe network shall be free of particulate matter and oil residue before installing nozzles or discharge devices.

C. Grooved Piping Joints: Groove pipe ends according to AWWA C606 dimensions. Assemble grooved-end steel pipe and steel, grooved-end fittings with steel, keyed couplings and lubricant according to manufacturer's written instructions.

D. Install extinguishing-agent containers anchored to substrate.

E. All pipe threads shall be sealed with Teflon tape pipe sealant applied to the male threads only.

F. Install pipe and fittings, valves, and discharge nozzles according to requirements listed in NFPA 2001, Section 4.2 "Distribution."

1. Install valves designed to prevent entrapment of liquid, or install pressure relief devices in valved sections of piping systems.
2. Support piping using supports and methods according to NFPA 13.
3. Install seismic restraints for extinguishing-agent containers and piping systems.

3.4 DETECTION, ACTUATION, ALARM, AND CONTROL SYSTEMS INSTALLATION

A. Install control panels, detection system components, alarms, and accessories, complying with requirements of NFPA 72 and NFPA 2001, Section "Detection, Actuation, and Control Systems," as required for supervised system application.

B. Smoke or Heat Detector Spacing:

1. Comply with NFPA 72, “Smoke-Sensing Fire Detectors” Section in the “Initiating Devices” Chapter, for smoke detector spacing.
2. Comply with NFPA 72, “Heat-Sensing Fire Detectors” Section in the “Initiating Devices” Chapter, for heat detector spacing.
3. Smoke ceiling spacing shall not exceed 30 feet (9 m).
4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A in NFPA 72.
5. HVAC: Locate detectors not closer than 3 feet (1 m) from air-supply diffuser or return-air opening.

6. Lighting Fixtures: Locate detectors not closer than 12 inches (300 mm) from any part of a lighting fixture.

C. Control Unit: Surface mount, with top of cabinet not more than 72 inches (1830 mm) above the finished floor.

D. Annunciator: Install with top of panel not more than 72 inches (1830 mm) above the finished floor.

3.5 CONNECTIONS

A. Where installing piping adjacent to equipment, allow space for service and maintenance.

B. Connect electrical devices to control panel and to building's fire-alarm system.

3.6 IDENTIFICATION

A. Identify system components, equipment, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

B. Identify piping, extinguishing-agent containers, other equipment, and panels according to NFPA 2001.

C. Install signs at entry doors for protected areas to warn occupants that they are entering a room protected with a clean-agent fire-extinguishing system.

D. Install framed operating instructions in a location visible from control unit.

3.7 SYSTEM WIRING

A. Wiring shall be installed by qualified individuals, in a neat and workmanlike manner in accordance with the National Electrical Code (NEC), Article 725 and 760, except as otherwise permitted for limited energy circuits as described in NFPA 72. Installation shall meet all local, state, province and/or country codes.

B. All wiring shall be installed in electrical metallic tubing (EMT) or conduit, and must be kept separate from all other building wiring. Runs of conduit shall be straight, neatly arranged, properly supported and installed parallel and perpendicular to walls and partitions.

C. Conductors shall be sized according to the design documents and color coded to allow easy circuit identification.

D. All wires shall be tagged at all junction boxes.

E. All wires shall be tested for the presence of opens, shorts and grounds prior to connection to control panel. Final wire terminations to control panel shall be made under the direct supervision of a factory trained representative.

F. All system components shall be securely supported independent of the wiring.

G. Ground control panel and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to control panel.

3.8 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Submit test plan for review and approval by the owner or owner's designated representative prior to performing tests.

C. Detection, Actuation, Alarm, and Control Systems Tests:

1. Visual Inspection: Conduct the visual inspection prior to testing.

   a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in it "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamental of Fire Alarm Systems" Chapter.
   b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in FNPA 72; retain the "Initial/Reacceptance" column and list only the installed components.

2. Operational Test: After electrical circuitry has been energized, apply power to control panel and confirm proper unit operation. Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing, and Maintenance" Chapter in NFPA 72.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Clean-Agent Fire Extinguishing Systems Test:

1. Flow Test: Using nitrogen or other inert gas, perform a flow test on the piping network to verify that flow is continuous and unobstructed through piping and nozzles.
2. Pressure/Leak Test: pneumatically test the piping in a closed circuit for a period of 10 minutes at 40 psi (276 kPa). At the end of 10 minutes, the pressure drop shall not exceed 20 percent of the test pressure. Repair leaks and retest until no leaks exist.
3. Room Pressurization Test: After all construction work is complete, conduct a room pressurization test in accordance with NFPA 2001 in each clean agent suppression system hazard area. Test shall confirm enclosures ability to retain the agent concentration level for the required hold time. If the test fails, the suppression system contractor shall coordinate room sealing with the general contractor. Additional tests shall be conducted until successful test results are achieved. Include final test results in project 'Closeout Submittals'.

E. System will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports: Factory-authorized service representative shall

prepare the “Fire Alarm System Record of Completion” in the “Documentation” Section of the “Fundamentals of Fire Alarm Systems” Chapter in NFPA 72 and the “Inspection and Testing Form” in the “Records” Section of the “Inspection, Testing and Maintenance” Chapter in NFPA 72.

3.9 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the clean-agent fire-extinguishing systems.

3.10 SERVICE CONTRACT

A. Suppression system installing contractor shall provide two (2) inspections of the systems installed under this contract, during the manufacturer’s one-year warranty period. The first inspection shall be at the six month interval, and the second shall be at the twelve month interval after system acceptance.

B. Inspections shall be conducted in accordance with the equipment manufacturer’s guidelines and the recommendations of NFPA 72 and NFPA 2001. Use forms provided in NFPA 72 for initial tests and inspections.

C. Prepare and submit test and inspection reports.

3.11 WARRANTY

A. Clean Agent System manufacturer shall guarantee all components furnished under this contract against defects in design, materials, and workmanship for no less than one (1) year from the date of system acceptance.

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SECTION 221113 - FACILITY WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1. Pima Association of Governments (PAG), Standard Specifications for Public Improvements, 2015 Edition, Volume 1, http://apps.pagnet.org/standardspecifications, if more stringent than herein specified.
2. Tucson Water Standard Specifications and Details (TWSSD), 2017 Edition, https://www.tucsonaz.gov/water/spec-book if more stringent than herein specified.
3. Tucson Water Approved Materials List (TWAPL) https://www.tucsonaz.gov/files/water/docs/StandardSpecsDetails/approved_material_list.pdf

1.2 SUMMARY

A. This Section includes water-distribution piping and related components outside the building for combined water service and fire-service mains.

B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

1.3 DEFINITIONS

A. PVC: Polyvinyl chloride plastic.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.5 INFORMATIONAL SUBMITTALS

A. NOT USED

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements of Tucson Water. Include tapping of water mains and backflow prevention.
2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.

E. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.

F. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

G. NSF Compliance:

1. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends and flange faces.
3. Set valves in best position for handling. Set valves closed to prevent rattling.

B. During Storage: Use precautions for valves, including fire hydrants, according to the following:

1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

F. Protect flanges, fittings, and specialties from moisture and dirt.

G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.9 PROJECT CONDITIONS

A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:

1. Notify Owner, Architect, and Tucson Water no fewer than five (5) days in advance of proposed interruption of service.
2. Do not proceed with interruption of water-distribution service without Tucson Water's written permission.

1.10 COORDINATION

A. Coordinate connection to water main with Tucson Water.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Copper pipe shall be annealed and meet ASTM Specification B-88 Type K per TWSSD. No copper pipe of foreign manufacture will be accepted, nor shall the copper used in the fabrication of the pipe be of foreign manufacture. Materials shall conform to the requirements of TWSSD and TWAPL.

B. Fittings and connections directly to copper pipe shall be either flared or compression per TWSSD and TWAPL

2.2 DUCTILE-IRON PIPE AND FITTINGS

A. Ductile iron pipe shall be Class 350 for diameters up to 12-inch per TWSSD. Materials shall conform to the requirements of TWSSD and TWAPL.

B. Joint restraint shall be included as described in TWSSD.

2.3 PVC PIPE AND FITTINGS

A. Unless otherwise specified on the plans, 4”-12” PVC pipe shall be pressure class 305, dimension ratio 14 (DR 14)(cast iron O.D.) and 16” PVC pipe shall be pressure class 235, dimension ratio 18 (DR 18)(cast iron O.D.) Materials shall conform to the requirements of TWSSD and TWAPL.

B. Joint restraint shall be included as described in TWSSD.

2.4 SPECIAL PIPE FITTINGS

A. Ductile-Iron Rigid and Flexible Expansion Joints and Deflection Fittings shall conform to the requirements of TWSSD and TWAPL.

2.5 JOINING MATERIALS

A. Refer to Section 330500 "Common Work Results for Utilities" for commonly used joining materials.

B. Materials shall conform to the requirements of TWSSD and TWAPL.

2.6 PIPING SPECIALTIES

A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

B. Couplings, Connectors, Fittings, and Flanges, and Insulating Kits materials shall conform to the requirements of TWSSD and TWAPL.

2.7 CORROSION-PROTECTION PIPING ENCASEMENT

A. Encasement for Underground Metal Piping and Material shall conform to the requirements of TWSSD and TWAPL.

2.8 GATE VALVES

A. Design pressure for resilient-seated gate valves shall be 200 psi for diameters up to 12 inches and 150 psi for valves 16 inches and larger per TWSSD. Valves for operating pressures other than the above shall be as specified on the plans. Unless otherwise provided herein, component parts for resilient-seated gate valves shall be in accordance with AWWA C509 and C515. All components of resilient-seated valves shall be tested and certified by an approved testing laboratory located in the United States. All parts shall be readily available. Materials shall conform to the requirements of TWSSD and TWAPL.

2.9 GATE VALVE ACCESSORIES AND SPECIALTIES

A. Tapping-Sleeve Assemblies:

1. Design pressure for tapping valves shall be 200 PSI for diameters up to 12-inch and 150 PSI for valves 16 inches diameter and larger per TWSSD. Valves for operating pressures other than the above shall be as specified on the plans. Tapping sleeve shall be rated for a minimum working pressure of 150 psi. Materials shall conform to the requirements of TWSSD and TWAPL.

B. Valve Boxes:

1. New valve boxes and covers shall be heavy cast iron in conformance with ASTM A48, Class 30B. They shall also conform to the requirements of TW Standard Detail 300. Materials shall conform to the requirements of TWSSD and TWAPL.

2.10 CHECK VALVES

A. Check Valves:

1. Pumps shall be equipped with check valves, the outside diameter of which shall not exceed the outside diameter of the pump per TWSSD. Materials shall conform to the requirements of TWSSD and TWAPL.

2.11 CORPORATION VALVES

A. Service Saddles:

1. Service saddles shall be per AWWA C88-14 per TWSSD. All new material shall conform to the requirements of TWSSD and TWAPL.

2.12 WATER METERS

A. Water meters shall be furnished by Tucson Water.

2.13 PRESSURE-REDUCING VALVES

A. All new material shall be on the TWAPL.

2.14 RELIEF VALVES

A. Air-Release Valves, Air/Air Vacuum Valves, and Combination Air Valves materials shall conform to the requirements of TWSSD and TWAPL.

2.15 BACKFLOW PREVENTERS

A. Backflow Preventer Assembly and Test Kit materials shall conform to the requirements of TWSSD and TWAPL. See plans for type specified.

B. Reduced-Pressure-Detector, Fire-Protection Backflow Preventer Assemblies:

1. See plumbing plans for details and specifications.

2.16 WATER METER BOXES

A. All materials shall conform to the requirements of TWSSD and TWAPL.

2.17 PROTECTIVE ENCLOSURES

A. Security Enclosures:

1. Description: The backflow security enclosure shall be fabricated from bent 1-1/4" diameter Schedule 40 steel pipe, 1"x1"x1/8" steel angle, and 13 gauge expanded metal panels. The enclosure shall be equipped with hinges and U-bolt hasp for padlocking. The enclosure shall have a powder coated finish. Color shall be "Desert Tan". Submit data sheet to Architect for product approval.
2. Freeze Protection: The backflow preventer freeze protection enclosure shall consist of an insulated fabric bag that be seasonally installed over the backflow preventer and secured without impacting the operation of the device. It shall have a 22 oz. vinyl coated, UV resistant, and waterproof outer fabric shell. Insulation shall be R-19 (min.) polyfill insulation. The enclosure shall be equipped with rust-proof grommets that allow for security/locking the enclosure around the backflow preventer. The freeze protection enclosure shall either be installed on the device or turned over to the Owner as directed by the Owner's Representative.
3. Base: 6-inch minimum thickness PAG Class "B" concrete pad, of dimensions required to extend at least 8 inches beyond the edges of enclosure housings. Include openings for piping.

2.18 FIRE HYDRANTS

A. Fire Hydrants:

1. Fire hydrants shall be designed for a working pressure of 150 psi per TWSSD.
2. All materials shall conform to the requirements of TWSSD and TWAPL.

2.19 FIRE DEPARTMENT CONNECTIONS

A. Fire Department Connections:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Elkhart Brass Mfg. Co., Inc.
b. Fire End & Croker Corporation.
c. Guardian Fire Equipment, Inc.
d. Kidde Fire Fighting; A UTC Business Unit.
e. Potter Roemer LLC.
f. Reliable Automatic Sprinkler Co., Inc. (The).

2. Description: Freestanding, with cast-bronze body, thread inlets according to NFPA 1963 and matching local fire department hose threads, and threaded bottom outlet. Include lugged caps, gaskets, and chains; lugged swivel connection and drop clapper for each hose-connection inlet; 18-inch high brass sleeve; and round escutcheon plate.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Refer to Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. Install pipe according to TWSSD construction requirements.

3.3 VALVE APPLICATIONS

A. Install valves according to TWSSD construction requirements.

3.4 PIPING SYSTEMS - COMMON REQUIREMENTS

A. See Section 330500 "Common Work Results for Utilities" for piping-system common requirements.

3.5 PIPING INSTALLATION

A. Water-Main Connection to be installed according to TWSSD construction requirements.

B. Install pipe according to TWSSD construction requirements.

3.6 JOINT CONSTRUCTION

A. See Section 330500 "Common Work Results for Utilities" for basic piping joint construction.

B. Make pipe joints according to TWSSD construction requirements.

3.7 ANCHORAGE INSTALLATION

A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types according to TWSSD construction requirements.

B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches according to TWSSD construction requirements.

3.8 VALVE INSTALLATION

A. Install valves according to TWSSD construction requirements.

3.9 WATER METER INSTALLATION

A. Tucson Water to install water meters.

3.10 ROUGHING-IN FOR WATER METERS

A. Rough-in piping and specialties for water meter installation according to Tucson Water's written instructions.

3.11 BACKFLOW PREVENTER INSTALLATION

A. Install backflow preventers according to TWSSD construction requirements.

3.12 WATER METER BOX INSTALLATION

A. Install water meter boxes according to TWSSD construction requirements.

3.13 PROTECTIVE ENCLOSURE INSTALLATION

A. Install concrete base level and with top approximately 1 inch above grade.

B. Install protective enclosure over valves and equipment.

C. Anchor protective enclosure to concrete base.

3.14 FIRE HYDRANT INSTALLATION

A. General: Install each fire hydrant according to TWSSD construction requirements.

3.15 FIRE DEPARTMENT CONNECTION INSTALLATION

A. Install ball drip valves at each check valve for fire department connection to mains.

B. Install protective pipe bollards on three sides of each fire department connection. Pipe bollards are specified in Section 055000 "Metal Fabrications."

3.16 CONNECTIONS

A. See Section 330500 "Common Work Results for Utilities" for piping connections to valves and equipment.

B. Connect water-distribution piping to existing water main according to TWSSD construction requirements.

C. Connect water-distribution piping to interior domestic water and fire-suppression piping.

3.17 FIELD QUALITY CONTROL

A. Piping Tests: Conduct piping tests per requirements of TWSSD before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

B. Hydrostatic Tests: Test according to TWSSD construction requirements.

C. Prepare reports of testing activities.

3.18 IDENTIFICATION

A. Install continuous underground tracer wire during backfilling of trench for underground water-distribution piping per requirements of TWSSD. Locate below finished grade, directly over piping. Underground warning tapes are specified in Section 312000 "Earth Moving."

B. Permanently attach equipment nameplate or marker indicating plastic water-service piping, on main electrical meter panel. See Section 330500 "Common Work Results for Utilities" for identifying devices.

C. Install pipe marking, detection tape, and tracer wire according to TWSSD construction requirements.

3.19 CLEANING

A. Clean and disinfect water-distribution piping according to TWSSD construction requirements.

B. Prepare reports of purging and disinfecting activities.

END OF SECTION 221113

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SECTION 221313 - FACILITY SANITARY SEWERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1. Pima Association of Governments (PAG), Standard Specifications for Public Improvements, 2015 Edition, Volume 1, http://apps.pagnet.org/standardspecifications, if more stringent than herein specified.
2. Pima County Regional Wastewater Reclamation Department Standard Specifications and Details for Construction (PCRWRD SSC), 2016 Edition (see department website for latest edition) if more stringent than herein specified.
   RWRD Approved Materials List (see department website for approved products list).

1.2 SUMMARY

A. Section Includes:

1. Pipe and fittings.
2. Nonpressure and pressure couplings.
3. Expansion joints and deflection fittings.
4. Backwater valves.
5. Cleanouts.
6. Encasement for piping.
7. Manholes.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Expansion joints and deflection fittings.
2. Backwater valves.

B. Shop Drawings: For manholes, order inserts, and frames and covers.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic manholes, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle manholes according to manufacturer's written rigging instructions.

1.5 PROJECT CONDITIONS

A. Interruption of Existing Sanitary Sewerage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Architect, PCRWRD, and Owner no fewer than five (5) days in advance of proposed interruption of service.
2. Do not proceed with interruption of service without PCRWRD's written permission.

PART 2 - PRODUCTS

2.1 DUCTILE-IRON, GRAVITY SEWER PIPE AND FITTINGS

A. Materials shall conform to the requirements of PCRWRD SSDC.

2.2 PVC PIPE AND FITTINGS

A. Materials shall conform to the requirements of PCRWRD SSDC.

2.3 NONPRESSURE-TYPE TRANSITION COUPLINGS

A. Materials shall conform to the requirements of PCRWRD SSDC.

2.4 EXPANSION JOINTS AND DEFLECTION FITTINGS

A. Ductile-Iron, Joints and Fittings:

1. Materials shall conform to the requirements of PCRWRD SSDC.

2.5 BACKWATER VALVES

A. See plumbing sheets for details and specifications.

2.6 CLEANOUTS

A. Materials shall conform to the requirements of PCRWRD SSDC.

2.7 ENCASEMENT FOR PIPING

A. Materials shall conform to the requirements of PCRWRD SSDC.

2.8 MANHOLES

A. Precast Concrete Manholes:

1. Materials shall conform to the requirements of PCRWRD SSDC.

B. Manhole Frames and Covers:

1. Materials shall conform to the requirements of PCRWRD SSDC.

C. Manhole-Cover Inserts:

1. Materials shall conform to the requirements of PCRWRD SSDC.
2. Activated carbon odor filter insert per Parson Odoreater (https://www.nassco.org/sites/default/files/manhole-parson06.pdf) or approved equal.

2.9 CONCRETE

A. Materials shall conform to the requirements of PCRWRD SSDC.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

A. Install pipe according to PCRWRD SSDC construction requirements.

3.3 PIPE JOINT CONSTRUCTION

A. Install joints according to PCRWRD SSDC construction requirements.

3.4 MANHOLE INSTALLATION

A. Install manholes complete with appurtenances and accessories indicated according to PCRWRD SSDC construction requirements.

3.5 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to PCRWRD SSDC construction requirements.

3.6 BACKWATER VALVE INSTALLATION

A. See plumbing plan details and specifications.

3.7 CLEANOUT INSTALLATION

A. Install cleanouts according to PCRWRD SSDC construction requirements.

3.8 CONNECTIONS

A. Connect nonpressure, gravity-flow drainage piping to building's sanitary building drains specified in Section 221316 "Sanitary Waste and Vent Piping."

B. Make connections to existing underground manholes according to PCRWRD SSDC construction requirements.

C. Connect to grease interceptors specified in Section 221323 "Sanitary Waste Interceptors."

3.9 IDENTIFICATION

A. Comply with requirements in Section 31200 "Earth Moving" for underground utility identification devices. Arrange for installation of green warning tapes directly over piping and at outside edges of underground manholes.

1. Install identification measures according to PCRWRD SSDC construction requirements.

3.10 FIELD QUALITY CONTROL

A. Inspect and test according to PCRWRD SSDC construction requirements.

3.11 CLEANING

A. Clean dirt and superfluous material from interior of piping according to PCRWRD SSDC construction requirements.

END OF SECTION 221313

SECTION 224000 – PLUMBING

PART 1 – GENERAL:

1.1 WORK INCLUDED

A. Plumbing Fixtures

B. Plumbing Specialties

C. Plumbing Equipment

1.2 RELATED SECTIONS

A. Section 23 05 00 - Basic Mechanical Materials and Methods

B. Section 23 07 00 - Mechanical Insulation

C. Section 23 20 00 - Building Services Piping

D. Section 21 11 00 - Fire Protection

1.3 QUALITY ASSURANCE

A. The plumbing equipment schedules are shown on the drawings. The following is a list of additional equipment approved for use on this project:

1. LAVATORIES, WATER CLOSETS, URINALS, SHOWERS:
   Sloan, American Standard, Kohler, Crane/UR
2. SHOWER VALVES: Symmons, Powers, Moen, Bradley
3. THERMOSTATIC MIXING VALVES: Symmons, Powers, Leonard, Lawler
4. SINK: Eljer, Kohler American Standard, Crane, Just, Elkay, Designers Choice
5. MOP BASIN: Florestone, Stern Williams, Fiat (molded stone only)
6. ELECTRIC WATER COOLER: Haws, Halsey Taylor, Oasis, Sunroc, Elkay
7. ROOF DRAIN, FLOOR DRAIN, SANITARY FLOOR DRAIN, WALL CARRIERS, CLEANOUTS, WATER HAMMER ARRESTORS:
   Josam, J.R. Smith, Ancon, Rockford, Wade, Zurn, Watts
8. WATER HEATERS/BOILERS: Heat Transfer Products, Lochinvar, A.O. Smith, Precision, Teledyne Laars, Weben-Jarco, Bock, Bradford White, State.
9. FAUCETS: Symmons, Delta, Chicago Faucet Co., T&S Brass and Bronze Works, Cambridge Brass, Powers, Bradley, Kohler, Sloan
10. FLUSH VALVES: Zurn, Sloan
11. PUMPS: Grundfos, Hydromatic, Paco, Bell & Gosset, Amtrol, Armstrong, Taco
12. EXPANSION TANKS: Amtrol, Watts, John Wood Co., (ASME ONLY), Wessels
13. TRAP AND SUPPLIES: McGuire, Brass Craft, Eastman, CS&B
14. WATER CLOSET SEATS: Church, JSC Comfort Seats, Bemis, Olsonite.
15. TRAP SEALERS: Sure Seal, J.R. Smith
16. EMERGENCY FIXTURES: Haws, Bradley, Chicago, Encon
17. FLEXIBLE GAS CONNECTIONS: Dormont, T&S Brass and Bronze Works
18. INSULATION KITS (for P-traps and supplies): Truebro, McGuire, Plumberex
19. HOSE BIBBS: Chicago, Woodford, Mifab, Nibco

20. WALL HYDRANTS: Woodford, Wade, Zurn
21. GREASE INTERCEPTORS: Smith Pre-Cast, Hayden Concrete Products
22. NEUTRALIZATION TANKS: Orion, Schott, Nalgene, Enfield
23. LABORATORY TURRETS, FAUCETS: Chicago Faucet Co., T&S Brass and Bronze Works, Cambridge Brass, Orion (DI water only)

1.4 SUBMITTALS (ALSO REFER TO SECTION 23 05 00)

A. Before beginning work, provide shop drawings on the following items:

1. Plumbing fixtures
2. Drains
3. Water heaters
4. Recirculation Pumps
5. Plumbing Specialties
6. Expansion Tanks
7. Other items as directed by the Owner or Architect

1.5 SPECIFICATIONS FOR OTHER DIVISIONS

A. Some work performed by the Division 22 contractor is specified under Division 23. Division 22 contractor shall be responsible for complying with all Division 22 and 23 specifications.

PART 2 – PRODUCTS:

2.1 FIXTURES

A. General:

1. Furnish and install all plumbing fixtures as indicated below. All fixtures shall be white and be of the same manufacturer unless otherwise noted. All fixtures to have accessible stops and all faucets shall have renewable seats, discs, and metal indexed handles. All fixture trim shall be chrome plated and by the same manufacturer unless otherwise noted.

B. Cleanouts:

1. Floor cleanouts in finished floors shall be Wade W-6000-Z series with nickel bronze cover and frame, adjustable top, and tapered bronze plug. Cleanouts in concrete floors shall be provided with standard tractor type covers. Cleanouts in carpeted areas shall be provided with carpet flange top. Cleanouts in tile floors shall be provided with square or round tops for tile or terrazzo as required.

2. Wall cleanouts shall be Wade W-8560-E series with 8480-R. Cast iron tee with countersunk brass plug drilled for cover screw and round stainless steel access cover.

3. Exterior cleanouts in non-traffic areas or pedestrian light-traffic areas shall be Wade W-6000-Z-179 series with nickel bronze cover and frame, adjustable top, tapered bronze plug, and vandal proof top. Set in an 18" cube of concrete.

4. Exterior cleanouts in traffic areas shall be Wade W-8300-MF with W-8550-B series. Access housing with adjustable anchor flange and extra-heavy secured

scoriated ductile iron cover set in an 18" cube of concrete. With cast iron cleanout ferrule with spigot outlet and raised tapered brass plug.

5. Provide membrane clamps for cleanouts installed in surfaces have waterproofing membranes installed.

2.2 PLUMBING SPECIALTIES

A. All water heaters shall be equipped with self-closing temperature and pressure relief valves. Approved manufacturers: Watts, Conbraco, Wilkins.

B. All water heaters shall be provided with a thermometer.

C. Water hammer arrestors shall be all stainless steel construction, bellows assembly type. Bellows shall be nested and welded. Unit shall be tested and certified in accordance with PDI-WH201 and by A.S.S.E. to Standard 1010

D. Provide ASSE 1072-07 listed trap sealer (Sure Seal or equivalent) on all floor drains and sanitary floor drains provided on this project.

E. Expansion tanks shall have a steel outer shell, pre-charged air chamber with standard air valve, stainless steel system connection, heavy-duty butyl diaphragm and rigid polypropylene liner.

PART 3 – EXECUTION:

3.1 GENERAL

A. All changes in the plumbing work made after letting of the contract, in order to comply with the applicable codes or requirements of the plumbing inspectors, Health inspectors, Utility Regulatory Agency and similar shall be made without additional cost to the Owner.

1. Should the Plumbing Contractor or any of the Subcontractors perform any work that does not comply with the requirements of the applicable Building Codes, State Laws, Local Ordinances and Industry Standards, he shall bear all costs arising in correcting the deficiencies, as approved by the Engineer.

3.2 INSTALLATION

A. Secure each water line where it penetrates partitions to serve fixtures, shower arms, hose bibbs and similar items. Wrap all piping in block walls or penetrating concrete with 10 mil polyethylene tape or covering with polysleeve.

B. Set hose bibbs 18 inches above finished grade, unless otherwise indicated. Adjust height as required to line-up bottom or top edge of wall hydrants with masonry seams where applicable. Grout water-tight any wall penetrations with non-shrinking grout. Wall hydrants shall be installed level and square with face flush with finished wall face. Thoroughly clean after installation.

C. Seal fixtures to walls, floors, and counters using a sanitary type, one part, mildew resistant white 100% silicone sealant.

D. Cleanouts shall be installed in accessible locations. Wall cleanout access covers shall be installed above bottom course of tile when installed in tiled walls. Floor and ground cleanouts shall be installed with covers set flush to finished grade or floor.

E. During construction, floor drains, fixtures, and equipment shall be provided with adequate protection against damage and sealed against entrance of construction debris. Floors shall not be washed into floor drains as part of the construction clean-up process.

3.3 PLUMBING SPECIALTY INSTALLATION

A. Temperature and pressure relief valves shall be installed such that the sensing element is within 6” of the high water level of the tank. Extend discharge of temperature and pressure relief valve full size to daylight with elbow down between 6" and 18" above finished grade or as indicated on plans.

B. Install each thermometer in a 304 stainless steel bimetal type thermowell with the entire sensing element in the flow of water and a min. pipe size of 1-1/4" for entire length of element. Provide extension necks for insulation piping. Operating ranges shall be selected to assure nominal temperature readings at the midpoint thereof.

C. Provide a water hammer arrestor on all cold and hot water lines serving fixtures using flush valves, solenoid valves or quick closing devices, sized in accordance with P.D.I. Standard WH-201 for the total number of fixtures served. Provide access door as required.

D. Provide an expansion tank sized in accordance with manufacturer’s recommendations for all hot water heating vessels which store hot water.

3.4 FLASHINGS

A. All vent stacks passing through the roof shall be flashed per the architectural detail sheets at the roof surface. Vent stacks within 10 feet of a parapet wall shall be extended at least 12” above adjacent walls.

B. Coordinate installation of all roof drains and overflow roof drains with architectural detail sheets and roofing subcontractor.

END OF DOCUMENT 224000

SECTION 230500 – BASIC MECHANICAL MATERIALS AND METHODS

PART 1 – GENERAL:

1.1 GENERAL

A. This Document covers basic materials and methods which may be common to one or more subsequent Documents.

1.2 WORK INCLUDED

A. Mechanical Sound, Vibration, and Seismic Control

B. Mechanical Identification

C. Motors

D. Access Panels and Doors

1.3 RELATED DOCUMENTS

A. Document 01 30 00 – For submittals

B. Document 01 70 00 – Record drawings and O&M manuals

C. Document 05 45 00 – For mechanical supports

D. Document 09 90 00 – For field painting of equipment and piping, other than for identification.

E. Document 13 48 00 – For sound and vibration control of structure

F. Document 40 92 49 – Adjustable frequency motor control

G. Document 26 00 00 – For motor starters

1.4 SYSTEM DESCRIPTION

A. The work under this Document of the specifications shall include all systems as shown on drawings or specified herein. This shall include all items of a minor nature necessary to complete the installation whether specifically mentioned in the contract documents or not.

B. Drawings are diagrammatic. Dimensions given in figure on the plans shall take precedence over scaled dimensions and all dimensions, whether given in figures or scaled, shall be verified in the field.

C. No ductwork or piping shall be shop fabricated before clearances are field verified. Offsets and transitions required because of interferences encountered in the field shall be a part of this contract and shall be shown on record drawings.

1.5 PROJECT/SITE CONDITIONS

A. Before submitting a bid, carefully study the Civil, Architectural, Structural, Electrical and Mechanical drawings. Make a careful examination of the premises and any existing

work. Determine, in advance, the methods of installing and connecting the apparatus, the means to be provided for getting the equipment into place, and become thoroughly familiar with all of the requirements of the contract.

1.6 REFERENCES

A. All work shall be performed in accordance with all codes, laws, rules and regulations of all National, County, State and Local authorities having jurisdiction over the premises. This shall include, but not be limited to, the latest editions of the 2012 International Plumbing Code, the 2012 International Mechanical Code, the 2012 International Building Code, State or local Board of Health, Federal and State Environmental protection regulations, 2012 International Energy Conservation Code, Utility Regulatory Agencies, Occupational Safety and Health Act, the American Gas Association, National Fire Protection Association, and the 2012 International Fire Code. In case of differences, between codes, ordinances, specifications, or plans, the most stringent shall apply. This does not delete requirements of plans and specifications which may be in excess of code requirements.

1.7 QUALITY ASSURANCE

A. The mechanical systems have been designed around the makes and sizes of equipment named on the drawings or elsewhere in the specifications. Other makes of equipment named in the specifications, shown on the drawings, or approved by the Architect as outlined in Division 01, may be furnished at the contractor's option. Equipment furnished must have equivalent capacity, the same electrical characteristics, substantially the same physical dimensions, and can be installed in the space available with ample working space around it. Any extra costs resulting from equipment substitution shall be at no cost to the owner.

B. Where possible, all items of the same type (i.e. pumps, fans, fixtures) shall be by the same manufacturer.

C. Where instructions on installation are not included in these specifications or on the plans, the manufacturer's instructions shall be followed.

1.8 SUBMITTALS

A. See Document 013000 for general submittal requirements. Refer to subsequent Documents for other requirements.

B. Before beginning work and prior to placing orders, submit one electronic copy of shop drawings or literature in portable document format (PDF) with bookmarks (separating groups of similar items) on fixtures, materials, and equipment to be furnished. Each cut-sheet or shop drawing shall have options and selections highlighted or otherwise clearly identified. Each cut-sheet or shop drawing shall include: mark indicated on drawings, manufacturer with address and phone number, model number, capacities, ratings, dimensions, electrical characteristics, trim, and accessories. Each cut sheet or shop drawing shall be an original from the manufacturer or a clean and clear color scan. Each submittal shall include a cover sheet indicating the project title, Architect, General Contractor's name, and contractor's name, address, and phone.

C. Submittals not in the format of paragraph B or illegible will be returned. All submittals shall be complete, shall be submitted at one time and shall not be submitted in batches.

Separate complete submittals for Plumbing, HVAC, and Fire Protection may be submitted. HVAC control drawings may be submitted separate from the rest of the HVAC submittals.

D. Resubmittals shall be issued in PDF format and marked as "resubmittal" on each page.

E. Before submitting any equipment for review, determine that such equipment will fit satisfactorily into the space allotted to it.

F. When equipment or materials submitted differ from that specified or when local conditions necessitate an arrangement of equipment or materials different from that indicated on the drawings, submit for review shop drawings showing proposed rearrangement before installation. Any deviations from plans and specifications shall be called to the attention of the Architect in writing.

G. Voltage and phase of motors furnished under this Document shall be as indicated on the electrical drawings. Verify electrical characteristics with electrical drawings before final ordering of equipment.

H. Submittals will be checked for general compliance only and should not be relied on for review of quantities, fabrication methods, safety precautions, or electrical or physical coordination. Requirements of contract documents are not limited, waived, or superseded by submittal review.

1.9 FEES, PERMITS & INSPECTIONS

A. The Architect-Owner shall secure and pay for all permits and fees including, but not limited to: water meters, fire line connection charges, sewer connection fees, and other mechanical connection charges required for the installation of the mechanical systems. The Contractor shall arrange for all inspections and secure all approvals required for work.

1.10 COOPERATION AND WORK PROGRESS:

A. Perform work so that progress of project, including work of other Trades is not delayed.

B. Coordinate work of this Document with work of other Documents to complete work as soon as conditions permit and to minimize interruptions of building functions. Assume additional costs incurred due to lack of or improper coordination with work of other Documents.

C. Coordinate exact mounting arrangement and location of equipment shown on Drawings. Allow for proper space requirements for equipment access, operation and maintenance. Particular attention shall be given to group installations. If insufficient space or conflict with work of other Documents will prevent proper installation, access, operation, or maintenance of shown equipment, immediately notify Architect and do not proceed with this part of Contract work until directed by Architect.

PART 2 – PRODUCTS:

2.1 MECHANICAL SOUND, VIBRATION, AND SEISMIC CONTROL

A. All equipment, piping, registers and grilles, etc., shall be installed to meet local seismic code requirements including but not limited to the following:

1. Isolators under equipment shall have seismic restraint.

2. Ceiling diffusers and return grilles in T-bar ceilings connected to flexible duct shall be supported from structure above.

2.2 MECHANICAL IDENTIFICATION

A. Provide coiled plastic pipe markers for pipe identification of all exposed piping or piping above accessible ceilings. Markers used on outdoor piping shall be approved for outdoor use.

B. Provide 2" x 3" or larger laminated black plastic nameplates with one-half inch engraved white numbers and letters for each piece of equipment. Nameplate materials mounted outside shall be resistant to UV degradation.

C. Approved pipe identification and engraved plastic tag manufacturers: Seton, Brimar Industries, Marking Services Inc., MIFAB.

D. Valves shall be provided with brass valve tags stamped with valve number and identification for service.

E. White stickers with black lettering shall be affixed to the ceiling grid and access panels to indicate the location of each VAV box.

F. Piping Painting:

1. All exposed steel piping and all equipment room piping indicated below shall be painted. Coordinate with Document 09 90 00 for painting. The color code scheme shall be as indicated in the table below. The color code is per Federal Standard No. 595A.

PIPING CONTENTS	COLOR	COLOR CODE
Fire Protection	Red	11105
Domestic Cold Water	White	17875
Gas Piping	Yellow	13538
Condensate	Gray	16357

2. Primer on exposed steel piping shall be iron oxide Fed Spec TT-P-664D. Second and third coats for exterior piping shall be alkyd-enamel resin Fed Spec TTP-37D and TT-E-489H Class A. The second and third coat for exposed interior steel pipe shall be semi-gloss enamel Fed Spec TT-E-508C. Installation shall be per manufacturer recommendations. Note: Products specified in Document 099000 shall take precedence.

2.3 ACCESS PANELS AND DOORS

A. Provide access panel for any concealed equipment or valve requiring access. Access panel shall be minimum sizes required by code and be of a type compatible with ceiling or wall construction.

B. Access doors for lined duct shall be insulated access door type. Access doors for wrapped duct shall have insulation trimmed back and insulation glued to the outside of the access door. All access doors shall have screwdriver-operated latches.

C. Approved access panel and door manufacturers: Cesco, Karp

PART 3 – EXECUTION:

3.1 GENERAL

A. All work shall be performed by personnel and company with a minimum of three years experience in this type of work. All work shall be under the direct supervision of a competent foreman. Verification of similar work experience may be required prior to beginning work. All work shall be planned and carried out so as not to interfere with the progress of the work by other Documents on the job.

B. Locations indicated on the drawings show the arrangement desired for the principal apparatus and shall be followed as closely as possible. The work shall be laid out on the job to secure a neat arrangement, to secure the best conditions throughout, and to overcome local difficulties and interferences where encountered. Equipment shall be installed to permit access for service. All installations shall be made as recommended by the equipment manufacturers.

C. Erect equipment and accessories in neat and workmanlike manner. All piping, ductwork, etc. shall be run parallel and at right angles to building. Align, level and adjust for satisfactory operation, install so that connecting and disconnecting of piping and accessories can be made readily and so that all parts are easily accessible for inspection, operation and maintenance.

D. Be fully responsible for any and all damages to fixtures and equipment that results from improper handling or installation.

E. Provide safety guards for any equipment that may present a hazard to personal safety.

3.2 TEMPORARY FACILITIES

A. Staging and Scaffolding:

1. All staging and scaffolding, exterior and interior, required to be over eight feet in height, shall be furnished, erected and maintained in safe condition for proper execution of the work.

2. Staging, Scaffolding and other temporary construction shall be rigidly built in accordance with local and state requirements. Remove from premises upon completion of work.

B. Provide temporary construction required for work as directed by Architect.

C. Hoisting Equipment and Machinery:

1. All hoisting equipment and machinery required for the placement of equipment shall be furnished, installed, operated, and maintained in safe condition.

3.3 PROTECTIVE MEASURES

A. Protect all equipment, materials, and plumbing fixtures on the job site until project has been finished.

B. All equipment shall be tightly covered and protected against dirt, water, chemical or mechanical injury, and theft. Insulation damaged by rain or water shall be replaced at no cost to owner. Plumbing fixtures shall be covered with heavy paper coverings after installation and shall be thoroughly cleaned after completion of the project.

C. Any mechanical items damaged by exposure to the weather shall be replaced or refinished. Any damage or defect of work developed before final acceptance of work shall be replaced or repaired at no cost to the owner.

D. All materials such as valves, fittings, piping, equipment, pumps, coils, etc., shall be properly protected. All duct and piping openings shall be temporarily closed at the end of each working day to prevent obstruction and damage. Open ended ducts or plenums shall not be used for storage of materials or for temporary staging during construction.

E. At the completion of the work, equipment and materials shall be cleaned, polished thoroughly and turned over to the Owner in a condition satisfactory to the Architect.

3.4 MECHANICAL IDENTIFICATION

A. Screw tags to equipment with pan head sheet metal screws or strap to equipment in obvious locations. Attachment methods shall be in accordance with manufacturer’s recommendations. Engrave equipment designation and numbers as shown on plans and drawings on upper half of tag, leaving lower half of tag for future engraving. Tags for valves shall be attached using solid brass jack chain.

B. Pipe markers on exposed piping shall be maximum 25'-0" on center. Pipe markers on piping above accessible ceilings shall be maximum 6'-0" on center. Pipe markers shall indicate flow direction at every marker location (with arrows pointing away from text). Markers shall be installed per latest standards for markers. Markers shall not be required on painted piping.

3.5 PAINTING

A. Touch-up damaged factory finishes with factory approved products in accordance with manufacturer’s instructions.

B. All surfaces to be painted shall be thoroughly cleaned of grease, dirt and oil before paint is applied. Painting materials, the application thereof, and protection of other work shall conform to the requirements of Document 09 90 00.

C. Paint all plastic pipe exposed to sunlight with two coats of white latex paint.

D. Paint all visible sheet metal ductwork behind grilles and registers flat black.

E. All uninsulated steel piping either exposed to weather or visible in equipment rooms shall be painted white.

3.6 CUTTING & PATCHING

A. Provide all openings through walls, floors and the roof necessary for the installation of the work under this Document. Openings shall be neatly cut with any damage to the building repaired and repainted.

B. Layout all chases and openings required, and furnish and set all sleeves, concrete inserts and anchor bolts required for the installation of work under this Division.

3.7 MECHANICAL PROVISIONS

A. Extend all inaccessible oil or grease fittings by copper tubing to readily accessible locations.

3.8 TESTS AND ADJUSTMENTS

A. Notify the Architect of readiness to perform a test 24 hours in advance and all tests shall be performed in the presence of the Architect's representative. Any defective material and/or equipment shall be repaired, adjusted and/or replaced by like new materials and/or equipment before acceptance.

B. All items such as valves, gauges, traps, strainers, etc., which may be damaged by the test pressure shall be removed before the tests are made and shall not be replaced until the tests have been approved.

C. Furnish all pumping equipment tools, instruments, equipment, and temporary connections required for tests.

D. All defects which develop under tests shall be repaired promptly and the tests repeated. No caulking of screwed joints, cracks or holes will be permitted. Leaks in screwed joints shall be repaired by replacing the pipe or the fittings or both with new material. Leaks in copper fittings shall be repaired by melting out the joint, thoroughly cleaning both parts and resoldering.

E. Lubricate, start up, and operate all equipment and demonstrate its operation and compliance with the specifications. Any undue noise, vibration and/or other objectionable features shall be promptly repaired and/or the device replaced and the system retested.

F. All systems shall be placed in service and be operating properly for a period of not less than seven consecutive 24-hour days before acceptance.

G. A written report of all test results shall be submitted to the Architect for approval.

3.9 CLEANING-UP

A. At all times keep the building and premises in a neat manner. All instructions issued by the Architect and indicated elsewhere in these specifications in regard to storage of materials, protective measures, cleaning of debris etc., shall be followed. Upon completion of the work, thoroughly clean all machinery, piping, etc., and leave areas directly affected by work broom clean.

3.10 SYSTEM CLEANING AND START UP

A. Provide temporary connections and arrange piping in such a way to facilitate flushing and cleaning.

3.11 RECORD DRAWINGS

A. Maintain a clean, undamaged set of blackline contract drawings on site. Record all changes from contract drawings including "found" conditions, addenda, change orders, or other instructions issued by the Architect and submit to Architect as "record drawings" at close of project. Changes to contract documents shall be clouded and dated. Include dimensioned locations of underground piping from a clearly visible point on the building. Refer to Document 017000.

3.12 CERTIFICATES

A. Perform sterilization of the domestic water systems with a 50 ppm chlorine at each valved outlet to be held for twenty-four hours with tests every eight hours or 200 ppm and allowed to stand for 3 hours. Then flush all outlets to 0.2 ppm. Testing shall be provided by locally based, full time, full service water treatment company with a minimum of three years experience in the water treatment business. Furnish all equipment and chemicals required. Provide appropriate tags on all outlets during testing to prevent accidental consumption or draining of the system. Give 24-hours notice to Owner's representative for start and finish inspections.

B. Certify in writing, by the testing company, that the water lines have been sterilized and that approval of the installation was obtained from the authorities having jurisdiction over the work. Sterilization to be in accordance with requirements of local authorities. Give original to owner and include one copy with each O&M submittal.

3.13 OPERATION AND MAINTENANCE MANUAL

A. Furnish to the Architect, three copies of operating and maintenance manuals – coordinate with Document 01 70 00. Manuals shall be loose-leaf 8-1/2”x11” format, bound in three-ring binders with identifying tabs separating Documents. Each shall contain manufacturer's spare parts list, care, operation, and installation instructions. Provide a sequence of operation and a preventative maintenance schedule identifying daily, weekly, monthly and seasonal maintenance procedures as required. Contractor shall provide this sequence of operation and schedule if not given by the manufacturer. Provide a list of suggested suppliers with names, addresses, and phone numbers for each product or product group. Information may be printed on both sides of each page. Each binder shall include a cover sheet indicating the project title, architect, general contractor’s name, and contractor’s name, address, and phone.

B. Instruct the maintenance personnel in the operation of the system and submit copies of a letter signed by the owner's representative attesting to such instructions listing names of Owner personnel who received these instructions. Include a copy with each operation and maintenance manual (O&M).

C. Provide an electronic copy of all O&M Manuals, Guarantees and Certificates in PDF format to the architect.

D. Coordinate with “guarantees” and “certificates” for other inclusions.

3.14 GUARANTEES

A. Guarantee work to be free from defects in workmanship and material for a period of one year from the date of final acceptance as determined by the Architect. Any material, equipment, or workmanship which proves defective within the guarantee period shall be promptly repaired or replaced at no cost to the Owner. Repair any damage done to areas, materials, and other systems resulting from the failure or defect at no cost to Owner. Extend guarantee of replaced item a period of one year from date of replacement or to the end of the Guarantee period, whichever is longer. Replace materials or equipment that requires excessive maintenance during the guarantee period. Service calls, repairs, adjustments, and replacements during the guarantee period shall be made at no cost to the owner.

B. Provide notarized copies of the guarantee with the O&M manuals.

C. Furnish a letter stating that the system has been installed in accordance with the contract documents and with any deviations detailed in full.

D. Connections made to owner provided equipment shall be the responsibility of the contractor and shall be included in the guarantee.

E. Service or replacement required as a result of faulty operation or neglect on the part of the Owner shall be paid for by the Owner at prevailing rates.

1. However, if written instructions of the care and maintenance of equipment were not given to the Owner the neglect shall be on the Contractor’s part and the cost of the service or replacements shall be at no cost to the owner.

F. Standard factory warranties shall be provided on all equipment furnished and evidence of same shall be included in each O & M Manual.

1. Provide an additional warranty on all air conditioning compressors, making a total five-year warranty.

END OF DOCUMENT 230500

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SECTION 230593 – TESTING, ADJUSTING, AND BALANCING (TAB)

PART 1 – GENERAL:

1.1 GENERAL

A. An independent testing, adjusting, and balancing (TAB) agency shall test, adjust, and balance the mechanical systems.

B. The work included in this Document consists of furnishing labor, instruments, and tools required in testing, adjusting and balancing the HVAC systems, as described in these specifications or shown on accompanying drawings. Services shall include checking equipment performance, taking the specified measurements, and recording and reporting the results.

1.2 WORK INCLUDED

A. Air Systems

B. Domestic Hot Water

C. Special Systems

1.3 RELATED DOCUMENTS

A. Document 230500: Basic Mechanical Materials and Methods

1.4 DEFINITIONS, REFERENCES, STANDARDS

A. All work shall be in accordance with the latest edition of the AABC National Standards. If these contract documents set forth more stringent requirements than the AABC National Standards, these contract documents shall prevail.

1.5 QUALIFICATIONS

A. The TAB Agency shall be a current member of the Associated Air Balance Council (AABC).

B. The following TAB Agencies are approved to provide TAB services on this project. No exceptions or prior approvals are allowed:

1. Arizona Air Balance Company, 624 South Perry Lane, Tempe, AZ 85281, contact Byron Seed at (480) 966-2001.

2. General Air Control, Inc., 1751 West Dairy Place, Tucson, AZ 85705, contact Jon Ziegler at (520) 887-8850.

3. Precisionaire of Arizona, Inc., 1720 East Deer Valley Road, Suite 205, Phoenix, AZ 85024, contact Dean Steffen at (623) 580-1644.

4. Tab Technology, Inc., 1912 North Rosemont, Mesa, AZ 85205, contact Phil Hoyt at (480) 964-0187.

5. Technical Air Balance, SW, Inc., 16055 N. Dial Blvd., Scottsdale, AZ 85260, contact Wade Handley at (623) 492-0831.

1.6 SUBMITTALS (ALSO REFER TO DOCUMENT 230500)

A. The TAB agency shall submit a company resume listing personnel and project experience in air and hydronic system balancing and a copy of the agency's test and balance engineer (TBE) certificate.

B. Procedures and Agenda: The TAB agency shall submit the TAB procedures and agenda proposed to be used.

C. The TAB agency shall submit sample forms, which shall include the minimum data required by the AABC National Standards.

1.7 TAB PREPARATION AND COORDINATION

A. TAB agency shall obtain shop drawings, submittal data, up-to-date revisions, change orders, and other data required for planning, preparation, and execution of the TAB work no later than 30 days prior to the start of TAB work.

B. System installation and equipment startup shall be complete prior to start of TAB agency’s work.

C. The building control system shall be complete and operational. The Building Control System contractor shall install all necessary computers and computer programs, and make these operational. Assistance shall be provided by TAB agency as required for reprogramming, coordination, and problem resolution.

D. All test points, balancing devices, identification tags, etc. shall be accessible and clear of insulation and other obstructions that would impede TAB procedures.

E. Qualified installation or startup personnel shall be readily available for the operation and adjustment of the systems. Assistance shall be provided as required for coordination and problem resolution.

1.8 REPORTS

A. The TAB agency shall submit three copies of the final TAB report for review by the engineer and building owner within 90 days of the date of receipt of the certificate of occupancy. The TAB report may be submitted electronically at the contractor’s option. All outlets, devices, HVAC equipment, etc., shall be identified, along with a numbering system corresponding to report unit identification. The TAB agency shall submit an AABC “National Project Performance Guaranty” assuring that the project systems were tested, adjusted and balanced in accordance with the project specifications and AABC National Standards.

1.9 DEFICIENCIES

A. Any deficiencies in the installation or performance of a system or component observed by the TAB agency shall be brought to the attention of the appropriate responsible person.

B. The work necessary to correct items on the deficiency listing shall be performed and verified by the affected contractor before the TAB agency returns to retest. Unresolved deficiencies shall be noted in the final report.

PART 2 – PRODUCTS:

2.1 INSTRUMENTS

A. All instruments used for measurements shall be accurate and calibrated. Calibration and maintenance of all instruments shall be in accordance with the requirements of AABC National Standards.

PART 3 – EXECUTION:

3.1 GENERAL

A. The specified systems shall be reviewed and inspected for conformance to design documents. Testing, adjusting and balancing on each identified system shall be performed. The accuracy of measurements shall be in accordance with AABC National Standards. Adjustment tolerances shall be + 10% or - 5% unless otherwise stated.

B. Equipment settings, including manual damper quadrant positions, manual valve indicators, fan speed control levers, and similar controls and devices shall be marked to show final settings.

C. All information necessary to complete a proper TAB project and report shall be per AABC standards unless otherwise noted. The description for work required, as listed in this Document, are a guide to the minimum information needed.

D. Changes to pulleys, drives, etc. shall be part of the balance responsibility.

3.2 AIR SYSTEMS

A. The TAB agency shall verify that all ductwork, dampers, grilles, registers, and diffusers have been installed per design and set in the full open position. Systems where VFD's or 2 speed motors are used, all balancing of air system will be conducted at the maximum and minimum rated speeds of unit. The TAB agency shall perform all TAB procedures in accordance with the AABC National Standards.

B. Supply Fans:

1. Fan speeds - Test and adjust fan RPM to achieve maximum or design CFM.

2. Current and Voltage - Test and record motor voltage and amperage, and compare data with the nameplate limits to ensure fan motor is not in or above the service factor.

3. Pitot-Tube Traverse - Perform a Pitot-tube traverse of main supply and return ducts, as applicable to obtain total CFM.

4. Outside Air - Test and adjust the outside air on applicable equipment using a Pitot-tube traverse. If a traverse is not practical use the mixed-air temperature method if the inside and outside temperature differences is at least 20 degrees Fahrenheit or use the difference between Pitot-tube traverses of the supply and return air ducts.

5. Static Pressure - Test and record system static profile of each supply fan. Variable frequency drive shall be tested in bypass mode to determine maximum static pressure capabilities.

C. Powered Exhaust Fans:

1. Fan speeds - Test and adjust fan RPM to achieve maximum or design CFM.

2. Current and Voltage - Test and record motor voltage and amperage, and compare data with the nameplate limits to ensure fan motor is not in or above the service factor.

3. Static Pressure - Test and record system static profile of each relief fan.

4. Pitot-Tube Traverse - If possible, per system ductwork, perform a traverse to determine Relief Air CFM.

D. Exhaust Fans:

1. Fan speeds - Test and adjust fan RPM to achieve maximum or design CFM.

2. Current and Voltage - Test and record motor voltage and amperage, and compare data with the nameplate limits to ensure fan motor is not in or above the service factor.

3. Pitot-Tube Traverse - Perform a Pitot-tube traverse of the main exhaust ducts to obtain total CFM.

4. Static Pressure - Test and record system static profile of each exhaust fan.

E. Zone, Branch and Main Ducts

1. Adjust ducts to within design CFM requirements. As applicable, at least one zone balancing damper shall be completely open. Multi-diffuser branch ducts shall have at least one outlet or inlet volume damper completely open.

F. VAV Systems:

1. Set volume regulators on all terminal boxes to meet design maximum and minimum CFM requirements.

2. Identification - Identify the type, location, and size of each terminal box. This information shall be recorded on terminal box data sheets.

3. The ductwork from the air handling units to the VAV boxes shall be pressure tested per AABC Standards. The duct shall have a maximum CFM leakage rate of 1% per hundred lineal feet of duct.

4. The CFM of VAV boxes shall be coordinated with the EMCS, so the EMCS can be calibrated to display actual field conditions.

G. Diffusers, Registers and Grilles:

1. Tolerances - Test, adjust, and balance each diffuser, grille, and register to within 10% of design requirements. Minimize drafts.

2. Identification - Identify the type, location, and size of each grille, diffuser, and register. This information shall be recorded on air outlet data sheets.

3. Adjust the louvers in all supply outlets to produce air distribution satisfactory to the occupants.

4. All measurements of air quantities delivered by grilles shall be made in a manner approved by the manufacturer of the grille.

H. Coils:

1. Air Temperature - Once air flows are set to acceptable limits, take wet bulb and dry bulb air temperatures on the entering and leaving side of each cooling coil. Dry-bulb temperature shall be taken on the entering and leaving side of each heating coil or furnace.

3.3 DOMESTIC HOT WATER

A. The TAB agency shall, as applicable, confirm that all domestic hot water equipment, piping have been filled and purged; that strainers have been cleaned; and that all balancing valves (except bypass valves) are set full open. The TAB agency shall perform all testing and balancing functions in accordance with the AABC National Standards.

B. Pumps:

1. Test and adjust domestic hot water pumps to achieve maximum or design GPM. Check pumps for proper operation. Pumps shall be free of vibration and cavitations. Record appropriate gauge readings for final TDH and Block-Off/Dead head calculations.

2. Current and Voltage - Test and record motor voltage and amperage, and compare data with the nameplate limits to ensure pump motor is not in or above the service factor.

C. System Mains and Branches:

1. Adjust domestic hot water return flow to achieve maximum or design GPM.

3.4 SPECIAL SYSTEMS

A. Verification of HVAC Controls:

1. The TAB agency shall be assisted by the building control systems contractor in verifying the operation and calibration of all HVAC and temperature control systems. The following tests shall be conducted:

a. Verify that all control components are installed in accordance with project requirements and are functional, including all electrical interlocks, damper sequences, air and water resets, fire and freeze stats, and other safety devices.

b. Verify that all controlling instruments are calibrated and set for design operating conditions.

B. TAB Report Verification:

1. At the time of final inspection, the TAB agency may be required to recheck, in the presence of the owner's representative, specific or random selections of data recorded in the certified report. Points and areas for recheck shall be selected by the owner's representative. Measurements and test procedures shall be the same as approved for the initial work for the certified report. Selections for recheck, specific plus random, will not exceed 10% of the total number tabulated in the report.

C. Building/Zone Pressurization:

1. The TAB agency shall test and adjust building/zone pressurization by setting the design flows to meet the required flow direction and pressure differential. For positive pressure areas, it shall set the supply air to design flow, and gradually reduce the exhaust air rate to obtain the required flow or pressure difference. For negative pressure areas, it shall set the supply air to design flow, and gradually increase the exhaust air rate to obtain the required flow or pressure difference.

D. Fire and Smoke Testing:

1. The TAB agency shall test fire/smoke dampers to assure operation. It shall verify that an access door has been installed for each fire and smoke damper. For fire dampers, the TAB agency shall open the access door, disconnect the fusible link, and allow the damper to close. Operation should be smooth and the damper must close completely. The TAB agency shall then reset the damper. For the smoke damper, the TAB agency shall open the access door, activate the damper, and observe operation. The damper must close quickly and completely. The TAB agency shall then reset the damper and observe its complete opening.

E. Life Safety Controls:

1. The TAB agency shall test and record life safety control operation on the HVAC equipment. It shall verify the installation of required smoke detectors in air handling equipment (AHE), and shall verify operation of the smoke detector by activating the smoke detector and observing air handler shutdown. With the controls and alarm contractors, the TAB agency shall verify the operation of interconnected systems such as the AHE smoke detector's activation of the fire alarm system and the alarm system's activation of the life safety control sequences.

3.5 GUARANTEE

A. All work shall be guaranteed for a period of ninety days. TAB contractor shall make adjustments during this period for comfort level adjustment, at direction of Engineer. TAB contractor shall meet with Engineer during this period as may be required to verify any readings. Coordinate with Document 013000.

END OF DOCUMENT 230593

SECTION 230700 – MECHANICAL INSULATION

PART 1 – GENERAL:

1.1 WORK INCLUDED

A. Piping insulation

B. Equipment insulation and covering

C. Ductwork Insulation

1.2 RELATED DOCUMENTS

A. Document 22 40 00 – Plumbing

B. Document 23 05 00 – Basic Mechanical Materials and Methods

C. Document 23 20 00 – Building Services Piping

D. Document 23 30 00 – Air Distribution

1.3 QUALITY ASSURANCE

A. The following is a list of additional manufacturers approved for use on this project:

1. Insulation Products: Owens Corning, Johns Manville, CertainTeed, Schuller, Manson
2. Closed Cell: Armstrong, Nomaco

1.4 SUBMITTALS

A. Product Data: Provide product description, list of materials and thickness for each service or equipment scheduled, locations, and manufacturer's installation instructions.

B. See Document 23 05 00 for general submittal requirements.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

PART 2 – PRODUCTS:

2.1 GENERAL

A. Coverings and linings, including adhesives when used, shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84.

B. Duct coverings and linings shall not flame, glow, smolder, or smoke when tested in accordance with ASTM C 411 at the temperature to which they are exposed in service. The test temperature shall not fall below 250°F (121°C).

2.2 PIPE INSULATIONS

A. Glass Fiber insulation shall meet ASTM C547. Insulation shall be rigid, molded, and noncombustible.

1. 'K' ('ksi') Value: 0.23 at 75°F (0.033 at 24°C).

2. Maximum Service Temperature: 850°F (454°C).

3. Vapor Retarder Jacket: AP-T PLUS White kraft paper reinforced with glass fiber yarn and bonded to aluminum foil, secured with self sealing longitudinal laps and butt strips or AP Jacket with outward clinch expanding staples or vapor barrier mastic as needed.

B. Elastomeric Foam (refrigeration and condensate) shall meet ASTM C534 and be flexible, cellular elastomeric, molded or sheet.

1. 'K' ('ksi') Value: 0.28 at 75°F (0.04 at 24°C).

2. Maximum Service Temperature: 220°F (104°C).

3. Maximum Flame Spread: 25

4. Maximum Smoke Developed: 50 (3/4" thick and below). 100 (above 3/4" thick).

5. Connection: Waterproof vapor retarder adhesive as needed.

6. UV-Protection: Outdoor protective coating.

C. Field Applied Jackets (for fiberglass insulation):

1. PVC Plastic: One piece molded type fitting covers and jacketing material, gloss white.

a. Connections: Tacks; Pressure sensitive color matching vinyl tape.

2. Aluminum Jacket: 0.016 inch (0.045 mm) thick sheet, embossed finish, with longitudinal slip joints and 2 inch (50mm) laps, die shaped fitting covers with factory attached protective liner.

2.3 DUCTWORK INSULATION

A. Flexible Glass Fiber Blanket: shall meet ASTM C 553 for flexible blanket.

1. 'K' ('ksi') Value: 0.29 Btu-in/(hr-ft^2-°F) at 75°F for labeled thickness.

a. Labeled thickness of 2-1/5” shall have a minimum installed ‘R’ value of 6.0. (Installed ‘R’ value calculated with a material thickness of 1-5/8” following recommended duct wrap stretch-outs.)

b. Labeled thickness of 3” shall have a minimum installed ‘R’ value of 8.3. (Installed ‘R’ value calculated with a material thickness of 2-1/4” following recommended duct wrap stretch-outs.)

2. Vapor Barrier Jacket: FSK, Aluminum foil reinforced with fiber glass yarn and laminated to fire-resistant kraft, secured with UL listed pressure sensitive tape and/or outward clinched expanded staples and vapor barrier mastic as needed.

3. Density: 0.75 lb/cuft (Type 75)

B. Duct Liner shall be: Flexible duct liner made from strong, flame attenuated glass fibers bonded with a thermosetting resin.

1. 'K' ('ksi') Value: ASTM C 518, 0.24 at 75°F (0.036 at 24°C).

a. R-6.0 for 1-1/2" liner.

b. R-8.0 for 2" liner.

2. Noise Reduction Coefficient based on Type "A" Mounting per ASTM C 423.

a. 0.80 NRC for 1-1/2" liner.

b. 0.85 NRC for 2" liner.

3. Maximum Velocity on Mat or Coated Air Side: 6,000 ft/min (30.5 m/sec) per ASTM C 1071.

4. Maximum operating temperature: 250°F (121°C) per ASTM C 411.

5. Adhesive: UL listed waterproof type.

6. Fasteners: Duct liner galvanized steel pins, welded or mechanically fastened.

PART 3 – EXECUTION:

3.1 EXAMINATION AND PREPARATION

A. Verify that ductwork has been tested for leakage in accordance with SMACNA standards before applying insulation materials.

B. Verify that all surfaces are clean, dry and free of foreign material before applying insulation materials.

3.2 INSTALLATION

A. Install materials in accordance with manufacturer's recommendations, building codes and industry standards.

B. Insulation shall be continuous at pipe and duct hangars.

C. Continue insulation, including vapor barrier, through wall and floor penetrations except where prohibited by code.

D. Piping Insulation

1. Locate insulation and cover seams in least visible locations.

2. Neatly finish insulation at supports, protrusions, and interruptions.

3. Provide form fitted insulation for elbows and tees with PVC covers.

4. Provide fitted insulation which can be removed and reused around equipment, valves and flanges, etc.

5. Provide insulated dual temperature pipes or cold pipes conveying fluids below ambient temperature with vapor retardant jackets with self-sealing laps. Insulate complete system

6. For insulated pipes conveying fluids above ambient temperature, secure jackets with self-sealing laps or outward clinched, expanded staples.

7. Bevel and seal ends of insulation at equipment, flanges, and unions. For insulated pipes conveying fluids above ambient temperature, insulation shall also be beveled at valves, strainers, flexible connections, etc.

8. For piping 1 ¼" and larger, provide calcium silicate insert between support shield and piping.

9. For insulated pipe exposed in mechanical equipment rooms or in finished spaces below 6 feet above finished floor, finish fitting covers.

10. For exterior applications, provide weather protection jacket. Exterior insulated pipe, fittings, joints, and valves shall be covered with aluminum jacket. Jacket seams shall be located on bottom side of horizontal piping.

11. All insulated pipes shall have a protective metal shield inserted centrally at all hangers, rollers, and support points. Metal shield shall be installed regardless of presence of calcium silicate insert.

    a. Shields shall be of galvanized steel and shall cover the lower 1/2 of the insulation.

    b. Shields for pipe up to 6 inch in diameter shall be 18 gauge, 12 inch long.

    c. Shields for pipe above 6 inch shall be 16 gauge, 18 inch long.

    d. Size and thickness of shields should not be left to discretion of installing contractor.

    e. Similar shields shall be installed on sides and tops of all insulated piping at locations where such piping is in the path of normal personnel traffic, and the insulation would be subject to damage from such traffic.

E. External Ductwork Insulation:

1. Provide insulated ductwork with vapor retardant jacket. Seal all vapor retardant jacket seams and penetrations with UL listed tapes or vapor retardant adhesive.

2. Continue insulation through walls, sleeves, hangers, and other duct penetrations except where prohibited by code.

3. The underside of duct work 24" or greater shall be secured with mechanical fasteners and speed clips spaced approximately 18" on center. The protruding

ends of the fasteners should be cut off flush after the speed clips are installed, and then, sealed with the same tape as specified above.

4. For ductwork exposed to physical abuse in mechanical equipment rooms or in finished spaces, finish with PVC jacket or aluminum jacket.

F. Duct Liner:

1. Adhere insulation to sheet metal with full coverage of a UL listed adhesive.

2. Secure insulation with mechanical liner fasteners as indicated by SMACNA or manufacturer. Pin length should be as recommended by the liner manufacturer.

3. All exposed edges of the liner must be factory or field coated. For systems operating at 4000 fpm or higher a metal nosing must be installed in all liner leading edges.

4. Repair liner surface penetrations with UL listed adhesive

3.3 PIPING INSULATION SCHEDULE

	Pipe Size	Insulation Thickness
A. Fiber Glass Insulation		
Domestic Hot Water	Up to 4”	1”
Piping Subject to freezing	All Sizes	1”
B. Elastomeric Foam		
Refrigerant Suction	All Sizes	3/4”
Refrigerant Hot Gas	All Sizes	3/4”
Condensate	All Sizes	1/2”

C. Domestic hot water branch lines down in walls up to 3/4" may be insulated with 1" elastomeric foam at contractor’s option.

3.4 DUCTWORK INSULATION SCHEDULE

	Thickness	Finish
A. Flexible Fiber Glass (wrap)		
Interior Medium Pressure Supply; Interior Round Low Pressure Supply and Return	2-1/5”	FSK
B. Duct Liner		
Interior Rectangular Low Pressure Supply and Return	1-1/2”	Mat Faced
Exterior Rectangular Low Pressure Supply and Return	2”	Mat Faced

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SECTION 230800 - COMMISSIONING OF HVAC SYSTEMS

PART 1 – GENERAL:

1.1 COMMISSIONING PROVIDER

A. The Architect/Owner shall procure the commissioning provider (CP). The commissioning provider shall be a Certified Commissioning Authority (CxA) as recognized by the AABC Commissioning Group (ACG). The CP has overall responsibility for planning and coordinating the commissioning process. However, commissioning involves all parties to the design and construction process, including the contractor.

1.2 CONTRACTOR RESPONSIBILITY

A. This Document of the specifications defines the contractor's responsibilities with respect to the commissioning process. Each contractor and sub-contractor shall review this Document and shall include in their bids for carrying out the work described, as it applies to each Division and Document of these specifications, individually and collectively.

1.3 DESCRIPTION OF WORK

A. The purpose of the commissioning process is to give the owner/operator of the facility the assurance that the HVAC systems operate within the performance guidelines set out in the construction documents. The CP will provide the owner with an unbiased, objective view of the system's operation and performance. The commissioning process does not take away or reduce the responsibility of the installing contractors to provide a finished product, installed and fully functional in accordance with the contract documents.

B. The General Contractor and HVAC Contractor shall be responsible for cooperating and coordinating their work with the CP. They shall also be responsible for operating the HVAC systems during the commissioning process as required in this Document.

C. The following commissioning tasks shall be performed in accordance with the 2012 International Energy Conservation Code (IECC) Document C408.2:

1. Develop commissioning specifications for the construction bid documents.
2. Develop the Commissioning Plan.
3. Write Functional Performance Test procedures.
4. Complete Testing, Adjusting, and Balancing (TAB).
5. Execute Functional Performance Testing.
6. Prepare the Preliminary Commissioning Report.
7. Compile O&M Manuals.
8. Prepare the Final Commissioning Report.

1.4 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including general and supplementary conditions, general HVAC provisions and applicable Division 23 Specification Documents, apply to work of this Document.

1.5 REFERENCES

A. 2012 International Energy Conservation Code (IECC)

1.6 BUILDING SYSTEMS TO BE COMMISSIONED

A. All HVAC systems installed under this contract shall be tested and operated for commissioning provider verification as described in Part 3 of this Document:

1. Rooftop Packaged Air Conditioning Units

2. VAV Terminal Units with Electric Heaters

3. Ductless Split Systems

4. Exhaust Fans

5. Energy Management and Controls System (EMCS)

B. The contractor shall be responsible for carrying out all work required for commissioning the systems that are defined as a contractor responsibility in Part 3 of this Document.

1.7 FUNCTIONAL PERFORMANCE TESTS

A. Equipment functional performance testing shall demonstrate the installation and operation of components, systems, and system-to-system interfacing relationships in accordance with approved plans and specifications such that operation, function, and maintenance serviceability for each of the commissioned systems is confirmed. Testing shall include all modes and sequence of operation, including under full-load, part-load and the following emergency conditions:

1. All modes as described in the sequence of operation;

2. Redundant or automatic back-up mode;

3. Performance of alarms; and

4. Mode of operation upon a loss of power and restoration of power.

B. HVAC control systems shall be tested to document that control devices, components, equipment, and systems are calibrated, adjusted and operate in accordance with approved plans and specifications. Sequences of operation shall be functionally tested to document they operate in accordance with approved plans and specifications.

C. Air economizers shall undergo a functional test to determine that they operate in accordance with manufacturer’s specifications.

D. The Commissioning Plan contains draft versions of Functional Performance Tests (FPTs) as listed below:

FPT #1 Rooftop Packaged Air Conditioning Units

FPT #2 VAV Terminal Units

FPT #3 Ductless Split System

FPT #4 Exhaust Fan – Scheduled

FPT #5 Exhaust Fan – Temperature Controlled

1.8 MEMBERS OF THE COMMISSIONING TEAM

A. The commissioning team will consist of representatives of the following:

1. Commissioning provider (CP)
2. General contractor (GC)
3. HVAC (Div. 23) contractor (HC)
4. Controls contractor (CC)
5. Testing, adjusting, and balancing agency (TAB)

PART 2 – PRODUCTS:

2.1 COMMISSIONING SOFTWARE

A. At the commissioning provider's option, the commissioning provider may utilize the CxAlloyTQ commissioning management software package (http://www.cxalloy.com/tq). The cost of the software shall be borne by the commissioning provider. However, the general contractor and each installing contractor shall be required to provide a web-enabled electronic device for their own use on the job site. The web-enabled electronic device shall be capable of running the CxAlloyTQ software. CxAlloyTQ is available on Apple iOS for iPad or iPhone, Chrome for Android or Windows mobile devices, or the software can be accessed through a desktop web browser.

1. Every contractor on the commissioning team shall include the cost of the electronic device and web access on the job site in their bid. The owner will not be responsible for providing web access.

PART 3 – EXECUTION:

1.01 COMMISSIONING RESPONSIBILITIES - NON-CONTRACTOR TEAM MEMBERS

A. INTRODUCTION

1. A multi-disciplinary team carries out commissioning. The commissioning responsibilities of non-contractor team members are provided here for information, and to provide some context for the overall process.

B. COMMISSIONING PROVIDER RESPONSIBILITIES

1. The commissioning provider will:

a. Plan, organize and implement the commissioning process as specified herein
b. Prepare the commissioning plan and ensure its distribution. The commissioning plan shall include the following:

i A narrative description of the activities that will be accomplished during each phase of commissioning, including the personnel intended to accomplish each of the activities.

ii A listing of the specific equipment, appliances or systems to be tested and a description of the tests to be performed.

iii Functions to be tested, including, but not limited to calibrations and economizer controls.

iv Conditions under which the test will be performed. At a minimum, testing shall affirm winter and summer design conditions and full outside air conditions.

v Measurable criteria for performance.

c. Write functional performance test procedures

d. Direct the HVAC contractor to operate equipment and systems as required to ensure that all functional performance tests are carried out for verification purposes

e. Witness all functional performance tests and document the results

f. Track deficiencies using an Issues and Resolutions Log

g. Prepare a Preliminary Commissioning Report which identifies the following. The Preliminary Commissioning Report shall be submitted to the Owner prior to the final mechanical inspection with copies to the General Contractor, HVAC Contractor, Architect and Mechanical Engineer:

i. Itemization of deficiencies found during testing required by this Document that have not been corrected at the time of report preparation.

ii. Deferred tests that cannot be performed at the time of report preparation because of climatic conditions.

iii. Climatic conditions required for performance of the deferred tests.

h. Prepare a Final Commissioning Report which identifies the following. The Final Commissioning Report shall be submitted to the Owner within 90 days of the date of receipt of the certificate of occupancy with copies to the General Contractor, HVAC Contractor, Architect and Mechanical Engineer.

i. Results of functional performance tests.

ii. Disposition of deficiencies found during testing, including details of corrective measures used or proposed.

iii. Functional performance test procedures used during the commissioning process including measurable criteria for test acceptance, provided herein for repeatability.

vi Exception: Deferred tests which cannot be performed at the time of report preparation due to climatic conditions.

3.2 COMMISSIONING RESPONSIBILITIES - GENERAL CONTRACTOR

A. The General Contractor has responsibility to ensure the overall completion of the Work. In this regard, he shall:

1. Participate as required in the commissioning process.

2. Review the commissioning plan.

3. Incorporate commissioning tasks into the master construction schedule.

4. Ensure the HVAC Contractor performs all assigned commissioning responsibilities as specified below.

5. Make available a copy of the Preliminary Commissioning Report for review by the code official, Authority Having Jurisdiction (AHJ), and the building and mechanical inspectors.

B. The General Contractor shall assign a representative to the commissioning team, and submit the person's name to the commissioning provider, within one (1) month of the award of the contract. The representative shall have the authority to make decisions on behalf of the General Contractor as they relate to the organization and scheduling of commissioning. The representative shall facilitate communications among all contractors and suppliers and other commissioning team members, and shall foster the necessary cooperative action. One specific responsibility shall be to ensure corrective actions arising from testing are attended to as required to allow the commissioning process to proceed on schedule.

C. In the event that any scheduled equipment or system start-ups or functional performance tests are terminated because the CP, Mechanical Engineer, or the Electrical Engineer discover deficient or incomplete work, or due to the non-attendance of required contractor or supplier personnel, the contractor or sub-contractor responsible for the termination shall also be responsible for paying reasonable costs of time and travel expenses of any or all of the following representatives who were physically present for the purpose of witnessing the testing: the CP, the Mechanical Engineer, the Electrical Engineer, and the Owner. The Owner may provide a statement to the General Contractor identifying the specific activity that was terminated, the scheduled date, and a list of those in attendance, along with their reasonable time and travel expense costs.

3.3 COMMISSIONING RESPONSIBILITIES — DIVISION 23 (HVAC) CONTRACTOR

A. The HVAC Contractor, and all the sub-contractors and suppliers within Division 23, shall cooperate with the commissioning provider (CP), and other commissioning team members, to facilitate the successful completion of the commissioning process.

B. The contractor shall assign a representative to the commissioning team, and submit the person's name to the commissioning provider, within one (1) month of the award of the contract. The representative shall have the authority to make decisions on behalf of the HVAC Contractor as they relate to the organization and scheduling of commissioning. The representative shall ensure communications between Division 23 contractors and

suppliers and all other commissioning team members, and shall foster the necessary cooperative action. One specific responsibility shall be to ensure corrective actions arising from testing are attended to as required to allow the commissioning process to proceed on schedule.

A. The HVAC Contractor, and all mechanical sub-contractors and suppliers, shall cooperate with the commissioning provider in carrying out the commissioning process. In this context, the HVAC Contractor shall:

1. Include in their quotes the cost of participating in the commissioning process as specified herein.

2. Ensure the automatic temperature controls contractor (CC) performs HVAC commissioning responsibilities as specified below.

3. Ensure the testing, adjusting and balancing (TAB) agency performs commissioning responsibilities as specified below.

4. Include requirements for O&M data in each purchase order or sub-contract written.

5. Ensure participation of major equipment manufacturers in appropriate testing activities.

6. Provide sufficient personnel to assist the CP during functional performance testing.

7. Provide access to all HVAC equipment for the commissioning provider's use during functional performance testing. This includes ladders, lifts, scaffolding, etc.

8. Notify the CP a minimum of two weeks in advance of the time for start of the TAB work.

9. Ensure the testing, adjusting and balancing agency performs all commissioning responsibilities as listed below.

10. Carry out pre-FPT checks to ensure that all equipment and systems are fully functional and ready for the CP to witness prior to scheduling functional performance tests (FPTs). Provide written notification that FPTs have been pre-tested.

11. Operate equipment and systems for FPTs in accordance with the commissioning plan and as directed by the commissioning provider. If improper functionality, incomplete work, or other deficiencies affecting system performance are discovered, the FPTs will be stopped by the CP. Those responsible for deficient or incomplete work will be responsible for costs in accordance with 3.02 in this Document. Ensure that all corrections are completed; then with the Controls Contractor and other applicable sub-contractors, carry out pre-functional performance checks to confirm correct operation before applying to the CP to reschedule the FPTs for the system in question.

12. Gather operating and maintenance (O&M) data on all HVAC equipment and assemble in binders as required by other Documents of the specifications and the following. O&M data shall be submitted to the Owner within 90 days of the date of receipt of the certificate of occupancy with copies to the General Contractor, HVAC Contractor, Architect and Mechanical Engineer. At a minimum the O&M manuals shall include:

    a. Submittal data stating equipment size and selected options for each piece of equipment requiring maintenance.

    b. Manufacturer's operation manuals and maintenance manuals for each piece of equipment requiring maintenance, except equipment not furnished as part of the project. Required routine maintenance actions shall be clearly identified.

    c. Name and address of at least one service agency.

    d. HVAC controls system maintenance and calibration information, including wiring diagrams, schematics, and control sequence descriptions. Desired or field-determined setpoints shall be permanently recorded on control drawings at control devices or, for digital control systems, in system programming instructions.

    e. A narrative of how each system is intended to operate, including recommended setpoints.

3.4 COMMISSIONING RESPONSIBILITIES - TAB AGENCY

A. The TAB Agency shall assign a representative to the commissioning team, and submit the person's name to the commissioning provider. The representative shall have the authority to make decisions on behalf of the TAB Agency as they relate to the organization and scheduling of commissioning. The representative shall facilitate communications among all contractors and suppliers and other commissioning team members, and shall foster the necessary cooperative action.

B. With respect to HVAC commissioning, the TAB agency shall:

1. Include costs for commissioning requirements in the quoted price.

2. Perform TAB in accordance with the 2012 IECC Document C408.2.2 and as specified in Document 23 05 93.

3. Submit proposed schedule for completing TAB work to the GC and CP for review and acceptance.

4. At the completion of the TAB work, submit the final TAB report to the Owner within 90 days of the date of receipt of the certificate of occupancy with copies to the General Contractor, HVAC Contractor, Architect and Mechanical Engineer.

3.5 COMMISSIONING RESPONSIBILITIES - CONTROLS CONTRACTOR

A. The Controls Contractor shall assign a representative to the commissioning team, and submit the person's name to the commissioning provider. The representative shall have the authority to make decisions on behalf of the Controls Contractor as they relate to the

organization and scheduling of commissioning. The representative shall facilitate communications among all contractors and suppliers and other commissioning team members, and shall foster the necessary cooperative action. One specific responsibility shall be to ensure corrective actions arising from testing are attended to as required to allow the commissioning process to proceed on schedule.

B. With respect to HVAC commissioning, the Controls Contractor shall:

1. Include cost for commissioning requirements in the quoted price.

2. Review design for controllability with respect to equipment selected for commissioning:

a. Review and confirm in writing that a proper hardware specification exists to permit functional performance testing as required by specification and sequence of operation.
b. Review and confirm in writing that proper safeties and interlocks are included in the design.
c. Clarify all questions concerning sequences of operation with the Mechanical Engineer.

3. Provide the following submittals to the A/E team and CP for review:

a. Hardware and software submittals.

b. Comprehensive schedule for calibrating sensors and actuators.

c. Control panel construction shop drawings.

d. Network architecture drawing showing all controllers, routers, workstations, printers, and other devices in a riser format, including protocols for all trunks.

e. Diagrams showing all control points, sensor locations, point names, actuators, controllers and where necessary, points of access, all superimposed on diagrams of the physical equipment.

f. Narrative description of all control sequences for each piece of equipment controlled. Whether included in the engineer's sequence of operations or not, the control contractor's sequence of operations shall include all needed clarifications such as dead bands, delays, and timers that are built into the software to make the sequence work in the field.

g. Occupancy schedule for each piece of equipment requiring a different schedule.

h. Setpoint schedule identifying user adjustable and non-adjustable parameters and their values. Setpoints include but are not limited to cooling space temperature, heating space temperature, differential pressure, duct static pressure, supply air temperature, chilled water supply temperature, heating water supply temperature, timers, deadbands, etc. Setpoint schedule shall explain any automatic reset

sequences. At contractor's option, the setpoints may be incorporated into the sequence of operations.

i. A list of all control points, including analog inputs, analog outputs, digital inputs, digital outputs, and software points. Include the values of all parameters for each system point. Provide a separate list for each stand-alone controller.

4. Inspect, check, and confirm the proper installation and performance of controls/BAS hardware and software provided by others.

5. Integrate installation and programming scheduling with construction and commissioning schedules.

6. Carry out pre-FPT checks to ensure that all equipment and systems are fully functional and ready for the CP to witness prior to scheduling functional performance tests (FPTs). Provide written notification that FPTs have been pre-tested.

7. In conjunction with the HVAC Contractor, demonstrate system performance to the CP including all sequences of operation during the functional performance tests (FPTs). If improper functionality, incomplete work, or other deficiencies affecting system performance are discovered, the FPTs will be stopped by the CP. Ensure that all corrections are completed; then with the HVAC contractor and other applicable sub-contractor, carry out functional performance checks to confirm correct operation before applying to the CP to reschedule the FPT's for the system in question.

8. Provide control system technician to operate the controls system during functional performance testing.

9. Provide support and coordination with TAB contractor on all interfaces between controls and TAB scopes of work. Provide, at no additional cost to the TAB and commissioning agencies, all devices, such as portable operator's terminals and all software for the TAB agency to use in completing TAB procedures.

10. Gather operating and maintenance (O&M) data on all controls equipment and assemble in binders as required by other Documents of the specifications and the following. O&M data shall be submitted to the Owner within 90 days of the date of receipt of the certificate of occupancy with copies to the General Contractor, HVAC Contractor, Architect and Mechanical Engineer. At a minimum the O&M manuals shall include:

a. Submittal data stating equipment size and selected options for each piece of equipment requiring maintenance.

b. Manufacturer's operation manuals and maintenance manuals for each piece of equipment requiring maintenance, except equipment not furnished as part of the project. Required routine maintenance actions shall be clearly identified.

c. Name and address of at least one service agency.

d. HVAC controls system maintenance and calibration information, including wiring diagrams, schematics, and control sequence descriptions. Desired or field-determined setpoints shall be permanently recorded on control drawings at control devices or, for digital control systems, in system programming instructions.

e. A narrative of how each system is intended to operate, including recommended setpoints.

C. The Controls Contractor shall provide access to all EMCS hardware, control panels, and junction boxes for the commissioning provider's use during functional performance testing. This includes ladders, lifts, scaffolding, etc.

PART 4 – COMMISSIONING PLAN:

4.1 GENERAL

A. The commissioning plan will be provided prior to the scoping meeting to assist the contractor in scheduling the commissioning effort. FPTs will be finalized after submittals have been reviewed and approved by the A/E team.

END OF DOCUMENT 230800

SECTION 230900 - ENERGY MONITORING AND CONTROL SYSTEM (EMCS)

PART 1 – GENERAL:

1.1 WORK INCLUDED

A. EMCS

B. Valve Actuator Electric/Electronic

C. Airflow Measuring Station

D. Control Dampers

E. Digital Control System for VAV Terminals

1.2 RELATED DOCUMENTS

A. Document 230500 - Basic Mechanical Materials and Methods

B. Document 232000 - Building Services Piping

C. Document 233000 - Air Distribution

D. Document 230593 - Testing, Adjusting, and Balancing (TAB)

E. All work of this Division shall be coordinated and provided by the single EMCS Contractor.

F. The work of this Division shall be scheduled, coordinated, and interfaced with the associated work of other trades. Reference the applicable sections for details.

G. The work of this Division shall be as required by the Specifications, Point Schedules and Drawings.

H. If the EMCS Contractor believes there are conflicts or missing information in the project documents, the Contractor shall promptly request clarification and instruction from the design team.

1.3 GENERAL EMCS SYSTEM DESCRIPTION

A. The EMCS shall be a complete system designed for use with the enterprise IT systems. This functionality shall extend into the equipment rooms. Devices residing on the automation network located in equipment rooms and similar shall be fully IT compatible devices that mount and communicate directly on the IT infrastructure in the facility. Contractor shall be responsible for coordination with the owner’s IT staff to ensure that the EMCS will perform in the owner’s environment without disruption to any of the other activities taking place on that LAN.

B. Any and all components of the EMCS that are connected via field bus or IP network, including the network controllers, field controllers, application specific controllers, server and user interface software, system and controller programming tools and software applications shall be designed, engineered, and tested to work together as a complete building management system, and shall be manufactured by the same EMCS

manufacturer. Systems that use or require network controllers, field controllers, application specific controllers, server and user interface software, programming tools and software from more than one EMCS manufacturer shall not be accepted.

C. All points of user interface shall be on standard computing devices that do not require the purchase of any special software from the EMCS manufacturer for use as a building operations terminal. The primary point of interface on these devices will be a standard Web Browser.

D. The work of the single EMCS Contractor shall be as defined individually and collectively in all Sections of this Division specification together with the associated Point Sheets and Drawings and the associated interfacing work as referenced in the related documents.

E. The EMCS work shall consist of the provision of all labor, materials, tools, equipment, software, software licenses, software configurations and database entries, interfaces, wiring, tubing, installation, labeling, engineering, calibration, documentation, samples, submittals, testing, commissioning, training services, permits and licenses, transportation, shipping, handling, administration, supervision, management, insurance, temporary protection, cleaning, cutting and patching, warranties, services, and items, even though these may not be specifically mentioned in these Division documents which are required for the complete, fully functional and commissioned EMCS.

F. Provide a complete, neat and workmanlike installation. Use only manufacturer employees who are skilled, experienced, trained, and familiar with the specific equipment, software, standards and configurations to be provided for this Project.

G. Manage and coordinate the EMCS work in a timely manner in consideration of the Project schedules. Coordinate with the associated work of other trades so as not to impede or delay the work of associated trades.

H. The EMCS as provided shall incorporate, at minimum, the following integrated features, functions and services:

1. Operator information, alarm management and control functions.
2. Information management including monitoring, transmission, archiving, retrieval, and reporting functions.
3. Diagnostic monitoring and reporting of EMCS functions.
4. Energy management.
5. Standard applications for terminal HVAC systems.
6. Enterprise-wide information and control access.
7. Offsite monitoring and management access.
8. Indoor Air Quality monitoring and control.

1.4 SUBMITTALS (Also Refer to Document 230500)

A. Prior to commencement of work, provide complete system drawings, control air compressor calculation, panel drawings, schematic diagrams, point to point wiring diagrams, written operational sequences, and description and engineering data on each control system component.

B. Refer to Document 019113 for additional submittal requirements.

C. The EMCS contractor shall submit a list of all shop drawings with submittals dates within 30 days of contract award.

D. Submittals shall be in defined packages. Each package shall be complete, shall only reference itself, and previously submitted packages. The packages shall be as reviewed by the Architect and Engineer for Contract compliance.

E. Allow 15 working days for the review of each package by the Architect and Engineer in the scheduling of the total work.

F. Equipment and systems requiring approval of local authorities must comply with such regulations and be approved. Filing shall be at the expense of the Contractor where filing is necessary. Provide a copy of all related correspondence and permits to the Owner.

G. Prepare an index of all submittals and shop drawings for the installation. Index shall include a shop drawing identification number, Contract Documents reference and item description.

H. The Contractor shall correct any errors or omissions noted in the first review.

I. At a minimum, submit the following:

1. EMCS network architecture diagrams including all nodes and interconnections.
2. Systems schematics, sequences, and flow diagrams.
3. Points schedule for each point in the EMCS, including: Point Type, Object Name, Expanded ID, Display Units, Controller type, and Address.
4. Samples of Graphic Display screen types and associated menus.
5. Detailed Bill of Material list for each system or application, identifying quantities, part numbers, descriptions, and optional features.
6. Control Damper Schedule including a separate line for each damper provided under this section and a column for each of the damper attributes, including Code Number, Fail Position, Damper Type, Damper Operator, Duct Size, Damper Size, Mounting, and Actuator Type.
7. Room Schedule including a separate line for each VAV box and/or terminal unit indicating location and address.
8. Details of all EMCS interfaces and connections to the work of other trades.
9. Product data sheets or marked catalog pages including part number, photo and description for all products including software.

1.5 ENVIRONMENT

A. The EMCS shall be capable of operating in an environment of 32-120 degrees F and 10-95% relative humidity. Sensors and control elements shall operate under the temperature, pressure, humidity, and vibration conditions normally encountered in the installed location. EMCS system shall maintain accuracy as follows:

1. +/- .5°F for the space temperatures in the 40 - 120°F range.

2. +/- 1.0°F for outside air temperatures in the 30 - 130°F range.

3. +/- 1.0°F for water temperature in the 30 - 230°F range.

4. +/- .5°F for duct temperatures in the 40 - 130°F range.

5. +/- 3% for relative humidity in the 20 - 70% range

1.6 QUALITY ASSURANCE

A. The Contractor shall have a branch facility within a 100-mile radius of the job site supplying complete maintenance and support services on a 24 hour, 7-day-a-week basis. The Contractor shall have, at this facility, a trained, directly employed and full time technical staff, spare parts inventory, and all necessary test and diagnostic equipment.

B. As evidence and assurance of the contractor's ability to support the Owner's system with service and parts, the contractor must have been in the business for at least the last ten (10) years and have successfully completed total projects of at least 10 times the value of this contract in each of the preceding five years.

C. The EMCS architecture shall consist of the products of a manufacturer regularly engaged in the production of EMCS, and shall be the manufacturer's latest standard of design at the time of bid.

D. Designate a competent and experienced employee to provide EMCS Project Management. The designated Project Manager shall be empowered to make technical, scheduling and related decisions on behalf of the EMCS Contractor. At minimum, the Project Manager shall:

1. Manage the scheduling of the work to ensure that adequate materials, labor and other resources are available as needed.
2. Manage the financial aspects of the EMCS Contract.
3. Coordinate as necessary with other trades.
4. Be responsible for the work and actions of the EMCS workforce on site.

PART 2 – PRODUCTS:

2.1 EMCS

A. General

1. The Electronic Microprocessor Based Energy Monitoring & Control System (EMCS) shall monitor the Data Environment and perform control functions in relation to a programmed strategy and the status of the Data Environment.

2. The system shall use solid state computer-based digital and analog technology. The system shall be standard with the manufacturer to insure ongoing parts availability and trained technical support.

3. The EMCS shall be of the fully user programmable type requiring no special computer education for operation. All necessary instruction manuals and user orientation training shall be supplied by the manufacturer or agent thereof.

4. Communication protocol between Application Specific and Programmable controllers shall adhere to BACnet protocol as described in paragraph 2.1B below. Communication protocol shall be considered "native" BACnet at all levels. Proprietary protocols are not acceptable at any level.

5. The intent of this division specification is to establish a level of control system required for this project. All functions described herein are required but it is

understood that some degree of flexibility may be required. Any major deviation requires the written approval of the Architect/Engineer prior to bid date.

6. The EMCS shall use an open architecture and fully support a multi-vendor environment. To accomplish this effectively, the EMCS shall support open communication protocol standards and integrate a wide variety of third party devices and applications. The system shall be designed for use on the Internet, or intranets using off the shelf, industry standard technology compatible with other owner provided networks.

7. The EMCS shall consist of the following:

   a. Network Engine(s)
   b. Field Equipment Controller(s)
   c. Input/Output Module(s)
   d. Local Display Device(s)
   e. Portable Operator's Terminal(s)
   f. Distributed User Interface(s)
   g. Network processing, data storage and communications equipment
   h. Other components required for a complete and working EMCS

8. The system shall be modular in nature, and shall permit expansion of both capacity and functionality through the addition of sensors, actuators, controllers and operator devices, while re-using existing controls equipment.

9. System architectural design shall eliminate dependence upon any single device for alarm reporting and control execution.

10. The failure of any single component or network connection shall not interrupt the execution of control strategies at other operational devices.

11. The System shall maintain all settings and overrides through a system reboot.

B. Open Protocol Communications

1. Read (Initiate) and Write (Execute) Services as defined in Clauses 15.5 and 15.8 respectively of ASHRAE Standard 135-95, shall be used to communicate with BACnet objects in the network.

C. System Architecture

1. Automation Network

   a. The automation network shall be based on a PC industry standard of Ethernet TCP/IP. Where used, LAN controller cards shall be standard “off the shelf” products available through normal PC vendor channels.

   b. The EMCS shall network multiple user interface clients, application and data servers, automation engines, system controllers and application-specific controllers including but not limited to:

      i Network Automation Engines

ii Network Integration Engines
iii Network Control Engines
iv Select Field Equipment Controllers
v Select VAV Modular Assemblies
vi Third Party BACnet controllers and peripheral devices with compatibility listed by BACnet International
vii Application and Data Server

c. All EMCS devices on the automation network shall be capable of operating at a minimum communication speed of 100 Mbps, with full peer-to-peer network communication.

d. Network Security – To protect the EMCS from unauthorized users and computer hackers the Automation Network shall support HTTPS with TLS 1.2 between components, including the Application and Data Server(s), Network Engines, Mobile User Interface and Site Management Portal. Self-signed certificates are installed on supported products, with the option of configuring trusted certificates. Computing devices supplied by the EMCS vendor will automatically shut down unused ports to deter unauthorized access.

e. The automation network will be compatible with other enterprise-wide networks. Where indicated, the automation network shall be connected to the enterprise network and share resources with it by way of standard networking devices and practices.

2. Control Network

a. Network Engines (NAE, NIE, NCE) shall provide supervisory control over the control network and shall selectively support the following communication protocols:

i BACnet Standard Master-Slave/Token-Passing (MS/TP) Bus Protocol ASHRAE SSPC-135:

A) The NAE shall be BTL certified and carry the BTL Label.
B) The NAE shall be tested and certified as a BACnet Building Controller (B-BC).

b. Control networks shall provide either “Peer-to-Peer”, Master-Slave, or Supervised Token Passing communications, and shall operate at a minimum communication speed of 9600 baud.
c. Control network shall support digital controllers as indicated in plans and specifications.
d. Default control network communication protocol for this project shall be BACnet Standard MS/TP Bus Protocol ASHRAE SSPC-135.
e. A BACnet Protocol Implementation Conformance Statement (PICS) shall be provided for each controller device (master or slave) that will communicate on the BACnet MS/TP Bus.
f. The PICS shall be submitted 10 days prior to bidding.

3. Integration

a. Hardwired

i Analog and digital signal values shall be passed from one system to another via hardwired connections.
ii There will be one separate physical point on each system for each point to be integrated between the systems.

b. Direct Protocol (Integrator Panel)

i The EMCS system shall include appropriate hardware equipment and software to allow bi-directional data communications between the EMCS system and third party manufacturers' control panels. The EMCS shall have the ability to receive, react to, and return information from multiple building systems, including but not limited to the chillers, boilers, variable frequency drives, power monitoring system, and medical gas.
ii All data required by the application shall be mapped into the Automation Engine's database, and shall be transparent to the operator.
iii Point inputs and outputs from the third party controllers shall have real-time interoperability with EMCS software features such as: Control Software, Energy Management, Custom Process Programming, Alarm Management, Historical Data and Trend Analysis, Totalization, and LAN Communications.

c. BACnet Protocol Integration – BACnet

i The neutral protocol used between systems will be BACnet IP and comply with the ASHRAE BACnet standard 135.
ii A complete Protocol Implementation Conformance Statement (PICS) shall be provided for all BACnet system devices.
iii The ability to command, share point object data, change of state (COS) data and schedules between the host and BACnet systems shall be provided.

D. Acceptable Manufacturers:

1. Johnson Controls

2. Delta Controls – Advanced Controls (Alternate #3 only)

E. Modular Design/Expandability

1. The EMCS shall be of a modular design providing distributed processing capability, and allowing future expansion of both input/output points and processing/control functions.

F. Battery Backup

1. The system shall be tolerant of power failure and hold memory a minimum of 24 hours using battery backup. On power restoration, the system shall automatically execute the following restart procedures.

    a. Come on line
    b. Update all monitored functions.
    c. Resume operation based on current time and status.
    d. Implement special building start up strategies as required.
    e. Log time of power outages and start ups

2. System shall monitor the battery backup and provide a low battery alarm.

G. Program Storage

1. The system shall be capable of interfacing with a mass storage (DVD and CD) device, for use in up loading and down loading programs to the EMCS.

H. EMCS Inputs

1. The input Document of the EMCS shall connect the EMCS to the building environment. The EMCS shall be capable of accepting information in the form of 3k and 10k thermistors, 0-5 VDC, 0-10 VDC, 4-20 mA, dry contacts, and pulse inputs.

2. The Analog Input (AI) function shall monitor each analog input, perform analog-to-digital (A/D) conversion, and hold the digital value in a buffer for interrogation. The A/D conversion shall have a minimum resolution of 10 bits. Analog inputs shall withstand continuous direct shorting to 120 VAC, 60 Hz power without failure.

3. The Digital Input (DI) function shall accept dry contact closures and voltage level transitions. Digital inputs shall withstand continuous direct shorting to 120 VAC, 60 Hz power without failure.

4. Temperature inputs originating from a thermistor or resistance temperature detector (RTD) shall be monitored and buffered as an AI, except that automatic conversion to degrees F shall occur without any additional signal conditioning. Temperature inputs shall withstand continuous direct shorting to 120 VAC, 60 Hz, power without failure.

5. The pulse or watt accumulator function shall have the same characteristics as the DI, except that, in addition, a buffer shall be included to totalize pulses between interrogations. The pulse accumulator shall accept rates up to 10 pulses/second. Pulse inputs shall withstand continuous direct shorting to 120 VAC, 60 Hz, power without failure.

I. EMCS Outputs

1. The Digital Output (DO) function shall provide contact closure for momentary (Pulse Width Modulation) and maintained operation of field devices. Output pulse width shall have a minimum resolution of 0.1 seconds. Isolation and protection against voltage surges up to 180 VAC peak shall be provided. Contact rating shall be a minimum of 2 amps at 24 VAC. Each digital output shall be

equipped with an On/Off/Auto switch to manually obtain either output state. Manual overrides shall be reported to the Master at each update. An LED shall be provided to indicate the state of each digital output.

2. The EMCS shall have an Analog Output (AO) function which shall accept digital data, perform digital-to-analog (D/A) conversion, and modify the signal of a current loop within the range of 4-20mA. D/A conversion shall have a minimum resolution of 8 bits. 4-20mA signal shall be regulated with a minimum resolution of .16mA.

J. Surge Protection

1. Lighting arrestors shall be provided on communication lines that run between buildings.

2. Controllers shall be rated to withstand voltage spikes of 1500 volts.

3. Input wiring shall be shielded; output wiring and power circuits shall use metal oxide varistors.

4. Noise, surge, and spike protection shall be Kele Model No. HSP-121-B or equivalent.

K. Software Features

1. Mathematical Capabilities:

a. The EMCS shall have a math package capable of +, -, *, <, >, functions and up to five levels of parentheses for computation of variables. Control commands may be executed based on these calculated variables which are available to the program on a global basis. Math expressions may be used in action and exit commands of control program.

b. The mathematical software shall be capable of mixed mode arithmetic, utilizing Boolean Logic statements in combination with basic arithmetic to provide conditional mathematical computations.

c. Final field programs shall be stored in battery backed up memory.

d. The software shall include fixed formulas for psychrometric calculations.

2. Passwords:

a. The EMCS shall have a minimum of six levels of user programmable passwords in addition to a master password, for programming security. Up to eight character passwords may be programmed. Access to first level password shall allow interrogation of system status only.

3. History Logging (Trend Logs):

a. System server shall periodically gather historically recorded data stored in the building controllers and archive the information. Archived files shall be appended with new sample data, allowing samples to be accumulated. Systems that write over archived data shall not be allowed,

unless limited file size is specified. Samples shall be viewed at the operator's workstation. Operator shall be able to scroll through all trended data. All trend log information shall be displayed in standard engineering units.

b. Software shall be included that is capable of graphing the trend logged object data. Software shall be capable of creating two-axis (x, y) graphs that display up to ten object types at the same time in different colors. Graphs shall show object values relative to time.

c. Operator shall be able to change trend log setup information. This includes the information to be logged as well as the interval at which it is to be logged. All input, output, and value object types in the system may be logged.

d. Contractor shall provide history logging software as an add-on if it is not already included with the operator's workstation software package.

e. Trend data shall be downloadable to Microsoft Excel format.

4. Messages:

a. The EMCS shall have the capability of storing and displaying up to 99 user programmed messages of up to 128 characters each for alarming, preventative maintenance, and status reporting.

5. Look Up Tables:

a. The EMCS shall have preprogrammed "LOOK UP" tables for the conversion of voltage inputs into temperature and water vapor pressure values for the computation of relative humidity and enthalpy.

6. Output Documentation Format for Operator's Use:

a. The programming language of the EMCS shall be English based such that a printout of the control program may serve as the primary documentation for the system. The same programming language shall be used for all levels of system equipment.

7. Micro Processor Integrity Checking:

a. The EMCS microprocessor shall continuously monitor and check itself and produce error messages in the event of a malfunction.

8. Software Manual:

a. The software manual shall describe programming and testing, starting with a system overview and proceeding to a detailed description of each software feature. The manual shall instruct the user on programming or re-programming any portion of the system. This shall include all control programs, variables, set points, time periods, messages, passwords, and other information necessary to load, alter, test, and execute the system. The manual shall include:

i Complete description of the programming language, including commands, editing and writing control programs, printouts and logs, and mathematical calculations.
ii Instructions on modifying any control point, verifying error status, changing passwords, and initiating or disabling control programs.

L. User Interface

1. Dedicated Web Based User Interface

a. Where indicated on plans the EMCS Contractor shall provide and install a personal computer for command entry, information management, network alarm management, and database management functions. Real-time control functions, including scheduling, history collection and alarming, shall be resident in the EMCS Network Automation Engines and Data Server(s) to facilitate greater fault tolerance and reliability.

b. Dedicated User Interface Architecture – The architecture of the computer shall be implemented to conform to industry standards, so that it can accommodate applications provided by the EMCS Contractor and by other third party applications suppliers, including but not limited to Microsoft Office Applications. Specifically it must be implemented to conform to the following interface standards.

i Microsoft Internet Explorer 11.0 or Edge for user interface functions.
ii Microsoft Office Professional for creation, modification and maintenance of reports, sequences other necessary building management functions.
iii Microsoft Outlook or other e-mail program for supplemental alarm functionality and communication of system events, and reports.
iv Required network operating system for exchange of data and network functions such as printing of reports, trends and specific system summaries.

c. PC Hardware/Software – The personal computer(s) shall be configured as specified in the Computing Hardware and Software section.
d. Provide one operational device as herein specified and located on plans.

2. Mobile, Web Based, User Interface (MUI)

a. General

i The mobile, web based, user interface shall be HTML5-compliant and provide device-agnostic access to the system from smartphones, tablets, portable and desktop computers. User Interfaces that require software installation on the client device (e.g. Java, MicrosoftSilverlight®, Adobe® Flash®), or software

downloads from an online app store shall not be acceptable for these purposes.

ii The mobile user interface shall provide system operators with a simple location-based navigation approach to finding information, including the ability to search for any location by name and to bookmark a location in a standard browser.

iii The mobile user interface shall organize and display information using customer specific locations and spaces. At a minimum, the user interface shall provide:

A) Organization of all space, equipment and point information in a familiar way (using standard equipment names and location descriptions), reducing the need for extensive training prior to use.
B) A navigation mechanism or tree for users to select the specific location or space for accessing information – only spaces and locations in the navigation tree or equipment serving that space, nothing more.
C) The ability to search for and/or bookmark any location, space, or equipment by name for quick access to critical or troublesome areas.
D) Application of the same navigation mechanisms across any client device (e.g. Smart phone, tablet, personal computer) for consistency and ease of use.

iv The same user interface elements shall be accessible from any type of personal computer or mobile device running any type of operating system supported (e.g. iOS, Android, Windows®). It shall automatically adapt and optimize the display for the screen size and touch screen navigation.

v The user interface shall provide support for up to 50 concurrent users from individuals with defined access to the system.

b. Navigation Trees

i A dedicated location based navigation tree shall be provided as part of the user interface in order to navigate to specific places within the facility on a hierarchical basis (typ. Facility, Building, Wing, Floor, Room.)

ii The location-based tree shall use place names familiar to the operator without training or familiarization regarding special codes and conventions utilized in the generation of the EMCS.

iii Clicking or tapping on a location name in the tree shall display the home page associated with the space and simultaneously expand the tree to display the next level of spaces below the one selected.

iv It shall be possible for qualified users to view a navigation tree of devices connected to the EMCS network in order to enable troubleshooting of equipment and communications. Clicking or tapping on the Network Icon at the top of the Navigation Tree will access this alternate view. Users without the necessary access rights shall not see the Network Icon.

v A click or tap on a device in the network tree shall display a dashboard for that device including information regarding related equipment and access to a separate focus view of commandable points associated with the piece of hardware. A click or tap on such a point shall display a control dialogue box allowing the user to modify or command that point as indicated. The dialog box shall contain an annotation box for describing why the action was taken or special circumstances that apply.

vi Specific hardware and software types in the Network tree shall also include access to one or more the following views in their dashboard depending on hardware type or network element (e.g. MS/TP trunk):

A) Summary View
B) Diagnostic View
C) Network View
D) Trend View

vii It shall be possible to hide the Network Tree and return to the Spaces Tree at any time by clicking on the Spaces Icon above the tree.

c. Dashbard Displays

i The user interface shall provide the ability to view equipment visualizations, floor plans, and/or other graphics on mobile or desktop client devices in a browser environment, without the need for additional plugins or software. Graphics shall be accessible via a space (for floorplans, campus maps, etc.) or equipment dashboard.

ii Standard dashboards shall be configured for each defined space including one of the following predefined or custom elements:

A) Equipment Serving Space
B) Potential Problem Areas
C) Equipment Summary
D) Graphic Display
E) Schedule

iii Standard dashboards shall be configured for each system or device (typ. mechanical or electrical equipment) including the following predefined or custom elements:

A) Trend
B) Equipment Activity Summary
C) Equipment Relationships Summary
D) Equipment Data
E) Graphic Display
F) Schedule

iv Users with appropriate permissions shall have access to a Dashboards Manager that can change the display order of Summaries and Data elements, add or remove elements and apply custom dashboards layouts to equipment and space by type.

v Dashboard Manager shall apply dashboards to spaces or equipment based on the viewing platform (Desktop/Tablet or Phone) in order to tailor the user experience to the needs of the specific user base.

vi Default dashboard displays by space and equipment type shall be created per the guidelines in this specification or by mutual agreement with the owner's representative.

d. Alarm Management

i The user interface shall provide a single display of all potential issues in a facility including items currently in alarm, warning, override, out-of-service and offline.

ii The user interface shall provide notification of new alarms, visually and audibly.

iii The user interface shall provide the ability to view a summary of alarms, including a chart of the number of alarms in each of the defined alarm priority ranges. The priority ranges should be filterable.

iv The user interface shall provide the capability to view multiple occurrences of the same alarm, ultimately providing the ability to acknowledge or discard all occurrences of the alarm in a single action.

v The user interface shall provide the capability to view, and filter on, all alarms present in a well-defined mechanical system using the equipment serving equipment relationships.

vi The user interface shall provide the capability to acknowledge and discard all occurrences of at least 1000 alarms in one operation.

vii The user interface shall provide the user with the understanding of what physical space is being affected when an alarm occurs.

The user interface shall provide the ability to filter alarms by physical space affected when the alarm occurred.

viii The user interface shall provide the capability to monitor alarms 24/7 without requiring an active login to the system, accessible via segregated web page. The user interface shall provide the capability to enabled or disable the 24/7 alarm monitor mode if desired.

e. Equipment Activity Summary

i The user interface shall provide a filterable, single display, of all activity related to a specific piece of equipment including user changes, discarded user changes, pending alarms, discarded alarms, and acknowledged alarms for at least one year of historical data.

ii Items shall be listed in timed order with the latest activity at the top of the list.

iii Filters shall allow only specific activities for specific data points occurring within a specific time and date window to be displayed.

iv It shall be possible to export a .csv copy of the currently displayed summary by clicking or tapping on the export icon.

v It shall be possible to create a custom trend graph containing the data shown in the currently displayed summary by tapping or clicking on the trend icon in the header bar and selecting the specific points to trend in the resulting selection panel.

vi Clicking on the information icon in front of any displayed activity listed in the summary shall expand the display to include the name of the user, server time, value prior to the activity, the ability to annotate the activity and a user selectable icon for displaying a trend graph of the point.

f. Equipment Relationships Summary

i The user interface shall provide a summary of all equipment and spaces related to the operation of the system or device currently selected for viewing.

ii Include the capability to navigate to the home page of any related piece of equipment or space with a single click or tap on the desired element.

g. Equipment Data Summary

i The user interface shall provide a summary of all data pertaining to a particular piece of mechanical or electrical equipment in a tabular format.

ii Clicking or tapping on any value in the summary shall display a related command panel allowing the user to command, override, or change service condition of the point selected and to annotate such actions for future reference.

iii It shall be possible to export a .pdf copy of the report with a single click on the associated export icon.

h. Equipment Serving Space Summary

i The user interface shall provide a summary of all mechanical and electrical equipment as defined in the points list that serves a selected space from the navigation tree.

ii The summary shall be capable of including a subset of the viewable points for each system representing the key elements of interest to operators without subjecting them to long lists of points irrelevant to basic operation.

iii Clicking or tapping on any item in the summary shall navigate to the item's assigned home page in the user interface.

iv It shall be possible to view a custom trend of information contained in the summary with a single click of the trend icon residing in the title header.

v It shall be possible to display specific systems and points by filtering equipment types desired.

vi Because the data is intended to be a snapshot of the current conditions in the space it shall not dynamically update but a click or tap on the update icon at any time performs that function.

i. Potential Problem Areas

i The user interface shall provide a summary of all points in the system related to the space that are not operating correctly (e.g. alarm, off normal or not communicating correctly) in order to provide the operator with a quick update on current conditions.

ii The information shall include:

A) Point status (via color.)
B) Point name.
C) Value of the point when the summary was taken.
D) Equipment that contains the offending point.
E) Space that is served by that equipment.

iii Data points in the summary may be filtered by one or more types of off-normal condition (e.g. above setpoint, offline and overridden).

iv The summary may be exported in .csv format for inclusion in spreadsheets or other documents.

j. Equipment Summary

i The user interface shall provide a summary that allows the user to compare all similar equipment that serves the space as well as downstream (child) spaces in order to evaluate conditions quickly and determine patterns for troubleshooting purposes.

ii Each unique equipment type shall be selectable and display a representative set of values along with the space(s) being served by the device. Equipment types can be selected from a dropdown menu in the summary.

iii Clicking or tapping on a selected device in the summary shall navigate to the home page for that piece of equipment while clicking or tapping a data point shall display the command panel for that point.

iv It shall be possible to export a .pdf copy of the currently displayed summary by clicking or tapping on the export icon.

v It shall be possible to create a custom trend graph containing the data shown in the currently displayed summary by clicking on the trend icon in the header bar and selecting the specific points to trend in the resulting selection panel.

k. User Defined Summaries

i Provide the capability to view, command, and modify large quantities of similar data in summaries without the use of a secondary application (e.g. a spreadsheet). These summaries shall be generated automatically or user defined. User defined summaries shall allow up to seven user defined columns describing attributes to be displayed including custom column labels with up to 100 rows per summary.

l. Trend

i The user interface shall provide the capability to view historical trend data from multiple pieces of equipment in both bar and line formats.

ii The user shall have the ability to navigate to a selection list of frequently viewed trends.

iii Trend graphs shall have to ability to be smartly auto-generated based on equipment and space relationships.

iv Each graph shall include a dedicated selection icon to export a copy of the graphic and data in .pdf format or the data only as a .csv file.

m. Operator Access

i The user interface shall provide the ability to segment access to building data based on the space(s) or location(s) the user is physically located in and/or manages. The user interface shall provide the capability to assign “inherited” space permissions and the ability to assign user’s space based access in bulk.

ii The user interface shall provide the ability to segment access to building data based on the space(s) or location(s) the user is physically located in and/or manages. The user interface shall provide the capability to assign “inherited” space permissions and the ability to assign user’s space based access in bulk.

n. Graphics

i The user interface shall display an equipment visualization or graphic within the context of its associated space (building, floor, room, etc.) or equipment dashboard.

ii Graphics shall include the ability to define individual information layers for operator selection in order to clarify systems status and simplify operation on mobile devices. Where desired a master layer may be defined to include important information about the facility on all graphic screens.

iii Graphics shall support the use of photo-realistic symbols as well as color change and animation to match the status of the related system control point.

iv It shall be possible to export a time stamped .pdf file of the graphic being viewed in order to communicate the current conditions in the space or the equipment being viewed and to provide a historic record.

v An integral graphic manager shall be provided including the following features and capabilities:

A) Creation and modification of graphics from any HTML5 capable browser without the need for additional plug-ins or software packages.

B) Access to a full suite of pre-defined templates for air and water sourced HVAC applications as well as the ability to add custom templates as created for other use. Pre-aliased graphic templates may be defined and saved for

repetitive representations of common mechanical and electrical equipment.

C) A full suite of pre-defined three dimensional symbols for mechanical and electrical systems as well as all line, text and shape tools required for integration into a graphic with zoom and pan capabilities on multiple platforms and in multiple browsers.

D) The ability to search and replace items in multiple graphics with a single command.

E) The ability to import and insert photos and images into the graphic.

F) The ability of the graphics manager to create and edit graphics including the ability to bind graphic elements to the values and conditions of system points in both an on-line and off-line mode.

vi As required, the EMCS Contractor shall provide software licenses in the name of the owner for programming, configuration and graphics building tools to allow designated representatives to make changes, modifications or additions to the system. While future updates or revisions may require an update fee, the owner shall incur no additional cost if they choose not to update. Systems that require any annual or time-limited licensing fees shall not be permitted.

o. Scheduling

i The user interface shall provide the capability to display, in a singular view, all of the effective schedules in the context of the space (building/floor/room, etc.) or equipment that the schedule effects. The software should have the ability to display an effective schedule, for the present, or a future date.

ii The user interface shall provide a report of all schedules affecting a space or equipment. The report shall provide the user details of events that comprise the weekly schedule and exception schedule(s). The report shall provide a means of viewing individual breakout scheduling elements for Weekly Schedule, Exceptions and Default Commands.

iii The user interface shall provide the capability to efficiently change or modify schedules in mass quantities. This includes the capability to add, in bulk, exceptions to schedules, in addition to assigning, in bulk, weekly schedules.

p. Command and Control

i It shall be possible to command system analog and binary points via a dropdown menu accessed by clicking or tapping on the value shown in any equipment summary or graphic display and completing the task in the resultant menu including an optional annotation.

ii Commanding multiple points shall be possible on displays where multiple like system elements can be chosen.

q. Search

i Typing a text string in the Search box shall display a list of all occurrences of that string in the mobile user interface. When a string is represented in the description of a space or network element, selecting it shall display its default dashboard.

ii Clicking or tapping on the Advanced Search Icon shall display the Advanced Search dialog box permitting the following:

A) Search by Space and Equipment, Equipment Definition or Network Reference.
B) Filter the search by wildcard name or object type.
C) Multi-selection of objects for commanding or the creation of reports including Trend, Alarm, Audit and Activity for a specific period of time.

r. Offline Operation

i The mobile user interface shall have the ability to operate in an offline mode in order to create or edit graphics and dashboard elements.

ii Content created offline shall be available to all authorized users for inclusion of an operating user interface later.

3. Mobile Access Portal Gateway

a. General: The Mobile Access Portal (MAP) Gateway shall provide a complementary extension to the DDC system user interface requirements previously described in these specifications. The MAP Gateway shall provide an HTML5 browser interface between mobile devices and DDC controllers without the requirement for operational engines or servers. A task specific mobile application shall not be required to use the MAP Gateway.

i The MAP Gateway shall be a hardware/software device which consists of a combination WiFi Access Point hotspot and user interface web server, with BACnet MS/TP RS-485 connectivity, and optional Ethernet IP connectivity.

ii The MAP Gateway can be used tether free using its built in WiFi Access Point or it can be connected to an existing building network through the MAP Gateway Ethernet IP port. This feature may also be used to provide remote connectivity for accessing building controls through the site's IT infrastructure.

iii When not connected via the Ethernet IP port, the MAP Gateway shall provide a secure, isolated connection to controllers on the BACnet MS/TP field bus with no opportunities to "jump off", or bridge over, to the site's IT infrastructure.

iv The MAP Gateway shall serve up HTML5 web pages to allow authorized users to view and/or override controller inputs, outputs, setpoints, schedules, trends, and to view and acknowledge alarms via a browser interface.

v The MAP Gateway shall not require the user to purchase or install any software or applications on the user's smart phone, tablet, PC, or smart device.

vi MAP Functionality: The MAP Gateway shall be capable of serving pre-configured Web Pages to an HTML5 enabled browser. Authorized persons can interact with space and control application set points, alarms, schedules, and trends using a PC, iMac, notebook, smart phone, tablet, or mobile device with WiFi connectivity.

vii The MAP Gateway shall include the following pre-configured user interface web pages linked to real-time data in the field controllers:

A) Device List Page: Include a Device List Page that will allow the user to scroll through all of the controllers connected to the associated MS/TP Field Bus. When the MAP Gateway is plugged directly into a controller and/or its associated room sensor, the Device List Page will indicate which controller it is connected to. The Device List will show an alarm indication (if any are present) for each connected controller. The operator can click on any controller summary to advance to the Device Home Page.

B) Device Home Page: Each controller on the MS/TP Field Bus will include a home page that can be selected on the Device List page. The Device Home Page will show the relevant value and status information for the respective controller using consistent summary graphics that are derived from the equipment model and/or standard control applications libraries. The summary graphic will change to red if there is an alarm present for that controller. The Device Home Page will also show an alarm indication box for the highest priority alarm for that controller.

C) Device Alarm Page: An Alarm Page shall allow the user to toggle between a list of Active Alarms or All Alarms. The Alarm Page shall be organized to automatically show the highest priority alarm indication for each connected device. The Alarm Page will display color

differentiation of alarm priorities. The Alarm Page will provide an accordion pull-down view of reoccurring alarms, showing the date-time stamp of the alarms.

D) Point View/ Edit Page: The Device Home Page shall provide a slide-over menu for each device, which will allow the user to select Point View/Edit Pages. The Point View/Edit Page will provide a scrolling list of all of the input and output points for each device, along with their respective software points. The Point View/Edit page will show the point name, status/reliability, and current value in the appropriate engineering units. An icon will appear for points that can be overridden or edited; clicking on the icon will open a point edit dialog screen. The point edit screen will show the pre-configured minimum and maximum limits; changing the point value can be done with a slider or mobile keyboard. Ex. For a VAV box controller, the technician can change temperature set points, change minimum and maximum velocity set point, display room temperature, and display duct velocity.

viii Audit Log: Provides a log of user actions on MAP Gateway device that Administrators may download. The Audit Log will be stored in non-volatile memory so that it persists on device restarts. Audit Log messages will include data/time stamp, current user, current device name and address (commands only), and commanded value (commands only).

ix Tailored Summary: Provides the ability to set up a custom summary tailored to the specific needs of the operator and the capabilities of the connected equipment. Tailored summaries can aggregate and display information from multiple controllers on a field bus.

x Live Trend: Provides users with the ability to specify up to 3 points from a controller to trend in near real-time. The user shall have the ability to choose the sample interval and the total time covered in the display (x-axis). The system will create an appropriate y-axis automatically. Each trended variable shall be identified by unique color and symbol.

xi Airflow Balancing: The gateway shall provide a tool for VAV box commissioning and air balancing for controllers provided under this specification. Connectivity to the individual boxes will not require connection to each controller but rather a connection to a single device on the MS/TP network within WiFi range.

xii Report Creation: It shall be possible to create reports that summarize system status and setpoints and to forward those

reports to a central repository for the creation of as-built summaries or commissioning documents.

b. RS-485 connectivity and connections.

i The MAP Gateway shall include an RS-485 Port configured as BACnet MS/TP Master. Communications with devices and field controllers shall be possible via the following modes; all of these connections will provide access to all controllers on the MS/TP Field Controller bus:

A) Connecting to a Smart Equipment Controller through the Sensor-Actuator Bus (SA Bus) RJ12 jack.
B) Connecting to a field controller through the field controller SA Bus RJ12 jack.
C) Connecting to the SA Bus of the field controller from a network room sensor via the RJ12 jack on the network room sensor.
D) Connecting directly to the field controller bus, using an RJ12 to Terminal Block adaptor.

ii The MAP Gateway power may be supplied via the SA Bus, the field controller bus, or a micro USB port.

c. USB connection: The MAP Gateway shall include a USB Port to provide access to MAP web pages through the USB port for stationary user interface configurations or USB connected equipment:

i The USB port will follow USB 2.0 Network Device Profile.

ii Network Profile will have similar security requirements to Ethernet Port with fixed IP Ports but no AES Encryption.

d. Multi-Client access: The MAP Gateway shall provide multi-client connectivity for up to three (3) simultaneous users, and shall provide three (3) password protected User Roles with automatic LOGOUT after 30 minutes of inactivity.

e. Security: In order to provide greater security for the enterprise-wide EMCS, the MAP Gateway shall provide a user interface for interacting with the EMCS without connecting to the enterprise-wide EMCS. The Wi-Fi Port shall provide WPA2 Security with AES 128 Bit Encryption:

i AP Only Operation or Client Mode to connect to other Wi-Fi networks.

ii The MAP Gateway shall provide a WiFi to Ethernet Pass-thru option; this option shall be disabled by default.

iii The MAP Gateway shall provide an option to disable the built-in Wi-Fi; this option shall only be available when the Ethernet connection is enabled.

iv When connected to an enterprise or EMCS specific IT infrastructure, the MAP Gateway shall be designed and connected for use inside of a firewall.

v The MAP Gateway shall provide Authentication/Authorization.

vi The MAP Gateway shall be certified as penetration tested by a professional agency that specializes in penetration testing for IT appliances and devices.

f. Navigation: the MAP Gateway pages shall be derived from the respective HVAC equipment model and/or standard HVAC control application. The pages use and support HTML5 navigation practices, such as click to select, slide over/down.

g. Installation and status indicators:

i The MAP Gateway shall be designed to work as a portable device or it may be permanently mounted on site.

ii Portable: The MAP Gateway shall include a preconfigured, flexible coiled RJ-12 Cable to connect in the field directly to controllers or through wall mounted room sensors with an RJ-12 port. The MAP Gateway shall include a protective Rubber Bumper Guard and a Lanyard.

iii Stationary: The MAP Gateway shall include a Stationary Mounting Cradle to install the device in a panel. RJ-12 Cable, and an auto-switching 90-230 VAC Power Supply.

iv Status Indication: The MAP Gateway shall provide LED lights to indicate overall operating condition and status, communications for the MS/TP bus connection, communications via the Ethernet connection, and WiFi connection and signal strength.

h. MAP Gateway web page configuration and linking:

i The MAP Gateway shall provide automatic BACnet MS/TP device detection and connection, and automatic web page configuration and point linking.

i. Portable Operator Terminal:

i For systems that do not provide full access to systems configuration and definition as defined in this section via a browser based user interface, the EMCS Contractor shall provide a portable operator terminal for troubleshooting, commissioning, and programming purposes. The terminal shall be configured as follows:

A) Personal Laptop Computer Manufacturer – Dell, Compaq or HP.
B) 8GB RAM – Windows 10 Professional.
C) 3.2 GHz Clock Speed Intel Microprocessor.
D) 500 GB Hard Drive for storage of programs and historical data.
E) (2) USB 3.0 ports minimum.
F) 1 Standard QWERTY Keyboard with 83 keys minimum.
G) Integral 2 button Track Point, Track Pad or Track Ball.
H) 15" Wide Screen HD with minimum 1920x1080 resolution color display.
I) Complete operator workstation software package, including any hardware or software tools required for required system functionality.
J) Original printed manuals for all software and peripherals.
K) Original installation media for all software, device drivers, and peripherals.
L) Registration cards and paid-up licenses for all included software shall be provided to the Owner.
M) Carrying case.
N) Spare battery.
O) External power supply/battery charger.

ii Software:

A) Portable operator terminals shall support all controllers within the system on a direct-connect communications basis.
B) When used to access First or Second Tier controllers, the portable operator terminal shall utilize the standard operator workstation software, as previously defined.
C) When used to access Application Specific Controllers, the portable operator terminal shall utilize either the standard operator workstation software, as previously defined, or controller-specific utility software.

iii Proprietary Portable Terminal:

A) Manufacturers providing proprietary portable terminals shall submit technical data sheets for the terminal and all associated software and hardware.

iv Provide Johnson Controls MAP Gateway or approved equal.

M. Approval

1. The complete EMCS shall be UL 916 approved as an Energy Management System

2.2 AIRFLOW/TEMPERATURE MEASUREMENT STATION

A. General:

1. The airflow/temperature measurement station (AFTMS) indicated on the plans shall be capable of monitoring airflow and temperature rates at each measurement location.

B. Description:

1. The system shall be factory tested prior to shipment and shall not require calibration or adjustment over the life of the equipment, when installed in accordance to manufacturer's guidelines. Each sensor probe shall be provided with a UL plenum-rated connecting cable. Connecting cable shall be a minimum of 10 feet in length for each probe. No additional devices or transducers shall be required to interface with the host controls.

2. Sensors shall be calibrated to NIST-traceable standards for both airflow and temperature. Each sensing point shall independently measure airflow and temperature prior to averaging. Installed accuracy shall be percent of reading and demonstrated at both maximum and minimum airflow rates for each measurement location.

C. Acceptable Manufacturers:

1. Ebtron GTA116-PC: Gold Series probes, combination airflow/temperature sensors plus associated transmitter.

2. TekAir model Vortek: vortex-shedding probes and matching electronics with display, and mated with conforming multi-point temperature sensors.

3. Air Monitor VoluProbe: supplied with Veltron II (0.1% FS) transmitters and mated with conforming multi-point temperature sensors.

D. Transmitter and Electronics Enclosure

1. The transmitter shall operate on 24 VAC. The transmitter shall have a minimum 16 character alphanumeric LCD display for airflow, temperature, and system diagnostics. Analog output signals shall be user selectable (0-10 VDC or 4-20 mA). When required on the plans, a serial RS-485 interface will be made available with network protocols of either N2 or ModBus RTU, as required by the DDC control equipment. All inputs and outputs shall be fused, protected, and internally isolated from the 24 VAC power supply. The transmitter shall have a non-drifting adjustment for output signal offset/gain. The transmitter display shall be capable of being configured in either I.P. or S.I. units. The transmitter shall accept a user-defined area to display volumetric flow rates in CFM or LPS. An infrared output to transmit instantaneous airflow and temperature data for traverse information of the airflow profile shall be provided. This output shall be available to a PDA device (supplied by others) and transferable to Microsoft® Excel® using Ebtron provided free software.

2. The enclosure shall be aluminum alloy for indoor use and capable of operating over a temperature range of +30° F to +120° F. The electronics shall be installed inside and protected from the weather.

E. Duct and Plenum Mounted Sensor Probes

1. Sensor probes shall be constructed of anodized aluminum alloy tube with stainless steel mounting brackets. Probes shall be constructed to provide insertion, internal, or standoff mounting, depending on the applications and field installation requirements.

2. The sensor accuracy for airflow shall be at least ±2% of Reading over the sensor probe operating ranges. The installed total accuracy for airflow shall be better than ±3% of Reading over the sensor probe operating ranges when installed in accordance with manufacturers' guidelines. The sensor accuracy for temperature shall be better than ±0.15° F over the entire operating range. Each sensing point shall independently measure airflow and temperature prior to averaging.

3. The number of independent sensing points shall be distributed per duct face area, at a minimum quantity as indicated below.

Area (ft^2)	Area (m^2)	Sensors
<= 1	<= 0.093	2
>1 to <4	>0.093 to < 0.372	4
4 to <8	0.372 to < 0.743	6
8 to <12	0.743 to < 1.115	8
12 to <16	1.115 to < 1.486	12
>=16	>= 1.486	16

4. Airflow: 0 to 5,000 FPM Temperature: -20° F to +160° F Relative Humidity: 0 to 99% (non-condensing)

F. Warranty

1. Provide 36 month manufacturer warranty from date of shipment.

2.3 CONTROL DAMPERS

A. The dampers for the outside air shall be furnished by the air handling unit supplier. The damper motor and linkage shall be furnished and installed by Division 23 09 00. The damper motor shall have a 120/24V transformer.

2.4 DIGITAL CONTROL SYSTEM FOR VAV TERMINALS

A. The Advanced Application VAV Modular Assembly (AVMA) shall provide both standalone and networked DDC of pressure-independent, VAV terminal units.

B. The AVMA shall be BTL certified and carry the BTL Label.

1. The AVMA shall be tested and certified as a BACnet Advanced Application Controller (B-AAC).
2. A BACnet Protocol Implementation Conformance Statement shall be provided for the AVMA.
3. The Conformance Statement shall be submitted 10 days prior to bidding.

C. The AVMA shall communicate over the Automation Network in compliance with BACnet IPv4 and supporting BACnet Protocol Revision 12 (PR12).

D. The AVMA shall include an integral real-time clock and support time-based tasks that enables these field controllers to monitor and control:

1. Schedules.
2. Calendars.
3. Alarms.
4. Trends.

E. The AVMA can continue time-based monitoring for extended periods when offline from an Automation Network.

F. The AVMA can operate as a stand-alone controller in applications that do not require a networked supervisory device or for network applications where it is preferred to have the scheduling, alarming, and/or trending performed locally in the field controllers.

G. The AVMA shall have internal electrical isolation for MS/TP communications.

H. The AVMA shall be a configurable digital controller with integral differential pressure transducer and damper actuator. All components shall be connected and mounted as a single assembly, removable as one piece.

I. The AVMA shall be assembled in a plenum-rated plastic housing with flammability rated to UL94-5VB or the controller is designed and suitable for use in other environmental air space (plenums) in accordance with Section 300.252(C) of the National Electrical Code.

J. The integral damper actuator shall be a fast response stepper motor capable of stroking 90 degrees in 60 seconds for quick damper positioning to speed commissioning and troubleshooting tasks.

K. The controller shall determine airflow by a state-of-the-art digital non-flow pressure sensor to provide 14-bit resolution with bidirectional flow operation that supports automatic correction for polarity on high- and low-pressure DP tube connections; this pressure sensor eliminates high- and low-pressure connection mistakes.

L. Each controller shall have the ability to automatically calibrate the flow sensor to eliminate pressure transducer offset error due to ambient temperature / humidity effects.

M. The controller shall utilize a proportional plus integration (PI) algorithm for the space temperature control loops.

N. Each controller shall continuously, adaptively tune the control algorithms to improve control and controller reliability through reduced actuator duty cycle. In addition, this tuning reduces commissioning costs, and eliminates the maintenance costs of manually re-tuning loops to compensate for seasonal or other load changes.

O. The controller shall provide the ability to download and upload configuration files, both locally and via the communications network. Controllers shall be able to be loaded individually or as a group.

P. Control setpoint changes initiated over the network shall be written to VMA non-volatile memory to prevent loss of setpoint changes and to provide consistent operation in the event of communication failure.

Q. The controller firmware shall be flash-upgradeable remotely via the communications bus.

R. The controller shall provide fail-soft operation if the airflow signal becomes unreliable, by automatically reverting to a pressure-dependent control mode.

S. The controller shall interface with balancer tools that allow automatic recalculation of box flow pickup gain ("K" factor), and the ability to directly command the airflow control loop to the box minimum and maximum airflow setpoints.

T. Controller shall have on-board diagnostics. These diagnostics shall consist of control loop performance measurements executing at each control loop's sample interval, which may be used to continuously monitor and document system performance. The AVMA shall calculate Exponentially Weighted Moving Averages (EWMA) for each of the following. These metrics shall be available to the end user for efficient management of the VAV terminals.

1. Absolute temperature loop error.
2. Signed temperature loop error.
3. Absolute airflow loop error.
4. Signed airflow loop error.
5. Average damper actuator duty cycle

U. The controller shall detect system error conditions to assist in managing the VAV zones. The error conditions shall consist of:

1. Unreliable space temperature sensor.
2. Unreliable differential pressure sensor.
3. Starved box.
4. Actuator stall.
5. Insufficient cooling.
6. Insufficient heating.

V. The controller shall provide a flow test function to view damper position vs. flow in a graphical format. The information would alert the user to check damper position. The AVMA would also provide a method to calculate actuator duty cycle as an indicator of damper actuator runtime.

W. The controller shall provide a compliant interface for ASHRAE Standard 62-1989 (indoor air quality), and shall be capable of resetting the box minimum airflow based on the percent of outdoor air in the primary air stream.

X. The controller shall comply with ASHRAE Standard 90.1 (energy efficiency) by preventing simultaneous heating and cooling, and where the control strategy requires reset of airflow while in reheat, by modulating the box reheat device fully open prior to increasing the airflow in the heating sequence.

Y. Inputs:

1. Analog inputs with user-defined ranges shall monitor the following analog signals, without the addition of equipment outside the terminal controller cabinet:
   a. 0-10 VDC Sensors
   b. 1000ohm RTDs
   c. NTC Thermistors
2. The AVMA shall provide minimum 15 bit A/D resolution of Analog Inputs.
3. Binary inputs shall monitor dry contact closures. Input shall provide filtering to eliminate false signals resulting from input "bouncing."

4. Binary inputs shall meet applicable CE noise immunity standards. The inputs shall be resilient against faults from power and output circuits as well as isolated from communications ports.

Z. Outputs

1. Analog outputs shall provide 0-10V DC output with 24 VAC miswiring protection. The AVMA shall provide minimum 15 bit D/A resolution of Analog outputs.
2. Binary outputs shall provide a SPST Triac output rated for 500mA at 24 VAC utilizing isolated drive circuitry.
3. Outputs shall meet applicable CE noise immunity standards.

AA. Application Configuration

1. The AVMA shall be configured with a software tool that provides a simple Question/Answer format for developing applications and downloading.

BB. Sensor Support

1. The AVMA shall communicate over the SA Bus with a Network Sensor.
2. The AVMA shall support an LCD display room sensor.
3. The AVMA shall also support standard room sensors as defined by analog input requirements.
4. The AVMA shall support humidity sensors defined by the AI side loop.

CC. Provide Johnson Controls VMAxx or approved equal as shown on plans.

2.5 NETWORK SENSORS

A. The Network Sensors (NS) shall have the ability to monitor the following variables as required by the systems sequence of operations:

1. Zone Temperature.
2. Zone Humidity.
3. Zone Setpoint.
4. Discharge Air Temperature.
5. Zone CO2.

B. The NS shall transmit the information back to the controller on the SA Bus using BACnet Standard protocol SSPC-135.

C. The NS shall be BTL certified and carry the BTL Label.

1. The NS shall be tested and certified as a BACnet Smart Sensors (B-SS).
2. A BACnet Protocol Implementation Conformance Statement shall be provided for the NS.
3. The Conformance Statement shall be submitted 10 days prior to bidding.

D. The Network Zone Temperature Sensors shall include the following items:

1. A backlit LCD to indicate the temperature, humidity and setpoint.
2. An LED to indicate the status of the Override feature.
3. A button to toggle the temperature display between Fahrenheit and Celsius.

4. A button to program the display for temperature or humidity.
5. A button to initiate a timed override command.
6. Available in either surface mount, wall mount, or flush mount.
7. Available with either screw terminals or phone jack.

E. The Network Discharge Air Sensors shall include the following:

1. 4 inch or 8 inch duct insertion probe.
2. Ten foot pigtail lead.
3. Dip Switches for programmable address selection.
4. Ability to provide an averaging temperature from multiple locations.
5. Ability to provide a selectable temperature from multiple locations.

F. The Network CO2 Zone Sensors shall include the following:

1. Available in either surface mount or wall mount.
2. Available with screw terminals or phone jack.
3. Measurement range of 0-2000 ppm
4. Sensing resolution of 1 ppm.
5. Sensing accuracy of +/- 2% of the reading plus 40 ppm.

G. Provide Johnson Controls NS series or approved equal where indicated on plans.

2.6 ELECTRICAL ENERGY MONITOR

A. General

1. Unit shall monitor power system and provide local display and remote connection to the EMCS. Unit shall be complete with current transformer shorting assembly and digital LCD display.

2. Unit shall be furnished in a NEMA 3R hinged over enclosure with external mounting feet and conduit knockouts on all sides. Setup shall be accomplished with a selector switch and DIP switches. Unit shall be able to identify and electronically correct wiring problems such as reversed CT polarities or improper phasing of voltages with CT's.

3. Unit shall be complete with three-phase current transformer, voltage selector switch (120-600V), accept 5 amp, 1 amp or .333 Volt CT's, low voltage alarm contact, two 4-20 mA outputs, pulse output for KWH with selectable pulse rate, two line LCD display, and CT shorting assembly.

4. Unit shall be Kele PT-9000 series or Hawkeye H6000 series.

2.7 SYSTEM TOOLS

A. System Configuration Tool

1. The Configuration Tool shall be a software package enabling a computer platform to be used as a stand-alone engineering configuration tool for a Network Automation Engine (NAE) or a Network Integration Engine (NIE).

2. The configuration tool shall provide an archive database for the configuration and application data.

3. The configuration tool shall have the same look-and-feel at the Site Management Portal user interface regardless of whether device configuration is being done online or offline.

4. The configuration tool shall include the following features:

    a. Basic system navigation tree for connected networks.
    b. Integration of Johnson Controls N1, LonWorks, and BACnet enabled devices.
    c. Customized user navigation trees.
    d. Point naming operating parameter setting.
    e. Graphic diagram configuration.
    f. Alarm and event message routing.
    g. Graphical logic connector tool for custom programming.
    h. Downloading, uploading, and archiving databases.

5. The configuration tool shall provide a site discovery feature to automatically discover field devices on connected buses and networks. Automatic discovery shall be available for the following field devices:

    a. BACnet Devices.

6. The configuration tool shall be capable of programming the Field Equipment Controllers.

    a. The configuration tool shall provide the capability to configure, simulate, and commission the Field Equipment Controllers.
    b. The configuration tool shall allow the FECs to be run in Simulation Mode to verify the applications.
    c. The configuration tool shall contain a library of standard applications to be used for configuration.

7. The configuration tool shall be capable of programming the field devices.

    a. The configuration tool shall provide the capability to configure, simulate, and commission the field devices.
    b. The configuration tool shall allow the field devices to be run in Simulation Mode to verify the applications.
    c. The configuration tool shall contain a library of standard applications to be used for configuration.

8. A wireless access point shall allow a wireless enabled portable PC to make a temporary Ethernet connection to the automation network.

    a. The wireless connection shall allow the PC to access configuration tool through the web browser using the user interface.
    b. The wireless use of configuration tool shall be the same as a wired connection in every respect.
    c. The wireless connection shall use the Bluetooth Wireless Technology.

9. Provide Johnson Controls SCT or approved equal.

B. Controller Configuration Tool

1. As part of the single software tool environment including system and controller elements, the Controller Configuration Tool (CCT) shall be used to configure, simulate and commission FEC, FAC, VMA, IOM and NCE controllers.

2. The CCT shall operate in distinct modes to facilitate efficiency at various steps in the steps leading to project completion as well as future upgrades and maintenance:

   a. The configuration mode allows users to select various mechanical and control logic options through selection trees for typical air handling, terminal unit, central plant, and VAV applications.
   b. The simulation mode allows the user to review all application logic as if the device were operating in a connected systems environment.
   c. The commissioning mode allows users to validate all sensor and control point interfaces and to adjust key setpoints and setup parameters once the device is mounted and connected in an operational environment.

3. The CCT shall provide multiple options for downloading files to the controllers including direct wired, wireless and Ethernet pass thru as dictated by controller type and location.

4. Provide Johnson Controls CCT or approve equal.

2.8 COMPUTING HARDWARE AND SOFTWARE

A. General

1. Computing hardware, software and operating systems shall be provided at the revision level or model number as specified or at the latest release of the vendor if not specified.

2. In order to provide a consistent level of performance, all PCs shall be provided with Operating Systems and Processors by the manufacturer specified.

B. Dedicated Web Based User Interface

1. PC Hardware – The personal computer(s) shall be configured as follows:

   a. Memory – 16 GB (8 GB Minimum.)
   b. CPU– Intel Quad Core processor. 3.2 GHz Clock Speed (minimum.)
   c. Hard Drive – 500 GB hard drive capacity.
   d. Hard drive backup system – CD/RW, DVD/RW or network backup software provided by owners IT department.
   e. Ports – (2) USB 3.0, Ethernet, VGA, microphone/headset.
   f. Keyboard – 101 Keyboard and 2 Button Mouse.
   g. Display configuration – 1-2 displays as follows:

      i Each Display – 24” LED Flat Panel Monitor 1920 x 1080 resolution minimum.
      ii 16 bit or higher color resolution.
      iii Display card with multiple monitor support.

2. Operating System Software

a. Windows 10 Professional or Enterprise Edition with Ann. Update (64 bit.)
b. Provide complete operator workstation software package, including any hardware or software keys. Include the original installation disks and licenses for all included software, device drivers, and peripherals.
c. Provide software registration cards to the Owner for all included software.

3. Peripheral Hardware

a. Reports printer (Dedicated):

i Printer Make – Hewlett Packard DeskJet.
ii Print Speed – 600 DPI Black, 300 DPI Color.
iii Buffer – 64 K Input Print Buffer (minimum.)

PART 3 – EXECUTION:

3.1 EMCS SPECIFIC REQUIREMENTS

A. Graphic Displays

1. Provide a color graphic system flow diagram display for each system with all points as indicated on the point list. All terminal unit graphic displays shall be from a standard design library.
2. User shall access the various system schematics via a graphical penetration scheme and/or menu selection.

B. Custom Reports:

1. Provide custom reports as required for this project.

C. Actuation / Control Type

1. Primary Equipment

a. Controls shall be provided by equipment manufacturer as specified herein.
b. All damper and valve actuation shall be electric.

2. Terminal Equipment:

a. Terminal Units (VAV, UV, etc.) shall have electric damper and valve actuation.
b. All Terminal Units shall be controlled with HVAC-DDC Controller.

3.2 QUALIFICATIONS

A. Control contractor shall have been in business a minimum of three years with a full time office and staff located in the Tucson area. Control contractor shall be an authorized distributor and have a full time locally based service staff that can respond to service calls

within four hours. Local office shall have an inventory of spare parts for support of all systems provided under this contract.

3.3 INSTALLATION

A. Check and verify location of all equipment with plans before installation.

B. Interlock EMCS alarms with starter switching to bypass alarm when equipment is manually disconnected to avoid false alarms.

C. Provide engineering, installation, supervision, labor, calibrations, software programming, and commissioning necessary for a complete and fully operational system.

3.4 STARTUP AND CHECKOUT

A. Fully commission all aspects of the EMCS work.

B. Acceptance Check Sheet

1. Prepare a check sheet that includes all points for all functions of the EMCS as indicated on the point list included in this specification.
2. Submit the check sheet to the Engineer for approval.
3. The Engineer will use the check sheet as the basis for acceptance with the EMCS Contractor.

C. VAV box performance verification and documentation:

1. The EMCS Contractor shall test each VAV box for operation and correct flow. At each step, after a settling time, box air flows and damper positions will be sampled. Following the tests, a pass/fail report indicating results shall be produced. Possible results are Pass, No change in flow between full open and full close, Reverse operation or Maximum flow not achieved. The report shall be submitted as documentation of the installation.
2. The EMCS Contractor shall issue a report based on a sampling of the VAV calculated loop performance metrics. The report shall indicate performance criteria, include the count of conforming and non-conforming boxes, list the non-conforming boxes along with their performance data, and shall also include graphical representations of performance.
3. Promptly rectify all listed deficiencies and submit a document summarizing completion to the Engineer.

D. Performance Verification

1. The installing contractor shall perform a complete Performance Validation (PV) of the Building management system three times throughout the project:

   a. At project turnover to customer.
   b. At six (6) months of project operation.
   c. At twelve (12) months of project operation or end of warranty.

2. Performance Verification shall include a complete and current Building Automation System site inventory including the following information at a minimum: a listing of all field and supervisory controllers with the following key attribute data; corresponding model numbers, firmware versions, available

security updates, CPU and memory performance data, battery conditions, integrations, controlled equipment, and device and point counts.

3. Performance Verification shall include a complete written evaluation of system configuration and performance in the following categories:

    a. Security – The Security evaluation shall include information about controllers that require security updates and conformance of user accounts to latest security rules and best practices.
    b. Energy Performance – The Energy Performance and Savings evaluation shall identify opportunities through schedule and nightly setbacks, economizers, eliminating simultaneous heating and cooling and adding VSD to equipment.
    c. Comfort and Health – The Comfort and Health evaluation shall identify temperature, pressure, and carbon dioxide values that deviate from desired set points that could lead to occupant discomfort.
    d. Reliability – The Reliability evaluation shall identify overridden control points, control points creating excessive alarms, and opportunities to adding control points and trends to further enable system functionality.
    e. Standards – The Standards evaluation shall identify conformance to published standards for point count, network performance and protocol standards.

E. Provide all reports as specified on a new, USB compatible flash drive.

3.5 WIRING

A. EMCS WIRING

1. All conduit, wiring, accessories and wiring connections required for the installation of the EMCS, as herein specified, shall be provided by the EMCS Contractor unless specifically shown on the Electrical Drawings under Division 24 Electrical. All wiring shall comply with the requirements of applicable portions of Division 24 and all local and national electric codes, unless specified otherwise in this section.
2. All EMCS wiring materials and installation methods shall comply with EMCS manufacturer recommendations.
3. The sizing, type and provision of cable, conduit, cable trays, and raceways shall be the design responsibility of the EMCS Contractor. If complications arise, however, due to the incorrect selection of cable, cable trays, raceways and/or conduit by the EMCS Contractor, the Contractor shall be responsible for all costs incurred in replacing the selected components.
4. Class 2 Wiring

    a. All Class 2 (24 VAC or less) wiring shall be installed in conduit unless otherwise specified.
    b. Conduit is not required for Class 2 wiring in concealed accessible locations. Class 2 wiring not installed in conduit shall be supported every 5’ from the building structure utilizing metal hangers designed for this application. Wiring shall be installed parallel to the building structural lines. All wiring shall be installed in accordance with local code requirements.

5. Class 2 signal wiring and 24 VAC power can be run in the same conduit. Power wiring 120VAC and greater cannot share the same conduit with Class 2 signal wiring.
6. Provide for complete grounding of all applicable signal and communications cables, panels and equipment so as to ensure system integrity of operation. Ground cabling and conduit at the panel terminations. Avoid grounding loops.

B. EMCS Line Voltage Power Source

1. 120-volt AC circuits used for the EMCS shall be taken from panel boards and circuit breakers provided by Division 24.
2. Circuits used for the EMCS shall be dedicated to the EMCS and shall not be used for any other purposes.
3. DDC terminal unit controllers may use AC power from motor power circuits.

C. EMCS Raceway

1. All wiring shall be installed in conduit or raceway except as noted elsewhere in this specification. Minimum control wiring conduit size 1/2".
2. Where it is not possible to conceal raceways in finished locations, surface raceway (Wiremold) may be used as approved by the Architect.
3. All conduits and raceways shall be installed level, plumb, at right angles to the building lines and shall follow the contours of the surface to which they are attached.
4. Flexible Metal Conduit shall be used for vibration isolation and shall be limited to 3 feet in length when terminating to vibrating equipment. Flexible Metal Conduit may be used within partition walls. Flexible Metal Conduit shall be UL listed.

D. Penetrations

1. Provide fire stopping for all penetrations used by dedicated EMCS conduits and raceways.
2. All openings in fire proofed or fire stopped components shall be closed by using approved fire resistive sealant.
3. All wiring passing through penetrations, including walls shall be in conduit or enclosed raceway.
4. Penetrations of floor slabs shall be by core drilling. All penetrations shall be plumb, true, and square.

E. EMCS Identification Standards

1. Node Identification. All nodes shall be identified by a permanent label fastened to the enclosure. Labels shall be suitable for the node location.
2. Cable types specified in Item A shall be color coded for easy identification and troubleshooting.

F. EMCS Panel Installation

1. The EMCS panels and cabinets shall be located as indicated at an elevation of not less than 2 feet from the bottom edge of the panel to the finished floor. Each cabinet shall be anchored per the manufacturer's recommendations.

2. The EMCS contractor shall be responsible for coordinating panel locations with other trades and electrical and mechanical contractors.

G. Input Devices

1. All Input devices shall be installed per the manufacturer recommendation.
2. Locate components of the EMCS in accessible local control panels wherever possible.

H. HVAC Input Devices – General

1. All Input devices shall be installed per the manufacturer recommendation.
2. Locate components of the EMCS in accessible local control panels wherever possible.
3. The mechanical contractor shall install all in-line devices such as temperature wells, pressure taps, airflow stations, etc.
4. Input Flow Measuring Devices shall be installed in strict compliance with ASME guidelines affecting non-standard approach conditions.
5. Outside Air Sensors

    a. Sensors shall be mounted on the North wall to minimize solar radiant heat impact or located in a continuous intake flow adequate to monitor outdoor air conditions accurately.
    b. Sensors shall be installed with a rain proof, perforated cover.

6. Building Differential Air Pressure Applications (-1” to +1” WC)

    a. Transmitters exterior sensing tip shall be installed with a shielded static air probe to reduce pressure fluctuations caused by wind.
    b. The interior tip shall be inconspicuous and located as shown on the drawings.

7. Air Flow Measuring Stations

    a. Where the stations are installed in insulated ducts, the airflow passage of the station shall be the same size as the inside airflow dimension of the duct.
    b. Station flanges shall be two inch to three inch to facilitate matching connecting ductwork.

8. Duct Temperature Sensors

    a. Duct mount sensors shall mount in an electrical box through a hole in the duct and be positioned so as to be easily accessible for repair or replacement.
    b. The sensors shall be insertion type and constructed as a complete assembly including lock nut and mounting plate.
    c. For ductwork greater in any dimension than 48 inches or where air temperature stratification exists such as a mixed air plenum, utilize an averaging sensor.
    d. The sensor shall be mounted to suitable supports using factory approved element holders.

9. Space Sensors

    a. Shall be mounted per ADA requirements.
    b. Provide lockable tamper-proof covers in public areas and/or where indicated on the plans.

10. Low Temperature Limit Switches

    a. Install on the discharge side of the first water or steam coil in the air stream.
    b. Mount element horizontally across duct in a serpentine pattern insuring each square foot of coil is protected by 1 foot of sensor.
    c. For large duct areas where the sensing element does not provide full coverage of the air stream, provide additional switches as required to provide full protection of the air stream.

11. Air Differential Pressure Status Switches

    a. Install with static pressure tips, tubing, fittings, and air filter.

12. HVAC Output Devices

    a. All output devices shall be installed per the manufacturers' recommendation. The mechanical contractor shall install all in-line devices such as control valves, dampers, airflow stations, pressure wells, etc.
    b. Actuators: All control actuators shall be sized capable of closing against the maximum system shut-off pressure. The actuator shall modulate in a smooth fashion through the entire stroke. When any pneumatic actuator is sequenced with another device, pilot positioners shall be installed to allow for proper sequencing.
    c. Control Dampers: Shall be opposed blade for modulating control of airflow. Parallel blade dampers shall be installed for two position applications.
    d. Control Valves: Shall be sized for proper flow control with equal percentage valve plugs. The maximum pressure drop for water applications shall be 5 PSI. The maximum pressure drop for steam applications shall be 7 PSI.
    e. Electronic Signal Isolation Transducers: Whenever an analog output signal from the EMCS is to be connected to an external control system as an input (such as a chiller control panel), or is to receive as an input a signal from a remote system, provide a signal isolation transducer. Signal isolation transducer shall provide ground plane isolation between systems. Signals shall provide optical isolation between systems.

3.6 OPERATOR INSTRUCTIONS

A. Provide competent instructors who will give full instruction to designated personnel in the adjustment, operation, and maintenance of the equipment and system specified, including pertinent safety requirements. A minimum of sixteen (16) hours of instruction, in two eight-hour sessions spaced a minimum of one week apart, shall be provided.

B. This orientation shall, at a minimum, consist of a review of the project as-built drawings, the EMCS software layout and naming conventions, and a walk through of the facility to identify panel and device locations.

C. A written statement that training has been completed, signed by owner's designated personnel, shall be submitted with warranty to Architect.

3.7 RECORD DOCUMENTATION

A. Operation and Maintenance Manuals.

1. Provide three (3) copies of the Operation and Maintenance Manuals shall be provided to the Owner's Representative upon completion of the project. The entire Operation and Maintenance Manual shall be furnished on a USB Flash Drive, and include the following for the EMCS provided:

a. Table of contents.
b. As-built system record drawings. Computer Aided Drawings (CAD) record drawings shall represent the as-built condition of the system and incorporate all information supplied with the approved submittal.
c. Manufacturer’s product data sheets or catalog pages for all products including software.
d. System Operator’s manuals.
e. Archive copy of all site-specific databases and sequences.
f. EMCS network diagrams.
g. Interfaces to all third party products and work by other trades.
h. The Operation and Maintenance Manual shall be self-contained, and include all necessary software required to access the product data sheets. Include a logically organized table of contents. Viewer software shall provide the ability to display, zoom, print, and search all documents.

2. On-Line documentation: After completion of all tests and adjustments the contractor shall provide a copy of all as-built information and product data to be installed on a customer designated computer workstation or server.

3.8 WARRANTY AND INSPECTIONS

A. Document 23 09 00 shall guarantee work to be free from defects in workmanship and material for a period of one year from the date of final acceptance. Any material or equipment furnished that proves defective within the period shall be promptly repaired or replaced without cost to the owner.

B. Make minimum of three complete inspections of approximately two hours duration, in addition to normal service calls to adjust controls, with reports written and submitted to the Architect/Engineer during first year. Inspections shall be spaced three months apart.

END OF DOCUMENT 230900

SECTION 232000 – BUILDING SERVICES PIPING

PART 1 – GENERAL:

1.1 GENERAL

A. This Document covers basic materials and methods which may be common to one or more subsequent Documents.

1.2 WORK INCLUDED

A. Valves

B. Backflow Preventers

C. Storm Drainage Piping

D. Sanitary Waste and Vent Piping

E. Domestic Water Piping

F. Fuel Piping

G. Heating and Cooling Piping

H. Piping Joints

I. Hangers and Supports

J. General Piping Specialties

K. Heating and Cooling Piping Specialties

1.3 RELATED DOCUMENTS

A. Document 330000 for Site Water Storm Drainage, and Sanitary Sewerage Distribution

B. Document 230500 for Basic Mechanical Materials and Methods

C. Document 230700 for Mechanical Insulation

1.4 SUBMITTALS (Also refer to 230500)

A. Prior to commencement of work, provide submittals on the following:

1. Valves

2. Backflow Preventers

3. Piping Specialties (Heating and Cooling and General)

4. Pipe Hangers

PART 2 – PRODUCTS:

2.1 GENERAL

A. Piping and piping specialties exposed within air plenums shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84.

2.2 VALVES

A. Provide isolation valves and either unions or flanges to isolate and to allow removal of all mechanical equipment.

B. All isolation valves (SOVs) 2" and smaller shall be 1/4 turn ball valves. SOVs 2-1/2" and larger shall be butterfly valves.

C. Valves shall be of an approved make, equivalent to Stockham company numbers listed as follows:

1. Bronze Ball Valves - 2" and under

600 psi CWP, 150 psi SWP, two piece construction, full port, blowout proof stem, ¼ turn, PTFE packing & seats, adjustable packing nut, bronze ball, threaded ends: Stockham S206BR-R-T, solder ends with extended solder cops: Stockham S206BR-R-S.

2. Bronze Check Valves - 2" and under

Class 125#, 200# WOG, swing check, bronze disc, threaded ends: Stockham B-319; Solder ends: Stockham B-309.

3. Iron Gate Valves - 2-1/2" and larger

(Acceptable for building domestic water supply shut-off underground in valve box only)
Class 125#, 200# WOG, IBBM, non-rising stem, solid disc, bolted bonnet, flanged ends: Stockham G-612; Threaded ends: Stockham G-608.

4. Iron Butterfly Valves - 2-1/2" and larger

200 psi wog, full lug style, iron body, field replaceable EPDM seat, 410 stainless steel stem, aluminum bronze disc, no painting of disc to stem connections 12" and under, 2" through 6" - lever lock operated: Stockham LG-712-BS3-E; 8" and larger-gear operated: Stockham LG-722-BS3-E.

5. Iron Check Valves - 2-1/2" and larger

Class 125#, IBBM, renewable seat and disc, bolted cap, swing, flanged ends: Stockham G-931; Threaded ends: Stockham G-927.

D. Valves in Insulated Piping: Valves shall have 2-inch stem extensions and the following features:

1. Ball Valves: Shall have extended operating handle of non-thermal-conductive material, protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation, and memory stops that are fully adjustable after insulation is applied.

2. Butterfly Valves: Shall have extended necks.

E. All valves shall be of the same manufacturer equivalent of Stockham, Red and White, Nibco, Hammond, Henry, & SSI Equipment.

F. Gas Valves:

1. Provide an AGA approved, quarter turn gas cock at building entrance and an approved gas cock, union and 4" long (minimum) dirt leg at each gas appliance. Gas valves may be lubricated cylindrical plug valves as manufactured by Resun.

2.3 BACKFLOW PREVENTERS

A. The backflow preventer shall be a Reduced Pressure Principle and shall include a tightly closing resilient-seated shut-off valve on each end of the body. The assembly shall be fitted with four properly located resilient-seated test cocks.

B. The assembly shall have two independent and internally loaded check valves and a pressure differential relief valve located between the check valves.

C. The backflow preventer shall be suitable for supply pressure up to 175 psi and water temperature from 33 to 180°F.

D. Backflow preventers serving carbonated beverage dispensing machines or other equipment in kitchen areas shall have corrosion resistant, cast 316 stainless steel body and cover and stainless steel ball valves. Equivalent to Watts SS-009.

E. The backflow preventer shall meet the requirements of the following standards: USC's FCCC and HR Manual, Sec. 10, ASSE 1013, AWWA C-5111, IAPMO, and CSA B65.5.

F. Approved manufacturers are: Conbraco, Watts, Febco, Flomatic Valves

2.4 STORM DRAINAGE PIPING

A. The building's storm drainage piping below grade to a point five feet outside the building shall be solid wall Schedule 40 PVC DWV (ASTM D1784). The building's storm drainage piping above grade shall be standard weight hubless cast iron soil pipe conforming to the requirements of CISPI standard 301-97 and ASTM A-888 with fittings conforming to ANSI B-16.4. Pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute and shall receive prior approval.

B. Site storm drainage piping below grade shall be the same as the building's storm drainage piping.

2.5 SANITARY WASTE AND VENT PIPING

A. The building's vent and sanitary waste piping to a point five feet outside the building shall be solid wall Schedule 40 PVC DWV (ASTM D1784).

B. Vent pipes solid wall Schedule 40 PVC DWV (ASTM D1784).

C. Building sewer piping shall be the same as sanitary waste and vent piping.

2.6 DOMESTIC WATER PIPING (COPPER)

A. Above ground domestic water piping shall be Type L seamless hard drawn copper tubing with cast brass or wrought copper fittings for piping up to 2" and wrought copper fittings for 2-1/2" and larger.

B. Underground domestic water piping shall be Type K copper, soft annealed, without joints when possible.

C. Exterior underground domestic cold water piping may be Class 200 DR 14 PVC plastic pipe or as specified by the Civil Engineer whose specification will take precedence.

2.7 FUEL PIPING

A. Above ground natural gas piping shall be Schedule 40 black steel.

B. Underground natural gas piping shall be standard weight Schedule 40 black steel pipe with "Scotch Coat #202" coating.

C. Underground gas piping may be yellow ASTM D2513PE 2406 SDR 11/11.5 polyethylene with ASTM D3261 butt fusion fittings and joints and pre-manufactured anodeless service risers.

2.8 HEATING AND COOLING PIPING

A. Condensate Drain Piping

1. Air conditioning condensate piping shall be type "M" copper with plugged tees for cleanouts. Male threads on plugs shall be wrapped with Teflon® tape prior to threading into tees.

2. Air conditioning condensate piping shall be PEX-AL-PE consisting of an outer layer of type PEX-b cross-linked polyethylene, an inner layer of high density polyethylene (PE) and a center layer of butt welded aluminum conforming to ASTM F 1281, NSF 14/61 and NSF CL-TD. Approved Manufacturers: Hydro-PEX Systems, COES North America.

B. Refrigerant Piping

1. Air conditioning refrigerant piping shall be ACR refrigeration hard tempered tubing cleaned and capped with wrought copper fittings.

2. Air conditioning refrigerant piping may be provided by the equipment manufacturer.

3. Refrigeration piping shall have a triple evacuation with dry nitrogen and a 12 hour holding tests inspected by Architect's representative. A written report of test results shall be submitted for approval signed by inspecting party.

2.9 PIPING JOINTS

A. Cast Iron:

1. Joints in cast iron soil pipe below grade and joints in storm drainage pipe above and below grade shall be Husky SD 2000 white shield couplings as manufactured by Husky Technologies. Shield and clamp assembly shall include white colored

type 304 corrugated, 0.010" minimum thick shield with multiple bands and neoprene gaskets complying with ASTM C-564. Approved manufacturers: Husky, A.B.&I.

B. Plastic Pipe:

1. Joints in plastic pipe shall be made using solvent cement per manufacturer's recommendations.

a. Solvent cement for PVC welding shall have maximum volatile organic compound (VOC) emissions of 510 g/L less water.
b. Solvent cement for CPVC welding shall have maximum volatile organic compound (VOC) concentration emissions of 490 g/L less water.
c. Solvent cement for ABS welding shall have maximum volatile organic compound (VOC) emissions of 325 g/L less water.

C. Copper Water Piping:

1. Joints in copper water piping 2" and smaller above grade shall be soldered with ENGELHARD "SILVABRITE 100", 100% LEAD FREE or other non-lead solder, minimum 4,000 psi tensile strength using nokorode solder paste applied with a brush to both the pipe and the inside of the fitting socket. No acid core solder nor flux containing acid shall be used. Pipe shall be cut square and reamed. The parts of the pipe and fittings to be soldered shall be thoroughly cleaned with sand cloth before applying flux.

2. Joints in copper piping 2 ½" and larger and all sizes below grade shall be brazed using a brazing compound with a minimum of 15% silver.

D. Refrigerant Piping:

1. Joints in copper air conditioning refrigerant piping shall be made with silfos and flux as recommended by the brazing alloy manufacturer. During brazing the pipe and fittings shall be kept full of an inert gas, dry nitrogen, or CO2, to prevent formation of scale.

2.10 HANGERS AND SUPPORTS

A. Pipe Hangers:

1. Approved manufacturers: Elcen, Unistrut, B-Line.

2. All piping within the confines of the building shall be supported by means of adjustable steel clevis hangers spaced per ASHRAE recommendations and suspended from the building construction by all thread rods sized per ASHRAE. Strap, wire, or chair hangers are not permitted. Where suspended from steel structural members, appropriate clamps shall be used. Provide a sheet metal saddle, minimum 12" long by two times the diameter of the outside of the insulated pipe at all hangers for insulated pipe.

3. Trapeze hangers may be used in lieu of individual clevis hangers at contractor's option. Where trapeze length exceeds 42", an additional hanger rod shall be installed at mid-span. Trapeze hangers shall be spaced no further apart than the

smallest pipe on the trapeze requires. Provide hold down clamps for each insulated pipe and a sheet metal cover full diameter of pipe insulation at each hold down clamp.

4. Where piping is supported from concrete or masonry construction, approved concrete inserts shall be used. Anchors shall be equivalent to HILTI "HDI" drop-in anchors or HILTI "HVA" adhesive anchors as required to accommodate applicable loads. Coordinate selection with structural. Powder driven anchors/studs shall not be used.

5. Clevis hangers shall be sized large enough to pass insulation on insulated pipe. Provide sheet metal saddle for piping 1" and larger. Refer to 23 07 00 for inserts on larger piping.

6. Pipe Rollers: All pipe rollers shall be of single piece cast iron construction. Reference, Elcen #17. Provide chain; carrier; clevice as required per each roller application. Individual rollers on each side of pipe are not acceptable.

7. All sizes of non-insulated copper piping shall be supported using "Trisolator #500" isolators at all support locations.

8. Insulated piping up to 1-1/2" shall continue insulation through support clamp or hanger.

9. Plastic piping shall be supported a minimum of 4' on center or as required to avoid sagging.

10. Except where governed by local codes, maximum hanger spacing for metal piping and minimum hanger rod sizes shall conform to the following table:

	Pipe Size	Spacing	Hanger Rod
Steel Pipe	1/2"	6-0"	3/8"
	3/4"-1-1/4"	8'-0"	3/8"
	1-1/2, 2"	10'-0"	3/8"
	2-1/2"	10'-0"	1/2"
	3"	12'-0"	1/2"
	4"	12'-0"	5/8"
	5"	12'-0"	5/8"
	6"	12'-0"	3/4"
	8-12"	12'-0"	7/8"
Copper Pipe	1/2"	6'-0"	3/8"
	3/4", 1"	8'-0"	3/8"
	1-1/4"-2"	10'-0"	3/8"
	2-1/2"-5"	12'-0"	1/2"
	6" and above	12'-0"	3/4"
Cast Iron	2"	1 ea. Joint	3/8"
	3"	1 ea. Joint	1/2"
	4" & 5"	1 ea. Joint	5/8"
	6"	1 ea. Joint	3/4"

B. Piping Supports:

1. Approved Manufacturers: Clearline Technologies "C-Port" (602-470-8535).

2. Construction shall be UV resistant, 100% recycled rubber. Minimum base shall be 6” x 10” x 4”. C-Port Model C-Series (strut).

2.11 GENERAL PIPING SPECIALTIES

A. Unions:

1. Unions in screwed steel pipe 2" and smaller and all unions in gas pipe shall be ground joint malleable iron with brass to iron seats.

2. Unions in welded pipe shall be a slip-on weld flange.

3. Unions in copper pipe 2" and smaller shall be ground joint copper unions equivalent to Mueller C-107. Unions for 2-1/2" and larger pipe shall be bronze flanges.

4. Provide nuts, bolts, and gaskets for flanges. Materials shall be compatible with the piping and fluid conveyed.

B. Sleeves:

1. Pipe sleeves shall be schedule 40 steel pipe for all pipes passing through fire rated floors or walls. Sleeves for non-rated walls shall be PVC schedule 40 pipe or 18 gauge sheet metal. Sleeves for uncovered pipe shall be two pipe sizes larger than the main. Sleeves for insulated mains shall be of sufficient size to pass the covering with a minimum 1/4" clearance.

C. Pressure Reducing Valve:

1. Approved Manufacturers: Watts, Conbraco, and Wilkins.

2. Valve shall be suitable for water supply pressures up to 300 psi and a maximum temperature of 180°F. Bronze body construction with inlet and outlet NPT unions and gauge tapping with pressure gauge. Coordinate pressure range and setpoint with equipment prior to ordering. Provide a pressure reducing valve in accordance with manufacturer’s instructions for each dishwasher, glasswasher, and similar items and where indicated on drawings. Pressure range shall be 10-35 psi for dishwashers as indicated by the manufacturer. Equivalent to Watts series N35BDU-LP-GG.

D. Balancing Valves:

1. Approved Manufacturers: Armstrong, Bell & Gossett, Watts, Taco, MEPCO.

2. Single Turn (1/2” and ¾”): Valve shall be globe style design with bronze body, solder end connection, bronze trim with EPDM plug, high strength resin handwheel with valve position locking inserts, and two 1/4” NPT brass metering ports with Nordel check valves and gasketted caps located on both sides of the valve seat. Valve shall provide 360° single turn adjustment range with indicating scale on valve handwheel. Valve shall provide three functions: 1) Precise flow measurement , 2) Precision flow balancing, 3) Positive drip tight shut-off.

PART 3 – EXECUTION:

3.1 VALVES

A. Valves shall be installed with valve stem in upright (vertical) orientation.

B. Provide access panels for any valves located above solid ceilings at valve location.

C. Provide a shut-off valve or angle stop with cast brass stem and nuts to isolate all plumbing equipment.

D. Valve box for cold water service shall be pre-cast concrete construction with cast iron cover marked "water".

E. Provide isolation valves where shown on drawings and at branch lines to multiple (more than two) fixture groups.

F. All flexible piping connectors (expansion joints) shall be installed on the equipment side of the shut off valves.

3.2 BACKFLOW PREVENTERS

A. Reduced pressure backflow preventers shall be installed at service to building as close as possible to the water meter (locations shown by civil engineer shall take precedence), and at connections between potable and non-potable water systems. Reduced pressure backflow assemblies with-in confines of the building shall have drains extended to the nearest floor drain.

B. Anti-siphon, pressure type vacuum breakers shall be installed at connection to irrigation systems.

C. Drain lines shall be provided from reduced pressure backflow preventers located in the building. Provide air gap drain funnel for each unit with a full-size rigid drain line. Terminate over appropriately sized (for full flow) drain with air gap.

3.3 CAST IRON JOINTS

A. Husky Couplings with at least 4 sealing bands shall have each bolt per band torqued to 80 inch-pounds and retorqued no sooner than four hours later. Husky Couplings with only 2 sealing bands shall have each bolt per band torqued to 125 inch-pounds and retorqued no sooner than four hours later.

B. Standard couplings shall have each bolt of the clamp assembly torqued to 60 inch-pounds and retorqued no sooner than four hours later.

3.4 PLASTIC PIPE

A. Joints in plastic pipe shall be made with solvent and cement per manufacturer's recommendations.

B. Plastic piping exposed to sunlight shall be painted with two coats of latex paint. Color shall be white unless otherwise specified by Architect.

3.5 COPPER PIPING JOINTS

A. No acid core solder or flux containing acid shall be used.

B. Pipe shall be cut square and reamed.

C. The parts of the pipe and fittings to be soldered shall be thoroughly cleaned with sand cloth before applying flux.

D. Maintain a minimum of 50% penetration of brazed joints.

3.6 FUEL PIPING

A. Gas meter and high pressure gas piping shall be by Southwest Gas Corporation. Provide all trenching for the natural gas site utilities and coordinate and pay any necessary fees required by The Gas Company.

B. Joints in black steel Schedule 40 gas piping 2-1/2" and larger shall be bevel welded. Piping 2" and smaller shall have threaded and screwed connections and malleable iron fittings.

C. Where joints are made in “Scotch” coated underground pipe, or the continuity of the sheath is destroyed, the protection of the pipe shall be maintained using 10 mil polyvinyl tape. Wrapping shall be lapped so that a double thickness of wrapped materials is obtained. Use maximum of 3/4" wide tape.

D. Provide a #18 copper tracer wire with polyethylene pipe and attached to underground gas pipe. Tracer wire to terminate above ground at each end. All underground piping to have minimum 18" ground cover.

3.7 THREADED PIPE

A. Joints in threaded pipe shall be made with sharp clean threads with Teflon joint compound on the male threads only. Joint compound shall be listed and approved and compatible with pipe materials and fluid being conveyed. All pipe shall be reamed to full inside diameter. Only pipe reamers shall be used to ream pipes.

3.8 WELDING

A. All welders shall present valid certification papers dated within 1 year of date of contract. Papers shall depict that each welder on the jobsite has passed testing indicating that their welds can comply with the requirements of the A.S.M.E. Boiler and Pressure Vessel Code, Document IX.

B. Field welds shall comply with the above requirements and may be examined, tested, and inspected at the owner’s discretion. Initial tests will be at no cost to the contractor, but in the event of any failure, additional welds will be examined, tested, and inspected by the same independent agency engaged by the owner but at the contractor’s expense.

C. Welders, whose tests and inspections indicate continuous failures, at the discretion of the owner, shall be removed from the job until such time that they pass recertification testing.

D. Each welder shall be assigned a unique stamp code. Each weld shall be ground flat and the stamp code stamped into each weld by the welder.

E. Additionally each weld shall be identified on adjoining pipe with paint marker.

F. Perform a minimum of three passes on welded joints (roof, filler, cap).

3.9 HANGERS AND SUPPORTS

A. Support piping to adequately prevent sagging, pocketing, swaying, and displacement.

B. Vertical piping shall be secured to structure.

C. Piping shall not be racked to the floor in kitchen or areas other than mechanical rooms.

3.10 ESCUTCHEONS

A. All pipes passing through walls, floors, or ceiling in finished rooms shall be fitted with polished chrome plated escutcheons.

3.11 UNIONS

A. A dielectric union shall be used to join any dissimilar metals.

B. Unions shall be installed in piping on the equipment side of each service valve and in all connections to fixtures or equipment where the trimmings do not permit convenient removal.

C. Provide dielectric unions at all tank (including hot water storage tanks) connections.

3.12 SLEEVES

A. Where pipes pass through floors (except slab on grade) or interior masonry or concrete walls, pipe sleeves shall be installed. Sleeves through concrete walls or floors shall be installed with minimum 1" clearance to be packed & sealed. Sleeves through floors shall extend a minimum of two inches above the finished floor. Sleeves through walls shall be one continuous piece and shall extend from finished surface to finished surface.

B. The outer surface of the sleeve shall be fixed to the partition it penetrates with pour rock, mortar, or etc. for fire-resistance-rated assemblies, the internal surface shall be sealed with a UL 2079 approved firestopping material. Sealant shall be tested per ASTM E 1399. Equivalent to Bio Fireshield Biostop 500+.

1. Firestopping material shall have maximum volatile organic compound (VOC) emissions of 50 g/L less water.

C. Sleeve shall not support pipes as it will transmit vibration and sound to structure.

D. Copper pipe passing through a steel sleeve shall be protected with polyethylene tape or other approved dielectric materials.

3.13 BALANCING VALVES

A. Balance valves shall be installed with flow in the direction of the arrow on the valve body. Install valves at least five pipe diameters downstream from any fitting, at least ten pipe diameters downstream from any pump, and with no fittings at least two pipe diameters downstream of the valve. Install to allow for easy and unobstructed access to the valve handwheel and metering ports for adjustment and measurement. Locate to prevent sediment build-up in metering ports.

3.14 INSTALLATION

A. No service lines shall be laid on the backfill over other service lines or conduits except at crossings. All piping shall be accurately cut and installed in place without forcing. Changes in direction shall be made with fittings. Bending of pipe is not permitted. Reducing fittings shall be used where pipe sizes change, rather than bushings.

B. Pipe and fittings located within return air plenums shall have a flame spread index of not more than 25 and a smoke developed rating of not more than 50 when tested in accordance with the test for Surface Burning Characteristics of Building Materials, U.B.C. Standard Number 42.1.

C. Route piping to allow sufficient access to all equipment, valves, controls, etc., for maintenance.

D. In general, piping shall be installed below electrical conduits not requiring maintenance access.

E. All pipe and fittings exposed in finished areas shall be chrome plated unless otherwise approved in writing.

F. It shall be this contractor's responsibility to coordinate inverts of underground waste lines and rainwater leaders with sanitary and storm sewer lines and other site utilities.

G. Provide isolation valves on each side of strainer.

H. Install piping sufficiently below structure to allow top air vents.

I. Cap all pipe openings during construction until final connections are made. Also caps or plugs for end of line valves until final connections are made.

J. Provide approved, listed fire-stopping materials for any piping which pass through fire partitions, rated walls, or floors. Coordinate with Architectural specifications.

K. Install piping parallel or at right angles to the building, straight, plumb, and level (or at slope as required). Piping shall be pitched for drainage at a uniform slope to drainage points.

L. Provide a pressure reducing valve on water lines which are subject to pressures above 80 psi and for any lines to fixtures which require less pressure than the building pressure.

3.15 EXCAVATION, TRENCHING AND BACKFILLING

A. Do all excavating and backfilling necessary for the installation of this work. This shall include the cutting of sidewalks and pavings if required.

B. All work under this heading shall be in accordance with Document 31 (earthwork Document) of these specifications.

C. Where trenches cross roads, walks, or public thoroughfares, provide suitable barricades and bridges adequately protected by signs or red flags during the day and lights at night.

D. No piping shall be concealed or buried before inspection by authorized person.

E. All trenches shall be dug to exact grade and depth with only sufficient dirt removed to provide working space. Trenches shall be dug 6" below the required depth and shall be

refilled to proper depth with sand. Accurately grade sand in bottom of trenches to provide uniform bearing and support for each Document of pipe at every point along its length. Trenches shall not be more than 18" wider than the external diameter of the pipe or duct and the sides shall be as perpendicular as possible. Trenches shall be shored or sheet piled if necessary to prevent caving and to protect the work of other contractors of existing structure.

F. All excavations shall be refilled with sand to 6" above piping and the rest with loosen granular, moist earth thoroughly tamped. Compact backfill to 95% of maximum density within limits of building, under sidewalks, under slabs on grade, and under asphalt or concrete paving.

G. After the trench is backfilled per specifications to within 12" of the finished grade, install a detectable pipe locating tape over the entire piping runs. The backfill shall be sufficiently leveled so that the tape will be installed on a flat surface. The tape shall be centered in the trench and laid flat with printed side up. Caution shall be exercised to avoid displacement of tape and to ensure its integrity. The tape shall consist of a minimum 4.0 mil thickness, inert polyethylene plastic which is impervious to all known alkalis, acids, chemicals, reagents and solvents likely to be encountered in the soil, with a minimum 1/3 mil metallic foil. The tape shall be at least three inches in width and shall be yellow in color with identifying print in black letters. The tape shall have printed thereon the following:

CAUTION - BURIED PIPELINES BELOW

The identifying lettering shall be 1" high and repeated continuously the full length of the tape. In no instance shall the spacing of the individual segment of the identifying message be greater than eight inches. Approved detection tape manufactures are Reef Industries, Alarmatape, and Linetec, Inc. The remainder of the trench shall be backfilled and compacted in accordance with these specifications.

H. Coordinate all trenching with operation "Blue stake", as applicable.

I. Underground private sewer lines outside the building structure shall have a green #18 tracer wire securely attached to it at 8’ O.C. and shall have 12” of tracer wire accessible above grade at the cleanout and be securely attached at that point.

J. Underground water lines outside the building structure shall have a blue #18 tracer wire securely attached to it at 8’ O.C. and shall have 12” of tracer wire accessible above grade at the termination and be securely attached at that point.

3.16 TESTS AND ADJUSTMENTS

A. All waste, vent, rainwater, gas, and water piping shall be tested per ***International Plumbing Code (IPC)*** before being concealed in any way. All joints shall be made driptight before being concealed. Domestic water piping shall be tested at 1-1/2 times working pressure or 100 psig, whichever is greater, for at least 15 minutes. Gas piping shall be tested with an inert gas at 1-1/2 times the working pressure or 3 psig, whichever is greater, for at least 1/2 hour per 500 cuft of piping, but no longer than 24 hours. Test on building drain, vent and rainwater piping shall be made with hydrostatic pressure to minimum 10'-0" head for at least 15 minutes. Final test of the complete drain and vent system per section 312.4 of the IPC shall be performed at final acceptance.

B. Piping shall not be insulated or covered until tested and approved.

C. Refrigeration piping shall have a triple evacuation with dry nitrogen and a 12 hour holding tests inspected by Architect's representative.

3.17 ACTIVE SERVICES

A. When encountered in work, active electric, steam, water, gas and sewer services shall be protected against damage due to construction work. If active services are encountered which require relocation, make request to proper authorities for determinations of procedure. Do not prevent or disturb operation of active services that are to remain.

END OF DOCUMENT 232000

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SECTION 233000 – AIR DISTRIBUTION

PART 1 – GENERAL:

1.1 WORK INCLUDED

A. Ducts

B. Duct Accessories

C. Air Terminal Units

D. Air Outlets and Inlets

E. Air Cleaning Devices

1.2 RELATED DOCUMENTS

A. Document 232000 - Basic Mechanical Materials and Methods

B. Document 230700 - Mechanical Insulation

C. Document 230900 - Controls

D. Document 230593 - Testing, Adjusting, and Balancing.

1.3 QUALITY ASSURANCE

A. The following is a list of additional equipment approved for use on this project.

1. AIR DEVICES: Krueger, Price, Titus, Nailor
2. SPIRAL DUCT: General Metals, Metal Manufacturing, Graco, Spiro FAB Inc., Spiral Pipe of Texas, CA Systems Inc.
3. FLEXIBLE DUCT: Thermaflex, ATCO
4. AIR FILTERS: Farr, Flanders
5. AIR TERMINAL UNITS: Krueger, Titus, Price
6. DUCT FITTINGS: Flexmaster, Air Tight, Inc., Metal Masters
7. SMOKE, COMBINATION FIRE/SMOKE DAMPERS: Ruskin, Greenheck

1.4 SUBMITTALS (also refer to Document 232000)

A. Before beginning work, submit shop drawings or literature bound on the following items:

1. Air Devices
2. Air Filters
3. Duct Accessories
4. Air Terminal Units
5. Ductwork
6. Other equipment as directed by the Architect

PART 2 – PRODUCTS:

2.1 DUCTS

A. Metal Ducts:

1. All metal ductwork shall be constructed of new galvanized steel ASTM A 527, G90 of lock-forming quality.

2. Ductwork conveying water vapor or in humid areas shall be 3003-H14 aluminum alloy or 316 stainless steel.

3. Duct from air handling units to VAV boxes shall be round or flat oval spiral duct.

4. Ductwork gauges shall be according to latest SMACNA "HVAC Duct Construction Standards" for the 2" W.G. pressure class unless otherwise specified.

   a. All duct joints shall be sealed with Hardcast FG1402-181BFX foil-grip tape or Hardcast VG-181 duct sealant. Material used for joining ducts shall be UL181 listed.
   b. Branch duct connections manufactured by "Air-Tite Inc." (1-501-935-8483) may be used in lieu of spin-in collars but must still be sealed with hardcast.

5. Duct construction for ductwork from air handling units to VAV or double duct boxes shall be per latest SMACNA "HVAC Duct Construction Standards" for the 4" W.G. pressure class.

   a. All joints shall be made with “Spiral-Mate” or “Oval Mate”. Rectangular duct with “Duct Mate” joints may be used at the contractor’s option.

6. Flue Piping:

   a. Flue piping shall be provided to meet the manufacturer’s installation manual.
   b. Terminate flue piping with factory termination cap.

B. Flexible Ducts:

1. Low pressure and medium pressure flexible duct shall be Thermaflex M-KC Class 1 duct with bi-directional reinforced metalized vapor barrier with triple ply stand-up seam. Woven and coated fiberglass fabric permanently bonded to a coated spring steel wire helix and supporting a thick blanket of fiber glass insulation. Velocity rating: 6000 FPM. Minimum positive pressure for all sizes shall be 10” w.c. Minimum negative pressure for all sizes shall be 2” w.c.

2. Medium velocity flexible duct shall be Thermaflex S-TL Class 1 duct with high pressure, heavy glass cloth fabric permanently bonded to a coated spring steel wire helix. Velocity rating: 6000 FPM. Minimum positive pressure for all sizes shall be 10” w.c. Minimum negative pressure for all sizes shall be 1” w.c.

2.2 DUCT ACCESSORIES

A. Volume Control Dampers:

1. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

a. Fabricate single blade dampers for duct sizes to 9-1/2 x 30 inch (240 x 760 mm).
b. Fabricate multi-blade damper of opposed blade pattern with maximum blade sizes 12 x 72 inch (300 x 1 825 mm). Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
c. Except in round ductwork 12 inches (300 mm) in diameter and smaller, provide end bearings.
d. Provide locking, indicating quadrant regulators on single and multi-blade dampers. Where width exceeds 30 inches (750 mm), provide regulator at both ends.

B. Flexible Connections:

1. Provide Duro Dyne UL approved neoprene-coated fiberglass flexible connection at inlet and outlet of all air moving devices.

2. Equivalent manufacturer: Ductmate Industries

C. Weatherproofing:

1. Caulk watertight all ductwork exposed to the weather with DAP "CMC" exterior duct sealant, Hardcast Versa Grip "VG-102", or Design Polymerics DP 1010.

2.3 AIR TERMINAL UNITS

A. Shall be pressure independent variable air volume boxes with factory preset maximum and minimum air flow rates. Maximum and minimum air flow rates shall be field adjustable.

B. Shall control air flow rate based on thermostat demand from minimum static pressure up to 4" S.P. within 5% of control volume.

1. The airflow sensor shall be a differential pressure airflow device measuring total and static pressures, and mounted to the inlet valve.
2. Plastic parts shall be fire-resistant, complying with UL 94.
3. The airflow sensor shall be RoHS (Restriction of Hazardous Substances) compliant. Material containing polybrominated compounds shall not be acceptable.
4. Control tubing shall be protected by grommets at the wall of the airflow sensor's housing.
5. The airflow sensor shall be furnished with twelve total pressure sensing ports and four static pressure sensing ports, and shall include a center averaging chamber that amplifies the sensed airflow signal.
6. After balancing, the airflow sensor signal accuracy shall be plus or minus 5% for static pressures up to 4” S.P.

C. Shall be provided with a damper having a neoprene lip seal and capable of shut-off with leakage less than 2% of nominal box rating at 4" S.P. Terminals with low leakage construction shall include the following design features:

1. The access door shall be supplied with compression style gasketing and quarter turn latches.

2. The unit casing shall be flanged and gasketed at all external casing seams.
3. All production units shall be individually factory tested to ensure compliance with project specific leakage requirements.
4. Leakage test results shall be documented on a label affixed to each certified low leakage unit.

D. Shall be constructed of minimum 22 gauge zinc coated steel. Unit discharge shall be slip and drive construction.

E. Insulation:

1. Unit casing shall be line with dual density, ½", 1" thick, 1-1/2 lb. density fiberglass insulation that meets UL 181 and NFPA-90A.

2. Unit casing provided in the pharmacy or treatment areas shall be lined with 3/8" thick, smooth surface, polyolefin, closed-cell insulation for fiber free application.

F. Reheat VAV units shall have electric heaters as specified on plans.

G. The electric heating coil shall be ETL listed to UL 1995 and CSA 22.2, and provided by the terminal unit manufacturer. The electric coil casing shall be constructed from a minimum 20 gauge, 0.038 inch galvanized steel. The heating elements shall be open wire nickel chrome construction, supported by ceramic insulators. The integral control panel shall be a NEMA 250, Type 1 enclosure with hinged access door for access to all controls and safety devices. The electric coils shall be provided with a primary automatic reset thermal cutout, a manual reset thermal cutout, and a differential pressure airflow switch for proof of airflow. The electric coils shall be provided with a non-fused door interlocking disconnect switch. The electric coils shall be provided with a silicon-controlled rectifier (SCR) controller.

H. The terminal unit shall be supplied with a factory mounted 50 VA control transformer.

I. Electrical Requirements:

1. Single duct terminal units shall be provided with single-point power connection.
2. The terminal unit equipment wiring shall comply with the requirements of NFPA 70.

PART 3 – EXECUTION:

3.1 INSTALLATION

A. Install flexible connections between fan or motorized equipment and ductwork. Flexible connectors shall not be in tension while running.

B. Prevent passage of unfiltered air around filters with felt, rubber, or neoprene gaskets.

C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access.

D. Support terminal units individually from structure. Do not support from adjacent ductwork.

E. Provide balancing dampers on duct take-off to diffusers, grilles and registers, regardless of whether dampers are specified as part of the diffuser, grille or register assembly.

F. Install a new set of filters after final inspection.

3.2 DUCTS

A. Furnish and install all sheet metal ducts together with necessary dampers, supports and other items required for a complete installation.

B. All ductwork shall, where practicable, be run parallel to or at right angles to the lines of the building.

C. All rectangular duct branch take-offs shall be made with 45 degree fittings with main duct size reduction downstream.

D. All duct work shall be hung with sheet metal strap hangers per latest SMACNA "HVAC Duct Construction Standards" fastened to structure above.

E. The sizes of internally lined ducts (where allowed by 230700) are actual outside duct dimensions.

F. Inside radius of all elbows shall be not less than 6" and shall incorporate turning vanes as shown on drawings. Turning vanes shall be single thickness with standard metal runners as manufactured by Duro Dyne or Aero Dyne and installed per SMACNA. Note: Elbows called out on the plans to be used specifically for sound attenuation shall be square, lined with insulation, and have no turning vanes.

G. Ductwork on the roof shall be supported with C-Port Model C-Strut rooftop ductwork supports. Hem all edges.

H. Reducing elbows with turning vanes shall not be used. All elbows with turning vanes shall have the same inlet and outlet sizes with transitions as necessary downstream of the elbow.

I. Changes in duct sizes or shape shall be made with transitions as long as practicable. The absolute maximum angle between the side and axis of the duct shall be 30 degrees divergence or 45 degrees convergence.

J. Exposed ductwork passing through walls shall be provided with sheet metal flashings covering entire opening. Flashing shall be same gauge as duct with mitered corners and hemmed edges.

K. Extractors shall not be used.

L. Low velocity round branch duct connections shall be made with a round hole cutter and a spin-in collar sealed with hardcast. No dove tail fittings and no duct tape allowed.

M. All high velocity branch duct connections shall be factory made 45 degree take offs or full conical tees. No straight taps or field connections allowed.

N. Flexible duct connections shall be made with metal type hose clamps per installation recommended by manufacturer and as required by UL 181 label procedure.

O. Where ductwork passes through roof, provide curbs and flashings in accordance with details on Architectural drawings or as directed by Architect.

P. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

Q. Ductwork shall be stored in a clean location prior to installation. Openings shall be covered to prevent entry of dust, moisture, and general construction dirt/debris. 10 mil plastic sheeting securely taped over open ends will be acceptable.

END OF DOCUMENT 233000

SECTION 237000 - HEATING, VENTILATING, AND AIR CONDITIONING EQUIPMENT

PART 1 – GENERAL:

1.1 WORK INCLUDED

A. Exhaust Fans

B. Rooftop Packaged Air Conditioning Units

C. Rooftop Packaged VAV Air Conditioning Units

D. High-Efficiency Split System Heat Pumps

1.2 RELATED DOCUMENTS

A. Section 230500 – Basic Mechanical Materials and Methods

B. Section 230593 – Testing, Adjusting, and Balancing

C. Section 230900 – Energy Monitoring and Control System

1.3 QUALITY ASSURANCE

A. The following is a list of additional equipment approved for use on this project.

1. EXHAUST FANS: Cook, Twin City, Greenheck

2. AIR CONDITIONING EQUIPMENT: Carrier

3. Alternate #2:

a. AIR CONDITIONING EQUIPMENT: Daikin and York

B. Rooftop Packaged VAV Air Conditioning Units

1. Unit shall be rated in accordance with AHRI (Air-Conditioning, Heating and Refrigeration Institute) Standard 340/360, latest edition and with ASHRAE Standard 90.1-2013.
2. Unit shall be designed to conform to ANSI (American National Standards Institute)/ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) 15 (latest edition), ASHRAE 62, and UL Standard 1995.
3. Unit shall be listed by ETL and ETL, Canada, as a total package.
4. Unit shall be designed to conform to ANSI Standard Z21.47 (U.S.A.)/CSA Standard 2.3 (Canada), Gas-Fired Central Furnaces.
5. Roof curb shall be designed to NRCA (National Roofing Contractors Association) criteria per Guideline B-1986.
6. Insulation and adhesive shall meet NFPA (National Fire Protection Association) 90A requirements for flame spread and smoke generation.
7. The management system governing the manufacture of this product is ISO (International Organization for Standardization) 9001:2008 certified.

1.4 SUBMITTALS

A. Before beginning work, submit shop drawings or literature bound on the following items:

1. Exhaust Fans
2. Packaged Air Conditioning Units
3. Rooftop Packaged VAV Air Conditioning Units
4. High-Efficiency Split System Heat Pumps

1.5 DELIVERY, STORAGE, AND HANDLING

A. Unit shall be stored and handled per manufacturer's recommendations.

PART 2 – PRODUCTS:

2.1 EXHAUST FANS

A. Ceiling Exhaust Fans:

1. Ceiling mounted exhaust fans shall be of the centrifugal direct drive type. The fan housing shall be constructed of heavy gauge galvanized steel with pre-punched mounting brackets. The housing interior shall be lined with 1/2" acoustical fiberglass insulation. The outlet duct collar shall include an aluminum backdraft damper and shall be adaptable for horizontal or vertical discharge. Unit to be complete with aluminum grilles with white baked enamel finish. The access for wiring shall be external. The motor disconnect shall be internal and of the pug in type. The motor shall be mounted on vibration isolators. The fan wheel(s) shall be of the forward curved centrifugal type, constructed of galvanized steel and dynamically balanced. Fans shall be licensed to bear the AMCA Certified Ratings Seals for sound and air performance and shall be U.L. listed.

B. Ceiling In-Line Exhaust Fans:

1. Duct mounted exhaust fans shall be of the centrifugal, direct drive type. The fan housing shall be constructed of heavy gauge galvanized steel and shall include pre-punched mounting brackets. The housing interior shall be lined with 1/2" acoustical fiberglass insulation. The outlet duct collar shall include an aluminum backdraft damper and shall be adaptable for horizontal or vertical discharge. The access for wiring shall be external. The motor disconnect shall be internal and of the plug in type. The motor shall be mounted on vibration isolators. The fan wheel(s) shall be of the forward curved centrifugal type, constructed of galvanized steel and dynamically balanced. Fans shall be licensed to bear the AMCA Certified Ratings Seals for sound and air performance and shall be U.L. Listed.

C. Centrifugal Dome - Rooftop Centrifugal Exhaust Fan

1. General:

a. Rooftop exhaust fans shall be centrifugal belt driven type complete with damper and disconnect. The fan wheel shall be centrifugal backward inclined, constructed of aluminum and shall include a wheel cone

carefully matched to the inlet cone for precise running tolerances. Wheels shall be statically and dynamically balanced.

b. The fan housing shall be constructed of heavy gauge aluminum with a rigid internal support structure. The fan shroud shall have a rolled bead for added strength. The curb cap shall be fully welded to eliminate moisture penetration into the space.

c. All fans shall bear the AMCA Certified Ratings Seal for sound and air performance.

2. Motors:

a. Motors shall be heavy duty ball bearing type, carefully matched to the fan load. Motors and drives shall be mounted on vibrations isolators, out of the airstream. Fresh air for motor cooling shall be drawn into the motor compartment from an area free of discharge contaminants. Motors shall be readily accessible for maintenance.

3. Drives:

a. Drive frame assemblies shall be constructed of heavy gauge steel and mounted on vibration isolators.

4. Bearings:

a. Precision ground and polished fan shafts shall be mounted in a relubricatable cast iron housing with pillow block ball bearings. Bearings shall be selected for a minimum (L50) life in excess of 200,000 hours at maximum cataloged speed. Drives shall be sized for a minimum of 150% of driven horsepower. Pulleys shall be of the fully machined cast iron type, keyed and securely attached to the wheel and the motor shafts. Motor pulleys shall be adjustable for final system balancing.

5. Wiring:

a. A disconnect switch shall be factory installed and wired from the fan motor to a junction box installed within the motor compartment. A fan conduit chase shall be provided through the curb cap to the motor compartment for ease of installation.

6. Sound Curb:

a. Exhaust fan to set on factory made sound curb. The curb body shall be constructed of heavy gauge galvanized steel. All seams shall be continuously welded. A cant shall be built into the curb to provide a fillet for roof flashing. Wooden nailer strips shall be securely attached to the body and provide a solid foundation for nailing the flashing material to the curb.

b. Rigid fiber glass board of three pound density shall be used for insulation and sound absorption around the interior curb wall.

c. Sound baffle shall be constructed with perforated aluminum sheet die formed into half-sections. Each section shall be filled with fiber glass wool and seamed together. Spring steel wire holding clips shall be secured to aluminum baffle ends to act as formers for the baffles. The

assembly shall be rigid, durable section which shall not warp or twist out of shape.

D. Utility Set Exhaust Fans:

1. General:

a. Exhaust fans shall be of the belt driven utility fan type in AMCA Arrangement 10 with a single width, single inlet housing in CW or CCW rotation as specified.
b. The housing shall be constructed of heavy gauge steel or aluminum with fully welded seams permitting no air leakage. The housing shall be field rotatable to any of the eight standard discharge positions. Housing and bearing supports shall be constructed of welded steel or aluminum members to prevent vibration and rigidly support the shaft bearings.
c. Fan performances shall be based on tests conducted in accordance with AMCA Standard 210 test code for air moving devices. Fan shall be licensed to bear the AMCA Certified Ratings Seal for air performance.

2. Fan Wheel:

a. The fan wheel shall be of the [backward inclined type, constructed of heavy gauge steel or aluminum with uniform stamped steel or aluminum blades.
b. Wheels shall be statically and dynamically balanced. The wheel cone and fan inlet cone shall be carefully matched for maximum performance and operating efficiency.

3. Motors:

a. Motors shall be permanently lubricated, heavy duty, ball bearing type carefully matched to the fan load and furnished at the specified voltage, phase and enclosure. The fan shaft shall be ground and polished solid steel mounted in a heavy duty, relubricatable cast iron housing, with pillow block ball bearings. Bearings shall be selected for a minimum L50 life in excess of 200,000 hours at maximum cataloged operating speed. Drives shall be sized for a minimum of 150% of driven horsepower. Pulleys shall be of the fully machined cast iron type, keyed and securely attached to the wheel and fan motor shafts. The motor pulley shall be adjustable for final system balancing.

4. Protective Coating:

a. Provide protective coating on all air stream components as notes on the fan schedule.

5. Weather cover and belt guard.

a. Unit shall have weather tight roof and end panels to protect motor, shaft, bearings and drive from the elements. Openings shall be provided for motor ventilation. Cover shall serve as a drive guard complying with OSHA requirements. End panel shall be easily removed for quick access to the motor compartment.

6. Vibration Isolators:

   a. Provide free standing spring isolator for use in isolating floor mounted sources of noise and vibration where support equipment will not be subjected to wind loads. Kinetics model FDS or equivalent.
   b. Provide horizontally restrained spring isolators for applications where support equipment will be subject to wind loads. Kinetics model FHS or equivalent.

7. Drain:

   a. A pipe coupling with removable plug shall be fitted into the lowest point of the housing to provide a scroll drain.

8. Disconnect Switch:

   a. Disconnect switches shall be mounted inside the drive compartment and factory wired to the motoSpark Proof Construction:

2.2 ROOFTOP PACKAGED AIR CONDITIONING EQUIPMENT (UP TO 27.5-TONS)

A. Evaporator fan compartment:

1. Interior cabinet surfaces shall be insulated with a minimum 1/2-in. thick, minimum 1 1/2-lb density, flexible fiberglass insulation bonded with a phenolic binder, neoprene coated on the air side.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
3. Unit internal insulation linings shall be resistant to mold growth in accordance with “mold growth and humidity" test in ASTM C1338, G21, and UL 181 or comparable test method. Air stream surfaces shall be evaluated in accordance with the “Erosion Test" in UL 181, as part of ASTM C1071.

B. Gas heat compartment:

1. Aluminum foil-faced fiberglass insulation shall be used.
2. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

C. Instrumentation and control devices for HVAC

1. Sensors and Transmitters

   a. Thermostats

      i Thermostat must energize both “W" and “G" when calling for heat.
      ii Thermostats must have capability to energize 2 different stages of cooling, and 2 different stages of heating.
      iii Thermostats must include capability for occupancy scheduling.

D. Direct-digital control system for HVAC

1. RTU Open protocol, direct digital controller:

a. Shall be ASHRAE 62 compliant.
b. Shall accept 18-30VAC, 50-60Hz, and consume 15VA or less power.
c. Shall have an operating temperature range from –40°F (–40°C) to 130°F (54°C), 10% to 90% RH (non-condensing).
d. Shall include built-in protocol for BACnet† (MS/TP and PTP modes)
e. Shall allow access of up to 62 network variables (SNVT). Shall be compatible with all open controllers
f. Baud rate controller shall be selectable using a dip switch.
g. Shall have an LED display independently showing the status of serial communication, running, errors, power, all digital outputs, and all analog inputs.
h. Shall accept the following inputs: space temperature, setpoint adjustment, outdoor air temperature, indoor air quality, outdoor air quality, compressor lock-out, fire shutdown, enthalpy switch, and fan status/filter status/ humidity/remote occupancy.
i. Shall provide the following outputs: economizer, fan, cooling stage 1, cooling stage 2, heat stage 1, heat stage 2, heat stage 3/ exhaust/reversing valve.
j. Shall have built-in surge protection circuitry through solid-state polyswitches. Polyswitches shall be used on incoming power and network connections. Polyswitches will return to normal when the “trip" condition clears.
k. Shall have a battery backup capable of a minimum of 10,000 hours of data and time clock retention during power outages.
l. Shall have built-in support for Carrier technician tool.
m. Shall include an EIA-485 protocol communication port, an access port for connection of either a computer or a Carrier technician tool, an EIA-485 port for network communication to intelligent space sensors and displays, and a port to connect an optional LonWorks communications card.
n. Software upgrades will be accomplished by either local or remote download. No software upgrades through chip replacements are allowed.

2. General:

a. Shall be complete with self-contained low-voltage control circuit protected by a resettable circuit breaker on the 24-v transformer side. Transformer shall have 75VA capability.
b. Shall utilize color-coded wiring.
c. Shall include a central control terminal board to conveniently and safely provide connection points for vital control functions such as: smoke detectors, phase monitor, gas controller, economizer, thermostat, DDC control options, and low and high pressure switches.
d. The heat exchanger shall be controlled by an integrated gas controller (IGC) microprocessor. See heat exchanger section of this specification.
e. Unit shall include a minimum of one 8-pin screw terminal connection board for connection of control wiring.

3. Safeties:

a. Compressor over-temperature, over-current. High internal pressure differential.
b. Low-pressure switch.

i Units shall have different sized connectors for the circuit 1 and circuit 2 low and high pressure switches. They shall physically prevent the cross-wiring of the safety switches between circuits 1 and 2.
ii Low-pressure switch shall use different color wire than the high-pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.

c. High-pressure switch.

i Units shall have different sized connectors for the circuit 1 and circuit 2 low and high- pressure switches. They shall physically prevent the cross-wiring of the safety switches between circuits 1 and 2.
ii High-pressure switch shall use different color wire than the low-pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.
iii Automatic reset, motor thermal overload protector.

d. Heating section shall be provided with the following minimum protections:

i High-temperature limit switches.
ii Induced draft motor speed sensor.
iii Flame rollout switch.
iv Flame proving controls.

E. Panel air filters

1. Standard filter section

a. Shall consist of factory-installed, low velocity, disposable 2-in. thick fiberglass filters of commercially available sizes.
b. Unit shall use only one filter size. Multiple sizes are not acceptable.
c. Filters shall be accessible through a dedicated, weather tight access panel.
d. 4-in. filter capabilities shall be capable with pre-engineered and approved Carrier filter track field-installed accessory. This kit requires field furnished filters.

F. General

1. Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing a fully hermetic scroll compressor(s) for cooling duty and gas combustion for heating duty.
2. Factory assembled, single-piece heating and cooling rooftop unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and special features required prior to field start-up.
3. Unit shall use Puron® refrigerant.

4. Unit shall be installed in accordance with the manufacturer’s instructions.
5. Unit must be selected and installed in compliance with local, state, and federal codes.

G. Quality Assurance

1. Unit meets ASHRAE 90.1-2016 and IECC*-2015 minimum efficiency requirements.
2. Unit shall be rated in accordance with AHRI Standard 340/360.
3. Unit shall be designed to conform to ASHRAE 15.
4. Unit shall be ETL-tested and certified in accordance with ANSI Z21.47 Standards and ETL-listed and certified under Canadian standards as a total package for safety requirements.
5. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
6. Unit internal insulation linings shall be resistant to mold growth in accordance with “mold growth and humidity" test in ASTM C1338, G21, and UL 181 or comparable test method. Air stream surfaces shall be evaluated in accordance with the “Erosion Test" in UL 181, as part of ASTM C1071.
7. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
8. Roof curb shall be designed to conform to NRCA Standards.
9. Unit shall be subjected to a completely automated run test on the assembly line. The data for each unit will be stored at the factory, and must be available upon request.
10. Unit shall be designed in accordance with UL Standard 1995, ETL listed including tested to withstand rain.
11. Unit shall be constructed to prevent intrusion of snow and tested to prevent snow intrusion into the control box up to 40 mph.
12. Unit shake tested to assurance level 1, ASTM D4169 to ensure shipping reliability.
13. High Efficiency Motors listed shall meet section 313 of the Energy Independence and Security Act of 2007 (EISA 2007).

H. Delivery, storage, and handling

1. Unit shall be stored and handled per manufacturer’s recommendations.
2. Lifted by crane requires either shipping top panel or spreader bars.
3. Unit shall only be stored or positioned in the upright position.

I. Operating characteristics

1. Unit shall be capable of starting and running at 115°F (46°C) ambient outdoor temperature, meeting maximum load criteria of AHRI Standard 340/360 at ± 10% voltage.
2. Compressor with standard controls shall be capable of operation down to 35°F (2°C), ambient outdoor temperatures. Accessory winter start kit is necessary if mechanically cooling at ambient temperatures below 35°F (2°C).
3. Unit shall be factory configured and ordered for horizontal supply and return configurations.
4. Unit shall be factory furnished for horizontal configuration. No field conversion is required.

J. Electrical Requirements

1. Main power supply voltage, phase, and frequency must match those required by the manufacturer.

K. Unit cabinet

1. Unit cabinet shall be constructed of galvanized steel, and shall be bonderized and coated with a pre-painted baked enamel finish on all externally exposed surfaces.
2. Unit cabinet exterior paint shall be: film thickness, (dry) 0.003 inches minimum, gloss (per ASTM D523, 60°F / 16°C): 60, Hardness: H to 2H Pencil hardness.
3. Evaporator fan compartment interior cabinet insulation shall conform to AHRI Standard 340/360 minimum exterior sweat criteria. Interior surfaces shall be insulated with a minimum 1/2-in. thick, 1-lb density, flexible fiberglass insulation, neoprene coated on the air side. Aluminum foil-faced fiberglass insulation shall be used in the gas heat compartment.
4. Unit internal insulation linings shall be resistant to mold growth in accordance with “mold growth and humidity" test in ASTM C1338, G21, and UL 181 or comparable test method. Air stream surfaces shall be evaluated in accordance with the “Erosion Test" in UL 181, as part of ASTM C1071.
5. Base of unit shall have a minimum of four locations for thru-the-base gas and electrical connections standard. Both gas and electric connections shall be internal to the cabinet to protect from environmental issues.
6. Base rail:

    a. Unit shall have base rails on a minimum of 2 sides.
    b. Holes shall be provided in the base rails for rigging shackles to facilitate maneuvering and overhead rigging.
    c. Holes shall be provided in the base rail for moving the rooftop by fork truck.
    d. Base rail shall be a minimum of 16-gauge thickness.

7. Condensate pan and connections:

    a. Shall be a sloped condensate drain pan made of a non-corrosive material.
    b. Shall comply with ASHRAE Standard 62.
    c. Shall use a 3/4-in. — 14 NPT drain connection, through the side of the drain pan. Connection shall be made per manufacturer’s recommendations.

8. Top panel:

    a. Shall be a multi-piece top panel linked with water tight flanges and locking systems.

9. Gas connections:

    a. All gas piping connecting to unit gas valve shall enter the unit cabinet at a single location on side of unit (horizontal plane).
    b. Thru-the-base capability

        i Standard unit shall have a thru-the-base gas-line location using a raised, embossed portion of the unit basepan.

ii Thru-the-base provisions/connections are available as standard with every unit. When bottom connections are required, field furnished couplings are required.
iii No basepan penetration, other than those authorized by the manufacturer, is permitted.

10. Electrical connections

a. All unit power wiring shall enter unit cabinet at a single, factory-prepared, knockout location.
b. Thru-the-base capability.

i Thru-the-base provisions/connections are available as standard with every unit. When bottom connections are required, field furnished couplings are required.
ii No basepan penetration, other than those authorized by the manufacturer, is permitted.

11. Component access panels (standard)

a. Cabinet panels shall be easily removable for servicing.
b. Unit shall have one factory-installed, removable, filter access panel.
c. Panels covering control box and filter shall have molded composite handles while the blower access door shall have an integrated flange for easy removal.
d. Handles shall be UV modified, composite. They shall be permanently attached, and recessed into the panel.
e. Screws on the vertical portion of all removable access panel shall engage into heat resistant, molded composite collars.
f. Collars shall be removable and easily replaceable using manufacturer recommended parts.

L. Gas heat

1. Heat exchanger shall be an induced draft design. Positive pressure heat exchanger designs shall not be allowed.
2. Shall incorporate a direct-spark ignition system and redundant main gas valve.
3. Gas supply pressure at the inlet to the rooftop unit gas valve must match that required by the manufacturer.
4. The heat exchanger shall be controlled by an integrated gas controller (IGC) microprocessor.
5. IGC board shall notify users of fault using an LED (light-emitting diode).
6. IGC board shall contain algorithms that modify evaporator-fan operation to prevent future cycling on high temperature limit switch.
7. Unit shall be equipped with anti-cycle protection with one short cycle on unit flame roll-out switch or 4 continuous short cycles on the high temperature limit switch. Fault indication shall be made using an LED.
8. Stainless steel heat exchanger construction:

a. Use energy saving, direct-spark ignition system.
b. Use a redundant main gas valve.

c. Burners shall be of the in-shot type constructed of aluminum-coated steel.
d. All gas piping shall enter the unit cabinet at a single location on side of unit (horizontal plane).
e. The optional stainless steel heat exchanger shall be of the tubular-section type, constructed of a minimum of 20-gauge type 409 stainless steel.
f. Type 409 stainless steel shall be used in heat exchanger tubes and vestibule plate.
g. Complete stainless steel heat exchanger allows for greater application flexibility.

9. Induced draft combustion motor and blower:

a. Shall be a direct-drive, single inlet, forward-curved centrifugal type.
b. Shall be made from steel with a corrosion-resistant finish.
c. Shall have permanently lubricated sealed bearings.
d. Shall have inherent thermal overload protection.
e. Shall have an automatic reset feature.

M. Coils

1. Standard aluminum fin/copper tube coils:
2. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seamless internally grooved copper tubes with all joints brazed.
3. Evaporator coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to UL 1995 burst test at 1775 psig.
4. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.
5. Optional E-coated aluminum-fin, aluminum tube condenser coils:

a. Shall have a flexible epoxy polymer coating uniformly applied to all coil external surface areas without material bridging between fins.
b. Coating process shall ensure complete coil encapsulation, including all exposed fin edges.
c. E-coat thickness of 0.8 to 1.2-mil with top coat having a uniform dry film thickness from 1.0 to 2.0 mil on all external coil surface areas, including fin edges, shall be provided.
d. Shall have superior hardness characteristics of 2H per ASTM D3363-00 and crosshatch adhesion of 4B-5B per ASTM D3359-02.
e. Shall have superior impact resistance with no cracking, chipping or peeling per NSF/ANSI 51-2002 Method 10.2.

N. Refrigerant components

1. Refrigerant circuit shall include the following control, safety, and maintenance features:
2. Thermostatic Expansion Valve (TXV) shall help provide optimum performance across the entire operating range. Shall contain removable power element to allow change out of power element and bulb without removing the valve body.
3. Refrigerant filter drier - Solid core design.
4. Service gauge connections on suction and discharge lines.

5. Pressure gauge access through a specially designed access screen on the side of the unit.
6. Compressors:

    a. Unit shall use fully hermetic, scroll compressor for each independent refrigeration circuit.
    b. Models shall be available with 2 compressor/ 2-stage cooling.
    c. Compressor motors shall be cooled by refrigerant gas passing through motor windings.
    d. Compressors shall be internally protected from high discharge temperature conditions.
    e. Compressors shall be protected from an over-temperature and over-amperage conditions by an internal, motor overload device.
    f. Compressor shall be factory mounted on rubber grommets.
    g. Compressor motors shall have internal line break thermal, current overload and high pressure differential protection.
    h. Crankcase heaters shall not be required for normal operating range, unless provided by the factory.

O. Filter section

1. Filters access is specified in the unit cabinet section of this specification.
2. Filters shall be held in place by a preformed, slide-out filter tray, facilitating easy removal and installation.
3. Shall consist of factory-installed, low velocity, throw-away 2-in. thick fiberglass filters.
4. Filters shall be standard, commercially available sizes.
5. Only one size filter per unit is allowed.
6. 4-in. filter capability is possible with a field-installed pre-engineered slide out filter track accessory. 4-in. filters are field furnished.

P. Evaporator fan and motor

1. Shall have inherent automatic-reset thermal overload protection or circuit breaker.
2. Shall have a maximum continuous bhp rating for continuous duty operation; no safety factors above that rating shall be required.
3. Belt-driven evaporator fan:
4. Belt drive shall include an adjustable-pitch motor pulley and belt break protection system.
5. Shall use rigid pillow block bearing system with lubricant fittings at accessible bearing or lubrication line.
6. Blower fan shall be double-inlet type with forward-curved blades.
7. Shall be constructed from steel with a finish that aids with corrosion resistance and that is dynamically balanced.
8. Standard on all 18-29 size Humidi-MiZer® models.

Q. Condenser Fans and Motors.

1. Shall be a totally enclosed motor.
2. Shall use permanently lubricated bearings.
3. Shall have inherent thermal overload protection with an automatic reset feature.

4. Shall use a shaft-down design.
5. Shall be a direct-driven propeller type fan.
6. Shall have aluminum blades riveted to steel spiders that have corrosion resistant properties and shall be dynamically balanced.

R. Special features options and accessories

1. Variable frequency drive (VFD). Only available on 2-speed indoor fan motor option (SAV):

    a. Factory-supplied VFDs qualify, through ABB, for a 24-month warranty from date of commissioning or 30 months from date of sale, whichever occurs first.
    b. Shall be installed inside the unit cabinet, mounted, wired and tested.
    c. Shall contain Electromagnetic Interference (EMI) frequency protection.
    d. Insulated gate bi-polar transistors (IGBT) used to produce the output pulse width modulated (PWM) waveform, allowing for quiet motor operation.
    e. Self diagnostics with fault and power code LED indicator. Field accessory Display Kit available for further diagnostics and special setup applications.
    f. RS485 capability standard.
    g. Electronic thermal overload protection.
    h. 5% swinging chokes for harmonic reduction and improved power factor.
    i. All printed circuit boards shall be conformal coated.

2. Humidi-MiZer® adaptive dehumidification system:

    a. The Humidi-MiZer Adaptive Dehumidification System shall be factory-installed and shall provide greater dehumidification of the occupied space by two modes of dehumidification operations in addition to its normal design cooling mode:
    b. Subcooling mode further sub cools the hot liquid refrigerant leaving the condenser coil when both temperature and humidity in the space are not satisfied.
    c. Hot gas reheat mode shall mix a portion of the hot gas from the discharge of the compressor with the hot liquid refrigerant leaving the condenser coil to create a two-phase heat transfer in the system, resulting in a neutral leaving air temperature when only humidity in the space is not satisfied.
    d. Includes head pressure controller.
    e. Head pressure control package (Motormaster®)
    f. Controller shall control coil head pressure by condenser-fan speed modulation or condenser-fan cycling and wind baffles.
    g. Shall consist of solid-state control and condenser-coil temperature sensor to maintain condensing temperature between 90°F (32°C) and 110°F (43°C) at outdoor ambient temperatures down to –20°F (–29°C).

3. Condenser coil hail guard assembly:

    a. Shall protect against damage from hail.
    b. Shall be louvered style design.

4. Unit-mounted, non-fused disconnect switch:

    a. Switch shall be factory-installed, internally mounted.
    b. National Electric Code (NEC) and UL approved non-fused switch shall provide unit power shutoff.
    c. Shall be accessible from outside the unit.
    d. Shall provide local shutdown and lockout capability.
    e. Sized only for the unit as ordered from the factory. Does not accommodate field- installed devices.

5. Convenience outlet:

    a. Powered convenience outlet.
    b. Outlet shall be powered from main line power to the rooftop unit.
    c. Outlet shall be powered from line side of disconnect by installing contractor, as required by code. If outlet is powered from load side of disconnect, unit electrical ratings shall be ETL certified and rated for additional outlet amperage.
    d. Outlet shall be factory-installed and internally mounted with easily accessible 115-v female receptacle.
    e. Outlet shall include 15 amp GFI receptacles with independent fuse protection.
    f. Voltage required to operate convenience outlet shall be provided by a factory-installed step-down transformer.
    g. Outlet shall be accessible from outside the unit.
    h. Outlet shall include a field-installed “Wet in Use" cover.

6. Flue discharge deflector:

    a. Flue discharge deflector shall direct unit exhaust horizontally instead of vertically.
    b. Deflector shall be defined as a “natural draft" device by the National Fuel and Gas (NFG) code.

7. Centrifugal propeller power exhaust:

    a. Power exhaust shall be used in conjunction with an integrated economizer.
    b. Independent modules for horizontal return configurations shall be available.
    c. Horizontal power exhaust shall be mounted in return ductwork.
    d. Power exhaust shall be controlled by economizer controller operation. Exhaust fans shall be energized when dampers open past the 0-100% adjustable setpoint on the economizer control.

8. Outdoor air enthalpy sensor:

    a. The outdoor air enthalpy sensor shall be used to provide single enthalpy control. When used in conjunction with a return air enthalpy sensor, the unit will provide differential enthalpy control. The sensor allows the unit to determine if outside air is suitable for free cooling.

9. Return air enthalpy sensor:

a. The return air enthalpy sensor shall be used in conjunction with an outdoor air enthalpy sensor to provide differential enthalpy control.

10. Time guard:

a. Shall prevent compressor short cycling by providing a 5-minute delay (±2 minutes) before restarting a compressor after shutdown for any reason.
b. One device shall be required per compressor.
c. Barometric hood (horizontal economizer applications)
d. Shall be required when a horizontal economizer and barometric relief are required. Barometric relief damper must be installed in the return air (horizontal) duct work. This hood provides weather protection.

11. Display kit for variable frequency drive (VFD):

a. Kit allows the ability to access the VFD controller programs to provide special setup capabilities and diagnostics.
b. Kit contains display module and communication cable.
c. Display kit can be permanently installed in the unit or used on any SAV™ system VFD controller as needed.

12. Condensate overflow switch (for units with electro-mechanical controls or RTU Open controller only):

a. This sensor and related controller monitors the condensate level in the drain pan and shuts down compression operation when overflow conditions occur. It includes:
b. Indicator light — solid red (more than 10 seconds on water contact - compressors disabled), blinking red (sensor disconnected).
c. 10 second delay to break — eliminates nuisance trips from splashing or waves in pan (sensor needs 10 seconds of constant water contact before tripping).
d. Disables the compressor(s) operation when condensate plug is detected, but still allows fans to run for Economizer.

13. Hinged access panels:

a. Shall provide easy access through hinged access doors with vinyl coated door retainers.
b. Shall be on major panels of – filter, control box, and fan motor.

2.3 ROOFTOP PACKAGED VAV AIR CONDITIONING UNITS

A. Factory-assembled, single-piece heating and cooling unit. Contained within the unit enclosure shall be all factory wiring, piping, refrigerant charge (R-410A), operating oil charge, dual refrigerant circuits, microprocessor-based control system and associated hardware, and all special features required prior to field start-up.

B. Unit Cabinet:

1. Constructed of galvanized steel (designated G90 per ASTM [American Society for Testing and Materials] Standard A653 — minimum coating weight of 0.9 oz

of zinc per square foot), bonderized and primer-coated on both sides and coated with a baked polyester thermosetting powdercoating finish on the outer surface.

2. Unit casing shall be capable of withstanding ASTM Standard B117 500-hour salt spray test.
3. Sides shall have person size insulated, double wall, hinged access doors for easy access to the control box and other areas requiring servicing. Each door shall seal against a rubber gasket to prevent air and water leakage.
4. Interior cabinet surfaces (except heat exchanger section) shall be insulated with flexible fire- retardant dual-density (1.75-lb/cu ft) fiberglass blanket, coated on the air side. Insulation coating shall be cleanable and shall contain an EPA-registered immobilized antimicrobial agent to effectively resist the growth of bacteria and fungi as proven by tests in accordance with ASTM Standards G21 and G22.
5. Interior cabinet surfaces within heat exchanger section shall be lined with sheet metal on all surfaces, insulated on the side opposite the airstream.
6. Insulation shall be applied by means of adhesion using a water reducible adhesive sprayed onto interior surface. Adhesive shall maintain a satisfactory adhesion and cohesion within the temperature range of –20 to 180 F and have excellent resistance to water and water vapor when cured.
7. Unit shall contain a sloped drain pan, to prevent standing water from accumulating. Pan shall be fabricated of stainless steel. Unit shall contain a factory-installed nonferrous main condensate drain connection.
8. Units shall be equipped with lifting lugs to facilitate overhead rigging.

C. Fans:

1. Supply Fan:

a. Unit shall have only one fan wheel, scroll, and motor.
b. Fan scroll, wheel, shaft, bearings, drive components and motor shall be mounted on a formed steel assembly which shall be isolated from the unit outer casing with factory-installed 2-in. deflection spring isolators and vibration-absorbent fan discharge seal.
c. Fan shall be double-width, double-inlet, centrifugal belt driven forward-curve type with single outlet discharge (standard) or centrifugal belt driven airfoil blade section type with single outlet discharge (optional). Optional airfoil fan include a high static pressure safety switch installed into the supply air p-lenum.
d. Fan wheel shall be designed for continuous operation at the maximum rated fan speed and motor horsepower.
e. Fan wheel and shaft shall be selected to operate at 25% below the first critical speed and shall be statically and dynamically balanced as an assembly.
f. Fan shaft shall be solid steel, turned, ground and polished, and coated with rust preventative oil.
g. Fan shaft bearings shall be self-aligning, pillow-block, regreasable ball or roller-type selected for a minimum average life of 200,000 hours at design operating conditions in accordance with ANSI B3.15.
h. A single motor shall be mounted within the fan section casing on slide rails equipped with adjusting screws. Motor shall be mounted on a

horizontal flat surface and shall not be supported by the fan or its structural members.

i. Fan drive shall be constant-speed fixed-pitch. All drives shall be factory-mounted, with belts aligned and tensioned.

2. Condenser Fans:

a. Direct-driven propeller type.
b. Size 035 units shall have a direct driven, 11-blade airfoil cross section, reinforced polymer construction, and shrouded-axial type fans with inherent corrosion resistance.
c. Discharge air vertically upward.
d. Protected by PVC-coated steel wire safety guards.
e. Statically and dynamically balanced.
f. Three-phase, totally enclosed motors.

3. Compressors:

a. Fully hermetic scroll type compressors with overload protection and short cycle protection with minimum on and off timers.
b. Factory rubber-in-shear mounted for vibration isolation.
c. Reverse rotation protection capability.
d. Crankcase heaters shall only be activated during compressor off mode.

4. Coils:

a. Evaporator Coil:

i Intertwined circuiting constructed of aluminum fins mechanically bonded to seamless copper tubes.
ii Full-face active type during full and part load conditions.
iii Coils shall be leak tested at 150 psig and pressure tested at 650 psig.

5. Condenser Coils:

a. Condenser coils shall be microchannel design. The coils shall have a series of flat tubes containing a series of multiple, parallel flow microchannels layered between the refrigerant manifolds. Microchannel coils shall consist of a two-pass arrangement. Coil construction shall consist of aluminum alloys for the fins, tubes and manifolds.
b. Air-cooled condenser coils shall be leak tested at 150 psig and pressure tested at 650 psig.

6. Outdoor-Air Hood Assembly:

a. Factory-installed manual outdoor-air damper shall allow intake of up to 25% nominal airflow (on units not equipped with optional economizer).

7. Heating Section:

a. Induced-draft combustion type with energy saving direct spark ignition systems and redundant main gas valves.

b. Heat exchanger shall be constructed of minimum 20-gage Type 409 Stainless Steel for corrosion resistance. Tubing material shall be suited for high temperature and corrosion resisting service. Tubing material shall comply with ASTM A268, Grade TP409. Tubing shall be welded and annealed.
c. Burners shall be of the in-shot type constructed of aluminized steel.
d. Induced Draft Fans:

i Direct-driven, single inlet, forward-curved centrifugal type.
ii Statically and dynamically balanced.
iii Made from steel with a corrosion-resistant finish.

e. High-corrosion areas such as flue gas collection and exhaust areas shall be lined with corrosion-resistant material.
f. All gas piping shall enter the unit cabinet at a single location.

8. Refrigerant Components:

a. Unit shall be equipped with dual refrigerant circuits, each containing:

i Filter drier.
ii Moisture indicating sight glass.
iii Thermostatic expansion valve.
iv Fusible plug.

9. Filter Section:

a. Filter section shall consist of 2-in. thick, MERV (Minimum Efficiency Reporting Value) 7 disposable fiberglass filters of commercially available sizes.
b. Factory 2-in. filter track shall allow easy field conversion to accept 4-in. thick, disposable fiberglass filters of commercially available sizes.

10. Controls:

a. Control shall be accomplished through the use of a factory-installed, microprocessor-based control system and associated electronic and electrical hardware. Control system shall determine control sequences through monitoring the following operational variables:

i Day and Time.
ii Schedule (Unoccupied/Occupied).
iii Set points (Unoccupied/Occupied,
iv Economizer, Duct Pressure, others).
v Space temperature.
vi Outdoor air temperature.
vii Unit supply air temperature.
viii Unit return air temperature.
ix Supply-air fan status.
x Economizer position.
xi Compressor suction and discharge pressure.
xii Scrolling marquee display.

xiii Accessory and/or field-supplied sensors, function switches and/or signals.

b. Controls shall be capable of performing the following functions:

i Capacity control based on supply-air temperature and compensated by rate of change of return-air temperature (VAV) or room temperature (CV). Capacity control shall be accomplished through the use of compressor staging or optional variable output compressors.

ii Perform a quick test to check the status of all input and output signals to the control system using scrolling marquee or Navigator™ display.

iii Control of integrated economizer operation, based on unit supply-air temperature.

iv Supply fan volume control shall control output from a variable frequency drive to maintain duct static pressure at user-configured set point (VAV). Static pressure reset in conjunction with Carrier communicating terminals to reduce supply fan power requirements. Control system calculates the amount of supply static pressure reduction necessary to cause the most open damper in the system to open more than the minimum value (60%) but not more than the maximum value (90% or negligible static pressure drop).

v Heating control shall provide space temperature control for unoccupied period heating, morning warm-up sequence and occupied period heating (when configured).

vi Adaptive optimal start shall determine the time unit will commence cooling (or heating or heating for morning warm-up) during the unoccupied mode to ensure occupied space reaches the set point in time for occupied mode.

vii Adaptive optimal stop shall turn off the compressors a preset amount of time before the end of the occupied mode to conserve energy (CV only).

viii Alerts and Alarms: Control shall continuously monitor all sensor inputs and control outputs to ensure safe and proper system operation. Alerts shall be generated whenever sensor conditions have gone outside criteria for acceptability. Alarms shall be initiated when unit control detects that a sensor input value is outside its valid range (indicating a defective device or connection that prevents full unit operation) or that an output has not functioned as expected or that a safety device has tripped. Current alarms shall be maintained in STATUS function; up to 9 (current or reset) shall be stored in HISTORY function for recall.

ix Timed override function shall permit a system in unoccupied mode to be returned to occupied mode for a user-configured period of 1, 2, 3 or 4 hours by pressing the override button on the front of the space temperature sensor.

x Nighttime Free Cooling (NTFC) shall start the supply fan and open the economizer on cool nights to precool the building structure mass using only outdoor air. Function shall be

restricted to operation above a user-configured low lockout temperature set point.

xi Modulating power exhaust control shall modulate capacity of exhaust fan system in response to building static pressure at user-configured set point. Power exhaust fan operation shall be interlocked with supply fan operation.

xii Return fan control (on optional return fan equipped units only) shall measure supply fan CFM and modulate return fan to maintain constant CFM differential between supply and return fan. Return fan operation shall be interlocked with supply fan operation. Capacity of exhaust air shall modulate in response to building static pressure at user-configured set point.

xiii Smoke control functions: Control shall initiate any of four separate smoke control functions in response to closure of field switches. Functions shall include: Pressurization, Evacuation, Smoke Purge and Fire Shutdown. Should two or more switches be closed simultaneously, Fire Shutdown shall be initiated.

xiv Support demand controlled ventilation through a reset of the economizer's minimum position. This reset based on differential CO2 ppm (outdoor and indoor) can be chosen as linear or as fast or slow-acting exponential curves.

xv Indoor air quality (IAQ) mode shall admit fresh outdoor air into the space whenever space air quality sensors detect unsuitable space conditions, by overriding economizer minimum damper position. IAQ shall be permitted only during occupied periods, unless configured to be allowed during unoccupied periods also.

xvi Provide control for reheat via auxiliary heating coil or gas heat during ventilation.

xvii IAQ pre-occupancy purge function shall provide complete exchange of indoor air with fresh air during unoccupied periods, when outdoor conditions permit. Function shall energize supply fan and open economizer two hours before next occupied period; duration of purge shall be user-configured (5 to 60 minutes).

xviii Outdoor Air Control (OAC) function shall maintain a minimum quantity of outdoor airflow into an occupied space. OAC mode shall be available only during an occupied period. Outdoor airflow shall be monitored by an airflow station and transducer. Economizer maximum damper opening position during OAC mode shall be user-configured.

xix Dehumidification and Reheat: Dehumidification function shall override comfort condition set points to deliver cooler air into the space and satisfy a user- configured humidity set point at the space or return air humidity sensor. Reheat function shall energize an auxiliary heating device should dehumidification operation result in cooling of the space down to the occupied heating set point.

xx Supply Air Temperature Set Point Reset: Control shall automatically reset the unit supply air temperature set point on VAV models from either space temperature or return-air temperature, at user-configured rate and limit. Control shall also

reset supply air temperature set point via external 2 to 10 vdc signal representing 0° to 20° F range of reset. Control shall respond to higher of either reset if both are active.

xxi Space Temperature Offset function shall permit occupants to adjust space temperature set point by ±5° F using T-56 space sensor (equipped with sliding scale adjuster).

xxii Lead-lag function shall distribute starts between the two refrigeration circuits in an effort to equalize the running time on the two circuits.

xxiii Condenser-fan cycling control shall maintain correct head pressure down to 0° F.

xxiv Refrigeration system pressures shall be monitored via pressure transducers. Alarms for low pressure, high pressure will be permitted.

xxv Timed Discrete Output function shall control an external function or device via user-configured activity schedule. This schedule shall be separate and different from the unit's occupied/unoccupied time schedule.

xxvi Two-step demand limit control (when used in conjunction with CEM [controls expansion module]).

xxvii Display may be configured to display data in Metric or English (Imperial) units of measure.

11. Safeties:

a. Unit components shall be equipped with the following protections:

i Compressors:

A) Overcurrent using calibrated circuit breakers (shuts down individual compressor).
B) Crankcase heaters.
C) High-pressure switch (shuts down individual circuit, automatic reset type).
D) Low-pressure switch (shuts down individual circuit, automatic reset type).
E) Check filter switch.

ii Belt-Drive Fan Motors:

A) Overcurrent protection manual reset circuit breakers.
B) Airfoil Supply Fan and Airfoil Return Fan (when equipped):
C) High static pressure safety switch installed into the associated air plenum.

iii Heating Section:

A) Redundant gas valves.
B) Flame proving controls.
C) Induced-draft fan motor speed sensor.
D) High-temperature limit switch.

E) Flame rollout switch.

12. Diagnostics:

a. The display shall be capable of indicating a safety lockout condition (alarm) through an expandable scrolling display.
b. The display shall also be capable of indicating an alert condition which does not lock out the unit, but informs the system monitor of a condition which could be detrimental to either the unit or the comfort of the occupants if allowed to continue.
c. Test mode must also be capable of displaying outputs of microprocessor-controller and to verify operation of every thermistor, actuator motor, fan, and compressor before unit is started.

D. Operating Characteristics:

1. Unit shall be capable of starting and running at 115 F ambient outdoor temperature per maximum load criteria of AHRI Standard 340/360, latest edition.
2. Unit shall be capable of mechanical cooling operation down to 32 F ambient outdoor temperature (–20 F with low ambient accessory).
3. Provides multi-stage cooling capability.
4. Provides 2 stages of heating capability.

E. Motors:

1. Compressor motors shall be cooled by suction gas passing over motor windings.
2. Condenser-fan motors shall be 3-phase, totally enclosed type with permanently lubricated ball bearings and internal over-temperature protection.
3. Supply and exhaust fan motors shall be of the 3-phase, NEMA (National Electrical Manufacturers Association) rated, open drip-proof (ODP), ball bearing type, with efficiencies per EISA (Energy Independence and Security Act) of 2007 (U.S.A.) requirements.

F. Electrical Requirements:

1. All unit power wiring shall enter unit cabinet at a single location.

G. Special Features:

1. Digital Compressor:

a. A digital compressor shall be available on the lead circuit for constant volume and variable air volume configurations. The ComfortLink control system shall be capable of unloading this compressor in an infinite number of steps from 100% of unit capacity down to 50% of compressor capacity.

2. Humidi-MiZer® Adaptive Dehumidification:

a. The Humidi-MiZer dehumidification system shall be factory installed with an e-coated reheat coil, and shall provide greater dehumidification of the occupied space by using two modes of dehumidification instead of the normal design cooling mode of the unit:

i Subcooling mode shall further sub-cool the hot liquid refrigerant leaving the condenser coil when both temperature and humidity in the space are not satisfied.
ii Hot gas reheat mode shall mix a portion of the hot gas from the discharge of the compressor with the hot liquid refrigerant leaving the condenser coil to create a two-phase heat transfer in the system, resulting in a neutral leaving-air temperature.
iii The system shall be equipped with modulating control valves to provide precise leaving-air temperature control. On-off, cycling type control shall not be acceptable.

3. Ultra Low Leak Economizer:

a. Differential enthalpy controlled integrated type consisting of dampers, actuator, and linkages in conjunction with control system to provide primary cooling using outdoor air, enthalpy permitting, supplemented with mechanical cooling when necessary.
b. Economizer shall meet the requirements of the California Energy Commission Title 24 economizer requirements.
c. Dampers shall be a gear driven ultra low leakage type with blade and edge seals. Dampers shall exhibit a maximum leakage rate of 3 cfm per square foot of area at 1 in. wg pressure differential when tested in accordance with AMCA (Air Movement and Control Association) Standard 500.
d. Actuator shall have a spring-return feature which shuts dampers upon a power interruption or unit shutdown. Actuators are capable of internal diagnostics.
e. Equipped with a solid-state humidity sensor that is capable of sensing outdoor-air heat content (temperature and humidity) and controlling economizer cut-in point at most eco-nomical level. The user can also configure dew point limiting.

4. Modulating Power Exhaust with VFD (Variable Frequency Drive):

a. Package shall include 2 double-width, double-inlet centrifugal belt drive, forward-curved power exhaust fans with variable frequency drive control of each fan to maintain a field- adjustable interior space pressure set point.
b. Fan bearings shall be of the pillow block type with an average design life of 200,000 hours.
c. Fans shall be statically and dynamically balanced.
d. Bypass for the VFD shall be available as a factory-installed option.
e. Differential pressure transducer for monitoring space pressure.
f. Exhaust air hood assemblies containing backdraft dampers on each fan outlet, factory installed.
g. All wiring and pressure tubing (except to space pressure pickup location) shall be factory supplied and installed.

5. Supply Fan Variable Frequency Drive:

a. Variable air volume and staged air volume units shall be equipped with variable frequency drive (VFD) inverter. The VFD shall be factory-

mounted, wired, and tested. The variable speed drive shall include the following features:

b. Factory-supplied VFDs qualify, through ABB, for a 24-month warranty from date of commissioning or 30 months from date of sale, whichever occurs first.
c. Full digital control with direct control from the unit ComfortLink controls.
d. Insulated gate bi-polar transistors (IGBT) used to produce the output pulse width modulated (PWM) waveform, allowing for quiet motor operation.
e. Inverters capable of operation at a frequency of 8 kHz so no acoustic noise shall be produced by the motor.
f. VFDs shall include EMI/RFI (electromagnetic/radio frequency interference) filters.
g. Digital display keypad module, mounted on the VFD enclosure.
h. Local/Remote and Manual/Auto function keys on the keypad.
i. UL-listed electronic overload protection.
j. Critical frequency avoidance.
k. Self diagnostics.
l. On-board storage of unit manufacturer's customer user settings, retrievable from the keypad.
m. RS485 communications capability (accessory card source required).
n. Internal thermal overload protection.
o. 5% swinging (non-linear) chokes for harmonic reduction and improved power factor.
p. All printed circuit boards shall be conformal coated.

6. Supply Fan Static Pressure Control (VAV units):

a. Variable air volume units shall be equipped with a supply fan VFD. The VFD shall control motor speed to maintain set point static pressure control at the supply duct sensor tube location. The supply fan drive shall be field-adjustable to maintain supply duct static pressure set point from 0.0-in. wg to 5-in. wg, adjusted via scrolling marquee display or Navigator™ display. A pressure transducer shall be factory-mounted and wired. (Control tubing from sensor tube location to transducer shall be field-supplied and installed.) Transducer shall provide a 4 to 20 mA signal to the unit control module; unit control module shall provide a 4 to 20 mA signal to the VFD indicating desired VFD output level.

7. Modulating Gas Heat:

a. Modulating gas heat option shall monitor unit supply-air temperature and control the unit heat exchanger to provide the following sequences:

i First-stage demand heating control, with modulation to maintain user-configured heating supply air temperature set point. Turndown ratio to be at least 4:1 (325 MBtuh), 7:1 (650 MBtuh) and 11:1 (975 MBtuh).
ii Full-fire demand heating on heating control command.

iii Tempering heat control, based on user-configured ventilation supply air temperature set point, to eliminate cold draft conditions with low mixed-air temperatures.

b. Modulating gas control option shall consist of:

i Modulating controller capable of ensuring the proper fuel air mixture at operating firing rates.
ii Supply air temperature thermistors with duct-mounting base.
iii Limit switch temperature thermistor.
iv Stainless steel heat exchanger tubes.

c. Field installation shall be limited to installing three supply air temperature thermistors in the supply duct. All other hardware, wiring and piping shall be factory-completed.

8. Non-Fused Disconnect:

a. A non-fused electrical disconnect for main unit power shall be factory installed. The disconnect shall be an interlocking through-the-door type.

9. 115-Volt Convenience Outlet:

a. A duplex GFCI (ground fault circuit interrupt) receptacle shall be factory mounted in a weatherproof enclosure and wired for a 10-amp load. It will remain powered when all unit circuit breakers have been turned off. The outlet will be deenergized by the unit disconnect.

10. Navigator™ Display Module:

a. The Navigator display module shall be a portable hand-held display module with a minimum of 4 lines and 20 characters per line, of clear English, Spanish, Portuguese or French language. Display menus shall provide clear language descriptions of all menu items, operating modes, configuration points and alarm diagnostics. Reference to factory codes shall not be accepted. An industrial grade coiled extension cord shall allow the display module to be moved around the chiller. Magnets shall hold the display module to any sheet metal panel to allow hands-free operation. Display module shall have NEMA 4x housing suitable for use in outdoor environments. Display shall have back light and contrast adjustment for easy viewing in bright sunlight or night conditions. The display module shall have raised surface buttons with positive tactile response.

11. Controls Expansion Module (CEM):

a. Factory-installed package shall include all hardware for additional control of base unit operation and product integrated controls features. The functions supported are:

i Building pressurization, evacuation, and smoke purge control.
ii Supply air reset from external 4 to 20 mA signal.

iii Two-step demand limit inputs (when used with the CCN [Carrier Comfort Network®] network).
iv Indoor air quality (IAQ) switch monitoring.
v Outdoor airflow monitoring
vi Outdoor humidity monitoring.
vii Space humidity monitoring (required for dehumidification control, reheat and humidifier control).
viii Return air humidity monitoring.
ix Demand limiting from an external 4 to 20 mA signal.
x Static pressure reset from an external 4 to 20 mA signal.

12. Return Air Smoke Detectors:

    a. The smoke detectors shall send input to the controller to shut down the unit in case smoke is detected.

13. Outdoor Airflow Sensor:

    a. An Ebtron Gold outdoor airflow sensor will be provided by the control contractor.

14. Differential Enthalpy Switch or Sensors (when equipped with both return air and outdoor air humidity sensors):

    a. For use with economizer only.
    b. Capable of comparing heat content (temperature and humidity) of outdoor and return air and controlling economizer cut-in point at the most economical level.

15. Hot Gas Bypass:

    a. Unit shall be factory equipped with hot gas bypass valve and tubing to maintain capacity control at minimal cooling loads.

16. Condenser Coil Protective Coating — E-Coated Microchannel Coil:

    a. E-coated aluminum microchannel coils shall have a flexible epoxy polymer coating uniformly applied to all coil external surface areas without material bridging between fins or louvers. Coating process shall ensure complete coil encapsulation, including all exposed fin edges. E-coat thickness of 0.8 to 1.2 mil with top coat having a uniform dry thickness from 1.0 to 2.0 mil on all external coil surface areas, including fin edges, shall be provided. E-coated coils shall have superior hardness characteristics of 2H per ASTM D3363-00 and cross-hatch adhesion of 4B-5B per ASTM D3359-02. E-coated coils shall have superior impact resistance with no cracking, chipping, or peeling per NSF/ANSI 51-2002 Method 10.2.

17. Condenser Coil Hail Guard (sizes 040 to 060 only):

    a. Canted face enclosure and welded wire grille complete with support retainers and fasteners shall be provided for protection of condenser coils. Field-assembled.

18. BACnet Communication Option:

    a. Shall provide factory-installed communication capability with a BACnet MS/TP network. Allows integration with i-Vu® Open control system or a BACnet Building Automation System.

19. Suction and Liquid Service Valves:

    a. Shall be equipped with ball type service valves in the suction and liquid line for each circuit.

20. Discharge Service Valve:

    a. Shall be equipped with a ball type service valve in the discharge line of each circuit.

21. Replaceable Core Filter Drier:

    a. Shall be equipped with a replaceable core filter drier in each liquid line.

22. Roof Curb:

    a. Designed to comply with criteria established by NRCA Guideline B-1986.
    b. Size 030-060 Units:
    c. Formed 14-gage galvanized steel with wood nailer. Supports full perimeter of unit.

23. Low Outdoor Sound:

    a. Low sound fans for outdoor sound reduction shall be available as a factory-installed option for all units (except 35 ton units).

24. Low Ambient Control:

    a. Control shall regulate fan motor speed in response to the saturated condensing temperature of the unit. The control shall be capable of operating with outdoor temperatures at –20 F.
    b. Motormaster® low ambient control shall be available as a factory-installed option or field-installed accessory for all units.

25. Low Compressor Sound Blanket:

    a. Low compressor sound blanket accessory shall be available for field installation.

26. Phase Loss Monitor Option:

    a. Phase loss monitor protection shall be available as a factory installed option.

PART 3 – EXECUTION:

3.1 MANNER OF PERFORMING WORK

A. Coordinate location of piping, ductwork, sleeves, inserts, hangers and equipment for this work with other trades.

B. All materials and equipment shall be installed in accordance with the approved recommendations and guidelines as issued by the respective manufacturers to conform with contract documents. Workmen skilled in the trades involved shall accomplish the installation.

3.2 SERVICE CONNECTIONS

A. Air handling units and coils shall be equipped with required valves, vents, drain valves and safety devices and connected to piping systems and electrical services in a neat and workmanlike manner.

END OF DOCUMENT 237000

SECTION 260500 - GENERAL ELECTRICAL PROVISIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Basic requirements of a common or administrative nature that pertains to all electrical work.

1.2 RELATED SECTIONS

A. The requirements set out in the contract documents, contract forms, general conditions, supplementary general conditions and general requirements apply to all work specified herein.

1.3 WORK INCLUDED

A. The Contractor shall furnish all materials, labor, transportation, tools, permits, fees and incidentals necessary for the installation of a complete electrical system. It is the intent of the contract documents to provide an installation complete in every respect. In the event that additional details or special construction are required for work indicated or specified, it shall be the responsibility of the Contractor to provide all materials and equipment which are usually furnished with such systems in order to complete the installation, whether mentioned in the contract documents or not.

1.4 CODES AND STANDARDS

A. All work shall be in compliance with all applicable portions of the 2011 Edition of the National Electrical Code (NEC), the National Electrical Safety Code (NESC), all city and county codes and ordinances, and other codes which may or may not be specifically referenced in these contract documents. None of the terms or provisions of these contract documents shall be construed as waiving any of the rules, regulations or requirements of these authorities.

B. All work located in health care areas where patient care services are provided shall be in accordance with Article 517 of the NEC.

C. In any instance where these contract documents call for construction materials of a better quality or larger size than required by the codes, the provisions of the contract documents shall take precedence. The codes shall govern in case violations are indicated in the construction documents.

1.5 DRAWINGS

A. The drawings are intended to show the general arrangement and the extent of the work. The exact location and arrangement of all parts shall be determined as the work progresses to

conform in the best possible manner with the surroundings and as directed by the Owner's Representative.

B. If any departures from the drawings are deemed necessary by the Contractor, details of such departures and the reasons therefor shall be submitted to the Owner's Representative for review. No departures shall be made without prior written acceptance of the Owner's Representative.

1.6 SUBMITTALS

A. The Contractor shall furnish six copies of the manufacturer's literature and drawings describing all proposed equipment and materials indicated in the specifications. The front sheet or brochure shall have job name, architect, engineer, contractor and suppliers identified.

B. All sheets of the submittal shall have the job name stamped or permanently written on them, and shall be assembled in an indexed brochure. The descriptive materials shall be arranged in the brochure in the same order as found in the specifications. Each brochure shall be submitted in a three-ring binder. Binders shall be hardback unless the Engineer, at his discretion, allows heavy-paper-type binders on a smaller project. The leading sheet of the descriptive material for each item shall be full size of heavy paper, with a numbered outside tab. An index sheet showing the location in the brochure of all equipment and material submitted shall be placed in the front of the brochure. The index sheet shall be made to conform to the following example.

- INDEX -

Item No.	Specifications Paragraph No.	Specifications Page No.	Description

C. Submittals shall include detailed specifications and construction data. Manufacturer's regular catalog sheets will not be acceptable unless they indicate completely all of the specification requirements. Where submittal sheets cover several sizes or types of equipment, they shall clearly indicate, by the use of a different color ink, the type or size to be used on the project and the use intended. Products submitted as substitutions shall be identified in the index as a substitution.

D. Approval of the submittals, or any part of the contents therein, shall not eliminate the responsibility for compliance with the drawings and specifications, nor shall it eliminate the requirements or the responsibility for freedom from errors of any sort in the data submitted.

1.7 RECORD DRAWINGS

A. The Contractor shall maintain a set of electrical drawings at the job site neatly marked with all changes from the original contract drawings. This set of drawings shall not be used for construction purposes and shall be available to the Owner's Representative at all times. Drawings shall be kept up to date as the job progresses and shall be delivered to the Owner's Representative at the completion of the contract.

B. A fresh, clean set of drawings on which variations to the original construction documents are legibly recorded and designated "as-built" shall be furnished to the Owner's Representative upon completion and acceptance of work and before final payment is made.

1.8 OPERATION AND MAINTENANCE MANUALS

A. The Contractor shall furnish six sets of operation and maintenance manuals to the Owner's Representative. These manuals shall include all items designated in the specifications, shall be assembled in an indexed three-ring binder as described in the paragraph titled "SUBMITTALS" and shall include all warranties. Separate equipment brochures will not be acceptable. A pictorial parts list, operation and maintenance instructions, system descriptions, schematic wiring diagrams and equipment cut sheets shall be included for each item with source information. NOTE: These manuals shall be delivered to the Owner's Representative prior to final acceptance of the installation by the Owner.

B. Final acceptance of the installation shall not occur until the Owner's personnel have been trained in the maintenance and operation of all equipment for a minimum of eight hours.

1.9 SITE EXAMINATION

A. The Contractor shall be responsible for the coordination and proper relation of his work to the building structure and to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, and verify all dimensions in the field. The Contractor shall advise the Owner's Representative of any discrepancy at least seven days prior to bidding. The submission of bids shall be deemed evidence of the Contractor's site visit, the coordination of all existing conditions and the inclusion of all considerations for existing conditions.

1.10 UTILITIES

A. The contract documents reflect the general location, voltage, capacity, size and manner of routing for all utilities known to be required on this project. It shall be the responsibility of the Contractor to visit the site and to meet with the local utility companies in order to coordinate and confirm the exact requirements for all electrical utilities, including, but not limited to, all facilities required to provide complete and operative electrical power and telephone services. The bid submitted by the Contractor shall include costs for all such coordinative work as well as any and all utility company charges and/or fees.

1.11 TEMPORARY POWER

A. The Electrical Contractor shall provide the necessary wiring, connections, service switches, poles, wiring protective devices, lighting fixtures, lamps, outlet devices, disconnect switches, etc., as required for temporary lighting. In addition, a similar system shall be provided for the distribution of single- and three-phase power of voltage levels and adequate ampacity as required to facilitate the construction of the project. These services shall be installed in accordance with requirements of the NEC and OSHA.

B. The Electrical Contractor shall coordinate with the local utility company, the General Contractor and other trades involved to determine requirements for temporary power on this project. No additional charges shall be made to the Owner for wiring, connections, pole, fixtures or devices required to facilitate construction.

1.12 STORAGE AT SITE

A. Store major electrical equipment (switchboards, panelboards, lighting fixtures, dry type transformers, VFDs, etc.) sealed in original factory wrapping in a clean, dry and conditioned environment protected from the weather. Storage outdoors is not acceptable.

1.13 GUARANTEE

A. The Contractor shall guarantee all labor and materials furnished by him in accordance with state law or the general conditions of the contract, but in no case for a period of less than two years. Certain work and materials shall be guaranteed for a longer period when so specified. Guarantee period shall extend form the time of final acceptance of the installation. The Guarantee shall cover the repair or replacement, without additional cost to the Owner, of any defective material or faulty workmanship. All necessary service to each item and other work requiring specialized training shall be furnished by the Contractor, at no cost to the Owner, for a period of two years, concurrent with the warranty period specified above. The above items pertaining to routine servicing of the equipment and motors, replacing fuses or replacing lamps are the responsibility of the Owner unless a service agreement is made between the Contractor and the Owner.

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIALS

A. All materials shall be new and of quality grade. All materials of a type for which the Underwriters' Laboratories, Inc. (UL) has established a standard shall be listed by UL and shall bear the UL label.

2.2 SUBSTITUTIONS

A. References in the specifications or on the drawings to any article, device, product, material, fixture, form or type of construction by naming more than one acceptable manufacturer shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; however, the Contractor, in such cases, shall obtain written prior approval for substitution of unnamed manufacturers. Requests for substitution must be received in writing, in accordance with the contract documents, at least ten working days before bid date. The request shall include a detailed listing of all products and/or devices for which acceptance is being requested. Engineering specification sheets and/or construction details shall be included for comparative purposes. If the product is acceptable to the satisfaction of the Owner's Representative and the Engineer, an addendum item will be issued stating acceptability.

PART 3 - EXECUTION

3.1 WORKMANSHIP AND COMPLETION OF INSTALLATION

A. All work shall be performed by competent mechanics, skilled in their trade, and shall be executed in a thorough and substantial manner.

B. The Contractor shall be held responsible for transportation of his materials to and on the job, and for their storage and protection until the final acceptance of the job.

C. The Contractor shall be held responsible for timely placing of all conduit and outlet boxes, cabinets and other wiring devices in the walls, ceilings, slabs, beams, etc., as construction progresses.

D. Contractor shall furnish all necessary scaffolding, tackle, tools and appurtenances of all kinds, and all labor required for the safe and expeditious execution of his contract.

E. All equipment shall be installed in a manner to permit access to parts requiring service. All electrical equipment shall be installed in such a manner as to allow removal for service without disassembly of other equipment, and shall have working clearances as required by NEC. Any large piece of apparatus which is to be installed in any space in the building, and which is too large to fit through finished openings, shall be placed before enclosing structure is completed. Following placement, such apparatus shall be completely protected from damage.

F. The Contractor shall, at all times, keep the premises free from accumulations of waste material and packaging debris. This debris shall be removed daily from the construction site.

3.2 CUTTING AND PATCHING

A. Where it becomes necessary to drill or cut through any floors, walls or ceilings to permit the installation of any work under this contract, such cutting shall be done under the supervision of the Owner's Representative by the Contractor. After the necessary work has been completed, the damage shall be repaired by the Contractor.

B. No joists, beams, girders or columns shall be cut by the Contractor without first obtaining written permission from the Owner's Representative.

C. All drilling for expansion bolts, hangers and other supports shall be done by the Contractor, subject to the approval of the Owner's Representative. Labor and materials required to replace or rebuild parts cut or injured shall be furnished at the Contractor's expense, subject to the satisfaction of the Owner's Representative.

D. All openings made in fire-rated walls, floors and ceilings shall be patched by the electrical contractor in a manner maintaining the original fire rating.

3.3 COORDINATION

A. The Contractor shall coordinate the work of the different trades so that interferences between piping, equipment, structural and architectural work shall be avoided.

B. The Contractor is responsible for ensuring that all conduit sleeves are timely installed and are sealed, flashed or caulked to the satisfaction of the Owner's Representative.

3.4 HVAC EQUIPMENT WIRING AND CONTROL

A. In general, the Mechanical Contractor shall provide the low-voltage (less than 120 volts) control wiring from the heating, ventilation and air conditioning equipment (HVAC) to the mechanical furnished device (T-STAT, temperature control system, etc.). The electrical drawings will indicate only branch circuit power supplies to serve the HVAC equipment.

3.5 IDENTIFICATION AND LABELING

A. The Contractor shall provide and install a presentation grade one-line diagram of the electrical system in a framed plexiglass enclosure near the service entrance switchgear at a location as directed by the Owner's Representative.

B. All equipment shall have the manufacturer's nameplate permanently affixed in an obvious location.

C. Branch circuit panelboards shall contain a typed index card identifying all circuits.

D. Major pieces of equipment shall be labeled, as required by the NEC and directed by Owner's Representative, with engraved nameplates constructed of laminated phenolic. Letters shall be condensed gothic, 1/4 inch high. Nameplates shall be at least 1/16 inch thick, 3 ply, white surfaces, black core. Labels shall include equipment name, voltage and phases.

Example: Panel HV1A
277/480V, 3ϕ

E. All junction boxes and pull boxes shall be labeled with a permanent felt tip marker, 1/4 inch wide, indicating the circuits contained within.

Example: L1 7, 9, 11

F. Permanently label device plates for all receptacles and light switches to indicate panelboard and circuit number supplying them.

G. Disconnect switches and/or starters for HVAC equipment shall not be supported by or mounted to the equipment. Provide unistrut brackets or sheet metal disconnect stands up from roof structure to support disconnects.

3.6 MISCELLANEOUS

A. Access and working space of all new electrical equipment shall comply with article 110.26 of the NEC. There shall not be any piping, ducts, leak protection apparatus or other equipment foreign to the electrical installation 6 feet above the electrical equipment per article 110.26(e)(1).

END OF SECTION 260500

SECTION 262213 - DRY TYPE TRANSFORMERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Single-and three-phase dry type transformers.

1.2 RELATED SECTIONS

A. Section 260000, "General Electrical Provisions."

B. Section 262700, "Basic Materials and Methods."

1.3 REFERENCES

A. ANSI/NFPA 70, National Electrical Code.

B. Underwriters' Laboratories (UL).

C. Institute of Electrical and Electronics Engineers (IEEE).

D. American National Standard Institute (ANSI).

E. National Electrical Manufacturers Association (NEMA).

F. Department of Energy (DOE2016) Efficiency Standard for Low-Voltage, Dry-Type Transformers.

1.4 SUBMITTALS

A. Submit under provisions of Section 260500.

B. Product Data: Provide nameplate data, impedance, dimensions, weight, mounting, decibel rating and connection diagrams.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Cutler Hammer (Basis of Design)

B. General Electric Company.

C. Square D.

D. ITE.

2.2 DRY TYPE TRANSFORMERS

A. Electrical Ratings: Voltage, phases and kVA as shown on the drawings.

B. Insulation Systems:

1. 30 kVA and above: Class H insulation for 220 degrees C total temperature, based on 150 degree C rise.
2. Required performance shall be obtained without exceeding the above-indicated temperature rise in a 40 degree C maximum ambient, with a 30 degree C average ambient over 24 hours.
3. Insulation shall be flame-retardant and shall not support combustion per ASTM Standard Test Method D635.

C. Core and Coil Assemblies:

1. Constructed with high grade, nonaging, silicon steel with high magnetic permeability, and low hysteresis and eddy current losses. Magnetic flux densities shall be kept well below the saturation points.
2. Coils shall be wound of electrical grade aluminum with continuous wound construction.
3. Core and coil assembly for units rated 30 kVA and above shall be impregnated with a nonhydroscopic, thermo-setting varnish. Assembly shall be installed on vibration-absorbing pads and bolted to the base to minimize transmission.
4. Core assembly to be grounded to the enclosure.

D. Enclosures:

1. 30 kVA and above: Ventilated, NEMA 2, drip proof, with lifting holes.
2. Outdoor units: Provide weather shields with rodent screens over ventilation openings.
3. Finish: Degreased, cleaned, phosphatized, primed and finished with grey baked enamel.
4. Enclosure temperature: Not to exceed 35 degrees C rise above a 40 degree C ambient.

E. Taps: Transformers 15 kVA and larger shall have a minimum of four 2-1/2 percent full-capacity primary taps; two above and two below normal voltage.

F. Sound Levels:

1. 45 db for transformers 10-50 kVA.
2. 50 db for transformers 51-150 kVA.
3. 55 db for transformers 151-300 kVA.

G. Energy Efficiency:

1. Transformers shall be compliant with DOE2016.

H. Factory Tests:

1. Ratio tests on the rated voltage connection and on all tap connections.
2. Polarity and phase-relation tests on the rated voltage connection.
3. Applied potential tests.
4. Induced potential test.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install per manufacturer's recommendations.

B. Where floor mounted, provide 4-inch housekeeping pad in equipment rooms or areas subject to occasional moisture on the floor.

C. Provide sound and vibration isolation devices under feet or contact points for transformer supports points, similar to isomode or core-form pads.

D. Connect primary and secondary wiring to transformer with flexible conduit.

E. Ensure National Electrical Code clearances on all sides.

F. Adjust transformer taps for proper secondary voltage.

END OF SECTION 262213

SECTION 262700 - BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Conduit

B. Junction, pull and device boxes

C. Conductors

D. Disconnect switches

E. Overcurrent devices

F. Wiring devices

G. Lighting and branch circuit panelboards

H. Grounding

I. Testing

1.2 RELATED SECTIONS

A. Section 260500 - General Electrical Provisions

1.3 REFERENCES

A. National Electrical Manufacturers Association (NEMA).

B. Underwriters' Laboratories (UL).

C. American National Standards Institute (ANSI).

D. ANSI/NFPA 70-National Electrical Code (NEC).

E. Institute of Electrical and Electronics Engineers (IEEE).

1.4 SUBMITTALS

A. Submit under provisions of Section 260500.

B. Product Data: Provide manufacturer's literature and product data on all equipment listed in Paragraph 1.1.

PART 2 - PRODUCTS

2.1 CONDUIT

A. Electrical metallic tubing (EMT) shall be galvanized on the outside and coated on the inside with a smooth hard finish of lacquer, varnish or enamel. EMT shall comply with Underwriters Laboratories (UL) Standard UL 797 and ANSI C80-3. EMT coupling and box connectors for EMT shall be of the steel compression gland type.

B. Rigid galvanized steel (RGS) conduit shall be hot-dipped, galvanized steel with zinc coating or corrosion-resistant lacquer on the inside. RGS shall comply with UL Standard UL 6 and ANSI C80-1. Fittings shall be threaded, water and concrete-tight.

C. Flexible metal conduit (FMC) shall be of hot-dipped, galvanized, interlocked, spirally wound steel strip and shall comply with ANSI/UL 1. Connectors shall be galvanized and shall be suitable for connection to the associated boxes and conduits.

D. Liquidtight flexible non-metallic conduit (LFNC) Connectors shall be listed for use with LFNC.

E. Plastic conduit for direct burial shall be rigid, heavywall, Schedule 40, polyvinyl chloride (PVC). All Schedule 40 PVC conduit shall meet the requirements of UL and shall be manufactured by Carlon or approved equal.

F. Plastic conduit for installation in concrete duct banks shall be thinwall conforming to NEMA Standard TC6 and shall be UL listed.

G. Minimum conduit size shall be 3/4 inch.

2.2 JUNCTION, PULL AND DEVICE BOXES

A. Junction and pull boxes shall be of code galvanized steel. Boxes mounted vertically on a wall shall be provided with hinged covers and catchlocks. Boxes mounted horizontally in or on the ceiling shall be furnished with screw covers. All such boxes shall conform to NEC for size and gauge of material. Junction and pull boxes shall be provided as required even if not shown on the drawings.

B. Device boxes and general purpose junction boxes shall be one-piece galvanized pressed steel knockout type with similar cover, and not less than 4 inches square. No sectional boxes will be permitted, except at single-pole switch locations with only two conductors.

C. All gang boxes for devices shall be designed specifically for the number of devices indicated.

D. Boxes for exterior devices shall be cast iron, Crouse Hinds FD, or approved equal, with gasketed covers.

2.3 CONDUCTORS

A. Conductors shall be of soft-drawn annealed copper. Conductors shall conform to federal specifications for the type of wire designated, and shall have a conductivity of not less than 98 percent of that of pure copper.

B. Minimum conductor size for power and lighting circuits shall be No. 12 AWG, unless shown otherwise on the drawings. Minimum conductor size for control and signal circuits shall be No. 14 AWG, unless shown otherwise on the drawings.

C. All conductors No. 8 AWG and larger shall be stranded. All conductors No. 10 AWG and smaller shall be solid.

D. All conductors located in dry locations shall be type THHN/THWN unless specifically designated otherwise. All conductors located in outdoor or wet locations shall be type XHHW-2.

E. All branch circuit conductors used for wiring in high temperature locations (such as boiler controls, range hoods, heating equipment, etc.) shall be type RHH heat-resistant grade.

F. Conductors shall be color coded as follows:

277/480V, 3 phase, 4 wire.....Brown, Orange, Yellow and Gray

120/208V, 3 phase, 4 wire.....Black, Red, Blue and White

Control circuits.....Other than above

G. For phase conductors larger than No. 4 AWG, or neutral conductors No. 4 AWG or larger, colored plastic tape may be used in lieu of continuously colored conductor insulation. Each conductor shall have at least three 1-inch bands (4-inch separation) at every termination and splice.

H. Wire connectors shall be as follows:

1. Connectors for No. 8 AWG and smaller (dry locations) shall be self-insulated spiral spring screw-on connector with resilient or unbreakable plastic insulating cap. No ceramic or brittle plastic shell connectors will be approved.

2. Connectors for No. 8 AWG and smaller (damp locations) shall be compression sleeve type.

3. Connectors for No. 6 AWG and larger wires (damp or dry locations) shall be compression sleeve type.

2.4 DISCONNECT SWITCHES

A. Provide enclosed, fusible or nonfusible switches as shown on the drawings.

B. Switches shall be horsepower rated and shall have quick-make and quick-break mechanisms and interlocked covers.

C. Disconnect switches shall be heavy duty type HD.

D. Switches shall be suitable for the voltage, number of phases and wires, and short circuit and load currents shown on the drawings.

E. Fusible disconnect switches shall have provisions for Class R fuses.

F. Enclosures shall be the NEMA type suitable for the environmental conditions where the switch is installed.

G. Enclosures shall be of code gauge steel (NEMA 1) or code gauge galvanized steel (NEMA 3R). Enclosures shall be treated with a rust-inhibiting phosphate and finished in gray baked enamel.

2.5 OVERCURRENT DEVICES

A. Circuit breakers

1. All circuit breakers shall be thermal magnetic, molded case, and shall have the following characteristics:

a. Quick-make, quick-break type.

b. "Bolt-on" type.

c. Fully rated for the available fault current as shown on the drawings. Series ratings are unacceptable.

d. Common trip type for all multipole breakers.

e. Operating handle shall visually indicate ON, OFF or TRIPPED conditions.

f. Indicate the ampacity and frame size on the breaker.

g. When used for switching light circuits, shall be marked "SWD," indicating "switch duty rated."

h. When required by equipment manufacturer, circuit breaker shall be "HACR" rated.

2.6 WIRING DEVICES

A. Receptacles (Other than Exam & Procedure rooms)

1. Receptacles indicated with a “TP” shall be flush, 20 amperes, 125 volts, specification grade, tamper proof, three wire, grounding, duplex, and shall be Hubbell No. BR20WHITR.

2. Receptacles shall be flush, 20 amperes, 125 volts, specification grade, three wire, self or automatic grounding, duplex, and shall be Hubbell No. HBL5362-W or approved equal.

3. Ground fault receptacles shall be flush, 20 amperes, 125 volts, specification grade, three wire, grounding, duplex, and shall be Hubbell No. GF20WLA or approved equal.

4. Color of receptacles on “normal” circuits shall be white. Color of receptacles on emergency generator shall be red.

5. Special purpose outlets not covered by the specifications but noted on the drawings shall be of the amperage and voltage rating indicated. The outlets shall be specification grade of the same quality, manufacturer and finish as those specified above.

6. Other approved wiring device manufactures are Byrant, P & S and Leviton.

B. Receptacles (Exam, Treatment, & Procedure rooms)

1. Receptacles shall be flush, 20 amperes, 125 volts, hospital grade, three wire, self or automatic grounding, duplex, and shall be Hubbell No. HBL8300W or approved equal.

2. Ground fault receptacles shall be self testing and shall be flush, 20 amperes, 125 volts, hospital grade, three wire, self or automatic grounding, duplex, and shall be Hubbell No. GFR8300HWST or approved.

3. Color of receptacles on “normal” circuits shall be white. Color of receptacles on emergency generator shall be red.

4. Special purpose outlets not covered by the specifications but noted on the drawings shall be of the amperage and voltage rating indicated. The outlets shall be specification grade of the same quality, manufacturer and finish as those specified above.

5. Other approved wiring device manufactures are Byrant, P & S and Leviton.

C. Wall switches

1. All lighting circuits shall be supplied with 20-ampere, 120/277-volt specification grade white quiet type switches.

a. Single-pole switches shall be Hubbell No. 1221-1 or approved equal

b. Three-way switches shall be Hubbell No. 1223-1 or approved equal.

2. Refer to construction documents for networked based switch requirements and specifications.

3. Color of devices shall be white.

D. Device plates and covers

1. Device plates for indoor concealed wiring shall be nylon thermoplastic, white color unless otherwise shown on the drawings.

2. Weatherproof receptacles shall have device-mounted snap covers, UL listed for wet locations.

3. Where shown on the drawings, outdoor weatherproof covers shall be raintight NEMA 3R rated and shall meet NEC and OSHA requirements for "While in Use" applications.

5. Device plates shall be manufactured by Hubbell, Byrant, P & S or Leviton.

6. Permanently label device plates for all receptacles and light switches to indicate panelboard and circuit number supplying them.

2.7 LIGHTING AND BRANCH CIRCUIT PANELBOARDS

A. Panelboards shall have the voltage, number of phases and wires, and current ratings as shown on the drawings.

B. Panelboards shall be circuit breaker panelboards conforming to the requirements of UL 67, UL 50, NEMA No. PB1 and the NEC. Each panelboard shall be mounted in a galvanized sheet-metal cabinet with a removable front panel complete with hinged door, latch and lock. All locks shall be keyed the same and two keys shall be provided for each lock. Cabinets shall have means for securing, supporting and adjusting panelboard front. There shall be no sharp points or edges inside cabinets.

C. Bus bars shall be copper. Bus bar taps shall be arranged for sequence phasing of the branch circuit devices. Neutral bars, where specified, shall be full size, insulated from the cabinet and mounted at the opposite end of the panel from the mains. A bare, uninsulated grounding bar, brazed to the cabinet, shall be provided where indicated. Bus bars for the mains shall have pressure-type lug connections for attaching feeders unless a main protective device is indicated. Where paralleled conductors feed the panel, lugs shall be provided for each conductor. Where spaces are indicated, the bus shall have all applicable accessories provided to enable a breaker to be readily installed.

D. Branch circuit breakers shall be as specified in Paragraph 2.5 (A).

E. A directory frame and card having a transparent cover shall be furnished on each door, neatly typed to indicate loads.

F. Basis of Design is Cutler Hammer. Other acceptable manufacturers are General Electric, Siemens and Square D.

2.8 Coordination Study:

A. The “Emergency System” shall coordinate with the upstream circuit breaker(s)/fuse(s). Prepare phase and ground coordination time-current characteristic curves to determine the required settings/sizes of the protective devices to maximize selectivity. The utility upstream protective device feeding the facility shall be maintained as the upper limit for coordination. These settings shall be obtained by the preparer, along with any other protective device setting requirements. The coordination curves shall be prepared on log-log paper and illustrate adequate clearing times between series devices. The curves shall be created by using a study software package but must reflect actual protective devices to be installed. Adequate time-current curves shall be generated to depict coordination. In addition, protective device characteristics shall be suitably determined to reflect calculated short-circuit levels at the location.

B. The coordination study shall be prepared prior to the submission of the equipment shop drawings to the Engineer. This is to ensure that the fuses/circuit breakers and trip units selected will provide selective coordination and that the equipment shop drawings will reflect the correct trip units. The Contractor will be responsible for replacing any equipment that has been ordered or installed that does not contain breakers/trip units that will provide proper coordination. The emergency system shall fully coordinate with all downstream devices to the .01 second level.

2.9 GROUNDING

A. Grounding conductors shall be copper, stranded, soft drawn or soft annealed.

B. Grounding conductors and jumpers shall be connected to each other and to items to be grounded by means of pressure connectors, clamps and/or other suitable methods approved by the Engineer.

C. All equipment grounding conductors installed in conduits shall be insulated.

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall study all construction documents and shall carefully lay out all work in advance of fabrication and erection in order to meet requirements of limited spaces. Where conflicts occur, the Contractor shall meet with all involved trades and resolve the conflict prior to erection of any work in the area involved.

3.2 CONDUIT

A. Above-grade conduit

1. Conduits located indoors and not subject to physical damage shall be electrical metallic tubing (EMT).

2. Conduits located outdoors, or subject to physical damage, shall be rigid galvanized steel (RGS).

3. Flexible metallic conduit (FMC) shall be used in dry locations and liquid tight flexible metal conduit (LTFMC) shall be used in wet locations to extend conduit connections to motors, lighting fixtures, transformers, etc. The length of flexible conduit shall not exceed 24 inches. The length shall not exceed 72 inches for recessed lighting fixtures only.

4. Where to Conceal: Conduits shall be concealed in all finished parts of the building. Conduits shall be concealed in pipe chases, walls, furred spaces, topping or above ceilings unless otherwise shown. All conduits shall be routed parallel or perpendicular to the building lines. No diagonal runs will be permitted.

5. Where to Expose: Conduits may be exposed in mechanical/electrical rooms, duct and piping chases, under-floor crawl spaces, and locations shown on the drawings. All exposed conduit shall be run in the neatest, most inconspicuous manner, and parallel or perpendicular to the building lines. No exposed diagonal runs will be permitted. The Contractor shall run all conduit in a manner satisfactory to the Owner's Representative.

6. Conduits shall be securely supported to building structure at intervals of not more than 8 feet. Conduits shall be fastened in place with galvanized steel clamps or pipe straps, hangers, 3/8-inch-diameter-minimum rods or trapeze. No perforated steel tape is permitted. Supports of structural steel or manufactured framing members shall be provided with all necessary rods, anchors, clamps, spacers and bolts. Conduits above removable ceiling panels shall allow sufficient clearance for panel removal or insertion. Conduits of any size shall not be supported from ceiling hangers or light fixture hangers. Conduit shall not be supported from piping or mechanical equipment unless specifically shown on plans. Allow 7 feet of headroom clearance.

7. Fasteners for conduit supports shall be self-drilling self-tapping screws in metal; wood screws in wood; or threaded expansion anchors or inserts in masonry or concrete. Wooden, plastic or lead inserts, or power-actuated anchors, will not be acceptable.

8. Rigid galvanized steel conduit shall be made up to boxes and equipment with double locknuts and shall have insulated bushings installed. Grounding continuity shall be maintained.

9. All roof penetrations shall be properly sleeved, sealed and flashed for complete waterproofing. In lieu of the above, approved factory-fabricated watertight entrance glands shall be used.

10. In no case shall a raceway be run within 6 inches of steam or hot water pipes, breechings, flues or other high-temperature surfaces.

11. Provide sleeves in new concrete or masonry walls for passage of conduits. Waterproof all sleeves where required.

3.3 JUNCTION, PULL AND DEVICE BOXES

A. Provide a standard access panel having a hinged metal door neatly fitted into a flush metal trim, where a junction box is located above hard ceilings or in finished walls. Coordinate the location and type with the Owner's Representative.

B. Verify final location of all boxes with Owner's Representative prior to rough-in.

C. Where more than one switch or device is located at the same location, multi-gang boxes and covers shall be provided.

D. Back-to-back device boxes in a wall are not permitted. Provide a minimum 12-inch-long nipple to offset boxes on opposite sides of a common wall to minimize sound transmission.

E. Provide proper throats and extension rings to ensure that device boxes are within 1/4 inch of finished wall surfaces.

F. Identify all circuits located in junction, pull and device boxes per Section 260500.

3.4 CONDUCTORS

A. All conductors shall be installed in conduit unless noted or specified otherwise.

B. Maximum branch circuit homerun lengths shall be as follows:

CIRCUIT TYPE	No. 12 AWG	No. 10 AWG	No. 8 AWG	No. 6 AWG
Multiple 120V receptacle or lighting homerun	50 feet	100 feet	150 feet	225 feet
Dedicated 120V receptacle homerun	75 feet	150 feet	225 feet	350 feet
Multiple 277V lighting homerun	100 feet	200 feet	300 feet	500 feet

C. A UL-approved cable pulling compound shall be used as a lubricant where necessary. No materials which may be injurious to the wire covering or insulation shall be used.

D. Conductors pulled into a wrong raceway or cut too short for termination shall be replaced. Conductors shall not be reinstalled after removal from a raceway.

E. Mains and feeders shall run their entire length in continuous pieces without joints or splices unless otherwise shown.

F. Joints in branch circuits shall occur only where such circuits divide as shown on the plans. No splices shall be made in submersible locations.

G. Splices and taps shall not be made in any conductor except at outlet boxes, pull boxes or junction boxes. Splices shall not be made in conduit bodies.

H. All electrical conductor terminations shall be torque wrench or torque screwdriver tightened per UL and NEMA standards.

I. Where the bodies of fluorescent lighting fixtures are used as raceways for lighting branch circuits, conductors shall be securely clamped within the fixture body to positively prevent contact of the wires with the ballast case.

J. Wire connectors located in damp locations shall be wrapped with rubber and vinyl tape equal to Scotch No. 130 and Scotch No. 33 tape, followed by a coating of ScotchKote, or approved equal.

3.5 OVERCURRENT DEVICES

A. Verify proper fuse or circuit breaker size prior to installing.

B. Where circuit breakers are installed in existing panelboards, verify that breaker type and AIC ratings match the existing circuit breakers installed in the panel.

3.6 WIRING DEVICES

A. All mounting heights shown below are to centerline of devices.

B. Receptacles shall be installed 18 inches above finished floor unless otherwise shown.

C. Receptacles above counters shall be horizontally mounted at 42 inches above finished floor unless otherwise shown.

D. Receptacles shall generally be mounted vertically in box, set plumb and true with the ground pin receiver in the top position.

E. Switches shall be flush mounted 48 inches above finished floor unless otherwise noted.

F. Switches shall be mounted vertically, set plumb and true, so that toggle handle is "up" in the "ON" condition.

G. Switches that are indicated as adjacent to each other on the drawings shall be installed in a common junction box. Provide box dividers for 277-volt circuits and one-piece wall plate, ganged as required. Sectionalized device plates will not be accepted.

H. All devices installed shall be installed with 6-inch pigtails.

I. All devices shall be compatible with architectural room finishes. All devices shall be trimmed out as scheduled to the satisfaction of the Owner's Representative.

3.7 LIGHTING AND BRANCH CIRCUIT PANELBOARDS

A. Cabinets shall be set rigidly in place with fronts straight and plumb.

B. Provide type-written circuit identification card placed in door-mounted directory frame.

C. Install panelboards in areas where NEC clearances can be maintained.

D. Provide panelboard nameplates in accordance with Section 260500.

E. Panelboard mounting height shall be 6 feet to the top of trim.

3.8 GROUNDING

A. The electrical system shall be grounded in accordance with Article 250 of the NEC. All electrical equipment including conduit systems, boxes, disconnect switches, receptacles, panelboards, motors, etc. shall be grounded.

B. The service entrance groundbus shall be bonded to the building water service, building steel, ufer ground and ground rods with conductors sized per NEC Table 250-94.

C. Resistance between any point on the grounding electrode system and any object in the vicinity, including earth and floors, shall not exceed 25 ohms. Ground resistance measurements of all ground rods shall be made in normally dry weather, not less than 24 hours after rainfall. The Contractor shall submit measured ground resistance readings to the Engineer.

D. If the ground resistance exceeds 25 ohms, additional ground rods shall be installed to lower the ground resistance to below 25 ohms.

E. The ground terminal on all convenience receptacles shall be bonded to the box and to the branch circuit grounding conductor with a bonding jumper to provide good continuity back to the source.

F. Conduits which connect to boxes, cabinets or enclosures having concentric or eccentric knockouts shall be provided with bonding jumpers sized in accordance with NEC Table 250-95 connected between a grounding type bushing/locknut on the conduit and a groundbus or stud inside the enclosure.

G. Where grounding connections are made to conduits, cabinets, etc., metal surface contacts shall be cleaned so that there is a good ground connection.

H. All raceways shall contain a green insulated equipment grounding conductor sized per NEC 250-95, even if not shown on the drawings.

3.9 TESTING

A. All tests shall be satisfactorily completed and accepted before final inspection or acceptance. Provide test reports for all tests. Test reports shall be bound with O & M manuals.

B. Measure and record ground resistances in accordance with Paragraph 3.8.

C. Test each receptacle for proper phase, neutral and ground connections.

END OF SECTION 262700

SECTION 263213 - EMERGENCY GENERATORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. The work includes supplying and installing a complete integrated emergency generator system to provide an alternate source of power to the plant emergency load in the event of a utility outage. The system shall consist of three diesel generator sets, integral control panels suitable for paralleling the three generator sets together, accessories and automatic transfer switches specified under a separate section.

1.2 REFERENCES

A. The generators covered by these specifications shall be designed, tested, rated, assembled and installed in strict accordance with all applicable standards of ANSI, NEC, ISO, U.L., IEEE and NEMA.

1.3 SUBMITTALS

A. Engine-generator submittals shall include the following information

1. Factory published specification sheet indicating standard and optional accessories, ratings, etc.
2. Manufacturer's catalog cut sheets of all auxiliary components such as isolators, battery charger, silencer, exhaust flex, main circuit breaker, etc.
3. Dimensional elevation and layout drawings of the generator set, enclosure and transfer switchgear and related accessories.
4. Weights of all equipment.
5. Concrete pad recommendation, layout and stub-up locations of electrical and fuel systems.
6. Interconnect wiring diagram of complete emergency system, including generator, switchgear, day tank, remote pumps, battery charger, and remote alarm indications.
7. Engine mechanical data at varying loads up to full load, including heat rejection, exhaust gas flows, combustion air and ventilation air flows, noise data, fuel consumption, etc.
8. Generator electrical data including temperature and insulation data, cooling requirements, excitation ratings, voltage regulation, voltage regulator, efficiencies, waveform distortion and telephone influence factor.
9. Generator resistances, reactances and time constants.
10. Generator current decrement curve.
11. Generator motor starting capability.
12. Generator thermal damage curve.
13. Jacket water heater connection diagram.
14. Control panel schematics.
15. Automatic load transfer switches.
16. Oil sampling analysis, laboratory location, and information.

17. Manufacturer's and dealer's written warranty.
18. Emissions data

B. Submit under provisions of Section 260000.

C. Product Data: Provide dimensions, weight, mounting, electrical ratings, one-line diagrams, switching and protective device type and ampere ratings.

D. Provide manufacturers installation instructions.

E. Factory Prototype Testing

1. The system manufacturer must certify that engine; generator, controls, and switchgear have been tested as complete system of representative engineering models (not on equipment sold). The manufacturer shall supply equipment that is a current factory production model.

   Prototype testing shall include:

   a. Fuel consumption at 1/4, 1/2, 3/4, and full load
   b. Exhaust emissions
   c. Mechanical and exhaust noise
   d. Governor speed regulation at 1/4, 1/2, 3/4, and full load; and during transients
   e. Motor starting kVA
   f. Generator temperature rise in accordance with NEMA MG1-22.40
   g. Harmonic analysis, voltage waveform deviation and telephone influence factor
   h. Generator short circuit capability
   i. Cooling system performance
   j. Generator revolving field assembly for 2 hours at 2700 rpm (150% overspeed) and 70C, and each production unit tested at 2250 rpm (125% overspeed) at room temperature.

1.4 AUTOMATIC TRANSFER SWITCHES

A. The automatic transfer switches specified in another section shall be supplied by the engine-generator manufacturer in order to establish and maintain a single source of system responsibility and coordination. Refer to construction documents for additional information.

1.5 WARRANTY

A. Two Year Warranty

1. The manufacturer's standard warranty shall in no event be for a period of less than two (2) years from date of initial start-up of the system and shall include repair parts, labor, reasonable travel expense necessary for repairs at the job site, and expendables (lubricating oil, filters, antifreeze, and other service items made unusable by the defect) used during the course of repair. Running hours shall not be a limiting factor for the system warranty by either the manufacturer or servicing distributor. Submittals received without written warranties as specified will be rejected in their entirety.

1.6 PARTS AND SERVICE QUALIFICATIONS

A. Service Facility

1. The engine-generator supplier shall maintain 24-hour parts and service capability. The distributor shall stock parts as needed to support the generator set package for this specific project.

B. Service Personnel

1. The dealer shall maintain qualified; factory trained service personnel that can respond to an emergency call within 2 hours of notification.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Onan-Cummins.

B. Caterpillar.

2.2 GENERATOR SET

A. Each generator set shall be Standby rated at 100 kW, 125 kVA, 1800 RPM, 0.80 power factor, 480 VAC, 3 phase, 4 wire, 60 hertz, including radiator fan and all parasitic loads, at an elevation of 2500 feet and a temperature rating of 120 degrees F.

2.3 MATERIALS AND PARTS

A. All materials and parts comprising the unit shall be new and unused.

2.4 DIESEL ENGINE

A. Engine Requirements

1. The engine shall be as manufactured by Cummins or approved equal. The engine shall be water-cooled inline or vee-type, four-cycle compression ignition diesel. It shall meet specifications when operating on number 2 domestic burner oil. Two cycle engines will not be considered. The engine shall be equipped with fuel, lube oil, and intake air filters, lube oil cooler, fuel transfer pump, fuel priming pump, service meter, gear-driven water pump.

2. Governor – Electronic

a. The control will monitor all significant engine parameters, and adjust engine performance according to speed, altitude, temperature, aftercooler temperature, and engine condition. It shall incorporate revisable control software capable of

reconfiguring engine operation to desired performance levels. The engine control shall be configured to avoid interruption of power whenever possible. In the event of system faults, which do not require immediate shutdown, the engine shall be programmed to continue operation at power levels sufficient to remain within performance limits. It shall display real time and historical data to allow user to optimize operation and provide accurate service information in the event of a malfunction. Information shall be accessible through a data link for remote monitoring, or through a RS 232 port. A data link failure shall not cause an interruption of engine operation.

b. The control shall have integral electronic governor to allow isochronous load sharing between automatically paralleled generator sets. Engine governing shall maintain steady state speed regulation of +/- 0.25%, and be adjustable from a remote location. Speed droop shall be adjustable from 0 (isochronous) to 10% from no load to full rated load and share within 5% when paralleled with similarly equipped engines. Ramping to rated speed during startup shall be delayed until engine oil pressure is assured, with rate of acceleration controlled. In the event of a DC power loss, the fuel system will remain closed.

3. Block Design

a. The complete engine block shall be machined from one casting. Designs incorporating multiple blocks bolted together are not acceptable.

4. Lubrication System

a. The engine shall utilize a gear-type, positive displacement, full pressure lubricating oil pump and water-cooled lube oil cooler. Pistons shall be spray-cooled. Provide oil filters, oil pressure gauge, dipstick and oil drain.

5. Fuel System

a. Fuel filter and serviceable fuel system components shall be located to prevent fuel from spilling onto gen set batteries.

2.5 GENERATOR

A. Generator Specifications

1. The synchronous three-phase generator shall be a single bearing, self-ventilated, drip-proof design in accordance with NEMA MG 1 and directly connected to the engine flywheel housing with a flex coupling.

B. Insulation

1. The insulation material shall meet NEMA standards for Class H insulation and be vacuum impregnated with epoxy varnish to be fungus resistant. Temperature rise of the rotor and stator shall not exceed NEMA class F (125 ºC rise by resistance over 40 C ambient). The excitation system shall be of brushless construction.

C. Exciter

1. Self-Excited

a. The self-excited, brushless exciter shall consist of a three-phase armature and a three-phase full wave bridge rectifier mounted on the rotor shaft. Surge suppressors shall be included to protect the diodes from voltage spikes.

2. Automatic Voltage Regulator

a. The automatic voltage regulator (AVR) shall maintain generator output voltage within +/- 0.5% for any constant load between no load and full load. The regulator shall be a totally solid state design, which includes electronic voltage buildup, volts per Hertz regulation, three phase sensing, overexcitation protection, loss of sensing protection, temperature compensation, shall limit voltage overshoot on startup, and shall be environmentally sealed.

D. Motor Starting

1. Provide motor starting capability of 880.00 kVA at > 30% instantaneous voltage dip as defined per NEMA MG 1.

E. Circuit Breaker

1. Provide a generator mounted circuit breaker, molded case or insulated case construction, 100% rated, 200 amp trip, 3 pole, NEMA 1P22, 35,000 amperes symmetrical minimum. Breaker shall be Merlin Gerin or equal and utilize a solid state trip unit with long time, short time, instantaneous & ground fault trip element and 24 VDC shunt trip. The breaker shall be UL listed with shunt trip device connected to engine/generator safety shutdowns. Breaker shall be housed in an extension terminal box mounted on the side of the generator. Mechanical type lugs, sized for the circuit breaker feeders shown on drawing, shall be supplied on the load side of breaker.

F. Generator Mounted Control Panel

1. Provide a generator mounted control panel for complete control and monitoring of the engine and generator set functions. Panel shall include automatic start/stop operation; adjustable cycle cranking, digital AC metering (0.5% true rms accuracy) with phase selector switch, digital engine monitoring, shutdown sensors and alarms with horn and reset, adjustable cooldown timer and emergency stop push-button. Panel shall incorporate self-diagnostics capabilities and fault logging. Critical components shall be environmentally sealed to protect against failure from moisture and dirt. Components shall be housed in a NEMA 1/IP22 enclosure with hinged lid. The control panel shall contain the necessary controls for automatic paralleling with the three generators

2. Digital Readouts

a. Provide the following digital readouts:

(1) Engine oil pressure
(2) Coolant temperature

(3) Engine RPM
(4) System DC Volts
(5) Engine running hours
(6) Generator AC volts
(7) Generator AC amps
(8) Generator frequency
(9) KW meter
(10) Percentage of rated Power
(11) KVA meter
(12) KVAr meter
(13) Power Factor meter
(14) KWHR meter

3. Alarm NFPA 110

a. Provide the following indications for protection and diagnostics according to NFPA 110 level 1:

(1) Low oil pressure
(2) High water temperature
(3) Low coolant level
(4) Overspeed
(5) Overcrank
(6) Emergency stop depressed
(7) Approaching high coolant temperature
(8) Approaching low oil pressure
(9) Low coolant temperature
(10) Low voltage in battery
(11) Control switch not in auto. position
(12) Low fuel main tank
(13) Battery charger ac failure
(14) High battery voltage
(15) EPS supplying load
(16) Spare

4. Remote Annunciator NFPA 110

a. Provide a remote annunciator to meet the requirements of NFPA 110, Level 1. The annunciator shall provide remote annunciation of all points stated above and shall incorporate ring-back capability so that after silencing the initial alarm, any subsequent alarms will sound the horn. Provide alarm indication for "generator ground fault" on solidly grounded wye systems of more than 150 volts to ground.

5. Programmable Control Panel

a. Provide programmable protective relay functions inside the control panel to include the following:

(1) Undervoltage
(2) Overvoltage
(3) Overfrequency

(4) Underfrequency
(5) Reverse power
(6) Overcurrent (phase and total)
(7) KW level (overload)
(8) Three spare LED's
(9) Four spare inputs

G. Cooling System

1. Radiator

a. The generator set shall be equipped with a rail-mounted, engine-driven radiator with blower fan and all accessories. The cooling system shall be sized to operate at full load conditions and 115 F ambient air entering the enclosure without derating the unit and 50/50 anti-freeze mixture. The generator set supplier is responsible for providing a properly sized cooling system based on the enclosure static pressure restriction.

H. Fuel System

1. Fuel Filter

a. Filter/Separator - In addition to the standard fuel filters provided by the engine manufacturer, there shall also be installed a primary fuel filter/water separator in the fuel inlet line to the engine. Engine mounted fuel/water separator.

2. Fuel Piping

a. All fuel piping shall be black iron or flexible fuel hose rated for this service. No galvanized piping will be permitted.

3. Fuel Line Rating

a. Flexible fuel lines rated 300 degrees F and 100 PSI.

4. Fuel Tank

a. A UL listed, painted steel day tank, sized as required, supply fuel to the engine for a minimum of 24 hours operation at 100% of rated load, shall be furnished. A bronze gear pump which exceeds the maximum flow of fuel drawn by the engine-mounted fuel supply pump, including fuel returned from the engine, shall be mounted on the tank and powered by a 120 VAC single phase motor. The pump shall be controlled by low/high level switches mounted inside the tank.

b. Supply piping connections for fuel suction/return lines to fuel storage tank, fuel supply/return lines to engine, and emergency vent. Include local fuel fill, tank drain connection, removable inspection plate with gasket, 'press to test" switch, and fuel level gauge. The following accessories shall be provided: steel rupture basin to contain 150% capacity, fuel in rupture basin switch, high/low fuel level switches for remote annunciator, UL 508 Control module, fuel strainer.

5. Exhaust System

    a. Silencer

        (1) A critical type silencer, companion flanges, and flexible stainless steel exhaust fitting properly sized shall be furnished and installed according to the manufacturer's recommendation. Mounting shall be provided by the contractor as shown on the drawings. The silencer shall be mounted so that its weight is not supported by the engine nor will exhaust system growth due to thermal expansion be imposed on the engine. Exhaust pipe size shall be sufficient to ensure that exhaust backpressure does not exceed the maximum limitations specified by the engine manufacturer.

6. Starting System

    a. Starting Motor

        (1) A 24VDC electric starting system with positive engagement shall be furnished. The motor voltage shall be as recommended by the engine manufacturer.

7. Jacket Water Heater

    a. A unit mounted thermal circulation type water heater. The heater Watt rating shall be sized by the manufacturer to maintain jacket water temperature at a minimum of 100 degrees F, and shall be a 120V, 60 hertz.

8. Batteries

    a. A lead-acid storage battery set of the heavy-duty diesel starting type shall be provided. Battery voltage shall be compatible with the starting system. The battery set shall be rated as recommended by the engine manufacturer. Necessary cables and clamps shall be provided.

9. Battery Trays

    a. A battery tray shall be provided for the batteries and shall conform to NEC 480-7(b). It shall treated to be resistant to deterioration by battery electrolyte. Further, construction shall be such that any spillage or boil-over battery electrolyte shall be contained within the tray to prevent a direct path to ground.

10. Battery Charger

    a. A current limiting battery charger shall be furnished to automatically recharge batteries. Charger shall float at 2.17 volts per cell and equalize at 2.33 volts per cell. It shall include overload protection, silicon diode full wave rectifiers, voltage surge suppressor, DC ammeter, DC voltmeter, and fused AC input. Ac input voltage shall be 120 volts, single phase. Charger shall have LED annunciation for low DC volts, rectifier failure, loss of AC power, high DC volts. Amperage output shall be no less than ten (10) amperes. Charger shall be wall-mounting type in NEMA 1 enclosure.

11. Sound Attenuated Enclosure

a. The weatherproof sound attenuated enclosure shall be formed from 14-gauge galvanized material with a pitched roof and be strengthened to support the exhaust silencer. Sound rated intake louvers shall be a minimum thickness of 14 gauge for all component parts. Sound level shall not exceed 70 dBA at 26 feet.

b. All doors on the enclosure shall be located to allow ease of maintenance on the generator set and allow access to and visibility of instruments, controls, engine gauges, etc. Each door shall be fitted with flush-mounted same key-lock latches. All louvers shall be designed to prevent the entrance of rainwater, but shall have sufficient free area to allow for 120% of the total engine-generator cooling air requirements in this application. Provide mounting brackets for the exhaust silencer and a rain skirt/collar to prevent the entrance of rain. A 90-degree elbow shall be attached to the exhaust silencer outlet and a suitable rain cap shall be furnished. A stainless steel, seamless, flexible exhaust connector with all necessary bolts, flanges, and gaskets to mate to the engine and the exhaust silencer shall be provided. Finish paint color shall be manufacturers standard.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install equipment in accordance with manufacturer's recommendations, the project drawings and specifications, and all applicable codes.

3.2 START-UP AND TESTING

A. Coordinate all start-up and testing activities with the Engineer and Owner. For testing, and for fueling of the emergency generator tank after testing, the fuel shall be provided by the Electrical Contractor. The fuel tank shall be full at the time the Emergency Generator is turned over to the Owner.

B. The generator system and automatic transfer switches shall support generator start-up and load transfer within 10 seconds.

C. After installation is complete and normal power is available, the manufacturer's local dealer shall perform the following:

1. Verify that the equipment is installed properly.
2. Check all auxiliary devices for proper operation, including battery charger, jacket water heater(s), generator space heater, remote annunciator, etc.
3. Test all alarms and safety shutdown devices for proper operation and annunciation.
4. Check all fluid levels.
5. Start engine and check for exhaust, oil, fuel leaks, vibrations, etc.
6. Verify proper voltage and phase rotation at the transfer switch before connecting to the load.

7. Connect the generator to building load and verify that the generator will start and run all designated loads in the building.
8. Perform a 4-hour load bank test at 1.0 power factor at full nameplate load using a resistive load bank and cables supplied by the local generator dealer. Observe and record the following data at 15-minute intervals:

    a. Service meter hours
    b. Volts AC - All phases
    c. Amps AC - All phases
    d. Frequency
    e. Power factor or Vars
    f. Jacket water temperature
    g. Oil Pressure
    h. Fuel pressure
    i. Ambient temperature

3.3 OPERATION AND MAINTENANCE MANUALS

A. Provide four (4) sets of operation and maintenance manuals covering the generator, switchgear, and auxiliary components. Include parts manuals, final as-built wiring interconnect diagrams and recommended preventative maintenance schedules.

3.4 TRAINING

A. On-Site Training

1. Provide one day of on-site training to instruct the owner's personnel in the proper operation and maintenance of the equipment. Review operation and maintenance manuals, parts manuals, and emergency service procedures.

3.5 SCHEDULED OIL SAMPLING

A. In order to forecast and minimize engine failure, the supplier of the equipment must provide an oil sampling analysis kit which operating personnel shall utilize for scheduled oil sampling.

B. The laboratory to which oil samples will be sent shall be located at and be a part of the local generator set supplier's facility, and shall be open to inspection during normal working hours. Independent laboratories not a part of the engine supplier's facility are disallowed as to conformance with this specification.

C. Scheduled oil sampling shall be of the atomic absorption spectrophotometer method as opposed to the spectrographic analysis method and shall be accurate to within a fraction of one part per million for the following elements:

1. Iron
2. Chromium
3. Copper
4. Aluminum

5. Silicon
6. Lead

D. In addition, the sample shall be tested for the presence of water, fuel dilution, and anti-freeze

E. All equipment needed to take oil samples shall be provided a kit at the time of acceptance and shall include the following:

1. Sample extraction gun (1)
2. Bottle (10)
3. Postage paid mailers (10)
4. Written instructions (1)
5. Metal storage box (1)

F. IMMEDIATE notification shall be provided to the owner when analysis shows any critical reading. If readings are normal, a report showing that the equipment is operating within established parameters shall be provided.

G. This scheduled oil sampling kit shall be made available, at additional cost to the owner beyond the mandatory starter kit specified previously and shall be optional for the owner to continue purchasing after the starter kit has been depleted.

END OF SECTION 263213

SECTION 263413 – DISTRIBUTION SWITCHBOARDS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Switchboards

B. Switchboard overcurrent devices

1.2 RELATED SECTIONS

A. Section 260500 - GENERAL ELECTRICAL PROVISIONS.

B. Section 262700 - BASIC MATERIALS AND METHODS.

1.3 REFERENCES

A. National Electrical Manufacturers Association (NEMA).

B. Underwriters' Laboratories (UL).

C. American National Standards Institute (ANSI).

D. ANSI/NFPA 70-National Electrical Code (NEC).

E. Institute of Electrical and Electronics Engineers (IEEE).

1.4 SUBMITTALS

A. Submit under provisions of Section 260500.

B. Product Data: Provide dimensions, weight, mounting, electrical ratings, one-line diagrams, switching and protective device type and ampere ratings.

C. Manufacturer's installation instructions.

D. Coordination Curves: The switchboard manufacturer shall prepare and submit overcurrent trip settings and coordination curves to the Engineer for review prior to the shipment of the switchboard. Trip settings shall be calculated and selected on the basis of selective coordination, wire sizes and loads as shown on the drawings. After review by the Engineer, the overcurrent devices shall be set at those values by the Contractor.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Cutter Hammer

B. General Electric

C. Square D

D. ITE/Siemans

1.5 DISTRIBUTION SWITCHBOARDS

A. General

1. Equipment shall comply with the latest applicable standards of NEMA PB2 and UL 891. Where switchboards are used as service entrance equipment, they shall comply with all NEC and UL requirements for service entrance and a UL service entrance label shall be provided.
2. Control and metering wiring, necessary fuse blocks and terminal blocks within the switchboard shall be furnished as required. All groups of control wires leaving the switchboard shall be provided with terminal blocks with suitable numbering strips.

B. Electrical Ratings: Suitable for operation on a three-phase, 60 Hertz system. Operating voltage, number of wires, bus amperage and short circuit ratings as shown on the drawings.

C. Structure

1. Totally enclosed dead front, free-standing structure consisting of one or more vertical sections joined together to form one 90 inch-high structure.

2. The sides, top and rear shall be covered with removable screw-on plates having formed edges all around. Front plates shall be sectionalized and removable, and shall be fabricated from code gauge steel.

3. Switchboards shall be provided with adequate lifting means and shall be capable of being rolled or moved into installation position and bolted directly to the housekeeping pad.

4. Provide cable pull sections or top cable pull boxes where shown on the drawings complete with cable tie down supports. Where cable pull section or pull boxes contain utility service cables, provide utility-acceptable sealing means.

D. Bussing

1. All bus bars shall be copper with bolted connections at joints. The bus bars shall be of sufficient size to limit the temperature rise to 65 degrees C based on UL tests, and rated to withstand mechanical forces exerted during short circuit conditions when directly connected to a power source having an available fault current as shown on the drawings.

Provide full capacity neutral where a neutral is shown on the drawings.

2. A ground bus shall be furnished firmly secured to each vertical section structure and shall extend the entire length of the switchboard. An incoming ground lug shall be furnished. Other ground lugs for feeder circuits shall also be supplied as shown on the drawings.
3. All hardware used on conductors shall be high-tensile strength and plated. All terminals shall be of the anti-turn solderless type suitable for copper or aluminum cable of sizes indicated for 75 degrees C cable.
4. Provide all provisions required for future extension of all bus.

E. Switchboard Type(s): See drawings for the types to be provided.

1. Front-Accessible Panel-Mounted Feeder Devices

a. Switchboards shown mounted against a wall shall be front accessible. All sections of the switchboard shall be 18 inches deep except service sections containing large ampacity main disconnects which may be deeper as indicated. All sections of the switchboard shall align so that the back of the complete structure may be placed flush against a wall.
b. Construction shall allow maintenance of incoming line terminations, main device connections and all main bus bolted connections to be performed without rear access. The feeder or branch devices shall be removable from the front and shall be panel mounted with the necessary device line and load connections front accessible. Provide lugs on all devices for cable sizes shown on drawings.

F. Utility Metering: Where shown on the drawings, furnish a separate barriered-off utility metering compartment complete with hinged sealable door. Bus work shall include provisions for mounting utility company current transformers and potential transformers or potential taps as required by utility company. Provide service entrance label and provide necessary applicable service entrance features per NEC, local code and utility company requirements.

G. Overcurrent Device Application

1. Main protective devices shall be fixed mounted molded case breaker with interrupting rating, frame and trip ratings as shown on the drawings.
2. Panel-mounted feeder protective devices shall be molded case breaker type with frame and trip ratings as shown on the drawings.
3. Individually fixed mounted feeder protective devices shall be molded case breaker type with frame and trip ratings as shown on the drawings.
4. Devices shall have a minimum interrupting rating as shown on the drawings.
5. Devices shall be manually operated unless noted otherwise.

H. Overcurrent Device Specification

1. Molded Case Breakers

a. Molded case circuit breakers shall provide complete circuit overcurrent protection by having inverse time and instantaneous tripping characteristics.
b. Circuit breakers shall be operated by a toggle-type handle and shall have a quick-make, quick-break over-center switching mechanism that is mechanically trip free.

Automatic tripping of the breaker shall be clearly indicated by handle position. Contacts shall be nonwelding silver alloy and arc extinction shall be accomplished by means of arc chutes.

c. Circuit breaker interrupting capacities shall be as shown on the drawings.

d. Trip Units

(1) Breakers 400 amperes and below shall be thermal-magnetic with inverse time current characteristics.

(2) Breakers 600 amperes and above shall have true rms digital trip units. The trip unit shall use microprocessor-based technology to provide the basic adjustable time-current protection functions. Interchangeable rating plugs shall establish the continuous trip ratings of each circuit breaker.

(a) The microprocessor-based trip unit shall have thermal memory capabilities to prevent the breaker from being reset following an overload condition until after a preset time delay.

(b) Breakers shall have built-in test points for testing the long time delay, instantaneous and ground fault functions of the breaker by means of a 120 volt operated test set.

(c) Complete system selective coordination shall be provided by the addition of the following individually adjustable time/current curve shaping solid state elements.

I) All breakers shall have adjustments for long time pick-up and delay, and adjustable instantaneous pick-up.

II) Main breakers shall have adjustable short time pick-up and delay.

III) Provide built-in ground fault protection with adjustable pick-up rating not exceeding 1,200 amperes; ground fault time delay shall be adjustable 0.1 to 0.5 second. Provide neutral ground fault current transformer for four-wire systems.

d) Provide one test set capable of testing all breakers 600 ampere frame and above.

e. Nameplates

(1) Engraved nameplates shall be furnished for all mains and feeder circuits with designation as shown on the drawings. Furnish master nameplates giving voltage, ampere rating, short circuit rating, manufacturer's name, general order number and item number.

f. Enclosures

(1) Enclosures shall be of NEMA 3R outdoor construction as shown on the drawings. Outdoor enclosures shall be nonwalk-in.

g. Finish

(1) All exterior and interior steel surfaces of the switchboard shall be properly cleaned and provided with a rust-inhibiting phosphatized coating. Color and finish of the switchboard shall be ANSI 61 and use the manufacturer's standard process.

I. Coordination Study:

a. The “Emergency System” shall coordinate with the upstream circuit breaker(s)/fuse(s). Prepare phase and ground coordination time-current characteristic curves to determine the required settings/sizes of the protective devices to maximize selectivity. The utility upstream protective device feeding the facility shall be maintained as the upper limit for coordination. These settings shall be obtained by the preparer, along with any other protective device setting requirements. The coordination curves shall be prepared on log-log paper and illustrate adequate clearing times between series devices. The curves shall be created by using a study software package but must reflect actual protective devices to be installed. Adequate time-current curves shall be generated to depict coordination. In addition, protective device characteristics shall be suitably determined to reflect calculated short-circuit levels at the location.

b. The coordination study shall be prepared prior to the submission of the equipment shop drawings to the Engineer. This is to ensure that the fuses/circuit breakers and trip units selected will provide selective coordination and that the equipment shop drawings will reflect the correct trip units. The Contractor will be responsible for replacing any equipment that has been ordered or installed that does not contain breakers/trip units that will provide proper coordination. The emergency system shall fully coordinate with all downstream devices to the .01 second level.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install per manufacturer's recommendations and NEC requirements.

B. Provide a 4 inch housekeeping pad for mounting the switchboard.

C. Ensure NEC clearances on all sides.

D. Megger bus prior to energizing to verify that shorts and grounds do not exist.

E. Verify proper overcurrent device sizes.

F. Set all adjustable settings on trip units to manufacturer-recommended settings.

END OF SECTION 263413

SECTION 263623 - AUTOMATIC TRANSFER SWITCHES AND COMBINATION BYPASS ISOLATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Combination Bypass Isolation/Automatic Transfer Switches.

1.2 REFERENCES

A. National Electrical Manufacturers Association (NEMA).

B. Underwriters' Laboratories (UL).

C. American National Standards Institute (ANSI).

D. ANSI/NFPA 70-National Electrical Code (NEC).

E. Institute of Electrical and Electronics Engineers (IEEE).

1.3 SUBMITTALS

A. Submit under provisions of Section 260000.

B. Product Data: Provide dimensions, weight, mounting, electrical ratings, one-line diagrams, switching and protective device type and ampere ratings.

C. Provide manufacturers installation instructions.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Eaton

B. Asco.

C. Russelectric

2.2 AUTOMATIC TRANSFER SWITCH RATINGS

A. The transfer switches shall be suitable for a 480 volt, 3 phase, 60 hertz system.

B. The transfer switches shall provide complete protection with field adjustable solid-state voltage sensing logic to monitor each phase of the normal power supply. The close differential shall be factory set to drop out when the monitored voltage drops below 70% of normal and initiate load transfer when the alternate standby source becomes available. Upon restoration of the normal source to a pickup level of 90%, the logic shall initiate automatic retransfer of the load circuits to the normal source.

C. Each transfer switch shall have 3 cycle withstand, closing, and interrupting ratings sufficient for the available short circuit current as shown on the drawings.

D. The voltage rating of the transfer switches shall be not less than the system voltage rating. The continuous current rating of the transfer switch shall be as shown on the drawings.

E. Each transfer switch shall be 100% equipment rated for continuous duty and shall conform to the applicable requirements of UL 1008 for emergency system total load.

F. All pilot devices and relays shall be of the industrial type with self-cleaning contacts and rated 10 amperes.

G. The automatic transfer switch shall be fully rated to protect all types of loads, inductive and resistive, from loss of continuity and power, without derating, either open or enclosed.

2.3 WORKMANSHIP AND MATERIALS

A. The materials and equipment shall be standard products from manufacturers who have produced continuously the type of equipment specified. All equipment and materials shall be new and high quality, ensuring long life and reliable operation.

2.4 CONSTRUCTION

A. General

1. Refer to the single line diagram for the number of switches, ratings and configurations.
2. All automatic transfer switches shall be combination bypass/isolation automatic transfer switches.
3. Each automatic transfer switch(ATS) and its associated bypass/isolation (BPS) shall be rated for 480 volts, three phase, 60 hertz and shall be suitable for an available fault current level as shown on the drawings.
4. On 3 phase, 4 wire systems, in which a switched neutral is required, a true 4 pole switch shall be supplied with all four electrically and mechanically identical poles mounted on a common shaft. The continuous current rating and the closing and withstand rating of the fourth pole shall be identical to the rating of the main poles.
5. The combination automatic transfer bypass/isolation switch shall be mounted in a freestanding NEMA 3R enclosure, unless otherwise indicated. Enclosures shall be fabricated from 12 gauge steel. The enclosure shall be sized to exceed minimum wire bending space required by UL 1008.

a. Both units shall be bused together with silver plated copper bus to provide a complete pre-tested assembly. Aluminum bus, and/or cable interconnections are not acceptable. Construction shall be such that the contractor needs to install only the power and control connections.

6. Bypass/isolation switches shall provide a safe and convenient means for manually bypassing and isolating the automatic transfer switch, regardless of the condition or position of the ATS, with the ability to be used as an emergency back-up system in the event the transfer switch should fail. In addition, the bypass/isolation switch shall be utilized to facilitate maintenance and repair of the automatic transfer switch.
7. The automatic transfer switch shall be completely isolated from the bypass/isolation switch by means of insulating barriers and separate access doors to positively prevent hazard to operating personnel while servicing the automatic transfer switch.
8. The transfer switches shall have both top and bottom cable access.
9. The main contacts shall be visible for inspection without any major disassembly of the transfer switch.
10. The main contacts shall be capable of being replaced without removing the power cables.
11. All bolted bus connections shall have Belleville compression type washers.
12. When a solid neutral is required, a fully rated bus bar with required AL-CU neutral lugs shall be provided.
13. Terminal blocks shall conform to NEMA ICS 4. Terminal facilities shall be arranged for entrance of external conductors from the top or bottom of the enclosure. The main transfer switch terminals shall be suitable for the termination of conductors shown on the plans.
14. The switch shall be equipped with 90 degree C rated copper/aluminum solderless mechanical type lugs.
15. The complete combination automatic transfer bypass/isolation switch assembly shall be factory tested to ensure proper operation and compliance with the specification requirements. A copy of the factory test report shall be available upon request.
16. Switching devices shall be draw-out contactors. All contactors shall be UL listed for application in their intended enclosures for 100% of their continuous ampere rating.

B. Bypass / Isolation Construction

1. All main contacts and operating linkages of the bypass/isolation switch shall be identical to the ATS, except that the operation shall be manual.
2. The bypass/isolation switch shall have the same electrical ratings of ampacity, voltage, short circuit withstand, and temperature rise capability as the associated ATS. The bypass/isolation switch shall be draw-out contactors. All contactors shall be UL listed for application in their intended enclosures for 100% of their continuous ampere rating.
3. The primary busswork of the drawout automatic transfer switch shall be connected to the stationary bus stabs in the freestanding cubicle by silver plated, segmented, self-aligning, primary disconnect fingers to facilitate proper alignment between the removable drawout when the ATS is withdrawn and shall be available for inspection without disturbing or de-energizing the main bus.
4. The secondary control disconnect contacts mounted on the ATS shall be self-aligning and shall plug into the stationary elements mounted on the freestanding cubicle. Separate, manual, secondary control disconnect plugs are not acceptable.

5. The isolating portion of the bypass/isolation shall allow the automatic transfer switch to be disconnected from all sources of power and control without opening the enclosure door. The transfer switch shall have a true drawout configuration which does not require disconnection of any electrically or mechanical device by maintaining personnel. The automatic transfer switch shall be provided with rollers or casters to allow it to be removed from its enclosure simply by rolling it out. Positive mechanical interlocks shall be provided to insure that the bypass/isolation functions can be accomplished without the danger of a short circuit. Overlapping contact bypass/isolation switches, that are dependent upon the position of the automatic transfer switch for proper operation, are not acceptable.
6. A fourth pole, switched neutral shall be provided if the associated automatic transfer switch is designed as a 4 pole. Basic 4 pole bypass/isolation switch construction shall be identical to the associated automatic transfer switch construction.
7. Necessary controls shall be provided to ensure that the engine run circuit remains closed when the switch is in the bypass-to-emergency position, even though the associated transfer switch is in the normal position or completely removed from the enclosure.

D. Automatic Transfer Switch Controls

1. The transfer switch shall be equipped with a microprocessor-based control system, to provide all the operational functions of the automatic transfer switch.
2. The CPU shall be equipped with self diagnostics which perform periodic checks of the memory I/O and communication circuits, with a watchdog/power fail circuit.
3. The controller shall use industry standard open architecture communication protocol for high speed serial communications via multidrop connection to other controllers and to a master terminal with up to 4000 ft. of cable, or further, with the addition of a communication repeater. The serial communication port shall be RS422/485 compatible.
4. The serial communication port shall allow interface to either the manufacturer's or the owner's furnished remote supervisory control.
5. The controller shall have password protection required to limit access to qualified and authorized personnel.
6. The controller shall include three phase over/under voltage, over/under frequency, phase sequence detection and phase differential monitoring on both normal and emergency sources.
7. The controller shall be capable of storing the following records in memory for access either locally or remotely:

    a. Number of hours transfer switch is in the emergency position (total since record reset).
    b. Number of hours emergency power is available (total since record reset).
    c. Total transfer in either direction (total since record reset).
    d. Date, time, and description of the last four source failures.
    e. Date of the last exercise period.
    f. Date of record reset.

E. Sequence of Operation

1. When the voltage on any phase of the normal source drops below 80% or increases to 120%, or frequency drops below 90%, or increases to 110%, or 20% voltage differential between phases occurs, after a programmable time delay period of 0-9999 seconds factory set at 3 seconds to allow for momentary dips, the engine starting contacts shall close to start the generating plant.
2. The transfer switch shall transfer to emergency when the generating plant has reached specified voltage and frequency on all phases.
3. After restoration of normal power on all phases to a preset value of at least 90% to 110% of rated voltage, and at least 95% to 105% of rated frequency, an adjustable time delay period of 0-9999 seconds (factory set at 300 seconds) shall delay retransfer to allow stabilization of normal power. If the emergency power source should fail during this time delay period, the switch shall automatically return to the normal source.
4. After retransfer to normal, the engine generator shall be allowed to operate at no load for a programmable period of 0-9999 seconds, factory set at 300 seconds.

F. Automatic Transfer Switch Accessories

1. Programmable three phase sensing of the normal source set to pickup at 90% and dropout at 80% of rated voltage and overvoltage to pickup at 120% and dropout at 110% of rated voltage. Programmable frequency pickup at 95% and dropout at 90% and over frequency to pickup at 110% and dropout at 105% of rated frequency. Programmable voltage differential between phases, set at 20%, and phase sequence monitoring.
2. Programmable three phase sensing of the emergency source set to pickup at 90% and dropout at 80% of rated voltage and overvoltage to pickup at 120% and dropout at 110% of rated voltage. Programmable frequency pickup at 95% and dropout at 90% and over frequency to pickup at 110% and dropout at 105% of rated frequency. Programmable voltage differential between phases set at 20%, and phase sequence monitoring.
3. Time delay for override of momentary normal source power outages (delays engine start signal and transfer switch operation). Programmable 0-9999 seconds. Factory set at 3 seconds, if not otherwise specified.
4. Time delay on retransfer to normal, programmable 0-9999 seconds, factory set at 300 seconds if not otherwise specified, with overrun to provide programmable 0-9999 second time delay, factory set at 300 seconds, unloaded engine operation after retransfer to normal.
5. Time delay on transfer to emergency, programmable 0-9999 seconds, factory set at 3 seconds.
6. A maintained type load test switch shall be included to simulate a normal power failure, keypad initiated.
7. A remote type load test switch shall be included to simulate a normal power failure. Remote switch initiated.
8. A time delay bypass on retransfer to normal shall be included. Keypad initiated.
9. Contact, rated 10 amps 30 VDC, to close on failure of normal source to initiate engine starting.
10. Contact, rated 10 amps 30 VCD, to open on failure of normal source for customer functions.
11. Light emitting diodes shall be mounted on the microprocessor panel to indicate: switch is in emergency position and controller is running.
12. A plant exerciser shall be provided with (10) 7 day events, programmable for any day of the week and (24) calendar events, programmable for any month/day, to automatically

exercise generating plant, programmable in one minute increments. Also include selection of either "no load" (switch will not transfer) or "load" (switch will transfer) exercise period. Keypad initiated.

13. Provision to select either "no commit" or "commit" to transfer operation in the event of a normal power failure shall be included. In the "no commit position," the load will transfer to the emergency position unless normal power returns before the emergency source has reached 90% of its rated values (switch will remain in normal). In the "commit position" the load will transfer to the emergency position after any normal power failure. Keypad imitated.
14. Two auxiliary contacts rated 10 amp, 120 volts AC (for switches 100 to 800 amps) 15 amp, 120 volts AC (for switches 1000 to 4000 amps), shall be mounted on the main shaft, one closed on normal, the other closed on emergency. Both contacts will be wired to a terminal strip for ease of customer connections.
15. A three phase digital LCD voltage readout, with 1% accuracy shall display all three separate phase to phase voltages simultaneously, for both normal and emergency source.
16. A digital LCD frequency readout with 1% accuracy shall display frequency for both normal and emergency source.
17. An LCD readout shall display normal source and emergency source availability.

G. Accessories

1. (2) time delay contacts that open simultaneously just (milliseconds) prior to transfer in either direction. These contacts close after a time delay upon transfer. Programmable 0-9999 seconds after transfer.
2. (2) Form "C" Contacts that open simultaneously before transfer in either direction and reclose instantaneously after transfer.
3. (2) Form "C" contacts that open simultaneously 5 seconds before transfer in either direction and reclose 5 seconds after transfer.
4. A block transfer function shall be included, energized from a 24 VDC signal, to prevent transfer to emergency.
5. A load shed function shall be included, energized from a 24VDC signal, to disconnect the load from the emergency source when an overload condition occurs.
6. A peak shave function shall be included, energized from a 24VDC signal. This function will start the emergency generator and transfer the ATS to the emergency source reducing the utility supply to the building. After the peak shave signal is removed, the transfer switch will retransfer to the normal supply, bypassing the retransfer time delay.

H. Bypass / Isolation Switch

1. Operation of the bypass/isolation shall be assured, regardless of the position of the automatic transfer switch.
2. Light emitting diodes shall be provided to indicate: bypass position, fully isolated position, and source availability.
3. Positive sequencing of all contacts, with no possible intermediate position, shall be accomplished through the manual operators from a dead front location. Electrical testing during maintenance of the automatic transfer switch shall be possible in the bypass position.
4. Inherent double throw (break-before-make) operation shall provide positive assurance against accidental short circuitry of the normal and emergency power sources. Arrangements utilizing interlocking of single-throw devices are not acceptable. The

operating speed of the contacts shall be independent of the speed at which the handle is moved.

5. The bypass/isolation switch shall be listed by Underwriters Laboratories, Inc., Standard UL-1008 and meet the identical withstand ratings of its associated transfer switch.
6. Bypass/isolation switch must have mechanical separation of normal and emergency to assure against accidental connection of unsynchronized sources. Electrical interlocking will not be considered acceptable.

2.5 TESTS

A. The manufacturer shall perform routine factory test of all equipment to NEMA and UL test standards.

B. All test instruments shall be calibrated and traceable to recognized standards.

C. All defects detected as a result of testing or non-compliance shall be replaced or repaired or retested by the manufacturer at his own expense before shipment.

D. Material improperly detailed, omitted, fabricated or assembled, so that its installation in the field requires extra work, shall be the responsibility of the seller, who shall pay replacement of incorrect fabricated parts.

E. Three copies of test report shall be submitted within two weeks after shipment of equipment.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install per manufacturer's recommendations and NEC requirements.

B. Ensure NEC clearances on all sides.

C. Megger bus prior to energizing to verify that shorts and grounds do not exist.

D. Provide and install all control wiring, as required and per manufacturer’s recommendations, between transfer switches and generator operator controller. Set all adjustable settings on trip units to manufacturer-recommended settings.

END OF SECTION 263623

SECTION 265100 - LIGHTING FIXTURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Requirements for furnishing and installing lighting fixtures as shown and scheduled on the drawings.

1.2 RELATED SECTIONS

A. Section 260500 - General Electrical Provisions.

B. Section 263700 - Basic Materials and Methods.

1.3 REFERENCES

A. Underwriter’s Laboratories (UL).

B. ANSI/NFPA 70, National Electrical Code.

1.4 SUBMITTALS AND SUBSTITUTIONS

A. Submit product data in accordance with Section 260500. Submittals shall include the manufacturer's name, catalog number, ballast type, type and size of lamp, and all ordering data. Should Contractor desire to substitute fixture types, the Owner's Representative may, at his option, require the Contractor to furnish an example of said fixture for examination and comparison purposes.

PART 2 - PRODUCTS

2.1 All lighting fixtures shall be furnished complete with mounting accessories to suit the specific service intended. See architectural and structural plans for ceiling and construction details where fixtures are to be mounted. Coordinate final location with architectural and mechanical features.

2.2 Fixtures shown in the schedule to be recessed shall be complete with any accessories required to fit the fixture to the ceiling construction. See architectural plans for type of ceilings. Locate fixtures in regard to ceiling patterns, unless otherwise indicated on drawings.

2.3 Fixtures scheduled to be surface mounted shall be furnished and installed employing supports, toggle bolts and any other accessories which, in the opinion of the Owner's Representative, are required to adequately support the fixtures.

PART 3 - EXECUTION

3.1 The Contractor shall furnish and install lighting fixtures complete with lamps for every lighting outlet scheduled on the accompanying drawings. Where a fixture type designation may have been omitted from the plans, it shall be the responsibility of the electrical bidder to contact the Owner's Representative prior to the bid opening and determine which fixture type is intended at the location in question. No allowance will be made on behalf of the Contractor who fails to comply with this requirement. In general, if fixtures are being relocated, Contractor shall ascertain the number of new fixtures to be purchased, if any.

3.2 All fixtures shall be cleaned and left free of any dirt, dust, grease, etc., at the completion of the job.

3.3 All exterior lighting standards are to be grounded through a separately driven ground rod at the pole and through the system ground.

3.4 Where bodies of light fixtures are used as raceways for branch circuit wiring, the wire shall be approved for such location, 90 degrees C and carefully and securely clamped within the fixture body to positively prevent contact of the wires with the ballast case.

3.5 All fixtures shall be securely supported from building structure. Troffer fixtures in exposed T-bar grid shall have a ceiling hanger support at all four corners.

3.6 All fixtures shall be securely supported from the building structure. Fixtures in T-bar grid ceilings shall be supported from the structure with #12 ceiling wire at opposite corners and shall be securely fastened to the grid. All lighting fixture installations shall comply with NEC Article 410

3.7 All exterior lighting fixtures shall be furnished complete with gaskets, cast aluminum weatherproof outlet boxes, labeled approved for damp locations, have a lamp bases coated with rust inhibitor to prevent base from corroding to the socket, and be solidly grounded.

END OF SECTION 265100

SECTION 270110 STRUCTURED CABLE RECYCLING

GENERAL

1.0 SECTION INCLUDES

A. Assessment of abandoned communications cable.

B. Recycling abandoned communications cable.

1.1 REFERENCES

A. National Electrical Code (NEC) -Most recent Edition
B. NEC 640.3 (A) - Spread of Fire or Products of Combustion: The accessible portion of abandoned audio distribution cables shall not be permitted to remain.
C. NEC 645.5 (D)(6) - Under Raised Floors: Abandoned cables shall be removed unless contained in metal raceway.
D. NEC 725.3 (B) - Spread of Fire or Products of Combustion: The accessible portion of abandoned Class 2, Class 3, and PLTC cables shall not be permitted to remain.
E. NEC 760.3 (A) - Spread of Fire or Products of Combustion: The accessible portion of abandoned fire alarm cables shall not be permitted to remain.
F. NEC 770.3 (A) - Spread of Fire or Products of Combustion: The accessible portion of abandoned optical fiber cables shall not be permitted to remain.
G. NEC 800.52 (B) - Spread of Fire or Products of Combustion: The accessible portion of abandoned communications cables shall not be permitted to remain.
H. NEC 820.3 - Spread of Fire or Products of Combustion: The accessible portion of abandoned coaxial cables shall not be permitted to remain.
I. NEC 830 (A) - Spread of Fire or Products of Combustion: The accessible portion of abandoned network-powered broadband communication cables shall not be permitted to remain.

1.2 DEFINITIONS

A. Abandoned audio distribution cable per NEC Section 640.2 - “installed audio distribution cable that is not terminated at equipment and not identified for future use with a tag.”

B. Abandoned Class 2, Class 3, and PLTC cable per NEC Section 725.2 - “installed Class 2, Class 3, and PLTC cable that is not terminated at equipment and not identified for future use with a tag.”

C. Abandoned fire alarm cable per NEC Section 760.2 - “installed fire alarm cable that is not terminated at equipment other than a connector and not identified for future use with a tag.”

D. Abandoned optical fiber cable per NEC Section 770.2 - “installed optical fiber cable that is not terminated at equipment other than a connector and not identified for future use with a tag.”

E. Abandoned communications cable per NEC Section 800.2 - “installed communications cable that is not terminated at both ends at a connector or other equipment and not identified for future use with a tag.”

F. Abandoned coaxial cable per NEC Section 820.2 - “installed coaxial cable that is not terminated at equipment other than a coaxial connector and not identified for a future use with a tag.”

G. Abandoned network-powered broadband communications cable per NEC Section 830.2 - “installed network-powered broadband communications cable that is not terminated at equipment other than a connector and not identified for future use with a tag.”

1.3 SUBMITTALS

A. Refer to Section 01 33 00 Submittal Procedures.

B. Existing Conditions Report
   1. Summary of assessment findings
   2. Photographic record of representative problem areas.
   3. Observations referenced to corresponding codes, standards and best practices.
   4. Recommendations for improvement and correction
   5. Budgetary estimate for completing recommendations as requested.
   6. (Specifier Note: When project is being submitted for certification under the U.S. Green Building Council (USGBC) LEED (Leadership in Energy and Environmental Design) Green Building Rating System®, contact a DuPont representative for assistance in determining how recycling abandoned communication cable can assist in obtaining points. DuPont will issue a Waste Diversion Certificate upon receipt of documentation from the Contractor indicating gross weight and character of copper cable received by the recycler.)

C. LEED submittals
   1. Logistics and certification for recycling of abandoned cable removed - (potential LEED innovation credit or LEED construction waste management plan).
   2. Logistics and certification for recycling of abandoned cable removed. (LEED construction waste management plan)

1.4 QUALITY ASSURANCE

A. Qualifications
   1. Assessment Auditor Credentials
      a. Minimum 5 years field experience in communications cable plant design and installation.
      b. Current BICSI RCDD or other recognized industry accreditation.
      c. Minimum 3 years design experience in IT infrastructure for commercial buildings
      d. Industry certified in firestopping design.
      e. Understanding of applicable codes and standards for IT infrastructure and structured wiring systems
      f. Commissioning experience of electrical or mechanical work (preferred)

B. Meet the performance requirements for the following Category 4: Material and Resources (MR) LEED Environmental Credit:

C. LEED Existing Building (EB): [Credit MR 1.1 Construction Waste Management: Divert 50% from landfill] [Credit MR 1.2 Construction Waste Management: Divert 75% from landfill].

1.5 WASTE MANAGEMENT AND DISPOSAL

A. Copper Cable being reclaimed shall not come into contact with hazardous materials or waste

B. Separate reclaimed copper cable from other demolition waste and unapproved cable infrastructure demolition items

C. Capture reclaimed cable in dumpsters, roll-carts, bins or bags.

PART 2 PRODUCTS

A. SOURCES

   1. DuPont™ Cabling Solutions; P.O. Box 80702, Wilmington, DE 19880; 800.207.0756;

PART 3 EXECUTION

3.0 ASSESSMENT

A. Inspect existing infrastructure for:
   1. Identification of abandoned cable in accordance with current NEC and industry codes and standards.
   2. Integrity of firestopping at communication cable penetrations.
   3. Other communication cable infrastructure concerns that may degrade performance or impact life safety.

3.1 REMOVAL

A. Remove cable infrastructure products to be recycled from plenums, risers, under-floor systems, and other telecommunications rooms.

B. Use caution in areas where network connectivity must be maintained. Remove abandoned cables without disturbing remaining cables.

C. Use caution in removal of abandoned cables in potentially hazardous materials environments, including but not limited to asbestos. Suspend removal and notify design professional of potentially hazardous environments that have not been documented.

D. Package removed copper cabling products using approved method prior to arranging collection with recycling partner. Utilize dedicated [dumpsters] [bins] [bags].

E. Sort and classify reclaimed cable as follows:
   1. Communications plenum copper cable of Category 5 or higher
   2. Other approved cable infrastructure products

END OF SECTION

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SECTION 270510 - BASIC COMMUNICATION REQUIREMENTS

PART 1 - GENERAL

1.1 Summary

A. The objective of this project is to provide materials, and certified installation, and other auxiliary equipment for a complete system in accord with the plans and specification. The bid shall include all labor, material, testing, etc. to provide a complete finished product, including the demolition of any unused existing cabling, outlets, boxes and the other equipment no longer in service and as directed by the owner.

1.2 Related Work:

A. Related work described elsewhere Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

1.3 Quality Assurance

A. Installer Qualifications:

1. Approved Leviton Premier Installer (LPI) or Leviton Network Installer (LNI) before, during, and through completion of the system installation. Supporting documentation will be required as part of the submittal.

2. Responsible for workmanship and installation practices in accordance with Leviton Installer Program

B. Although such work is not specifically mentioned herein or on the drawings, the Contractor shall furnish and install all miscellaneous items, accessories, appurtenances, and devices incidental to or required for a sound, secure, and complete installation, without claim for additional payment.

C. If any errors or omissions appear in Drawings, Specifications, or other documents, the bidding Contractor shall notify the Engineer no later than ten (10) days prior to submitting bid.

D. Should conflict occur in or between drawings and specifications, the bidding Contractor is deemed to have estimated the more expensive way of doing the work, unless the bidding Contractor has asked for and obtained a written decision (addendum), before submission of the bid, as to which method or materials will be required.

1.4 Related Documents, (Use most recent edition)

A. BICSI – Telecommunications Distribution Methods Manual, 12th Edition

B. BICSI – Information Technology Systems Installation Manual, 6th Edition

C. BICSI – Outside Plant Design Reference Manual, 5th Edition

D. IEEE C2 - National Electrical Safety Code; Institute of Electrical and Electronic Engineers

PART 2 - PRODUCTS

2.1 General Product Requirements” Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.

A. Materials and equipment shall be the standard products of the manufacturer regularly engaged in the manufacture of the products and shall be the manufacturer’s latest standard design that

has been in satisfactory use for at least 2 years prior to bid opening, and as approved by submittal.

PART 3 - EXECUTION

3.1 Comply with manufacturer's instruction for installation of products, anchor each product securely in place, accurately located and aligned with other Work. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION

SECTION 270526 - GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1. SECTION INCLUDES

A. Grounding and bonding components.

1.2. RELATED SECTIONS

A. Section 33 7900 - Site Grounding.

B. Section 27 0100 - Basic Communications Requirements

1.3. REFERENCES

A. ANSI/EIA/TIA 607 - Commercial Building Grounding and Bonding Requirements for Telecommunications

B. TIA 942 - Telecommunications Infrastructure Standard for Data Centers; 2005

C. IEEE - Recommended Practice for Powering and Grounding Electronic Equipment (Emerald Book)

D. NFPA 70 - National Electrical Code; National Fire Protection Association; 2004.

E. NEC - Article 250 - Grounding

F. NEC - Article 800 - Communication Circuits

1.4. PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 5 ohms.

1.5. SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittals procedures.

B. Product Data: Provide for grounding electrodes and connections.

1.6. QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

A. Panduit: www.panduit.com

B. Chatsworth Products Inc.: www.chatsworth.com

2.2. GROUND BARS

A. Telecommunications Main Grounding Busbar (TMGB): TMGB shall be Panduit GB2B0612TPI-1 busbar kit.

B. Telecommunications Grounding Busbar: (TGB) shall be Panduit GB2B0304TPI-1 busbar kit.

C. Rack Grounding Strip: (RGB) shall be Panduit RGS134-1 with paint piercing grounding washers installed.

2.3. GROUND WIRE: Unless otherwise noted, all conductors green insulated stranded copper

A. Telecommunications Bonding Backbone:(TBB) 2/0

B. Common Bonding Network:(CBN) #6 AWG

C. Equipment Jumper Kits: #6 AWG 24" length with 90 degree bent lug to straight lug

2.4. CONNECTORS AND ACCESSORIES

A. Grounding Clamp: U-bolt bronze for attachment to rods, pipes (non-water) and tubes

B. Ground Lugs:
1. TMGB: Code conductor, two-hole, long barrel irreversible compression with window lug
2. TGB: Code conductor, one-hole, long barrel irreversible compression with window lug

C. Paint Piercing Grounding Washers: 3/8" stud size .875 O.D. with antioxidant

D. HTAP: Single or multitap to meet conductor size with clear cover

E. Electro Discharge (ESD) Port: Panduit RGESD-1 with wrist strap

F. Exothermic Connections:

G. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 - EXECUTION

3.1. INSTALLATION

A. Provide or coordinate installation of TBB from the main electrical service entrance ground bus.
1. Do Not route TBB on Cable Ladderway
2. TBB must be insulated if exposed more than 24" within the CER.

B. Ensure TMGB is connectorized within 24" of TBB entrance has vertical access to Cable Ladderway and is no more than 18" above finished floor

C. Provide bonding to meet requirements described in Quality Assurance.

D. Provide (1) RGB at of each rack

E. Provide (1) TGB at each Voice Board

F. Provide & install ground buses as shown on plans.

G. Provide & install CBN from TMGB to each RGB & TGB in home run fashion. Do not daisy chain grounds.

H. Provide & install CBN from TMGB to all ladderway. Provide CBN grounding across all joints in ladderway.

I. Provide (2) spare Equipment Jumper Kits for each rack installed

J. Provide ESD port for each rack installed

3.2. FIELD QUALITY CONTROL

A. Owner will provide field inspection in accordance with Section 01 4000.

END OF SECTION

SECTION 270528.29 HANGERS AND SUPPORTS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1. SECTION INCLUDES

A. Hangers equipment supports.

B. Anchors and fasteners.

C. Backboards

1.2. REFERENCES

A. Section 27 0100 - Basic Communications Requirements

1.3. SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.4. QUALITY ASSURANCE

A. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

A. Erico Caddy Cablecat: www.erico.com.

B. Substitutions: See Section 01 6000 - Product Requirements.

2.2. MATERIALS

A. Hangers, Supports, Anchors, and Fasteners - General: Corrosion-resistant materials of size and type adequate to carry the loads of cable.
   1. CAT series with all accoutrements or equal

B. Supports: Fabricated of structural steel or formed steel members; galvanized.

C. Anchors and Fasteners:
   1. Obtain permission from Owner before using powder-actuated anchors.
   2. Steel Structural Elements: Use beam clamps, steel spring clips, or welded fasteners.
   3. Concrete Surfaces: Use self-drilling anchors or expansion anchors.
   4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts or hollow wall fasteners.
   5. Solid Masonry Walls: Use expansion anchors or preset inserts.

D. Backboards
   1. 3/4 " AC fire treated plywood

PART 3 - EXECUTION

3.1. INSTALLATION

A. Install hangers and supports as required to adequately and securely support cable system components, in a neat and workmanlike manner, as specified in NECA 1 and minimally 4' O.C.
   1. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
   2. Do not drill or cut structural members.

B. Install surface-mounted cabinets with minimum of four anchors/cabinet

C. Install fire treated backboard with a minimum of six anchors/board, 'A' side out. 'DO NOT PAINT'

END OF SECTION

SECTION 270528.33 - CONDUITS AND BACKBOXES FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Wall and ceiling outlet boxes.

B. Floor boxes.

C. Pull and junction boxes.

1.2 RELATED SECTIONS

A. Section 27 0100 (17100) - Basic Communications Requirements

B. Section 07 8400 - Firestopping.

C. Section 26 2726 - Wiring Devices: Wall plates in finished areas.

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Project Record Documents: Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

1.4 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Provide products listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

C. All building penetrations shall be reviewed and approved by the owner

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Hubble; www.hubble.com

B. Wiremold; www.wiremold.com

C. Carlon; www.carlon.com

D. Substitutions: See Section 01 6000 - Product Requirements.

2.2 CONDUIT REQUIREMENTS

A. Conduit Size: Comply with NFPA 70.
B. Minimum Size: 3/4 inch unless otherwise specified.

C. Conduit Sweeps
   1. All conduit shall use sweeps as follows
   2. Non-thread couplings shall not be used on metallic conduits.
   3. Metallic sweeps shall have a factory applied 40 mil PVC coating or be doubled (half overlap) wrapped with a 10 mil PVC plastic tape specifically manufactured for corrosion protection of metallic conduits installed below grade.
   4. Sweeps shall have a minimum radius of 12 times the nominal diameter of the conduit.

D. Underground Installations:

E. More than Five Feet from Foundation Wall: Use thickwall non-metallic conduit.
F. Within Five Feet from Foundation Wall: Use rigid steel conduit.

2.3 Outdoor Locations Above Grade:

A. Use rigid steel conduit or electrical metallic tubing.

2.4 Dry Locations:
A. Concealed: Use electrical metallic tubing.
B. Exposed: Use electrical metallic tubing.

2.5 Building Penetrations:

A. Provide core only.

2.6 METAL CONDUIT

A. RIGID STEEL CONDUIT:
1. All conduits 2" and greater galvanized rigid steel.
2. All Conduit Bends
3. Description: ANSI C80.1, UL6 Hot-dipped, galvanized steel with zinc coating or corrosion resistant lacquer inside.

B. Intermediate Metal Conduit (IMC): Rigid steel.

C. Fittings and Conduit Bodies: NEMA FB 1; threaded, water and concrete-tight.

D. FLEXIBLE METAL CONDUIT
1. Description: Interlocked steel construction.
2. Fittings: NEMA FB 1.

E. LIQUIDTIGHT FLEXIBLE METAL CONDUIT
1. Description: Interlocked steel construction with PVC jacket.
2. Fittings: NEMA FB 1.

F. ELECTRICAL METALLIC TUBING (EMT)
1. Suitable for all sizes up to and including 1-1/2"
2. Description: ANSI C80.3, UL797; galvanized tubing, coated on the inside with a smooth, hard finish of lacquer, varnish or enamel.
3. Fittings and Conduit Bodies: NEMA FB 1; Throated steel compression gland type.

G. NONMETALLIC CONDUIT
1. Unless otherwise specified, all conduit to be installed underground or installed in concrete structures shall be 4-inch diameter, rigid Polyvinyl Chloride (PVC) Non-Metallic Conduit
2. Description: UL 651,NEMA TC 2; Schedule 40 PVC, heavy wall, sunlight resistant, manufactured from high impact material and shall be rated for use at 90 degrees centigrade
3. Fittings and Conduit Bodies: UL 514, NEMA TC 3, Bell ends
4. Solvent Cement: ASTM D 2564 a medium or heavy-bodied cement capable of making watertight joints.
5. Primer: As recommended by cement manufacturer for the conduit,

H. INTEGRAL MULTI-CELL DUCT
1. Description: Schedule 40 PVC modular and,
2. Slip fit lengths
3. Pre-lubricated innerducts with internal spacers and which expand and contract at the same rate as the outerduct.
4. Anti-reversing gaskets

5. Integral innerduct o-ring
6. Inward tapered holes
7. Alignment indicator
8. Marked 'INSTALL PRINT SIDE UP' with marked innerducts & holes for installation coordination
9. Flexible bends cut through resistant
10. Manufacturers:
11. Carlon Telecom Systems Multi-Gard
12. Fittings: Match to manufacturers system

I. FLEXIBLE NON-METALLIC CONDUIT (INNERDUCT)
1. Requires per-approval for use in direct buried situations
2. Description: Polyvinyl Chloride (PVC), or Polyethylene (PE) plastic.
3. Use Plenum innerduct in the appropriate environment.
4. Fittings: Connection between the flexible conduit and conduits of other materials shall be made with a watertight transition coupling manufactured for the specific type of material.
5. Smooth walled exterior and a ribbed interior with 1250 pound test muletape installed. No corrugated innerduct will be accepted.
6. Manufacturers:
7. Carlon Optic-Gard
8. Substitutions: See Section 01 6000 - Product Requirements.

J. OUTLET BOXES

1. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel
   a. New work: minimum 4"x 4" deep box with single mud ring
   b. Surface box: weather proof deep Bell box.

2. Cast Boxes: NEMA FB 1, Type FD, aluminum. Provide gasketed cover by box manufacturer. Provide threaded hubs.

K. FLOOR BOXES

1. Floor Boxes: NEMA OS 1, fully adjustable, 1-1/2 inches deep.

2. Material: Cast metal.

3. Shape: Rectangular.

4. Service Fittings: As specified in Section 26 2726.

5. Approved Manufacturer
   a. Hubble HBLCFB401
   b. Wiremold RFB4

L. POLE RISERS

1. 4" Intermediate Metallic Conduit (IMC) Riser with (4) 1" Innerducts, Watertight Alibi, and Blank Duct Plugs. Installed per TEP Electric Service Requirements for Riser Details - Telco/CATV/CAP, SR-221 or per most current Revision.

M. PULL AND JUNCTION BOXES

1. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

2. Hinged Enclosures: As specified in Section 26 2716.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on drawings.

B. Verify routing and termination locations of conduit prior to rough-in.

C. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

D. Verify locations of floor boxes and outlets in offices and work areas prior to rough-in.

3.2 HANDLING & STORAGE

A. All conduit shall be transported in modules or bundled in a straight and level position. The straps securing the conduit to any transport vehicle shall be a minimum of 4 inches in width and shall not deform or damage the conduit in any manner. Conduits shall be unloaded in accordance with the manufacturer's recommendations and shall not be dropped to the ground.

B. All conduit shall be transported in modules or bundled in a straight and level position. The straps securing the conduit to any transport vehicle shall be a minimum of 4 inches in width and shall not deform or damage the conduit in any manner. Conduits shall be unloaded in accordance with the manufacturer’s recommendations and shall not be dropped to the ground.

3.3 INSTALLATION

A. All underground conduits shall have a minimum 36" cover.

B. Install a minimum of four 1 inch smooth wall exterior ribbed interior innerducts in all 4 inch conduits.

C. Install conduit securely, in a neat and workmanlike manner, as specified in NECA 1.

D. All conduits subject to mechanical injury or exposed in wet locations shall be Rigid Galvanized Steel.

E. Flexible conduit shall not be utilized for making bends in conduit system.

F. Field bent conduit shall not have flat spots or crimps.

G. Connection between flexible conduits and conduits of other materials shall be made with a watertight transition coupling manufactured for the specific type of material

H. Connection to a RGS bend, shall use a threaded PVC female adapter.

I. Arrange supports to prevent misalignment during wiring installation.

J. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.

K. Fasten conduit supports to building structure and surfaces under provisions of Section 26 0529.

L. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.

M. Do not attach conduit to ceiling support wires.

N. Route exposed conduit parallel and perpendicular to walls.

O. Route conduit installed above accessible ceilings parallel and perpendicular to walls.

P. Cut conduit square using saw or pipecutter; de-burr cut ends.

Q. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.

R. Use conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations.

S. Install no more than equivalent of two 90 degree sweeps between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one shot bender to fabricate bends in metal conduit larger than 2 inch size.

T. All 90-degree turns in raceway must be provided with the appropriate junction to ensure non-violation of bend radius

U. Any conduit from a workstation that does not go home-run to the telecommunications room but rather is specified as a stub out above a push-up tile ceiling shall include a gentle sweep toward the proposed telecommunications closet, a connector, and bushing.

V. Install non-metallic flexible conduit,(innerduct) per fill as shown on plans

W. Provide suitable pull string in each empty conduit except sleeves and nipples.

X. Use suitable caps to protect installed conduit against entrance of dirt and moisture.

Y. Ground and bond conduit under provisions of Section 26 0526.

Z. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1.

AA. Set wall mounted boxes at elevations to accommodate mounting heights indicated.

1. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
2. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
3. Align adjacent wall mounted outlet boxes for switches, thermostats, Information Outlets, and similar devices.

BB. .Do not install flush mounting box back-to-back in walls; provide minimum 12 inches separation. Provide minimum 24 inches separation in acoustic rated walls.

1. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
2. Support boxes independently of conduit.
3. Use gang box where more than one device is mounted together. Do not use sectional box.
4. Use gang box with plaster ring for single device outlets.
5. Set floor boxes level.
6. Provide firestopping under provisions of Section 07 8400 to sustain ratings when passing conduits and raceways through fire-rated elements.
7. Paint all conduits and raceways to match.

3.4 ADJUSTING

A. Adjust floor boxes flush with finish flooring material.

B. Adjust flush-mounting outlets to make front flush with finished wall material.

C. Install knockout closures in unused box openings.

D. Seal all penetrations per local, state and federal codes.

3.5 CLEANING

A. Remove all debris from pullboxes, conduit systems.

B. Ensure no water or other foreign materials have entered the system; remove completely

C. Clean interior of boxes to remove dust, debris, and other material.

D. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 270528.36 - CABLE TRAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cable trays and accessories.

1.2 REFERENCES

A. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.

B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2003.

C. NEMA VE 1 - Metallic Cable Tray Systems; National Electrical Manufacturers Association; 2002.

D. NFPA 70 - National Electrical Code; National Fire Protection Association; 2004.

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for fittings and accessories.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Quality Assurance. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

D. Project Record Documents: Record actual routing of cable tray and locations of supports.

1.4 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years experience.

C. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Square D; www.squared.com.

B. GS Metals; Flextray: www.flextray.com

C. Substitutions: See Section 01 6000 - Product Requirements.

2.2 LADDER-TYPE CABLE TRAY

A. Description: NEMA VE 1, Class 20C ladder type tray.

B. Material: Formed sheet steel, hot-dip galvanized after fabrication in accordance with ASTM A 123/A 123M, painted with gray epoxy.

C. Straight Section Rung Spacing: 6 inches on center.

D. Provide manufacturer's standard clamps, hangers, brackets, splice plates, reducer plates, blind ends, barrier strips, connectors, and grounding straps

1. Covers: Flanged, solid, flush cover.

2.3 STEEL MESH - TYPE CABLE TRAY

A. Description : UL Listed

B. Material: Continuous rigid welded steel wire mesh

C. Width 12 inches

D. Depth 4 inches

E. Provide manufacturer's standard clamps, hangers, brackets, splice plates, reducer plates, blind ends, barrier strips, and connectors.

PART 3 - EXECUTION

3.0 EXAMINATION

A. Verify that field measurements are as indicated.

B. Match all new materials to existing

3.1 INSTALLATION

A. Install metallic cable tray in accordance with NEMA VE 1.

B. Support trays in accordance with Section 27 0528. Provide supports at each connection point, at the end of each run, and at other points to maintain spacing between supports of 6 ft maximum.

C. Use expansion connectors where required.

D. Provide firestopping under provisions of Section 07 8400 to sustain ratings when passing cable tray through fire-rated elements.

E. Ground and bond cable tray under provisions of Section 27 0526.
1. Provide continuity between tray components.

END OF SECTION

SECTION 270543 – UNDERGROUND DUCTS & RACEWAYS FOR COMMUNICATION SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Metal conduit.
2. Nonmetallic duct.
3. Pullboxes.

B. Related Sections

1. Section 31 2316 - Excavation.
2. Section 31 2323 - Fill: Bedding and backfilling.
3. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.
4. Section 03 3000 - Cast-in-Place Concrete.

C. References

1. ANSI C80.1 - American National Standard Specification for Rigid Steel Conduit -- Zinc Coated; 1994.
2. IEEE C2 - National Electrical Safety Code; Institute of Electrical and Electronic Engineers; 2002.
3. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association; 2003.
4. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit; National Electrical Manufacturers Association; 2003.
5. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing; National Electrical Manufacturers Association; 2004.
6. NFPA 70 - National Electrical Code; National Fire Protection Association; 2005.

D. Submittals

1. See Section 01 3000 - Administrative Requirements, for submittal procedures.
2. Product Data: Provide for metallic conduit and nonmetallic conduit.
3. Project Record Documents: Record actual routing and elevations of underground conduit and duct, and locations and sizes of manholes.

E. Quality Assurance

1. Conform to requirements of NFPA 70.
2. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.
3. Storage & Handling:
   a. All conduit shall be transported in modules or bundled in a straight and level position. The straps securing the conduit to any transport vehicle shall be a minimum of 4 inches in width and shall not deform or damage the conduit in any

manner. Conduits shall be unloaded in accordance with the manufacturer's recommendations and shall not be dropped to the ground.

b. Conduits shall be stored in a straight and level position in stacks not exceeding 8 feet in height. Materials shall be stored in an approved manner and covered to prevent ultraviolet deterioration due to the exposure to sunlight. When stored, conduit ends shall not be capped nor shall conduit be subject to temperatures in excess of 140 F.

4. Cleaning. The interior of the conduit shall be kept clean and free of debris. Prior to installation, all foreign materials shall be removed from the interior of the conduit with compressed air and a swab.

PART 2 - PRODUCTS

2.1 CONDUIT AND DUCT:

A. Conduit Sweeps
1. All conduit shall use sweeps as follows
a. Non-thread couplings shall not be used on metallic conduits.
b. Metallic sweeps shall have a factory applied 40 mil PVC coating or be doubled (half overlap) wrapped with a 10 mil PVC plastic tape specifically manufactured for corrosion protection of metallic conduits installed below grade.
c. Sweeps shall have a minimum radius of 12 times the nominal diameter of the conduit.

B. Rigid Steel Conduit: ANSI C80.1.
1. Fittings: NEMA FB 1, steel.

C. Rigid Plastic Conduit: NEMA TC 2, Schedule 40 PVC, with fittings and conduit bodies to NEMA TC 3.

2.2 ACCESSORIES

A. Underground Warning Tape: 6 inch wide acid and alkali-resistant polyethylene film tape, detectable type colored Orange with warning, "CAUTION - FIBER OPTIC CABLE BURIED BELOW."

B. Seperators & Chairs: Polyvinyl Chloride (PVC) or other non-metallic material, vertical and horizontal interlocking and provide a minimum of 3-inch clearance between conduits.

C. Base Seperators: Wide base plate to provide a minimum clearance of 3 inches between the bottom of the trench and the conduit.

D. Innerducts: HDPE, SDR 11, 1" smooth out / ribbed in orange, with pull tape

E. Watertight Alibi. Duct Plug designed to seal around, organize, and support innerduct where it emerges at the top of all risers, pull boxes, and vaults.

1. Stainless steel fasteners
2. Minimum 400 lbs support
3. No chemical seal
4. Manufacturer: Jackmoon or equivalent
5. Blank Duct Plugs. Installed in each individual innerduct where it emerges at the top of all risers, pull boxes, and vaults.
a. All plastic construction

b. Air-tight to 30 psi
c. Manufacturer: Jackmoon or equivalent

F. Tracer Wire. Stranded continuous unspliced 10 AWG CU, rated for 600 volts, and shall be type THW or XHHW., colored green.

G. Electronic Marker. 3M model 1255 mini-marker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify routing and termination locations of duct bank prior to excavation for rough-in.

C. Duct bank routing is shown in approximate locations unless dimensions are indicated. Route as required to complete duct system.

D. Bends shall be installed only when absolutely necessary. All bends shall be constructed of rigid steel conduit.

E. Where bends are under slab and terminate in the CER, the entire bend raduis shall be under the slab. Trim exposed conduit to 4" above the finished slab.

3.2 DUCT BANK INSTALLATION

A. Install duct to locate top of ductbank at depths as indicated on drawings.

B. Install duct with minimum slope of 4 inches per 100 feet (0.33 percent). Slope duct away from building entrances.

C. Cut duct square using saw or pipe cutter; de-burr cut ends.

D. Insert duct to shoulder of fittings; fasten securely.

E. Join nonmetallic duct using adhesive as recommended by manufacturer.

F. Wipe nonmetallic duct dry and clean before joining. Apply full even coat of adhesive to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.

G. Install no more than equivalent of three 90-degree larg radius sweeps between pull points.

H. Provide suitable fittings to accommodate expansion and deflection where required.

I. Stagger duct joints vertically in concrete encasement 6 inches minimum.

J. Use suitable separators and chairs installed not greater than 4 feet on centers.

K. Band ducts together before backfilling.

L. Place Electronic Marker at the end location of any capped conduit not in a building or a pullbox.

M. Securely anchor duct to prevent movement during concrete placement.

N. Place concrete under provisions of Section 03 3000. Use mineral pigment to color concrete red.

O. Place tracer wire as shown on plans

P. Provide 1250# mule tape in each empty duct except sleeves and nipples.

Q. Interface installation of underground warning tape with backfilling. Install Warning tape 12

inches below finished surface.

R. At all locations where the conduits cross under a new curb, the letters "FO" shall be cut into the top of the curb directly over the conduit run. The letters shall be three inches tall and shall be clearly defined.

3.3 CLEANING

A. Prior to placement of innerducts or cables within conduits and duct

1. The completed conduit runs shall be cleaned and tested prior to final acceptance. Cleaning shall consist of pulling a swab through the conduit and removing all foreign material from within the conduit. If water is allowed to enter the conduit during construction, it shall be blown out or removed by other satisfactory means prior to the acceptance of the system. Vaults and pull boxes shall be cleaned of all debris. Upon completion of the cleaning operations, the ends of the conduit shall be capped.

3.4 TESTING

A. All conduit runs shall be clearance tested after the completion of all backfilling and subgrade preparation operations.

B. Test Procedure: The test shall consist of pulling a mandrel through the conduit run. The mandrel shall be segmented with an outer diameter not less than 1/4 inch smaller than the inside diameter of the conduit, and shall be minimum 10" inches in length. Each conduit run shall be verified for continuity along its entire length, as noted on the plans, and by means of an underground line locator. The installed conduit system shall be marked on the ground using standard bluestake color code and markings procedures.

C. Acceptance: The test shall be considered acceptable when the mandrel can be passed through the entire conduit run with a pulling force of 300 pounds or less.

END OF SECTION 270543

SECTION 270553 - IDENTIFICATION FOR COMMUNICATION SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

B. This Section (27 05 53) includes the specifications for:

1. The supply, delivery, supervision, coordination, and installation of equipment items specified herein and shown on drawings

2. The specifications for the incorporation of Owner Furnished Equipment (OFE)

3. The documentation and instruction for completing the Identification for Communication Systems

C. Related Drawings

1. T-Series drawings follow the specifications in this Section.

2. Electrical drawings specify the electrical requirements.

3. Interior Design drawings specify interior finishes, spatial relationships between items, and specific mounting height.

1.2 REFERENCES

A. Requirements, Codes, and Standards

B. Design, manufacture, test, and install telecommunications cabling networks per manufacturer's requirements and in accordance with latest revision of the NFPA-70 (National Electrical Code®), state codes, local codes, requirements of Authorities Having Jurisdiction (AHJ), and the following standards, including the most current revisions, addendums, and any Technical Service Bulletins (TSBs) that may have been released at the time of bid, including:

1. TIA/EIA-606 – Administration Standard for Commercial Telecommunications Infrastructure

1.3 SYSTEM DESCRIPTION

1.4 The Contractor will provide and install identification labeling for the project's voice and data communications systems, including all components from the TO to the TR and between telecommunications spaces.

PART 2 - PRODUCTS

2.1 GENERAL NOTES

A. In this section, certain products are specified by manufacturer and part number to establish a level of quality, performance, and consistency. To substitute other products would defeat this effort to the Owner's detriment. If no manufacturer or part number is specified for a part, then that part is generic, and the Contractor shall submit for approval a part that provides the performance specified herein.

2.2 IDENTIFICATION

A. Labels

1. Label Construction

2. Labels shall be white, manufactured of resilient and flexible vinyl or polyester, die-cut, and have adhesive backing for permanent attachment.

3. Labels for Data Cables

4. Labels for data cables shall be:

a. Self-laminating

b. Rotatable/repositionable

c. Of appropriate size to completely encircle the cable and completely overlay the identification tag area

5. Placement of Data Cable Labels

6. Labels shall be placed within view at the termination points, within 3 inches (75 mm) of each end of each:

a. Backbone cable

b. Horizontal cable

c. Bonding conductor

7. Labels for Data Cable Bundles

a. Cable bundles shall be identified with non-adhesive thermal-transfer-printable marker plates.

b. Marker plates shall be attached to cable bundles with nylon cable ties or hook and loop ties.

c. Marker plates shall offer legends and shall meet the requirements of MIL-STD-202G, Notice 12 Method 215J (Thermal Transfer Printable Marker Plates).

8. Labels for Cabinets and Equipment

a. Cabinets and equipment shall be identified with thermal-transfer-printed, die-cut, microcellular foam labels with a polyester printable surface and high-tack adhesive.

b. Each outlet, patch panel, and wiring block shall be identified by a label installed on or in the space provided on the device.

9. Label Sizes for Outlets and Termination Hardware

10. Labels for outlets and termination hardware shall be at least 1-1/4 inches wide and 3/8 inch high.

11. Label Sizes for Other Equipment

12. Labels for the following shall be at least 4 inches wide and 1 inch high:

a. Riser cables

b. Network equipment

c. Equipment cabinets and racks

d. Bonding busbars

e. Consolidation point enclosures

f. Active hardware and equipment

B. Warning Tags

1. At each location where the fiber cable is exposed to human intrusion, it shall be marked with warning tags. These tags shall:

a. Be yellow or orange

b. Bear the warning, “CAUTION FIBER OPTIC CABLE”

c. Have this text in permanent, black, block characters at least 5 mm high

2. A warning tag shall be permanently affixed to each exposed cable or bundle of cables at intervals of not less than 1.5 m.

3. Any section of exposed cable less than 1.5 m long shall have at least one warning tag affixed to it.

C. Printing of Labels

1. Printing shall be machine-generated in permanent ink that contrasts the background color.

2. All characters shall be block style.

3. The text shall fill the area of the printable field.

PART 3 - EXECUTION

3.1 IDENTIFICATION

A. Prior to the installation or termination of cabling, confirm all specific labeling requirements with the Owner or the Owner’s Engineer.

B. Cables

1. Mark backbone cables at each endpoint and at all intermediate pull points, access points, and junction boxes. Labels shall indicate the origination and destination identifier, the sheath identifier, and the strand or pair range.

2. Horizontal cables shall be marked at each end, on the sheath indicating the TR, patch panel and panel port to which the cable is wired. Block terminated cable shall be identified with a V in place of the panel ID.

C. Faceplates, Patch Panels, and Wiring Blocks

1. Mark Fiber Distribution Enclosures (FDEs) with adhesive labels that indicate the range of circuits installed within. Label each port with the origination and destination grid identifier and the individual strand ID.

2. Label patch panels alphabetically, beginning at the top. Individual ports shall come from the factory labeled with a number designation.

3. Label each faceplate to indicate, for each cable that it houses, the TR, patch panel, and panel port to which the cable is wired. Label block-terminated cables with the Telecommunication Room and "V" cable number.

4. Label each wiring block numerically, beginning at the top left of the termination field. Within each block, identify the individual rows alphabetically, beginning at the top left and proceeding sequentially down and to the right. Label each row with the corresponding cable identifier, and label each pair or circuit on each cable.

5. Fit each cable with a self-laminating label, bearing the appropriate cable identifier, that surrounds the outermost jacket. Place the label at each end of the cable, within 3 inches (75 mm) of the end of the sheath..

6. Fit each equipment enclosure with a self-adhesive label bearing its respective identifier, affixed to the top center of the front and rear doors.

7. Fit each FDE with a self-adhesive label, bear its respective identifier in block characters, affixed at the top center of the front and rear faces.

8. Fit each adapter inside enclosures with a label bearing its identifier, affixed directly adjacent to its shortest side. Rotate characters so that their orientation is kept left to right, top to bottom.

9. Label conduits and pathways within 0.5 m (18 inches) of each end, where exposed and accessible. It is recommended that additional labeling be provided every 3 m (10 feet) of exposed length.

10. Fit network equipment with a label, placed in an accessible area on the front and rear, bearing the appropriate identifier, MAC address, and date of installation. The label shall not interfere with the operation of or interface to the unit, nor shall it obscure manufacturer's labels.

END OF SECTION 270553

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SECTION 270580 – FIRESTOPPING FOR COMMUNICATIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Firestopping of Through Penetrations in Fire Rated Assemblies.

B. Smoke Seals.

C. Construction enclosing compartmentalized areas.

1.2 RELATED SECTIONS

A. Division 3 – Section 03 30 00 – Cast-In-Place Concrete
B. Division 4 – Section 04 22 00 – Concrete Unit Masonry
C. Division 9 – Section 09 20 00 – Plaster and Gypsum Board
D. Division 7 – Section 07 84 13 – Penetration Firestopping
E. Division 26 – Section 26 00 00 – Electrical
F. Division 27 – Section 27 00 00 – Communications

1.3 REFERENCES

A. ASTM E 84, “Surface Burning Characteristics of Building Materials”.
B. ASTM E 119, “Fire Tests of Building Construction and Materials”.
C. ASTM E 814, “Fire Tests of Through Penetration Firestops”.
D. ANSI/UL263, “Fire Tests of Building Construction and Materials”.
E. ANSI/UL723, “Surface Burning Characteristics of Building Materials”.
F. ANSI/UL1479, “Fire Tests of Through Penetration Firestops”.
G. Underwriters Laboratories Inc. (UL) – Fire Resistance Directory
H. National Fire Protection Association (NFPA) – NFPA 101: Life Safety Code.
I. National Fire Protection Association (NFPA) – NFPA 70: National Electrical Code.

1.4 PERFORMANCE REQUIREMENTS

A. Fire rated pathway devices shall be the preferred product and shall be installed in all locations where frequent cable moves, add-ons and changes will occur.

B. Where non- mechanical products are utilized, provide products that upon curing do no re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during or after construction.

C. Where it is not practical to use a mechanical device, openings within floors and walls designed to accommodate telecommunications and data cabling shall be provided with re-enterable products that do not cure or dry.

D. Openings for cable trays shall be sealed using re-enterable firestopping pillows.

1.5 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide manufacturer's standard catalog data for specified products demonstrating compliance with referenced standards and listing numbers of systems in which each product is to be used.

C. Shop Drawings: Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance ratings.

D. Certificates: Product certificates signed by firestop system manufacturer certifying material compliance with applicable code and specified performance characteristics.

E. Installation Instructions: Submit manufacturer's printed installation instructions.

1.6 QUALITY ASSURANCE

A. Products/Systems: Provide firestopping systems that comply with the following requirements:
   1. Firestopping tests are performed by a qualified, testing and inspection agency. A qualified testing and inspection agency is UL, or another agency performing testing and follow-up inspection services for firestop system acceptable to authorities having jurisdiction.
   2. Firestopping products bear the classification marking of qualified testing and inspection agency.

B. Installer Qualifications: Experience in performing work of this section who is qualified by the firestopping manufacturer as having been provided the necessary training to install firestop products in accordance with specified requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery:
   1. Manufacturer's original, unopened, undamaged containers, identification labels intact identifying product and manufacturer, date of manufacture; lot number; shelf life, if applicable; qualified testing and inspection agency's classification marking; and mixing instruction for multicomponent products.
   2. Handle and store products according to manufacturer's recommendations published in technical materials. Leave products wrapped or otherwise protected and under clean and dry storage conditions until required for installation.

B. Storage and Protection:
   1. Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

1.8 PROJECT CONDITIONS

A. Do not install firestopping products when ambient or substrate temperatures are outside limitations recommended by manufacturer.

B. Do not install firestopping products when substrates are wet due to rain, frost, condensation, or other causes.

C. Maintain minimum temperature before, during, and for a minimum 3 days after installation of materials.

D. Do not use materials that contain flammable solvents.

E. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

F. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

G. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Specified Technologies Inc., 200 Evans Way, Somerville, NJ 08876. Tel: (800) 992-1180, Fax: (908) 526-9623, Email: specseal@stifirestop.com, Website: www.stifirestop.com.

B. Substitutions: Not permitted.

C. Single Source: Obtain firestop systems for each type of penetration and construction condition indicated only from a single manufacturer.

2.2 MATERIALS

A. General: Use only firestopping products that have been tested for specific fire resistance rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire rating involved for each separate instance.

B. Firestop Sealants: STI SpecSeal® Brand single component latex formulations that upon cure do not re-emulsify during exposure to moisture, the following products are acceptable:
1. Specified Technologies Inc. (STI) SpecSeal® Series SSS Sealant
2. Specified Technologies Inc. (STI) SpecSeal® Series LCI Sealant

2.3 Firestop Putty: STI SpecSeal® Brand intumescent, non-hardening, water resistant putties containing no solvents, inorganic fibers or silicone compounds, the following products are acceptable:

A. Specified Technologies Inc. (STI) SpecSeal® Series SSP Putty

B. Firestop Pillows: STI SpecSeal® Brand re-enterable, non-curing, mineral fiber core encapsulated on six sides with intumescent coating contained in a flame retardant poly bag, the following products are acceptable:

C. Specified Technologies Inc. (STI) SpecSeal® Series SSB Pillows

D. Fire Rated Cable Pathways: STI EZ-PATH™ Brand device modules comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill, the following products are acceptable:
E. Specified Technologies Inc. (STI) EZ-PATH™ Fire Rated Pathway

PART 3 - EXECUTION

3.1 EXAMINATION

A. Before beginning installation, verify that substrate conditions previously installed under other sections are acceptable for installation of firestopping in accordance with manufacturer's installation instructions and technical information.

B. Surfaces shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellants, and any other substances that may inhibit optimum adhesion.

C. Provide masking and temporary covering to protect adjacent surfaces.

D. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install through-penetration firestop systems in accordance with Performance Criteria and in accordance with the conditions of testing and classification as specified in the published design.

B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of firestopping products.

3.3 FIELD QUALITY CONTROL

A. Inspections: Owner shall engage qualified independent inspection agency to inspect through-penetration firestop systems.

B. Keep areas of work accessible until inspection by authorities having jurisdiction.

C. Where deficiencies are found, repair firestopping products so they comply with requirements.

3.4 ADJUSTING AND CLEANING

A. Remove equipment, materials, and debris, leaving area in undamaged, clean condition.

B. Clean all surfaces adjacent to sealed openings to be free of excess firestopping materials and soiling as work progresses.

3.5 SCHEDULES:

	Concrete Floor	Concrete Wall	Gypsum Board Wall
Penetrant Type			
Blank Opening	C-AJ-0100, C-AJ-0101	C-AJ-0100, C-AJ-101	
Metal Conduits	C-AJ-1080, C-AJ-1240, C-AJ-1353	C-AJ-1080, W-J-1098, W-J-1100	W-L-1049, W-L-1222, W-L-1168
Plastic Conduits/ Raceways	C-AJ-2140, C-AJ-2292	W-J-2018, W-J-2076	W-L-2093, W-L-2241
Cables	C-AJ-3214, C-AJ-3231, F-A-3015	C-AJ-3214, C-AJ-3231, W-J-3098, W-J-3099	W-L-3218, W-L-3219
Cable Trays	C-AJ-4029	W-J-4021, W-J-4022, W-J-4033	W-L-4008, W-L-4029, W-L-4043

END OF SECTION

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SECTION 270813 - COMMISSIONING OF COMMUNICATIONS SYSTEMS - COPPER CABLE

PART 1 - GENERAL

1.1. SECTION INCLUDES

A. Testing & Documentation requirements for Copper cable plant.

1.2. RELATED SECTIONS

A. Section 27 0510 - Basic Communications Requirements

1.3. SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers catalog data for hardware

C. Project Record Documents: Prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).

1.4. QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Certify materials and equipment shall be the standard products of the manufacturer regularly engaged in the manufacture of the products and shall be the manufacturer's latest standard design that has been in satisfactory use for at least 2 years prior to bid opening

a. Provide Manufacturers Reel Test for all fiber optic cables before installation

b. Installer Qualifications: Company specializing in performing the work of this section with minimum 4 years of experience.

1.5. DELIVERY, STORAGE, AND PROTECTION

A. Deliver components to the site in original manufacturers packaging.

B. Store all materials in a secure place that is weather tight dry, and not exposed to UV radiation.

C. Protect all components from damages by handling, weather and construction operations before, during and after installation.

1.6. WARRANTY

A. Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1. GENERAL

A. Every cabling link in the installation shall be tested in accordance with the Telecommunications Industry Association (TIA) standard ANSI/TIA/EIA-568-B.1 Section 11.2: 100-Ohm twisted-pair transmission performance and field test requirements.The test equipment (tester) shall comply with or exceed the accuracy requirements for enhanced level II (Level II-E) field testers as defined in TIA-568-B; Annex I: Section I

B. One hundred percent of the installed cabling links must be tested and must pass the requirements of the standards mentioned in I.A.2 above and as further detailed in Section I.B. Any failing link must be diagnosed and corrected. The corrective action shall be followed with a new test to prove that the corrected link meets the performance requirements. The final and passing result of the tests for all links shall be provided in the test results documentation in accordance with Section I.C below

3.2. TEST REPORTS

A. Contractor shall supply Test reports on CD-ROM and paper copy, showing
1. All field tests performed to adjust each component
2. All field test performed to prove compliance with the specified performance criteria, upon completion of testing of the installed system.
3. A unique identifier for each test that clearly indicates the owner established circuit ID for that cable
4. One caqble test result per page

B. Contractor shall supply on CD-ROM one licensed copy of test equipment software which provides a means for viewing both copper and fiber test results in the format that the original test equipment was designed, suitable for running in a Windows environment.

3.3. TEST EQUIPMENT

A. The test equipment (tester) shall comply with or exceed the accuracy requirements for enhanced level II (Level II-E) field testers as defined in TIA-568-B; Annex I: Section I.4. The tester including the appropriate interface adapter must meet the specified accuracy requirements. The accuracy requirements for the permanent link test configuration (baseline accuracy plus adapter contribution) are specified in Table I.4 of Annex I of TIA/EIA-568-B.2. (Table I.5 in this TIA document specifies the accuracy requirements for the Channel configuration.)The tester shall be within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy.

B. The tester shall be within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy

C. The tester interface adapters must be of high quality and the cable shall not show any twisting or kinking resulting from coiling and storing of the tester interface adapters. In order to deliver optimum accuracy, preference is given to a permanent link interface adapter for the tester that can be calibrated to extend the reference plane of the Return Loss measurement to the permanent link interface. The contractor shall provide proof that the interface has been calibrated within the period recommended by the vendor. To ensure that normal handling on the job does not cause measurable Return Loss change, the adapter cord cable shall not be of twisted-pair construction

D. The Pass or Fail condition for the link-under-test is determined by the results of the required individual tests (detailed in Section I.B). Any Fail or Fail* result yields a Fail for the link-under-test. In order to achieve an overall Pass condition, the results for each individual test parameter must Pass or Pass*.

E. A Pass or Fail result for each parameter is determined by comparing the measured values with the specified test limits for that parameter. The test result of a parameter shall be marked with an asterisk (*) when the result is closer to the test limit than the accuracy of the field tester. The field tester manufacturer must provide documentation as an aid to interpret results marked with asterisks

3.4. TESTING

A. All cable shall be tested and certified for all EIA/TIA 568B.1 The contractor shall test all cabling for the Permanent Link, as follows unless otherwise noted;
   1. Riser cable certified to Category three parameters.
   2. Test equipment which certifies the cable in twenty-five pair bundles shall be used
   3. Test must be witnessed by the Owner.
   4. Any discrepancies noted during the tests shall be corrected and those tests shall be rerun.
   5. A representative of the Owner will select a random sample of 5% of the installed links. The representative (or his authorized delegate) shall test these randomly selected links and the results are to be stored in accordance with the prescriptions in Section I.C. The results obtained shall be compared to the data provided by the installation contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the installation contractor under supervision of the end-user representative shall repeat 100% testing and the cost shall be borne by the installation contractor.

3.5. PERFORMANCE PARAMETERS: The test parameters for Cat 5e are defined in TIA Cat 5e standard, which refers to the ANSI/TIA/EIA-568-B.2 standard. The test of each link shall contain all of the following parameters as detailed below. In order to pass the test all measurements (at each frequency in the range from 1 MHz through 100 MHz) must meet or exceed the limit value determined in the standard.

A. Wire Map
   1. Wire Map shall report Pass if the wiring of each wire-pair from end to end is determined to be correct. The Wire Map results shall include the continuity of the shield connection if present.

B. Length
   1. The field tester shall be capable of measuring length of all pairs of a basic link or channel based on the propagation delay measurement and the average value for NVP (1). The physical length of the link shall be calculated using the pair with the shortest electrical delay. This length figure shall be reported and shall be used for making the Pass/Fail decision. The Pass/Fail criteria are based on the maximum length allowed for the Permanent Link configuration (90 meters – 295 feet) plus 10% to allow for the variation and uncertainty of NVP.

C. Insertion Loss (Attenuation)
   1. Insertion Loss is a measure of signal loss in the permanent link or channel. The term “Attenuation” has been used to designate “Insertion Loss.” Insertion Loss shall be tested from 1 MHz through 100 MHz in maximum step size of 1 MHz. It is preferred to measure insertion loss at the same frequency intervals as NEXT Loss in order to provide a more accurate calculation of the Attenuation-to-Crosstalk ratio (ACR) parameter. Minimum test results documentation (summary results): Identify the worst wire pair (1 of 4 possible). The test results for the worst wire pair must show the highest attenuation value measured (worst case), the frequency at which this worst case value occurs, and the test limit value at this frequency.

D. NEXT Loss
   1. Pair-to-pair near-end crosstalk loss (abbreviated as NEXT Loss) shall be tested for each wire pair combination from each end of the link (a total of 12 pair combinations). This parameter is to be measured from 1 through 100 MHz. NEXT Loss measures the crosstalk disturbance on a wire pair at the end from which the disturbance signal is

transmitted (near-end) on the disturbing pair. The maximum step size for NEXT Loss measurements shall not exceed the maximum step size defined in the standard as shown in Table 1, column 2. Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst case NEXT margin (2) and the wire pair combination that exhibits the worst value of NEXT (worst case). NEXT is to be measured from each end of the link-under-test. These wire pair combinations must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.

Table 1

Frequency Range (MHz)	Maximum Step size (MHz)
1 – 31.25	0.15
31.26 – 100	0.25

E. PSNEXT Loss

1. Power Sum NEXT Loss shall be evaluated and reported for each wire pair from both ends of the link under-test (a total of eight results). PSNEXT Loss captures the combined near-end crosstalk effect (statistical) on a wire pair when all other pairs actively transmit signals. Like NEXT this test parameter must be evaluated from 1 through 100 MHz and the step size may not exceed the maximum step size defined in the standard as shown in Table 1, column 2.
2. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for PSNEXT. These wire pairs must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.

F. ELFEXT Loss, pair-to-pair

1. Pair-to-pair FEXT Loss shall be measured for each wire-pair combination from both ends of the link under-test. FEXT Loss measures the crosstalk disturbance on a wire pair at the opposite end (far-end) from which the transmitter emits the disturbing signal on the disturbing pair. FEXT is measured to compute ELFEXT Loss that must be evaluated and reported in the test results. ELFEXT measures the relative strength of the far-end crosstalk disturbance relative to the attenuated signal that arrives at the end of the link. This test yields 24 wire pair combinations. ELFEXT is to be measured from 1 through 100 MHz and the maximum step size for FEXT Loss measurements shall not exceed the maximum step size defined in the standard as in Table 1, column 2.
2. Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst-case margin and the wire pair combination that exhibits the worst value for ELFEXT. These wire pairs must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.

G. PSELFEXT Loss

1. Power Sum ELFEXT is a calculated parameter that combines the effect of the FEXT disturbance from three wire pairs on the fourth one. This test yields eight wire-pair combinations. Each wire-pair is evaluated from 1 through 100 MHz in frequency increments that do not exceed the maximum step size defined in the standard as shown in Table 1, column 2. Minimum test results documentation (summary results):

Identify the wire pair that exhibits the worst pair combinations must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.

H. Return Loss
1. Return Loss (RL) measures the total energy reflected on each wire pair. Return Loss is to be measured from both ends of the link-under-test for each wire pair. This parameter is also to be measured form 1 through 100 MHz in frequency increments that do not exceed the maximum step size defined in the standard as shown in Table 1, column 2.
2. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for Return Loss. These wire pairs must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.

I. ACR (Attenuation to crosstalk ratio) [This parameter is not demanded by the standard but may be required in order to obtain the premise wiring manufacturer's warranty]. ACR provides an indication of bandwidth for the two wire-pair network applications. ACR is a computed parameter that is analogous to ELFEXT and expresses the signal to noise ratio for a two wire-pair system. This calculation yields 12 combinations – six from each end of the link. Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst-case margin and the wire pair combination that exhibits the worst value for ACR. These wire pair combinations must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.

J. PSACR [This parameter is not required by the standard but may be required in order to obtain the premise wiring vendor's warranty]. The Power Sum version of ACR is based on PSNEXT and takes into account the combined NEXT disturbance of all adjacent wire pairs on each individual pair. This calculation yields eight combinations –one for each wire pair from both ends of the link. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for PSACR. These wire pairs must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.

K. Propagation Delay - Minimum test results documentation (summary results): Identify the wire pair with the worst-case propagation delay. The report shall include the propagation delay value measured as well as the test limit value.

L. Delay Skew [as defined in TIA/EIA-568-B.1; Section 11.2.4.11] Minimum test results documentation (summary results): Identify the wire pair with the worst-case propagation delay (the longest propagation delay). The report shall include the delay skew value measured as well as the test limit value.

3.6. TEST DOCUMENTATION

A. The test results information for each link shall be recorded in the memory of the field tester upon completion of the test.

B. The test results records saved by the tester shall be transferred into a Windows™-based database utility that allows for the maintenance, inspection and archiving of these test records. A guarantee must be made that the measurement results are transferred to the PC

unaltered, i.e., "as saved in the tester" at the end of each test and that these results cannot be modified at a later time.

C. The database for the completed job shall be stored and delivered on CD-ROM including the software tools required to view, inspect, and print any selection of test reports.

D. A paper copy of the test results shall be provided that lists all the links that have been tested with the following summary information
   1. The identification of the link in accordance with the naming convention defined in the overall system documentation
   2. The overall Pass/Fail evaluation of the link-under-test including the NEXT Headroom (overall worst case) number
   3. The date and time the test results were saved in the memory of the tester.

E. General Information to be provided in the electronic data base with the test results information for each link:
   1. The identification of the customer site as specified by the end-user
   2. The identification of the link in accordance with the naming convention defined in the overall system documentation
   3. The overall Pass/Fail evaluation of the link-under-test
   4. The name of the standard selected to execute the stored test results
   5. The cable type and the value of NVP used for length calculations
   6. The date and time the test results were saved in the memory of the tester
   7. The brand name, model and serial number of the tester
   8. The identification of the tester interface
   9. The revision of the tester software and the revision of the test standards database in the tester
   10. The test results information must contain information on each of the required test parameters.
   11. The detailed test results data to be provided in the electronic database for each tested link must contain the following information
      a. For each of the frequency-dependent test parameters, the value measured at every frequency during the test is stored. In this case, the PC-resident database program must be able to process the stored results to display and print a color graph of the measured parameters. The PC-resident software must also provide a summary numeric format in which some critical information is provided numerically as defined by the summary results (minimum numeric test results documentation) as outlined above for each of the test parameters.

F. Length: Identify the wire-pair with the shortest electrical length, the value of the length rounded to the nearest 0.1 m (1) and the test limit value

G. Propagation delay: Identify the pair with the shortest propagation delay, the value measured in nanoseconds (ns) and the test limit value

H. Delay Skew: Identify the pair with the largest value for delay skew, the value calculated in nanoseconds (ns) and the test limit value

I. Attenuation: Minimum test results documentation as explained in Section I.B for the worst pair

J. Return Loss: Minimum test results documentation as explained in Section I.B for the worst pair as measured from each end of the link

K. NEXT, ELFEXT, ACR: Minimum test results documentation as explained in Section I.B for the worst pair combination as measured from each end of the link

L. PSNEXT, PSELFEXT, and PSACR: Minimum test results documentation as explained in Section I.B for the worst pair as measured from each end of the link

3.7. ACCEPTANCE

A. Acceptance of system shall occur after all required documentation, test results, certification of test results and operation by the Owner. Final acceptance shall include a visual inspection of the system in its entirety and approval of Owner, or their appointed representative(s).

3.8. PROTECTION, CLEANING, REPAIR

A. Remove all unsightly marks and repair any damaged scratched or disfigured work

END OF SECTION

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SECTION 270816 - COMMISSIONING OF COMMUNICATIONS SYSTEMS - OPTICAL FIBER

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Fiber optic test instruments
B. Fiber optic testing

1.2 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers catalog data for hardware

C. Project Record Documents: Prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Certify materials and equipment shall be the standard products of the manufacturer regularly engaged in the manufacture of the products and shall be the manufacturer's latest standard design that has been in satisfactory use for at least 2 years prior to bid opening

1. Provide Manufacturers Reel Test for all fiber optic cables before installation

2. Installer Qualifications: Company specializing in performing the work of this section with minimum 4 years of experience.

1.4 DELIVERY, STORAGE, AND PROTECTION

A. Deliver components to the site in original manufacturers packaging.

B. Store all materials in a secure place that is weather tight dry, and not exposed to UV radiation.

C. Protect all components from damages by handling, weather and construction operations before, during and after installation.

1.5 ACCEPTANCE OF TEST RESULTS

A. Unless otherwise specified by the Owner or the Owners representative, each cabling link shall be in compliance with the following test limits:

1. Optical loss testing

2. Backbone (multimode and singlemode) link

3. The link attenuation shall be calculated by the following formulas as specified in ANSI/TIA/EIA-568-B.1. Section 11.3

4. Link Attenuation (dB) = Cable_Attn (dB) + Connector_Attn (dB) + Splice_Attn (dB)

5. Cable_Attn (dB) = Attenuation_Coefficient (dB/km) * Length (Km)

6. Connector_Attn (dB) = number_of_connector_pairs * connector_loss (dB)
7. Maximum allowable connector_loss = 0.75 dB
8. Splice_Attn (dB) = number_of_splices * splice_loss (dB)
9. Maximum allowable splice_loss = 0.3 dB
10. The values for the Attenuation_Coefficient (dB/km) are listed in the table below:

Type of Optical Fiber	Wavelength (nm)	Attenuation Coefficient (dB/km)	Wavelength (nm)	Attenuation Coefficient (dB/km)
Multimode 50/125 µm	850	3.4	1300	1.0
Multimode 62.5/125 µm	850	2.8	1300	1.0
Singlemode (Inside Plant)	1310	.65	1550	.65
Singlemode (Outside Plant)	1310	34	1550	.32

1.6 OTDR testing

A. Reflective events (connections) shall not exceed 0.75 dB.

B. Non-reflective events (splices) shall not exceed 0.3 dB.

C. Magnified endface inspection

1. Fiber connections shall be visually inspected for endface quality.
2. Scratched, pitted or dirty connectors shall be diagnosed and corrected.

D. All installed cabling links and channels shall be field-tested and pass the test requirements and analysis as described in Part 3. Any link or channel that fails these requirements shall be diagnosed and corrected. Any corrective action that must take place shall be documented and followed with a new test to prove that the corrected link or channel meets performance requirements. The final and passing result of the tests for all links and channels shall be provided in the test results documentation in accordance with Part 3.

1.7 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide a 25-year Corning manufacturer’s warranty

PART 2 - PRODUCTS

2.1 OPTICAL FIBER CABLE TESTERS

A. The field-test instrument shall be within the calibration period recommended by the manufacturer.

B. Optical loss test set (OLTS)

1. Singlemode optical fiber light source

a. Provide dual laser light sources with central wavelengths of 1310 nm (20 nm) and 1550 nm (20 nm).

b. Output power of –10 dBm minimum.

2. Power Meter

a. Provide 850 nm, 1300/1310 nm, and 1550 nm wavelength test capability.

b. Power measurement uncertainty of 0.25 dB.

c. Store reference power measurement.

d. Save at least 100 results in internal memory.

e. PC interface (serial or USB).

3. Optional length measurement

a. It is preferable to use an OLTS that is capable of measuring the optical length of the fiber using time-of-flight techniques.

C. Optical Time Domain Reflectometer (OTDR)

1. Singlemode OTDR

a. Wavelengths of 1310 nm (20 nm) and 1550 nm (20 nm).

b. Event deadzones of 2 m maximum at 1310 nm and 2 m maximum at 1550 nm.

c. Attenuation deadzones of 15 m maximum at 1310 nm and 15 m maximum at 1550 nm.

d. Distance range not less than 10000 m.

e. Dynamic range at least 10 dB at 1310 nm and 1550 nm

PART 3 - EXECUTION

3.1 GENERAL

A. All tests performed on optical fiber cabling that use a laser or LED in a test set shall be carried out with safety precautions in accordance with ANSI Z136.2.

B. Testing shall be carried out in accordance with this document. This includes testing the attenuation and polarity of the installed cable plant with an optical loss test set (OLTS) and the installed condition of the cabling system and its components with an optical time domain reflectometer (OTDR). The condition of the fiber endfaces shall also be verified.

C. Testing shall be performed on each cabling link (connector to connector).

D. Testing shall be performed on each cabling channel (equipment to equipment) that is identified by the owner.

1. Testing shall not include any active devices or passive devices within the link or channel other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.

E. All tests shall be documented including OLTS dual wavelength attenuation measurements for multimode and singlemode links and channels and OTDR traces and event tables for multimode and singlemode links and channels.

3.2 OPTICAL FIBER CABLE TESTING

A. Field-test instruments shall have the latest software and firmware installed.

B. Link and channel test results from the OLTS and OTDR shall be recorded in the test instrument upon completion of each test for subsequent uploading to a PC in which the administrative documentation (reports) may be generated.

C. Fiber endfaces shall be inspected at 250X or 400X magnification. 250X magnification is suitable for inspecting multimode and singlemode fibers. 400X magnification may be used for detailed examination of singlemode fibers. Scratched, pitted or dirty connectors shall be diagnosed and corrected.

1. The endface images shall recorded in the memory of the test instrument for subsequent uploading to a PC and reporting.

D. Testing shall be performed on each cabling segment (connector to connector).

E. Testing shall be performed on each cabling channel (equipment to equipment) that is planned for use per the owner's instructions.

F. Testing of the cabling shall be performed using high-quality test cords of the same fiber type as the cabling under test. The test cords for OLTS testing shall be between 1 m and 5 m in length. The test cords for OTDR testing shall be approximately 100 m for the launch cable and at least 25 m for the receive cable.

G. OLTS Testing

1. Horizontal/Backbone link

a. Multimode links shall be tested at 850 nm and 1300 nm in accordance with ISO/IEC 14763-3 One Jumper Reference Method

b. Singlemode backbone links shall be tested at 1310 nm and 1550 nm in accordance with ISO/IEC 14763-3 One Jumper Reference Method

c. Link attenuation does not include any active devices or passive devices other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.

H. OTDR Testing

1. Backbone, horizontal and centralized links shall be tested at the appropriate operating wavelengths for anomalies and to ensure uniformity of cable attenuation and connector insertion loss.

a. Backbone singlemode: 1310 nm and 1550 nm

2. Each fiber link and channel shall be tested in one direction.

3. A minimum 100m launch cable shall be installed between the OTDR and the first link connection.

4. A receive cable shall be installed after the last link connection.

I. Magnified Endface Inspection

1. Fibers shall be inspected at 250X or 400X magnification. 250X magnification is suitable for inspecting multimode and singlemode fibers. 400X magnification may be used for detailed examination of singlemode fibers.

J. Polarity Testing

1. Paired duplex fibers in multi-fiber cables shall be tested to verify polarity in accordance with subclause 10.3 of ANSI/TIA/EIA-568-B.1. The polarity of the paired duplex fibers shall be verified using an OLTS.

3.3 TEST REPORTS

A. Contractor shall supply Test reports on CD-ROM and paper copy

B. Test results saved within the field-test instrument shall be transferred into a Windows™-based database utility that allows for the maintenance, inspection and archiving of the test records. These test records shall be uploaded to the PC unaltered, i.e., “as saved in the field-test instrument”. The file format, CSV (comma separated value), does not provide adequate protection of these records and shall not be used.

C. The test results documentation shall be available for inspection by the Owner or the Owner’s representative during the installation period and shall be passed to the Owner's representative within 5 working days of completion of tests on cabling served by a telecommunications room or of backbone cabling. The installer shall retain a copy to aid preparation of as-built information.

D. The database for the complete project, including twisted-pair copper cabling links, if applicable, shall be stored and delivered on CD-ROM prior to Owner acceptance of the building. This CD-ROM shall include the software tools required to view, inspect, and print any selection of the test reports.

E. Circuit IDs reported by the test instrument should match the specified label ID

F. The detailed test results documentation data is to be provided in an electronic database for each tested optical fiber and shall contain the following information

1. The identification of the customer site as specified by the end-user

2. The name of the test limit selected to execute the stored test results

3. The name of the personnel performing the test

4. The date and time the test results were saved in the memory of the tester

5. The manufacturer, model and serial number of the field-test instrument

6. The version of the test software and the version of the test limit database held within the test instrument

7. The fiber identification number

8. The length for each optical fiber

9. Optionally the index of refraction used for length calculation when using a length capable OLTS

10. Test results to include OLTS attenuation link and channel measurements at the appropriate wavelength(s) and the margin (difference between the measured attenuation and the test limit value).

11. Test results to include OTDR link and channel traces and event tables at the appropriate wavelength(s).

12. The length for each optical fiber as calculated by the OTDR.

13. The overall Pass/Fail evaluation of the link-under-test for OLTS and OTDR measurements

14. A picture or image of each fiber end-face

15. A pass/fail status of the end-face based upon visual inspection.

3.4 ACCEPTANCE

A. Acceptance of system shall occur after all required documentation, test results, certification of test results and operation by the Owner. Final acceptance shall include a visual inspection of the system in its entirety and approval of Owner, or their appointed representative(s).

B. Provide record copy drawings periodically throughout the project as requested by the Construction Manager or Owner, and at end of the project on CD-ROM/DVD. Record copy drawings at the end of the project shall be in CAD format and include notations reflecting the as built conditions of any additions to or variation from the drawings provided such as, but not limited to cable paths and termination point. CAD drawings are to incorporate test data imported from the test instruments.

C. The as built drawings shall include, but are not limited to block diagrams, frame and cable labeling, cable termination points, equipment room layouts and frame installation details. The as builts shall include all field changes made up to construction completion:

1. Field directed changes to pull schedule.

2. Field directed changes to cross connect and patching schedule.

3. Horizontal cable routing changes.

4. Backbone cable routing or location changes.

5. Associated detail drawings

3.5 PROTECTION, CLEANING, REPAIR

A. Remove all unsightly marks and repair any damaged scratched or disfigured work

END OF SECTION

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SECTION 271116 - COMMUNICATIONS CABINETS, RACKS, FRAMES, AND ENCLOSURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Communication Equipment room termination support hardware, backboards

1.2 RELATED SECTIONS

A. Section 27 0526 Ground & Bonding for Communications Systems

B. Section 27 1123 Communications Cable Management & Ladder Rack

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers catalog data for hardware

C. Project Record Documents: Prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).

1.4 QUALITY ASSURANCE

A. Products Requiring Electrical Connection: Listed and classified by UL as suitable for the purpose specified and indicated.

1.5 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Chatsworth Products Inc.; www.chatsworth.com

B. Hofmann; www. Hofmannonline.com

C. Substitutions: See Section 01 6000 - Product Requirements.

RACKS

A. Floor Racks – 2 post
   1. High strength 6061-T6 aluminum with two top angles
      a. Height 7'
      b. Width 19"
      c. Finish Color Black
      d. CPI 55053-703

B. Wall Racks
   1. High strength lightweight aluminum.
      a. Height 24"
      b. Depth 30"
      c. Finish Color Black
      d. CPI 12419-724 or equal
      e. Mounting height to be determined in the field.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with plans and manufacturer's instructions.

B. Ground shields and system to Main Telecommunications Grounding Bus

3.2 INTERFACE WITH OTHER WORK

A. Coordinate with appropriate parties to ensure placement of conduits, sleeves, cable tray, and other equipment is per plans and specification.

3.3 RACKS/CABINETS

A. Install all work plumb and true in alignment and in relation to lines, and grades shown.

B. Anchor all equipment with an appropriate expansion bolt, toggle, J-bolt.

C. Each rack shall consist of a Wire Management Panels, power strip and any other appurtenances required for a complete installation as shown on plans.

D. Contractor shall take great care to route cabling and ensure clearance for maintenance.

E. Label racks per Owner standard labeling scheme.

3.4 CLEANING

A. Remove all unsightly marks and repair any damaged scratched or disfigured work

END OF SECTION

SECTION 271119 - COMMUNICATIONS TERMINATION BLOCKS & PATCH PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Copper, fiber termination blocks & panels

1.2 RELATED SECTIONS

A. Section 27 0510 Basic Communication Requirements

B. Section 27 0526 Ground & Bonding for Communications Systems

C. Section 27 1123 Communications Cable Management & Ladder Rack

D. Section 27 1116 Communications Cabinets, Racks, Frames & Enclosures

E. Section 27 1543 Communications Faceplates & Connectors

F. Section 27 1619 Communications Patch Cords, Station Cords, and Cross Connect Wire

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers catalog data for hardware

C. Project Record Documents: Prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).

1.4 QUALITY ASSURANCE

A. Approval by Contracting Officer is required of products of proposed manufacturer, or supplier, and will be based upon submission by Contractor certification.

B. Manufacturer Qualifications: Manufacturer regularly engaged, for past 10 years, in manufacture of communications horizontal cabling of similar type to that specified.

C. Certify materials and equipment shall be the standard products of the manufacturer regularly engaged in the manufacture of the products and shall be the manufacturer’s latest standard design that has been in satisfactory use for at least 2 years prior to bid opening

D. Installer Qualifications:

1. Approved Leviton Premier Installer (LPI) or Leviton Network Installer (LNI) or Berk-Tek Oasis Integrator before, during, and through completion of the system installation. Supporting documentation will be required as part of the submittal.
2. Responsible for workmanship and installation practices in accordance with Leviton Installer Program and Berk-Tek Oasis Program.

1.5 DELIVERY, STORAGE, AND PROTECTION

A. Deliver components to the site in original manufacturers packaging.

B. Store all materials in a secure place that is weather tight dry, and not exposed to UV radiation.

C. Protect all components from damages by handling, weather and construction operations before, during and after installation.

1.6 WARRANTY

A. The horizontal communications cabling system installed shall be eligible for coverage by a Limited Lifetime Warranty to the end user.

1. Horizontal channels shall be completed with Leviton Network Solutions factory-terminated copper and/or fiber optic patch cords in order to be eligible for the applicable Berk-Tek or Leviton Warranty with channel performance guarantees.

2. Approved product shall be listed on the most recent version of the applicable Berk-Tek Leviton Technologies data sheets for each Berk-Tek Leviton Technologies solution.

B. Installer Integrator shall provide labor, materials, and documentation in accordance with Berk-Tek and Leviton Network Solutions requirements necessary to ensure that the Owner will be furnished with a Limited Lifetime Warranty.

C. The installed structured cabling system shall provide a warranty guaranteeing installed channel performance above the ANSI/TIA 568-C requirements for Cat 6, and/or Cat 6A cabling systems or ISO 11801 requirements for Cass D, Class E, and/or Class Ea.

1. Standards-compliant channel or permanent link performance tests shall be performed in the field with a Berk-Tek Leviton Technologies approved certification tester in the appropriate channel or permanent link test configuration.

D. Necessary documentation for warranty registration shall be provided to the manufacturer by the installer (within 10 days) following 100 percent testing of cables.

1. Submit test results to Leviton Network Solutions or to Berk-Tek, in the certification tester’s original software files.

2. Installer shall ensure that the warranty registration is properly submitted, with all required documentation within 10 days of project completion.

3. Contractor Integrator must adhere to the terms and conditions of the respective manufacturer’s warranty programs.

E. Installer shall ensure that the Owner receives the manufacturer issued project warranty certificate within 60 calendar days of warranty registration.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Leviton Network Solutions, 2222 222nd Street SE, Bothell, Washington 98021. Phone 425-486-2222. Fax 425-485-3373. Website www.leviton.com.

B. Berk-Tek, A Nexans Company, 132 White Oak Road, New Holland, PA 17557 Phone: 717-354-6200. Fax 717-354-7944. Website www.berktek.com.

2.2 PATCH PANELS

A. 24-port, 1RU, QuickPort, metal, patch panel, empty.

1. Part Number: Leviton 49255-H24

B. 48-port, 2RU, QuickPort, metal, patch panel, empty.

1. Part Number: Leviton 49255-H48.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions, ANSI/TIA-568-C.0, ANSI/TIA-568-C.1, ANSI/TIA-569-C, BICSI TDMM, and NFPA 70.

B. Terminate individual services on separate Patch Panels

C. Field Terminated Copper Patch Cords & Jumpers: Not allowed.

D. Copper Patch Cords: Manufactured by Leviton Network Solutions

E. Leave no gaps or spaces between consecutively mounted panels

END OF SECTION 271119

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SECTION 271123 - COMMUNICATIONS CABLE MANAGEMENT & LADDER RACK

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Horizontal & Vertical management & support

1.2 RELATED SECTIONS

A. Section 27 0526 Ground & Bonding for Communications Systems

B. Section 27 1116 Communications Cabinets, Racks, Frames & Enclosures

C. Section 27 1619 Communications Patch Cords, Station Cords, and Cross Connect Wire

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers catalog data for hardware

C. Project Record Documents: Prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).

1.4 QUALITY ASSURANCE

A. Approval by Contracting Officer is required of products of proposed manufacturer, or supplier, and will be based upon submission by Contractor certification.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

C. Certify materials and equipment shall be the standard products of the manufacturer regularly engaged in the manufacture of the products and shall be the manufacturer's latest standard design that has been in satisfactory use for at least 2 years prior to bid opening

D. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.

1.5 DELIVERY, STORAGE, AND PROTECTION

A. Deliver components to the site in original manufacturers packaging.

B. Store all materials in a secure place that is weather tight dry, and not exposed to UV radiation.

C. Protect all components from damages by handling, weather and construction operations before, during and after installation.

1.6 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Leviton: www.Leviton.com

B. Chatsworth Products, Inc.; www.chatsworth.com

C. Substitutions: See Section 01 6000 - Product Requirements.

2.2 CABLE MANAGEMENT

A. Horizontal
   1. WMPSE- Dual Sided Horizontal Patch Cord Organizers, 1RU, 2" D-Rings
   2. WMP1E- Dual Sided Horizontal Patch Cord Organizers, 2RU, 2" D-Rings

B. Vertical
   1. 35521-703 Vertical Front and Rear Cable Management, 6" Channel x 80" Long. Black Hinge Cover
   2. 35524-703 Vertical Front and Rear Cable Management, 12" Channel x 80" Long. Black Hinge Cover

C. Fiber Cable
   1. S4DCT-DHC 4x4 Solid Duct w/Hinged Cover Yellow with accessories

D. Velcro
   1. For management only. Not for supporting cables

2.3 CABLE LADDER

A. CPI Universal UL Cable Runway, UL Cable runway Radius Drops - Black

B. Width 12", 18” as shown

   1. 11275-712

   2. 11275-718

C. Radius Drops

   1. 12100-718

2.4 ACCESSORIES

A. Velcro
   1. For management only. Not for supporting cables

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with plans and manufacturer’s instructions.

B. CABLE MANAGEMENT
   1. Supply and install one (1) Horizontal wire management panel both front and back for every 48 Information Outlets, and not less than two panels per rack.
   2. Install Vertical wire management between all racks and at each end as shown.

C. CABLE LADDER
   1. Install all work plumb and true in alignment and in relation to lines, and grades shown.
   2. Attach ladderway to walls with appropriate ‘L’ bracket
   3. Attach ladderway to racks with appropriate rack to runway mounting plate
   4. Install runway radius drops as needed.
   5. Install ground braids to create a continuous system; ground to MGBB

END OF SECTION

SECTION 271323.13 - COMMUNICATIONS OPTICAL FIBER SPLICING & TERMINATIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Inside & outside optical fiber cable plant

1.2 RELATED SECTIONS

A. Section 27 0526 Ground & Bonding for Communications Systems

B. Section 27 1116 Communications Cabinets, Racks, Frames, and Enclosures

C. Section 27 1619 Communications Termination Blocks & Patch Panels

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers catalog data for hardware

1.4 QUALITY ASSURANCE

A. Approval by Contracting Officer is required of products of proposed manufacturer, or supplier, and will be based upon submission by Contractor certification.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

C. Certify materials and equipment shall be the standard products of the manufacturer regularly engaged in the manufacture of the products and shall be the manufacturer’s latest standard design that has been in satisfactory use for at least 2 years prior to bid opening

D. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.

1.5 DELIVERY, STORAGE, AND PROTECTION

A. Deliver components to the site in original manufacturers packaging.

B. Store all materials in a secure place that is weather tight dry, and not exposed to UV radiation.

C. Protect all components from damages by handling, weather and construction operations before, during and after installation.

1.6 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. 3M; www.3m.com

B. Corning Cable Systems; www.corning.com

2.2 SPLICE CLOSURES

A. 3M: 2178

B. Corning: UCAO, SCF

2.3 SPLICE MODULES

A. Fusion Splice Trays
1. As Approved by Splice Case Manufacturer
2. Heat Shrink Splice Protectors required

2.4 SPLICING TAPE

A. 3M LR or VM

B. Corning TP

2.5 GROUNDING/BONDING CONNECTORS

A. As Approved by Splice Case Manufacturer

2.6 ENCAPSULANT

A. 3M 4442 reenterable

2.7 STRAPS & SUPPORTS

A. As required

2.8 FIBER HOUSING

A. Corning CCH

2.9 FIBER CONNECTORS

A. Fiber Connectors shall be of the same manufacturer as Optical Fiber Cable

B. Type: Factory Terminated LC Pigtail

C. Insertion Loss: 0.3 dB average, FOTP-171

D. Durability: <= 0.2 dB change, 500 rematings, FOTP-21

E. Materials
1. Ferrule: Composite or Ceramic
2. Housing Composite

2.10 FIBER COUPLERS-SPLICE HOUSING

A. OS-2 Duplex LC

1. CCH-CS24-AE-P00RE - CCH Pigtailed Splice Cassette 24 F, LC UPC duplex shuttered, Single-mode (OS2)

2.11 CABLE CLEANER

A. D-Gel or Hydrosol wipes or liquid

2.12 EXECUTION

2.13 PRE-INSTALLTION

A. Verify splice parameters with Construction Administrator

B. Verify splice will not affect active equipment

2.14 SPLICING

A. Clean and clear all cable ends

B. Terminate and splice all optical fiber cable on the appropriate block, terminal, or module.

C. Ground system as required

D. Seal all openings in conduits, sleeves, and pass thru's with the required fire stopping material or duct plug as appropriate.

END OF SECTION

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SECTION 271323 - COMMUNICATIONS OPTICAL FIBER BACKBONE CABLING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Inside & outside Optical Fiber cable plant

1.2 RELATED SECTIONS

A. Section 27 0526 Ground & Bonding for Communications Systems

B. Section 27 1116 Communications Cabinets, Racks, Frames, and Enclosures

C. Section 27 1619 Communications Termination Blocks & Patch Panels

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers catalog data for hardware

1.4 QUALITY ASSURANCE

A. Approval by Contracting Officer is required of products of proposed manufacturer, or supplier, and will be based upon submission by Contractor certification.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

C. Certify materials and equipment shall be the standard products of the manufacturer regularly engaged in the manufacture of the products and shall be the manufacturer’s latest standard design that has been in satisfactory use for at least 2 years prior to bid opening

D. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience.

1.5 DELIVERY, STORAGE, AND PROTECTION

A. Deliver components to the site in original manufacturers packaging.

B. Store all materials in a secure place that is weather tight dry, and not exposed to UV radiation.

C. Protect all components from damages by handling, weather and construction operations before, during and after installation.

1.6 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

1. Must be able to provide a 25-year Corning manufacturer’s warranty

PART 2 - PRODUCTS

2.1 GENERAL

A. All Outside Plant, (OSP,) cables shall be filled or water blocked unless pre-approved by Communication Maintenance

2.2 MANUFACTURERS

A. Corning Cable Systems; www.corning.com

2.3 OPTICAL CABLE

A. Fiber Parameters
1. OS-2- (Low Water Peak) Bend-insensitive Singlemode fiber
a. Dispersion - unshifted single mode optical fibers with Low Water Peak complying with ITU-T G.652.D and with improved bending loss complying with ITU-T G.657.A1.
b. The zero dispersion wavelength shall be between 1300 nm and 1320 nm. The ANSI/EIA/TIA-455-168 maximum value of the dispersion slope shall be no greater than 0.090 ps/km-nm2. Dispersion measurements shall be made in accordance with ANSI/EIA/TIA-455-169 or ANSI/EIA/TIA-455-175-B.
c. The nominal mode field diameter shall be 9.2 □m with a tolerance of □ 0.4 □m at 1310 nm when measured in accordance with ANSI/EIA/TIA 455 191 B.
d. Transmission Characteristics:
e. Maximum cabled attenuation for loose tube fibers shall be 0.4/0.3 dB/km @ 1310/1550 nm.
f. Maximum cabled attenuation for tight buffer fibers shall be 0.7/0.7 dB/km @ 1310/1550 nm.
g. The cabled cutoff wavelength shall be □1260 nm when measured in accordance with ANSI/EIA/TIA-455-80-C.
h. ATTENUATION:
1.) Single-Mode:
a.) Loose Tube max.;
I 1310 nm - 0.34 dB/km
II 1385 nm - 0.31 dB/km
III 1550 nm - 0.21 dB/km
b.) Tight Buffer max.
I 1310 nm - 0.7 dB/km
II 1385 nm - 0.7 dB/km
I 1550 nm - 0.7 dB/km

2. OM-4 - Bend-insensitive Laser Optimized 50/125 micron fiber
a. Graded-index optical fiber wave-guide with nominal 50/125micron -core/cladding diameter.
b. The fiber shall comply with the latest revision of ANSI/EIA/TIA-492AAAD.
c. Attenuation shall be measured in accordance with ANSI/EIA/TIA-455-78.
d. Information transmission capacity shall be measured in accordance with the latest revision of ANSI/EIA/TIA-455-204.
e. Maximum attenuation dB/km @ 850/1300 nm: 3.0/1.0
f. EMB Bandwidth 4700 MHz-km @ 850nm.
g. OFL Bandwidth 500 MHz-km @ 1300nm.
h. Optical Fiber shall be Bend-insensitive Laser Optimized and guarantee 1Gigabit Ethernet distances of 1040m/600m for 850nm and 1300nm, respectively.
i. Optical fiber shall guarantee a 10 Gigabit Ethernet distance of 550m at 850

B.

C. Commscope Arid Core Armored, Non-Armored, Triathlon Indoor/Outdoor LSZH, Indoor/Outdoor Standard

D. Corning FREEDM LST

1.2 RISER CABLE

A. Commscope: Premise

B. Corning: MIC

1.3 CABLE PULLING LUBRICANTS

A. Type F or J clear

PART 2 - EXECUTION

2.1 PRE-INSTALLTION

A. WRITTEN CERTIFICATION: Provide written certification
   1. Factory Certification showing compliance with all optical, attenuation and bandwidth specifications.

B. Ensure all cable placing personnel understand the handling requirements, minimum bend diameters, and maximum pull tensions

C. Swab and clean conduits

2.2 INSTALLATION OF CABLE

A. Place fiber optic cables to maintain minimum cable bend radius limits specified by manufacturer or 15 times cable diameter, whichever is larger.

B. Use care when handling fiber optic cables.

C. Carefully monitor pulling tension so as not to exceed limits specified by manufacturer.

D. Do not splice horizontal fiber optic cables.

E. Where cables are to be routed in pathway, conductor shall supply and install any additional pathway necessary to complete any cable route. Use of existing pathway must comply with EIA/TIA standards and recommendations. Contractor shall ensure fire rating of all Contractors used pathway.

F. Cables not routed in conduit or tray must be supported each 3' O.C. with an appropriate support.

G. Seal all openings in conduits, sleeves, and pass thru’s with the required fire stopping material or duct plug as appropriate.

H. Provide minimum 50' slack cable coiled neatly in each pullbox.

I. Provide minimum 150' slack cable coiled neatly in each manhole.

END OF SECTION

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SECTION 271513 - COMMUNICATIONS COPPER HORIZONTAL CABLING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Copper cabling inside of buildings

1.2 RELATED SECTIONS

A. Section 27 0510 Basic Communication Requirements

B. Section 27 0526 Ground & Bonding for Communications Systems

C. Section 27 1123 Communications Cable Management & Ladder Rack

D. Section 27 1116 Communications Cabinets, Racks, Frames, and Enclosures

E. Section 27 1619 Communications Termination Blocks & Patch Panels

1.3 SYSTEM DESCRIPTION

A. This section describes CER, CD, BD to Workstation or Device cable plant from existing CER, CD, BD termination equipment

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers catalog data for hardware

C. Project Record Documents: Record actual locations of All outlets, cable pathway, sleeves.

D. Warranty: Submit manufacturer warranty and ensure that forms have been completed in City of Tucson's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Approval by Contracting Officer is required of products of proposed manufacturer, or supplier, and will be based upon submission by Contractor certification.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 10 years of documented experience.

C. Certify materials and equipment shall be the standard products of the manufacturer regularly engaged in the manufacture of the products and shall be the manufacturer’s latest standard design that has been in satisfactory use for at least 2 years prior to bid opening

D. Installer Qualifications:

1. Approved Leviton Premier Installer (LPI) or Leviton Network Installer (LNI) before, during, and through completion of the system installation. Supporting documentation will be required as part of the submittal.

2. Responsible for workmanship and installation practices in accordance with Leviton Installer Program.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Deliver components to the site in original manufacturers packaging.

B. Store all materials in a secure place that is weather tight dry, and not exposed to UV radiation.

C. Protect all components from damages by handling, weather and construction operations before, during and after installation.

1.7 WARRANTY

A. The horizontal communications cabling system installed shall be eligible for coverage by a Limited Lifetime Warranty to the end user.

1. Horizontal channels shall be completed with Leviton Network Solutions factory-terminated copper patch cords in order to be eligible for the applicable Leviton Warranty with channel performance guarantees.

B. Installer Integrator shall provide labor, materials, and documentation in accordance with Berk-Tek and Leviton Network Solutions requirements necessary to ensure that the Owner will be furnished with a Limited Lifetime Warranty.

C. The installed structured cabling system shall provide a warranty guaranteeing installed channel performance above the ANSI/TIA 568-C requirements for Cat 6, and/or Cat 6A cabling systems or ISO 11801 requirements for Cass D, Class E, and/or Class Ea.

1. Standards-compliant channel or permanent link performance tests shall be performed in the field with a Berk-Tek Leviton Technologies approved certification tester in the appropriate channel or permanent link test configuration.

D. Necessary documentation for warranty registration shall be provided to the manufacturer by the installer (within 10 days) following 100 percent testing of cables.

1. Submit test results to Leviton Network Solutions, in the certification tester's original software files.

2. Installer shall ensure that the warranty registration is properly submitted, with all required documentation within 10 days of project completion.

3. Contractor Integrator must adhere to the terms and conditions of the respective manufacturer's warranty programs.

E. Installer shall ensure that the Owner receives the manufacturer issued project warranty certificate within 60 calendar days of warranty registration.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Leviton Network Solutions, 2222 222nd Street SE, Bothell, Washington 98021. Phone 425-486-2222. Fax 425-485-3373. Website www.leviton.com.

B. Berk-Tek, A Nexans Company, 132 White Oak Road, New Holland, PA 17557 Phone: 717-354-6200. Fax 717-354-7944. Website www.berktek.com.

2.2 SYSTEM DESCRIPTION

A. Horizontal Distribution Subsystem: Intra-building twisted-pair and fiber optic communications cabling connecting Telecommunication Rooms (TRs) to Telecommunication Outlets (TOs) located at individual work areas.

B. Horizontal Cabling: Combination of the following types of cables from TR to TO:

1. Category 6A and Enhanced Category 6 (100-Ohm, 4-pair, unshielded twisted pair) cables

from TRs to TOs. Port 1 or Port 2. (As Specified)

C. Communications Horizontal Cabling System: Includes cables, jacks, patch panels, connecting blocks, patch cords, fiber connectors, fiber adapter plates, fiber enclosures, jumpers, and necessary support systems, such as cable managers and faceplates.

D. Cables: Route through conduit, cable trays, spaces below raised floors, open ceiling areas, non-ventilated spaces above ceiling tile, and through plenum air-handling spaces above ceiling tile.

E. Furnish and install all materials necessary for a complete and working communications horizontal cabling system

2.3 STATION CABLING

A. Category 6 Unshielded Twisted Pair: LANmark 1000 UTP System.
   a. 100 ohm, Category 6, 23 AWG, 4-pair unshielded twisted pair CMR rated.
   b. Electrical Characteristics: Characterized to 550 MHz.
   c. Cable: Third-party verified by ETL.
   d. Maximum Cable Diameter: 0.230 inch.
   e. Colors
      1) Data – Blue
      2) Voice – White
      3) Security – Yellow
      4) PA - Orange
      5) Pharmacy - Pink

B. Category 6 Unshielded Twisted Pair: LANmark-HD High-Definition AV FTP System.
   a. 100 ohm, Category 6, 23 AWG, 4-pair shielded twisted pair CMR rated.
   b. Electrical Characteristics: Characterized to 350 MHz.
   c. Cable: Third-party verified by ETL.
   d. Maximum Cable Diameter: 0.280 inch.
   e. Colors
      1) AV - Grey

PART 3 - EXECUTION

3.1 PRE-INSTALLTION

A. Ensure all cable placing personnel understand the handling requirements, minimum bend diameters, and maximum pull tensions

B. Examine areas to receive communications horizontal cabling.

C. Notify Architect of conditions that would adversely affect installation or subsequent use.

D. Do not begin installation until unacceptable conditions are corrected.

3.2 INSTALLATION OF CABLE

A. Install communications horizontal cabling in accordance with manufacturer’s instructions, ANSI/TIA-568-C.0, ANSI/TIA-568-C.1, ANSI/TIA-569-C, BICSI TDMM, and NFPA 70To each Information Outlet, supply and install (2), Data Cables, as indicated, from the CER.

B. Where information Outlets are surface mountable, supply, install the proper raceway, and surface mounted box.

C. Horizontal cabling shall be installed in raceways, cable trays, or other approved support systems and terminated at station locations indicated.

D. All cable shall be routed parallel and perpendicular to the building supporting steel structure

E. Cabling shall take the form of a “Universal Cabling Plan” where station cables are wired directly, home run fashion, from a distribution point to the appropriate Information Outlet supporting the specified Data capabilities.

F. Horizontal cables not installed in conduit or wireways shall be properly secured and neat in appearance.

G. All cabling shall be supported at least 15cm above the drop ceiling.

H. All cabling shall be supported a minimum of 1.5m O.C. via the means of ‘J’ hooks or other approved method.

I. All cabling shall be neatly organized using velcro. NO cinch-type cable ties.

J. Label each cable ends with computer generated permanent ink permanent label per TIA-606-B.

3.3 CLEANING

A. Remove all unsightly marks and repair any damaged scratched or disfigured work

END OF SECTION 271513

SECTION 271543 - COMMUNICATIONS FACEPLATES & CONNECTORS

PART 1 - GENERAL

1.1 RELATED SECTIONS

A. Section 270510 Basic Communication Requirements

B. Section 270526 Ground & Bonding for Communications Systems

C. Section 271123 Communications Cable Management & Ladder Rack

D. Section 271116 Communications Cabinets, Racks, Frames, and Enclosures

E. Section 271119 Communications Termination Blocks & Patch Panels

F. Section 271619 Communications Patch Cords, Station Cords & Cross Connect wire

1.2 SYSTEM DESCRIPTION

A. This section describes communication connectors, terminations and associated faceplates, labeling

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers catalog data for hardware

C. Project Record Documents: Record actual locations of All outlets, cable pathway, sleeves.

D. Warranty: Submit manufacturer warranty and ensure that forms have been completed in City of Tucson's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

A. Approval by Contracting Officer is required of products of proposed manufacturer, or supplier, and will be based upon submission by Contractor certification.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

C. Certify materials and equipment shall be the standard products of the manufacturer regularly engaged in the manufacture of the products and shall be the manufacturer’s latest standard design that has been in satisfactory use for at least 2 years prior to bid opening

D. Installer Qualifications: Company manufacturer certifies specializing in performing the work of this section with minimum 5 years of experience.

1.5 DELIVERY, STORAGE, AND PROTECTION

A. Deliver components to the site in original manufacturers packaging.

B. Store all materials in a secure place that is weather tight dry, and not exposed to UV radiation.

C. Protect all components from damages by handling, weather and construction operations before, during and after installation.

1.6 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Leviton Network Solutions, 2222 222nd Street SE, Bothell, Washington 98021. Phone 425-486-2222. Fax 425-485-3373. Website www.leviton.com.

2.2 INFORMATION OUTLETS

A. Leviton Atlas-X1 UTP Cat 6 Connector;

1. Data: Blue
2. Voice: White
3. Security: Red
4. PA: Yellow

B. Leviton Atlas-X1 Shielded Cat 6 Connector

1. AV: Grey

2.3 FACEPLATES

1. Flush-Mounted Plastic Faceplates:
    a. 1-port single-gang plastic wallplate with ID windows.
        1.) Colors: white
        2.) Part Number: Leviton 42081-1WS (white).
    b. 2-port single-gang plastic wallplate with ID windows.
        1.) Colors: white
        2.) Part Number: Leviton 42081-2WS (white).
    c. 4-port single-gang plastic wallplate with ID windows.
        1.) Colors: white
        2.) Part Number: Leviton 42081-4WS (white).
2. Surface-Mounted Outlet Boxes (Plenum Rated) WAP’s and Cameras:
    a. 1-port QuickPort surface-mount box, plastic, with ID window.
        1.) Color: white
        2.) Part Number: Leviton 41089-1WP (white).
    b. 2-port QuickPort surface-mount box, plastic, with ID window, extended depth, Cat 6A, other larger bend-radius cable applications.
        1.) Color: white
        2.) Part Number: Leviton 4S089-2WP (Plenum Rated)
    c. 2-port QuickPort surface-mount box, plastic, with ID window.
        1.) Color: white
        2.) Part Number: Leviton 41089-2WP (Plenum Rated

B. In-Ceiling Brackets - Mounting QuickPort Jacks, Connectors, 1 & 2 Port Surface Mounted Box, Slack Loops. (Wireless Access Points. PA and Cameras)

1. QuickPort In-Ceiling 2 Port Bracket, includes clip for drop wire/rod
    a. Colors: Metal
    b. Part Number: Leviton 49223-CBC.
2. QuickPort In-Ceiling 2 Port Bracket, no clip .
    a. Colors: Metal
    b. Part Number: Leviton 49923-CB0.

C. CATV: Stainless Steel with 'F' bulkhead

PART 3 - EXECUTION

3.1 PRE-INSTALLTION

A. Clean cable to remove construction materials

3.2 WORKSTATION TERMINATIONS

A. Use manufacturers recommend termination tool. Stuffer cap impact not acceptible

B. Terminate fiber connectors where appropriate

C. Label each cable ends with computer generated permanent ink permanent label per City of Tucson standard labeling scheme.

D. Install appropriate faceplate.

E. Label outlet per specification

3.3 RACK TERMINATIONS

A. Terminate differing systems on their own patch panel

B. Termination shall occur from the lowest information Outlet number to the highest Information Outlet number.

C. Contractor shall take great care to route cabling and ensure clearance for maintenance.

PART 4 - 3.04 CLEANING

A. Remove all unsightly marks and repair any damaged scratched or disfigured work

END OF SECTION

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SECTION 274100 AUDIO-VIDEO SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Work under this Contract includes the engineering, fabrication, and installation of Audio, Video, Control, and RF Systems as indicated on the drawings and described in these specifications. Notwithstanding any detailed information in this section, provide a complete and fully functional system. Supply all engineering, labor, equipment, materials, cabling, hardware, tools, transportation services, coordination, etc., necessary to complete the installation of the Audio-Video Systems, excluding those items designated as OWNER FURNISHED EQUIPMENT (OFE), WORK BY OTHERS, or NOT IN CONTRACT (NIC). The systems shall be called the "A/V Systems" and the installer, the "Contractor".

2. Notwithstanding any detailed information in the Contract Documents, it is the responsibility of the Contractor to supply a full working, tested, and calibrated system. Notify the Consultant of any discrepancies in part numbers or quantities before bid. Failing to provide such notification, supply items and quantities according to the intent of the Specification and Drawings, without claim for additional payment.

3. Specifications and drawings are complementary. Work called for by one is binding as if called for by both. Any discrepancies between specifications and drawings shall be brought to the attention of the Consultant for clarification during the bidding period. No allowance shall subsequently be made to the Contractor by reason of his failure to have brought said discrepancies to the attention of the Consultant.

4. Execute all work in accordance with the National Electrical Code (NEC), the National Fire Protection Association (NFPA), the Occupational Safety and Health Act (OSHA) and all applicable State and Local codes, ordinances, and regulations. If a conflict develops between the contract documents and the appropriate codes and is reported to the Consultant prior to bid opening, the Consultant will prepare the necessary clarification. Where a conflict is reported after contract award, propose a resolution of the conflict and, upon approval, perform Work.

5. All equipment requiring coordination with other trades must be tested and verified for proper operation. Contractor is fully responsible for the coordination and must resolve all conflicts with equipment that connect or interact with other systems.

6. Design, engineer and provide complete means of support, suspension, attachment, fastening, bracing, and seismic restraints (hereinafter "support") of the Work of this Section, including future installed equipment, in accordance with local building codes and regulations. Provide engineering of such support by parties licensed to perform work of this type in the Project jurisdiction. Contractor shall obtain the services of an engineer licensed to perform this work within the state or jurisdiction it is to be performed.

7. Standard electrical conduit and back boxes are by Division 26 Contractor. Provide all cable and wire associated with this specification section.

8. All systems shall be completely installed with all of the necessary interconnection, power

supplies, patch cords, snakes, portable equipment cables and wiring to provide a fully functioning system.

9. The governing overall requirement for this project is a complete and functional system. Include work not usually shown or specified, but necessary for proper installation and operation of the system or piece of equipment.

B. Products Supplied But Not Installed Under This Section

1. Loose equipment or products supplied but not installed shall be turned-over to the Owner immediately upon delivery.

2. Floor boxes, junction boxes, back boxes and speaker back boxes shall be provided to the General Contractor for installation.

C. The Contract also includes:

1. Provide all required licenses, permits, and insurance as required.

2. Verification of dimensions and conditions at job site.

3. Preparation of submittal information.

4. Installation in accordance with Contract Documents, manufacturer's recommendations, and applicable codes and requirements of Authority Having Jurisdiction (AHJ).

5. Initial tests and adjustments, written report, demonstration for approval, final adjustments, and documentation.

6. Instruction of operating personnel; provision of operating manuals.

7. Maintenance services and warranty.

D. Related Sections:

1. General and Supplementary Conditions – Division 1

2. Power and Ground Wiring — Division 26.

3. Conduit, raceways, and junction boxes — Division 26

4. 274213 Projection Screens

1.2 RESPONSIBILITY AND RELATED WORK

A. The Contractor shall:

1. Provide power distribution within the A/V system equipment racks and cabinets.

2. Provide for mounting or attachment of the A/V equipment to ceilings, walls, floors, or other locations as called out in these documents. Coordinate mounting requirements with others and all structural elements shall be approved in writing by a structural engineer.

3. The Contractor shall supply accessories and minor equipment items needed for a complete system, even if not specifically mentioned in the specifications, without claim for additional payment.

4. Coordinate work with the Owner, General Contractor, and other trades as required. As part of this coordination program include the following:
   a. Carefully check and verify all pertinent dimensions and sizes and the appropriateness of all structure supporting the specified equipment, both on the drawings and in the field, before proceeding with any work.
   b. The contractor shall provide additional structural or support members as required for the proper installation and operation of equipment, material, and devices supplied under this section.
   c. Examine all construction and work of other contractors at the job site which may affect the work of this section to ensure that everything is in proper condition to receive the equipment and devices proposed before manufacturing or installing any of the work of this section. Contractor shall take full responsibility for the proper fitting of materials and devices provided as part of the work of this section, into the structure, and the structure's ability to sustain imposed loads.
   d. Notify the Architect and Consultant in writing in a timely fashion of any difficulties that may prevent proper coordination of the work of this section with the work of other contractors. Failure to do so constitutes acceptance of construction as suitable in all ways to receive the work of this section, except for defects that may develop in the work of other contractors after the execution of the work of this section.

5. Submit a written request for modification to any installation practice desired which is contrary to these specifications or drawings. Modifications shall not commence without written approval from the Architect and the Consultant.

B. The following work is not included in this section:

1. AC Power shall be supplied to each equipment rack under Division 26.

2. Conduit and race ways.

3. All heating, ventilation, and air conditioning required for the A/V equipment are supplied by the HVAC contractor.

4. All structural work required in support of the A/V equipment, such as structural steel, backings and wall reinforcements, etc., are coordinated by the A/V contractor and supplied by the General Contractor.

5. Millwork, fire prevention and safety devices, rough and finished trim, painting and patching (with the exception of damage caused by the A/V System Installer), drapes, carpets, floor coverings, glazing, and acoustical treatments are supplied by others.

1.3 REFERENCES

A. Comply with all applicable governing codes. Work shall be performed in accordance with all applicable requirements of all governing codes, rules and regulations including the following minimum standards, whether statutory or not:

1. AES Audio Engineering Society

2.	ANSI	American National Standards Institute
3.	ASTM	American Society for Testing and Materials
4.	BICSI	Building Industry Consulting Service International, Inc.
5.	BTSC	Broadcast Television Stereo Committee
6.	CEDIA	Custom Electronic Design and Installation Association
7.	EIA	Electronic Industries Alliance
8.	ETL	Electrical Testing Laboratories, Inc.
9.	FCC	Federal Communications Commission
10.	1ICIA	International Communications Industries Association
11.	IEC	International Electrotechnical Commission
12.	IEEE	Institute of Electrical and Electronic Engineers
13.	INCITS	International Committee for Information Technology Standards
14.	ISO	International Organization for Standardization
15.	ITU	International Telecommunications UDSP
16.	NAB	National Association of Broadcasters
17.	NCTA	National Cable and Telecommunications Association
18.	NEC	National Electrical Code
19.	NEMA	National Electrical Manufacturers Association
20.	NFPA	National Fire Protection Association
21.	NSCA	National Systems Contractors Association
22.	OSHA	Occupational Safety and Health Administration
23.	SMPTE	Society of Motion Picture and Television Engineers
24.	TASO	Television Allocation Study Organization
25.	TIA	Telecommunications Industry Association
26.	UBC	Uniform Building Code

27. UL Underwriters Laboratories Inc.

28. Comply with all applicable codes and regulations.

1.4 DEFINITIONS

A. The following Terms used in this document are defined as follows:

1. Furnish - To purchase, procure, acquire, and deliver complete with related accessories.

2. Install – To set in place, join, attach, link, set up or otherwise connect together and test until complete before turning over to the Owner, all parts, items, or equipment supplied by Contractor.

3. Provide – To furnish and install.

4. Owner Furnish Contractor Installation (OFCI) - The Owner will provide the item at their warehouse. The Contractor is responsible for receiving the equipment from the owners' warehouse and the installation of the equipment.

5. Owner Furnished Equipment (OFI) – The Owner will furnish and install the equipment.

6. Not In the Contract (NIC) – Work not included in this scope.

B. General definition of terms for electronic systems: The following definition and conditions apply to each of the respective parameters and the measurements of those parameters, unless specifically stated otherwise:

1. The term "sensitivity" as used herein for microphones and expressed in dB (dB referenced to.001W) is the microphones available electrical input power level, when driven by a sound pressure of 10 dynes/cm2.

2. Frequency response: The minimum acceptable frequency band over which the amplitude response is within 3dB (or any other specified range), or the specified limits of the response relative to the reference frequency (1kHz for audio, 1MHz for video). This measurement is taken under design load conditions, at any operating level up to and including the specified maximum output, while fully in compliance with all other performance specifications.

3. Maximum output level: The minimum acceptable maximum amplitude measured in volts or decibels, under design load conditions, at any frequency or combination of frequencies within the specified frequency range, while fully in compliance with all other performance specifications.

4. Harmonic distortion: The maximum acceptable harmonic distortion measured at any operating level, up to and including the specified maximum output, with an applied sine wave signal of any frequency in the range of the specified frequency response.

5. Audio inter-modulation distortion: The maximum acceptable inter-modulation distortion resulting from the introduction of 60Hz and 7Khz signals in ratio of 4:1 under design load conditions atany operating level up to and including the specified maximum output level.

6. Signal to noise ratio: The minimum acceptable ratio of signal to noise levels derived from broadband measurements, under design load, at maximum output over the entire range of the specified frequency response.

7. Clipping level: The maximum level of signal applied to the device under design load conditions while fully in compliance with all other performance specifications.

8. Sensitivity: The maximum acceptable level of input signal applied to the device that is necessary to provide the maximum output under design load conditions.

9. Design load: The load (in ohms) specified by usage of the particular device input or output.

C. Signal levels

1. The following voltage levels shall be considered the standard operating levels for the particular circuitry unless specifically noted otherwise (0.775 Volt = 0dBm for 600 ohm terminated circuit):

2. Microphone circuits; -30dB or less: 02mV-6mV.

3. Audio line level circuits; -30dBu to -18dBu; equivalent to -30dBm to +24dBm for a 600 terminated circuit: 8mV-10mV.

4. Loudspeaker level circuits; more than +24dBu: -15V-44V.

5. Video line level circuits; 1.0 Volt, “peak to peak” composite signal.

6. CATV/MATV RF Distribution, +6dBmV (tolerance = -2dBmV to +4dBmV)

D. Characteristic Impedance

1.5 The following operating impedance shall be considered to be standard operating impedance for the particular circuitry unless specifically noted otherwise:

1. Microphone circuits: 50-250 ohms source, electrostatically and electromagnetically balanced to ground.

2. Audio line levels circuits: 600 ohms maximum source, 600 ohms minimum terminating, line to line, electrostatically and electro-magnetically balanced to ground.

3. Video line level circuits: 75 ohms maximum source, 75 ohms minimum terminating to shield and signal grounds.

4. RF signal circuits: 50 ohms maximum source, 50 ohms minimum terminating to shield and signal grounds.

5. CCTV/MATV distribution systems: 75 ohms maximum source, 75 ohms minimum terminating to shield and signal ground with Vertical Standing Wave Ratio (VSWR) not to exceed 1.2.

6. If the MATV System utilized both analog and digital channels, the digital channels shall be attenuated by 10 dB.

1.6 SYSTEM DESCRIPTION

A. Design Requirements:

1. Audio Systems
   a. Audio system shall be connected to the fire alarm system such that in case of alarm the audio

system shall mute. It may be acceptable to mute all systems when an alarm occurs, AV contractor shall coordinate with the fire protection report and AHJ.

b. Each area will use a "localized" system design using digital signal processing in the equipment rooms and with speakers located in the rooms/areas. Ceiling speakers will be used primarily.

c. The audio system has the capability to distribute audio content, within defined audio zones, over a wide geographic area, utilizing the Ethernet network. Some speaker locations and types will utilize local power amplification, either built-in to the speaker, or external. Distribution of signal to these locations will be via network or line level audio. The AV network should be dedicated and not part of the shared IT network in order to minimize high bandwidth usage of the AV systems and reduce security risks to the IT network.

d. The audio system shall mute in case of fire.

e. Coordination with the fire alarm provider shall be done by the AV contractor. The AV contractor shall provide a contract closure for each area required by the fire alarm system to mute the areas dictated by the fire and life safety strategy and AHJ.

The following portions shall be deleted from this specification

Addendum 03

f. Input/output wall and floor panels to connect to the audio system will be located throughout the building. Through this network of panels signals can be routed to and from the system. Video will also be available through the network of local input/output panels in addition to audio.

g. Local audio sources will be connected to the input/output panels as well as dedicated audio inputs and microphones located as indicated on the plans.

2. Video Distribution

a. Deployment of television signals throughout the campus will utilize an IPTV distribution infrastructure.

b. Each classroom, learning space or forum shall operate independently but have connection to and from the central studio, other rooms within the building and IPTV for video distribution.

c. Matrix switching will be provided as shown for the systems to enable video to each display independently.

3. Digital Signage

a. Digital signage shall be deployed throughout the campus.

4. Large Conference Room 119 A & B

a. The room will feature a projection system with three (3) projectors and screens and (2) Large Displays Screens along the divisible wall and curtain wall will be electrified roll up screens. Projectors will be fixed hung from the ceiling.

b. Contractor to provide appropriate lensing to fill the screen with no keystone correction, lens shift is acceptable and shall be provided with the projector.

c. Projector mount by the AV contractor, coordinate with architecture for exact mounting requirements.

d. Images can be presented on any one, any combination, or all the projectors including the monitors in the South space and Conference Monitor which is combinable.

e. An instructor's PC and document camera will be installed in the room and can be used as source devices (OFI). There are three locations in the North room and one location in the South room.

f. Wireless connectivity will be provided to use content from a laptop, and other portable digital devices such as tablet, or smartphone.

g. The speakers will provide combined program and speech reinforcement audio with

independent volume controls.

h. Speech reinforcement will be provided by a wireless microphone and ceiling mounted speakers. Wireless microphones will be.
   1.) HDTBLMIC Quantity 2
   2.) HDEXECMIC quantity 2

i. Control of the entire system will be from touch screen control panel. A wall mounted panel will provide general control of the Southern Room.

j. Functions such as:
   1.) system on/off,
   2.) source selection,
   3.) audio volume,
   4.) room combining/uncombining
   5.) and other operational activities will be available.

k. Advanced functions of the control system may include remote monitoring and automatic system start-up and shut-down sequences in addition to room combining functions.. Multi- level password protection will prevent unauthorized use.

l. Most of the audiovisual equipment will be located in the MDF/IDF room. Some equipment may be located in the instructor's workstation

5. Conference Rooms 117,127,137,116,122,126,141,142
   a. The room will feature flat panel displays affixed to walls.
   b. Connection to monitors provided thru architectural table box at the floor and wall boxes to be fed to the display.
   c. Wired and wireless connectivity will be provided to use content from a laptop, and other portable digital devices such as tablet, or smartphone.
   d. Sound reinforcement will be provided by wall/ceiling mounted speaker(s) and table top microphones. Wireless microphones will be.
      1.) HDTBLMIC Quantity 2
      2.) HDEXECMIC quantity 2
   e. There will be integrated HD video cameras for video conferencing.
   f. Control of the entire system will be from touch screen control panel.
   g. Advanced functions of the control system may include remote monitoring and automatic system start-up, room combining and shut-down sequences. Multi-level password protection will prevent unauthorized use.
   h. Most of the audiovisual equipment will be located in the MDF/IDF room(s).

6. Classroom 768
   a. The classroom accommodates instruction with multimedia presentation.
   b. There will be (1) wall mounted flat panel display to present visual content to the audience.
   c. Combined program and speech reinforcement system via ceiling mounted speakers.
   d. Wireless microphones will be provided in the space for speech reinforcement
   e. Control of the entire system will be from wall mount control panel mounted on the front wall near the instructor's workstation.
   f. Functions such as
      1.) system on/off,
      2.) source selection,
      3.) audio volume, and
      4.) other operational activities will be available.
   g. Advanced functions of the control system may include remote monitoring, multi-level password protection to prevent unauthorized use, room combining and automatic

system start-up and shut-down sequences.

h. Most of the audiovisual equipment will be located in the MDF/IDF room.

7. Small Conference/Huddle Spaces
   a. These spaces will feature a simple HDMI connection to the display.
   b. There will be a wall, flat panel display to present visual content, coordinate with architect and plans.
   c. Connectivity will be provided to display content from a laptop, and other digital devices.
   d. Connections from the floor or wall box to the display should be provided.
   e. The system shall be controlled from the TV remote control.
   f. All audiovisual equipment will be located within the room

8. Pharmacy
   a. There will be (2) wall mounted flat panel display to present visual content to patients.
   b. Content to be provided by OFI system
   c. Advanced functions of the control system may include remote monitoring, multi-level password protection to prevent unauthorized use, room combining and automatic system start-up and shut-down sequences.

9. Health Services system
   a. There will be (2) wall mounted flat panel display to present visual content to clients.
   b. The system shall be able to broadcast information to the Conference Monitor
   c. There will be a wall, flat panel display to present visual content, coordinate with architect and plans.
   d. Connectivity will be provided to display content from a Owners digital devices.
   e. Connections from the floor or wall box to the display should be provided.
   f. The system shall be controlled from a wall mounted panel.

B. Software Programming:

1. General
   a. Except when otherwise agreed in writing the client shall asset legal and beneficial ownership of all Intellectual Property, including source code, created by the Contractor, their employees and sub-contractors.

   b. The Contractor must allow sufficient time for the programming of all software configurable audio, video and control systems. Contractors must evaluate the systems functional requirements and user interface and then allow time in their bid accordingly. The system description as well as the end user interview will provide the Contractor with the necessary information needed to proceed with the programming. Any questions as to the systems functional requirements must be sent in written RFI form to the Consultant. All programming schemes must be submitted to the Consultant for approval before programming starts. This includes the appearance of all user interfaces, touch panel layouts, preset and sub-preset information (acquired through client interviews), and speaker control schemes. The Contractor will also submit a narrative for the control system concept to the Consultant for approval. The Contractor is to interview the Owner and their representatives to acquire the necessary information needed to allow for the proper programming of this system. The Contractor, after interviewing the Owner, will then submit a written report stating his interpretation of the client's requirements for approval by Consultant. Only after the Client and Consultant have approved the programming report may the Contractor proceed with the programming of this system.
   c. All equipment that is connected to the Client's local area network and is configurable via the local area network must have its equipment software installed onto dedicated computers

provided by the Client. The Contractor is to allot time to install and test equipment software onto a minimum of two of the Client's computers which are to be identified by the Client and/or Consultant. The computers will be programmed to emulate user interfaces throughout the facility. The Contractor shall coordinate all software deployment over IP with the Client's Information technology department.

2. Control system minimum programming outlined below:
   a. All touch panels shall be programmed with password protection to access system control. Upon start up a password dialog box shall be presented to the user to enter his/her password. Only after entering a password will the user have access to the system. The system shall be programmed to shut down automatically after being idle for a time to be specified by the user. A separate password shall be programmed for all dockable touch panels. This password shall allow the user to undock the touch panel.
   b. Touch panel layout design will conform to the InfoComm International "Dashboard for Controls" guidelines. Touch panel designs are to be custom to this project. Re-purposed touch panel designs are not acceptable.
   c. Control Help File: Each touch panel will include a help file that will explain each layer of the touch-panel control scheme.
   d. Preferred methods of device control in order of preference is Ethernet, Serial RS232/422/485, contact closure, IR. All Ethernet and serial controlled devices must have bi-directional communication with the control system. All control functions locally available on each device must be accessible via the remote control system. All locally gestured control functions must mirror on the control system user interface. In other words, if a volume control is adjusted on a DSP interface that adjustment must register on the control interface.
   e. Control system shall be used to power up and down connected equipment.
   f. The Contractor shall allot 16 hours for on-site control system programming with the Client's representative.

3. Digital Signal Processor (DSP) minimum programming outlined below:
   a. A user-friendly graphical interface programmed by the Contractor will allow for easy operation of the system. This interface shall allow novice users the control of main system components without having to access the digital schematic diagram. These main system components will include master volume control, zone volume control, room combining, routing, switching, source-equipment level control and any other control necessary for the system to function properly from a user standpoint.
   b. Volume control must be applied to device inputs as well as mixer outputs. Each piece of source equipment shall have a volume control to allow input level balancing. A main volume control and mute button will allow for overall adjustment of the composite mix.
   c. Provide automatic gain control at the input of all line level source equipment.
   d. Signal present indicators shall be placed on the graphical user interface to allow monitoring of all inputs and outputs to the audio system.
   e. Meters will be placed along strategic points in the signal chain to allow for monitoring signal level.
   f. Schematic diagram will be arranged so wire paths are easily traced. All inputs and output will be clearly labeled.
   g. Audio processing will be accomplished through the Digital Signal Processor. This processing will include equalization, automatic microphone mixing, standard mixing, compression, limiting, delay, metering, room linking, routing, speaker control, automatic gain control, ducking, ambient noise sensor, gates, adaptive equalization and any other control necessary for the system to function properly.
   h. Rooms combining of audio signal shall be accomplished through presets that control the

various room arrangements. These presets will include signal routing, level change, delay,

i. Wall mounted control stations shall track each other while in a combine mode and provide individual control of rooms when separated.
j. The DSP system will connect to the Local Area Network for control and programming.
k. The DSP system will have levels of security for system operation and maintenance privileges.
l. A first level of security will be available to a user that has privileges that requires no password, limited to source select and volume control.
m. A second level of security will grant an operator privileges that include System shut down, run hardware diagnostics, access on line help and adjust settings. This is reserved for maintenance personnel.
n. A third level of security will grant supervisor privileges and allow all that is outlined above plus the ability to change system options and edit user list.
o. A fourth level of security will grant designer privileges and allow all that is outlined above plus the ability to modify the base file. This should be reserved to the AV contractor only.
p. The Contractor is to allow programming time for at least 20 different presets as directed by the Owner and their representative.
q. The Contractor shall allot 8 hours for on-site digital signal processor programming with the client's representative.

4. Complexity of Programming:
   a. It is required that the Contractor be experienced and certified in programming systems of this complexity. Contractors shall allow enough time in their bid to permit extensive programming of all software configurable audio, video and control systems to the requirements of the client and consultant. Contractor shall break out cost associated with programming of these systems for review by the Consultant. By submitting this bid, the Contractor agrees that they understand systems of this type and that all programming services are included to the satisfaction of the Consultant. The Contractor further agrees that they will not make any claim for additional monies because of misinterpretation of programming requirements.

C. Responsibility:

1. The AV Systems Contractor shall provide all coordination with relevant disciplines including but not limited to structural, electrical and mechanical to provide the services required.

2. The AV Systems Contractor shall provide the infrastructure cabling as shown on the drawings, termination and testing of the cables.

3. The AV Systems Contractor shall also provide the equipment, materials, installation, and programming for the A/V systems.

4. The AV Systems Contractor shall hang/mount all displays, projectors and screens and shall be responsible for insuring proper backing and structural supports are installed as approved by the structural engineer.

D. Provide fire caulking as required by local codes to seal all penetrations made by A/V contractor and as required by the project.

1.7 PERFORMANCE REQUIREMENTS

A. Performance Standards: Unless restricted by the published specifications of a piece of equipment, or unless otherwise required elsewhere in this section, meet the following minimum performance standards

with each system.

1. Audio Systems:

1.8 Electrical Performance; Source Input to Power Amplifier Output:

a. Frequency Response (Equalizer flat): +/- 0.2 dB 20 Hz to 20 kHz.
b. Total Harmonic Distortion (THD): Less than 0.05%, 20 Hz to 20 kHz, 4 ohms.
c. Noise: At least -105 dB, 20 Hz to 20 kHz, referenced to input of +4 dBm.
d. Crosstalk: At least -60 dB, 20 Hz to 20 kHz.
e. Damping Factor: Greater than 500 (below 1 kHz)
f. Audio signal paths shall not degrade performance of connected equipment.
g. Audio Systems shall comply with NEC - Article 640: Audio Signal Processing, Amplification and Reproduction Equipment.

2. Audio System Reproduction:
a. Signal-to Noise Ratio (including crosstalk): 70dB minimum.
b. Total Harmonic Distortion: .5% maximum from 20Hz to 15,000 Hz.
c. Frequency Response for Distributed sound systems: (+,-) 3dB from 100Hz to 10kHz, rolling off 6db per octave below 100Hz and 2db per octave above 10kHz, as measured on axis of any loudspeaker.
d. Sound Output Capability for Distributed sound systems: provide program and speech reinforcement levels of not less than 95dB with 15dB of headroom within the frequency specification listed in F.3.b (3) above, without objectionable distortion, rattles, or buzzes employing as test signals several different samples of recorded music and microphones applied at any system input.
e. Frequency Response for Performance sound systems: (+,-) 3dB from 30Hz to 18kHz, as measured on axis of any loudspeaker.
f. Sound Output Capability for Performance sound systems: provide music, media playback, and vocal reinforcement levels of not less than 105dB with 20dB of headroom within the frequency specification listed above anywhere within the seating area without objectionable distortion, rattles, or buzzes, employing as test signals several different samples of recorded music and microphones applied at any system input.
g. Hum and Noise: Hum and noise shall be inaudible (below the background noise level of the space) under normal operation and as observed in normal listening locations.

3. Video Systems:
a. Video signal system: NTSC to EIA RS-1 70A, except as noted.
b. Video signal paths: To EIA RS-250C short haul where equalized or fiber optic transmission, otherwise to the performance limit of the specified video cable.
c. ANSI IT7.228 (ANSI Lumens): Measurement method for light output of fixed resolution video projection systems.
d. ANSI IT7.228 (ANSI Contrast Ratio): Measurement method for the contrast ratio of fixed resolution video projection systems.
e. SMPTE 170M: Color Specification for NTSC.
f. SMPTE 125M: Universal Sampling spec for SDTV and HDTV Broadcast Video.
g. SMPTE 253M: RGB Analog Video Interface spec for SDTV Studio applications.
h. SMPTE 274M: Component spec for 1920 x 1080 HDTV.
i. SMPTE 296M: Spec for 1280 x 720 RGB and Y-Pb-Pr Baseband
j. Video.

4. Data and Communications Systems:
a. TIA/EIA 568-B series: Commercial Building Telecommunications Cabling Standard.
b. J-STD-607-A: Commercial Building Grounding and Bonding Requirements

for Telecommunications.

c. Comply with ITU-T (International Telecommunications UDSP –Telecom) for video conferencing systems

5. Control Systems:
   a. RS485 (TIA-485): Electrical characteristics of generators and receivers for use in balanced digital multipoint systems.
   b. RS232 (TIA-232): Interface between data terminal equipment and data circuit-terminating equipment employing serial binary data interchange.
   c. RS422 (TIA-422): Electrical characteristics of balanced voltage digital interface circuits.
   d. Functional and reliable operation for all specified control operations.

6. Communications System:
   a. Frequency response shall be +/- .5db from 150 to 15kHz. Main station/power supply impedance shall be 200 ohms, nominal (adjustable to 1000ohms). Audio voltage level shall be –15db, nominal. System shall operate from a 28-volt power supply, nominal.
   b. System shall have short circuit protection against both the main power feed and the intercom line.
   c. Standard 2 conductor shielded microphone cable shall be used to interconnect the communications stations. Station signal-to-noise ratio shall be 70db or better, channel separation shall be greater than 45db, equivalent input-output noise shall be 110db or better.

1.9 QUALITY ASSURANCE

A. Qualifications

1. The bidder shall, prior to the bid, in accordance with the Instruction to Bidders, submit at least the following information to verify that the bidder has the necessary experience and qualifications to perform the specified work:
   a. Manufacturers certification to supply and install specified products
   b. Information identifying any and all local agents and/or subcontractors that will assist in the work and their role in the project.
   c. Evidence that he has acquired all necessary licenses, certificates and approvals to perform the specified work within the state or jurisdiction the work is to be performed.

2. Projects that include Digital Signal Processing (DSP) equipment will require the contractor to submit evidence of qualification from the manufacturer of said equipment. This would include completion of manufacturer's training courses, the name of the person or persons who completed said training and prior projects completed using DSP technology. If the Contractor is not approved for the DSP programming a qualified independent DSP programmer may be used subject to the Consultant's approval.

3. Projects that include networked audio or video systems will require the Contractor to submit the name of the person, in their employment, qualified to perform this work. This person shall have certification in computer network technology and hold one of the following certifications:
   a. CNP – Certified Network Professional Program.
   b. Computing Technology Industry Association – A+ or Network+ certification.
   c. MCSE – Microsoft Certified Systems Engineer.
   d. CNE – Certified Systems Engineer.

4. Projects that include software configurable, integrated central control systems will require the

contractor to submit evidence of qualification from the manufacturer of said equipment. This must include, as a sub-contractor, who is an authorized independent programmer, or company employee who is FULLY ENGAGED in the work of programming. This person shall hold a ACE – AMX Approved Certified Expert certification. If using an independent programmer the Contractor is to enter into an agreement utilizing the authorized independent programmer as a sub-contractor. Under this agreement, the Contractor will retain all of the responsibility for a complete and working system. The Contractor must include in their bid time to work out any programming glitches that may occur in the initial programming stage. These items include working through the initial and final programming stage with the authorized independent programmer to provide a functional system, testing the programmer's graphical user interface for intended functionality and provide onsite support for the programmer in the uploading and testing of programming revisions. The control systems programmer shall be present either by phone or in person at the end user interviews to acquire information first hand. The control systems programmer shall submit a report outlining the meeting results and a programming summery and submit to Contractor for approval. Only when the Contractor approves this report shall it be submitted to the consultant for review.

5. The Contractor will provide information on how and by whom the requirements of the warranty period will be fulfilled.

6. The submittal must justify, in the judgment of the Consultant, the Architect, and the Owner, that the Contractor has the capability to manage and install a project of this size and scope and that he is capable of the necessary business and technical arrangements for this installation and the pursuant warranty service. Contractor may be disqualified as a bidder if all of the submittal does not meet the approval of the Owner and his/her representative.

7. Work of this Section shall be performed by a Sound or Audio-Visual Systems Contractor who has at least five years direct experience with the devices, equipment and systems of the type and scope specified herein, and who has a fully staffed and equipped maintenance and repair facility, and who is licensed to perform work of this type in the Project jurisdiction.

8. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section. Supervisors shall have at least five years direct experience in similar work. Installation and maintenance personnel shall have at least three years direct experience in similar work.

9. Designated Supervisor: Provide a designated supervisor present and in responsible charge in the fabrication shop and on the Project Site during all phases of installation and testing of the Work of this Section. This supervisor shall be the same individual throughout the execution of the Work unless illness, loss of personnel, or other circumstances reasonably beyond the control of the Contractor intervene.

10. Coordination: Coordinate the Work of this Section with the Work of all other Separate Contracts.

11. The Contractor must employ a fully staffed help desk department that shall provide knowledgeable responses to enquiries regarding system operation. This department must also have the ability to provide remote diagnostics to identify equipment faults for troubleshooting.

B. Regulatory Requirements:

1. Regulations Applicable: including but not limited to those defined in Division 1.

2. Comply with all applicable federal, state, and local labor regulations, and applicable local and trade regulations.

3. Installation practices shall be in accordance to industry-accepted standards (ANSI, Cal-OSHA, IEC, IEEE, FCC, NEC, NFPA, ICIA, NSCA, CEDIA, and BICSI) or local acts, codes and standards enforced at the place of work, whichever is most stringent.

4. Procure and pay for all necessary permits, licenses, inspections, and observe any requirements stipulated therein.

5. Provide UL/ULC fire rated enclosures around all audio-visual floor and back boxes where required by code.

C. Pre-installation Meetings:

1. Attend a pre-installation meeting at the project site with the Owner and his representatives in order to coordinate related work and scheduling issues.

D. Verification

1. Verify dimensions and conditions at the Project Site. Submit any conflicts in timely manner for resolution.

E. Shop Fabrication and Testing

1. Assemble and fully wire equipment racks at a fabrication shop off the Project Site. Burn-in for not less than 40 hours. Following burn-in, perform specified adjustment procedures. Provide test equipment and test according to procedures specified herein. Submit verification of shop test in timely manner. Following verification of shop test and when installation locations are ready as specified, deliver equipment racks and equipment to the Project Site and install.

F. Project Site Installation and Testing

1. Install as specified herein. Perform specified adjustment procedures. Provide test equipment and test according to procedures specified herein. Request verification of project Site test in timely manner.

G. Verification of Submitted Test Data

1. Re-test in presence of designated representative(s) of the Owner at reasonable mutual convenience. Provide services of the designated supervisor and an additional technician familiar with work of this Section. Provide all test equipment. Provide complete set of latest stamped submittals of record for reference. Provide complete set of Shop and Project Site Test Reports, as applies. Provide a complete set of manufacturer's original operation, instruction and service manuals for each equipment item for reference.

H. Reference/Project Record Documents

1. At all times when the work is in progress, maintain at the workplace, fabrication shop or Project Site as applies, a complete set of the latest stamped, action submittals of record for reference.

2. Also, maintain a separate, clean, undamaged set for preparation of Project Record Documents.

3. Also, maintain at the workplace a complete set of manufacturer's original operation, instruction and service manuals for each equipment item for reference.

1.10 SUBMITTALS

A. Product Data: Submit manufacturer’s product data sheets for each item of equipment in accordance with Division 1 and stamped with an arrow showing which items are being supplied on each sheet submitted. Submit 1 original and 5 reproduced sets.

B. Provide required submittal documents within 45 days of contract award and prior to ordering equipment. Do not order equipment without approval from Consultant or Architect.

C. Shop Drawings: Submit in accordance with Division 1. Prepare Drawings, including floor plans, at appropriate scale, in an AutoCAD, Release 2014 format or later. Refer to Division 1 for submittal format. Architect and Consultant will not provide any electronic (CAD) contract drawings in electronic format except the backgrounds for AV Installers use in preparing shop drawings. All shop drawings must be AV Installers own work-product. Submit shop drawing information at one time, partial submittals may not be accepted. Information shall include, but not be limited to:

1. Wiring diagrams. Complete, detailed wiring diagrams for each system, including cable types, identification and color codes, and detailed wiring of connections and specified terminal strips, both at equipment racks and wiring in conduit.

2. Floor plans indicating device location and connecting conduit. Verify conduit sizing shown on Drawings is adequate to handle proposed quantity and routing of cables. All devices must have a unique identifier indicating:
   a. Box description
   b. Box Type
   c. Size
   d. Location (wall, floor, ceiling)
   e. Mounting elevation.

3. Submit conduit riser diagrams showing required conduits and junction boxes along with types and quantities of cables to be contained in each conduit. Show details of weatherproofing, lightning protection and grounding, strain relief and cable support and fire stop protection and wall penetrations through all rated partitions

4. Patch panel layouts and designation (labeling) strips, including color schemes at full scale.

5. Consoles, enclosures, racks, supports, console table and mounting.

6. Field device mounting details. Include hardware types and load capacity. Structural information to include design calculations and copy of independent structural engineer’s seal indicating review for overhead safety and compliance to specifications.

7. Custom Enclosure Shop Drawings, including material list, mounting hardware information, and weatherizing method.

8. Equipment.
   a. Location of equipment in racks, consoles, or on tables, with dimensions; wire routing and cabling within housings.
   b. AC power outlet and terminal strip locations.

9. Provide complete shop drawings on custom fabricated plates or panels. Drawings to include component types, hardware, engraving information and plate material and color and submitted at full scale.

10. A complete schedule of proposed construction operations for approval. The schedules of subcontractors, transportation, storage and other matters affecting the work shall be accounted for on the project schedule. This schedule shall be coordinated with the project's master schedule at time of submission.

11. Representative equipment labeling sizes, styles, and numbering.

12. Schematic drawings of custom circuitry or equipment modifications, including connector pin outs and component lists.

13. Material list of equipment to be furnished, arranged in specification order. Follow list with catalog data sheets, arranged in specification order, of equipment to be furnished. Where data sheet shows more than one product, indicate the proposed equipment with an arrow or other indicating symbol. Include the following information:
    a. Device ID code
    b. Manufacturer
    c. Model Number
    d. Quantity
    e. UL, ETL, or other approved listing.

14. Proposed cable labeling technique with samples of each type of label to be supplied.

15. Samples as required in specification paragraphs.

D. Programming Submittals

1. Control Programming Scheme Submittal
    a. Provide a password-protected link to a folder on the Contractor's network to remotely access the touch panel from the Consultant's computer. Contractor is to have a dedicated control processor utilized on their network.
    b. Provide a graphic layout of each user control interface (touch panels, push buttons, etc.).
    c. Provide a list of devices that are controlled by each control user Interface, including:
        1.) Device.
        2.) Brand.
        3.) Model Number.
        4.) Control Method.
    d. Provide a logic tree for each page for each control interface.
    e. Provide a system routing sheet for each control user interface, including:
        1.) Source.
        2.) Switcher / device input.
        3.) Switcher / device output.
        4.) Final destination.
    f. Provide a narrative explaining the function of each control interface.
    g. Provide help file content on each user interface.

2. DSP Programming Submittal

1.11 An overall system flow diagram. This includes the location of each component (DSP controller, I/O boxes, control panels, etc.) and the interconnection of the system components.

a. Provide a schematic diagram of the DSP programming including:
   1.) All inputs and outputs in the system
   2.) All routing, equalizers, processing objects, monitoring points, etc.
   3.) I/O control points and methods for DSP control.
   4.) If using a distributed DSP system (like BSS) then include individual box diagrams as well as an overview of the inter-relationship of all boxes.
b. A list of Ethernet and/or RS232 controlled DSP devices in the program
c. Screen shots of all DSP user control pages with a description of the function for each control.

B. Shop and Project Site Test Reports

1. Schedule: Submit test reports in a timely manner relative to the Project schedule such that the representative of the Owner may conduct Verification of Submitted Test Data without delay of progress.

2. Shop test report: Submit prior to shipping completed equipment racks to Project Site.

3. Project Site test report: Submit project site test report for this section after system completion and prior to Acceptance Review and Testing.

4. Content: Include at least:
   a. Time and date of start of burn-in.
   b. Time and date of test.
   c. Personnel conducting test.
   d. Test equipment, including serial and date of calibration.
   e. Procedures used.
   f. Results of test - numerical or graphical presentation.

C. Contract Close-out Submittals

1. Project Record Drawings (As Built Drawings).

2. Prepare and submit in accordance with requirements of Division 1. Maintain complete set of Drawings at jobsite, note changes made during installation, and submit corrected set showing Work as installed in accordance with Division 1 requirements.
   a. Provide (4) sets of drawings in AutoCAD release 2014 format, or later, and in PDF format, both on CD-ROM.
   b. Provide (2) copies of all software used for programming system equipment on CD-ROMs as needed to Owner including the compiled and uncompiled programs and all programming languages.

3. Submit the following data for review, prepared as indicated, at least one week prior to acceptance testing (exceptions noted):
   a. System Reference Manual: Furnish copies as required in Division 1, in 3-ring binders with clear vinyl pockets on cover and spine for project title. See Section 1.13 for training and manual requirements.
   b. Training Submittal including:
      1.) User training manual
      2.) Agenda for training
      3.) Verification of completion of all punch list items prior to scheduling training.
   c. Warranty Certificates in compliance with Division 1 requirements.
   d. Service Information, including service phone number(s) and hours; service schedule;

description of products recommended or provided for maintenance purposes, and instructions for the proper use of these products.

1.12 CUSTOM SOFTWARE

A. Introduction:

1. Proprietary software provided for the Technical Systems shall be subject to this software license between the Contractor and the Owner as an essential element of the system as defined in the system specification and associated documents, drawings and agreement.

2. Contractor shall agree that 3rd party proprietary software provided with the system shall be subject to this agreement.

3. Contractor and Owner agree that this software license is deemed to be part of, and subject to, the terms of the Agreement applicable to both parties; and shall supersede any standard manufacturer or Contractor's standard license agreement.

4. Proprietary software shall be defined to include, but not be limited to, device and system specific software and firmware designed to run on conventional computer based operating platforms as well as all micro-processor based hardware used to program, setup, or operate the system or its components.

5. For sake of this agreement, MS Windows® shall not be considered "proprietary" software, unless a non-public version of Windows® or any of its components are critical to the operation of the system in which case it shall be deemed proprietary.

B. License Grant and Ownership:

1. Contractor hereby grants to Owner a perpetual, non-exclusive, site license to all software for Customer's use in connection with the establishment, use, maintenance and modification of the system implemented by Contractor. Software shall mean executable object code of software programs and the patches, scripts, modifications, enhancements, designs, concepts or other materials that constitute the software programs necessary for the proper function and operation of the system as delivered by the Contractor and accepted by the Owner.

2. Except as expressly set forth in this agreement, Contractor shall at all times own all intellectual property rights in the software. Any and all licenses, product warranties or service contracts provided by third parties in connection with any software, hardware or other software or services provided in the system shall be delivered to Owner for the sole benefit of Owner.

3. Owner may supply to Contractor or allow the Contractor to use certain proprietary information, including service marks, logos, graphics, software, documents and business information and plans that have been authored or pre-owned by Contractor. All such intellectual property shall remain the exclusive property of Owner and shall not be used by Contractor for any purposes other than those associated with delivery of the system.

C. Copies, Modifications, and Use:

1. Source code shall be available to Owner for a period of not less than 10 years.

2. Owner may make copies of the software for archival purposes and as required for modifications to the system. All copies and distribution of the software shall remain within the direct control of

Owner and its representatives.

3. Owner may make modifications to the source code version of the software, if and only if the results of all such modifications are applied solely to the system. In no way does this Software License confer any right for Owner to license, sublicense, sell, or otherwise authorize the use of the software, whether in executable form, source code or otherwise, by any third parties.

4. All express or implied warranties relating to the software shall be deemed null and void in case of any modification to the software made by any party other than the Contractor or Owner's Third- Party Programming firm.

D. Warranties and Representations:

1. Contractor represents and warrants to Owner that: It has all necessary rights and authority to execute and deliver this Software License and perform its obligations hereunder and to grant the rights granted under this Software License to Owner; The goods and services provided by contractor under this Software License, including the software and all intellectual property provided hereunder, are original to Contractor or its subcontractors or partners; and the software, as delivered as part of the system, will not infringe or otherwise violate the rights of any third party, or violate any applicable law, rule or regulation.

2. Contractor further represents and warrants that, throughout the System Warranty Period, the executable object code of software and the system will perform substantially in accordance with the System Specifications and Agreement. If the software fails to perform as specified and accepted all remedies are pursuant to the policies set forth in the Specification and in the Agreement. No warranty of any type or nature is provided for the source code version of the software that is delivered as is.

3. Except as expressly stated in this Agreement, there are no warranties, express or implied, including, but not limited to, the implied warranties of fitness for a particular purpose, of merchantability, or warranty of no infringement of third party intellectual property rights.

1.13 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall bear costs of all shipping to the site, and of all unusual storage requirements. Make appropriate arrangements, and coordinate with authorized personnel at the site, for the proper acceptance, handling, protection, and storage of equipment so delivered.

B. The Contractor shall be responsible for insuring all equipment and installation materials stored in their shop facilities until it is delivered to the Project Site and a delivery acknowledgement is received from the Owner or its authorized representative.

C. The Contractor shall be responsible for furnishing a temporary substitute for equipment that could not be delivered in time for system operation. All costs associated for renting, shipping and handling temporary substitute equipment shall be the responsibility of the Contractor.

D. In the event the equipment or installation material delivery is delayed, the Contractor must employ the fastest means of delivery service available to deliver the equipment on time. All costs for expediting the delivery of equipment shall be the responsibility of the Contractor.

E. Deliver completed, wired, tested equipment racks to associated equipment rooms at the Project Site when major work of all other separate contracts is complete, equipment room ventilation is operating with clean filters in place, the area is clean and free from airborne contaminates, and continuing work of other trades will not produce airborne contaminates or permit transport of such airborne contaminates to the

equipment rooms.

F. All equipment and installation material delivered to the Owner shall be properly documented in the form of delivery receipts.

G. Replace all damaged or defective work or material at no additional cost, prior to acceptance.

H. Check, and if necessary, clean all systems, equipment, devices and components included in the work after acceptance and completion of the work of all other trades.

I. Provide and maintain suitable barriers, guards, fences and signs wherever necessary for the safety of others relative to and/ or for the protection of this work.

J. Protect all materials and equipment to prevent the entry or adhesion of concrete, plaster, unintended paint, or other damaging debris of materials.

1.14 SCHEDULING

A. Comply with the Project schedule

B. Make all Submittals specified herein in a timely manner. Failure to make timely submittals complete as specified herein is considered to be lack of substantial progress of the Work of this Section.

C. Deliver all equipment, devices and materials required for the Work of this Section

D. and install, test and ready all work for Acceptance Testing at least fourteen days prior to the completion date for the associated area of the Project, unless specifically instructed otherwise by the Owner.

E. Temporary Equipment: Provide and operate, without claim for additional cost or

F. time, temporary equipment and/or systems to provide reasonably equivalent function, as determined by the Owner, in lieu of the Work of this Section which is incomplete or found not in conformance with the Contract Documents as of seven days prior to the completion date. Provide such temporary equipment until Acceptance of the Work of this Section. Thereafter, remove such temporary equipment.

G. It shall be a common understanding that there is a time constraint when executing

H. this work. The Contractor shall use all means and resources to complete this project on or before the specified schedule at no additional cost to the Owner. This includes working beyond normal business hours and days, additional manpower, additional tools, etc.

1.15 WARRANTY

A. Warrant all Work of this Section to be free from defects in materials and

B. workmanship for a minimum of 1 year from the date of Owner acceptance, which shall be agree in writing by owner and contractor, of the Work of this Section.

C. All manufacturers' equipment warranties shall be activated in the Owner's name

D. and shall commence on the date of system acceptance. In the case of Contractor modified equipment, the manufacturer's warranty may be voided. In such cases, provide a warranty equivalent to that of the original manufacturer.

E. All high-level software shall follow the warranty conditions specified by the

F. manufacturer. Immediately update or upgrade the Owner's installed software as soon as new versions, updates or patches become available from the manufacturer at no additional cost to the Owner within this warranty period.

G. Response Time: Provide a qualified technician familiar with the work at the

H. Project Site within 12 hours after receipt of a notice of malfunction. Provide the Owner with the telephone number attended 8 hours a day, 5 days a week, and an answering service or equivalent facility attended 24 hours a day, 7 days a week, to be called in the event of a malfunction. Provide repairs at no expense to the Owner and at the Owner's request, alternate facilities, services and systems for the duration of the repairs to any defective work of this Section. Provide a complete and operational System, within 48 hours after notification of a malfunction.

I. All work requested due to warranty issues shall be performed during regular

J. working hours unless the Owner agrees to pay the difference in labor rates for overtime or night time work.

K. The Contractor shall use qualified service personnel to respond to all warranty issues or calls.

L. Off Site Service: Conduct all warranty repairs and services at the Project Site,

M. unless in violation of manufacturer's standard product warranty. Provide substitute systems, equipment, and/or devices acceptable to the Owner for the duration of off-site repairs. Provide transportation for substitute and/or test systems, equipment, devices, materials, parts and personnel to and from the Project Site.

N. Warranty replacement and service does not apply to Owner furnished equipment.

1.16 TRAINING

A. General

1. Conduct training on the completed system at a reasonable convenience of the Owner during normal Owner business hours. Contractor is to assess the complexity of the system and will be held responsible to fully train the operation and maintenance staff named by the Owner.

2. Do not start training until all systems have been commissioned, training manuals are approved and an agenda along with schedule of each departmental training session has been submitted.

3. Training will be conducted in the actual room that is the topic of the training session.

4. Provide an agenda with proposed dates/times/locations for training 1 week minimum prior to beginning training.

B. Operator Training – Do not start training before system is in full operation and all components have been signed off by owner's representative. Use the items covered in the commissioning portion of this specification as a basis for the training curriculum.

1. At least six (6) two (2) hour sessions of instruction will be given to familiarize the Owner with

the operation of the system. Each training session shall be recorded digitally and one (1) copy of the recorded sessions shall be provided with each owner's manual on a USB flash drive.

C. Maintenance Training

1. At least one 4-hour session of instruction will be given in order to learn how to maintain and troubleshoot the system. A maintenance binder shall be provided by the Contractor with all manufacturer-specific operating and maintenance information for each piece of equipment used. The binders shall be sub-divided into individual audio, video and control binders. Provide training on at least the following system features:
   a. Firmware upgrades
   b. Helpdesk features
   c. Complete use and operation of the systems plus advanced troubleshooting.

D. A training manual specific to this system will be written covering the basic and advanced functional techniques necessary to operate the system in a reliable and fully-functional condition. The Contractor will submit color copies of the training manual. This manual will include:

1. All contact information, including emergency and after hours phone and pager numbers, for requesting service assistance from the Contractor.
2. A 11x17 set of as-built drawings of the completed project (a full-sized set will be issued to the client for their use, a half-size set will be attached to the inside back door of the main equipment rack).
3. A table of contents at the beginning of the manual.
4. The manual will begin by explaining basic information such as manual references, abbreviations, any assumptions made by the author, prerequisites required, numbering convection, etc.
5. It will cover the basics of the software used to create the user interface including start up and shut down procedures, log on procedures, access privileges, operator password, levels of security, file structure, etc.
6. The manual will describe each user interface and its function. It will cover every layer of the interface and how to navigate through them.
7. Each of the system presets will be explained and the physical setup of the equipment and floor plan during presets will be illustrated. Source equipment shall have their routing scheme explained and illustrated.
8. Portable equipment and its connection to the system shall be explained and illustrated.
9. The manual will end by explaining basic troubleshooting procedures and equipment care instruction.
10. The Contractor's maintenance instructions, which will include the manufacturer's maintenance instructions found on the factory manuals to keep the manufacturer's warranty in force.
11. A list of consumables (lamps, fuses, batteries, etc.) required to keep the system operating over time, along with sources of supply (if not readily available).
12. Recorded training sessions.

E. Initial Use Support

1. Provide standby trainer/system engineer during the first two public events.

1.17 COMMISSIONING

A. The goal of this phase is to demonstrate the functionality of the completed system meets the requirements of a finished and fully commissioned project prior to Owner turnover and user training begins.

B. Commissioning shall take place after performance testing is complete, all systems meet the performance requirements, and any testing failures have been corrected.

C. Contractor is to demonstrate to the Consultant the operational functionality of all systems applicable under this scope including:

1. Audio systems DSP programming and user interface, speaker systems and amplification, input sources, portable equipment, typical use scenarios, and other functions as required in the design documents.

2. Video systems operation and setup, user interface, portable equipment, typical user scenarios, and any other functional as required in the design documents.

3. Video Distribution and IPTV systems setup and operation.

4. Control systems functionality and user interface including touch screens, control panels, and computer interfaces.

5. Other sub-system and specialty systems (video conference, broadcast, etc.) included in this scope of work.

6. Intercom and communication systems setup and use.

7. Facility interconnect features, setup, and use.

1.18 MAINTENANCE

A. The Contractor shall, within the warranty period, schedule two visits to inspect and perform preventive maintenance on the system. The first visit shall be six months after the commencement of the warranty period. The last visit shall be just prior to the end of the warranty period.

B. Return 90 to 120 days after the system has been turned over to the Owner for additional programming, maintenance and system fine-tuning. Conduct interviews with the user group to acquire information needed to complete this task. Allow for one full day of programming in your initial bid to complete. Provide a per hour programming fee that will be charged if additional programming is needed.

C. Cache for event logging needs to be unlimited until the Contractor's first maintenance site visit. After the Contractor's first maintenance site visit, the cache can be limited to the Owner specified level.

D. The Contractor shall use qualified service personnel to conduct all maintenance work.

PART 2 PRODUCTS

1.19 ACCEPTABLE MANUFACTURERS

A. To provide uniformity with the Owner's other properties the equipment specified shall be the exact equipment provided and no substitutions will be allowed. The only exception will be in the case where a particular product is no longer available in which case the Contractor shall inform the Consultant and request a substitute product be specified.

B. The brand name and model number(s) mentioned are used in this specification as a measure of quality and performance. Any brand or manufacturer equipment of equal or better quality and performance than that specified will be considered for acceptance by the Architect and Consultant at time of Bid. However, the Architect and Consultant reserve the right to reject and deny any substitution that it may, in its sole discretion, deem unequal, and the findings in this regard shall be accepted by the bidder as final and binding. Substitutions must be coordinated to fit the allocated spaces, power requirements, and required use and all costs to substitute shall be borne the AV contractor including structural or architectural changes if approved.

C. Substitutions may be submitted in writing for approval at the time of bid only. Bid only the listed items and approved substitutions. Where more than one manufacturer is listed, bid the same manufacturer throughout the project.

D. Substitutions for specified equipment will be considered subject to review and acceptance of complete technical data, samples, and results of independent testing laboratory tests of proposed equipment, submitted as follows. Provide a cover sheet with specified equipment and proposed substitution. Provide cut sheet of both specified and proposed substitute equipment for easy comparison. Substitution request will be reviewed by owner, architect and consultant and returned with comments.

1.20 GENERAL

A. All Contractor provided equipment and materials shall be new, latest version at time of bid, and shall conform to applicable UL, CSA, or ANSI provisions. Evidence of unauthorized re-manufactured, or "B" stock equipment on the project site will be deemed evidence of the contractor's Failure to Perform the Work. Take care during installation to prevent scratches, dents, chips or disfiguration and correct minor scratches with manufacturer's approved finish.

B. Regardless of the length or completeness of the descriptive paragraph, each device shall meet published manufacturer's specifications. Verify performance as required. All quantities are to be obtained from the AV drawings unless otherwise noted herein. In any event, if there is a discrepancy in the quantities, provide the greater number of the two.

C. In the event that a specified piece of equipment or product has been superseded, discontinued or is no longer available from the manufacturer, the Contractor shall submit a request for substitution of the originally specified product. The substitute product shall be the manufacturer's most current model of the specified product, or if the line has been discontinued, a product by the same manufacturer with specifications meeting or exceeding, and as close as possible to those of the originally specified product.

D. The Contractor shall defer purchase of equipment, including computers, touch panels, flat panel, displays and video projectors with short market life expectancy and is scheduled for installation more than 8 months after bid has been awarded.

1. Two months prior to its installation, the Contractor shall submit for the Consultant's approval, a list of the equipment that has replaced or superseded the specified equipment.

2. The submittal will include the manufacturer's specification sheets and other documentation to verify that the equipment meets the standards of the original specification.

E. Provide all auxiliary and incidental materials and equipment necessary for the operation and protection of the Work of this Section as if specified in full herein.

F. Safety Agency Listing

1. All devices provided under the Work of this Section that are connected to the Project electrical system shall be listed by Underwriters Laboratories (UL) or other Nationally Recognized Electrical Testing Laboratory acceptable to the Authorities having jurisdiction at the Project site, and shall be so labeled. Absent such listing, comply with Regulatory Requirements applicable to Unlisted Equipment.

2. Unlisted Equipment - Certain equipment specified herein may not bear listing by a Nationally Recognized Testing Laboratory. Such equipment is specified herein only where no equipment is known to exist bearing such listing which that perform the function required by the Owner. In such case, apply for field inspection of such equipment by a recognized agency such as ETL. The Contractor is responsible for the payment of such inspection costs.

G. Power Rating and Circuit Protection

1. All devices provided under the Work of this Section that are connected to the Project electrical system shall provide stable performance in full accordance with these specifications when operated on main service which complies with ANSI standard tolerances for voltage, frequency, transients and related parameters.

2. All active devices shall have integral fuse or circuit breaker protection.

3. All circuit breakers shall be fully magnetic.

4. Protection devices shall be located to facilitate examination, resetting and/or replacement without the need to disassemble or demount the associated device.

5. Contractor-fabricated items shall be provided with either indicating type circuit breakers or fuses of the clear glass cartridge type, mounted in fuse holders which will indicate a blown or defective fuse.

1.21 CONSTRUCTION

A. All electronic equipment shall be of the "dead-front" type and shall be designed for standard 19" EIA rack mounting, unless otherwise indicated.

B. Install all rack mounted equipment with non-corrosive 10-32, Phillips head machine screws with flat non- scuff washers protecting equipment panel.

C. Some rack mounted equipment may require shaft locks, covers, or removal of knobs; provide and install during Acceptance Testing.

D. Custom rack panels shall be 0.125-inch thick aluminum, standard EIA sizes, brushed and black anodized finish unless noted.

E. Custom connector plates (speaker, microphone, etc.) are typically 6061-T6 aluminum for indoor use, and stainless steel for outdoor use. The Contractor is responsible to verify plate finish with Architect.

F. Approved Labeling:

1. 125 aluminum or steel panel and plate lettering shall be engraved 0.125-inch block sans serif character unless noted. On dark panels or pushbuttons, use white letters; use black letters on stainless steel or brushed natural aluminum or a contrasting color as required by plate finish.

2. Thin panels, such as stainless steel, an engraved lamacoid or permanent adhesive plastic may be used.

3. Equipment labels can be engraved lamacoid or permanent adhesive plastic labels. Lettering shall be a minimum of .125-inch block sans serif character unless noted.

4. On dark panels or pushbuttons, use white letters; use black letters on stainless steel or brushed natural aluminum or a contrasting color as required by plate finish.

5. A sample of each type of label and material shall be submitted to the Consultant for approval prior to manufacture.

G. Connections shall be made with approved connectors. Per IEC-268 standard, all XLR connectors not mounted on equipment shall be wired pin 2 hot (high), pin 3 low, and pin 1 screen (shield).

H. Mounting Hardware exposed to the weather shall be aluminum, brass, or epoxy painted galvanized steel or stainless steel. Apply corrosion inhibitor to all threaded fittings.

I. Connections shall be made with approved connectors and/or terminal blocks equal to Wago 280 series as noted herein. “Interlocked” switches shall be mutual release blocking type. Mount trim potentiometers, custom circuit cards, relays, and transformers (except large 70V units) in shielded enclosures, and mark their function and connections with approved labels.

J. Provide approved labels at the front and rear of all rack-mounted signal processing equipment. Mount labels on the equipment rack or equipment chassis, and attach in a neat, plumb, and permanent manner. Label equipment with schematic enumeration reference, and with descriptive information regarding its function or area it is serving. Similarly, provide labels at the rear only of equipment mounted in furniture consoles.

K. Key all boxes, cabinets, enclosures, panels, controls, doors and related provided for similar usage within a system identically. For each unique key type, provide a quantity of ten. Stamp each key with a reference designation.

L. The contract specifications generally list all major equipment, but do not include items generally categorized as miscellaneous installation material, supplies, and custom assemblies. The contractor shall furnish and install all required equipment, devices and other materials, even though not specifically mentioned herein, which are necessary for the proper operation of each system so that each system shall perform the functions herein in compliance with all other specified requirements. Items in this category include, but are not limited to the following:

1. Electrical power wiring and wiring devices.

2. Signal ground wiring and wiring devices.

3. Cable designation strips and labels.

4. Jackfield designation strips and labels.

5. Equipment and other labels and designations.

6. Cable ties and lacing devices.

7. Speaker, monitor, and camera mounting brackets and supports.

8. Miscellaneous hardware such as rack screws and washers, bolts, nuts, brackets, isolated mounts, mounting plates, plugs, connectors, heatshrink etc.

9. Video, audio, RF, and related signal termination devices including BNC 75-ohm terminators, audio resistive termination, etc., where required by the project.

1.22 AUDIO EQUIPMENT

A. Ceiling Speakers

1. Provide with required installation hardware including Tile Bridge and supports

2. Models
   a. JBL 16C/T
   b. Lowell LCT81CT
   c. Pre-Approved equal

B. Power Amplifier

1. Models
   a. Crown Drive Core CD4/300
   b. JBL CSA 180Z
   c. Pre-Approved equal

C. DSP Processor

1. Models
   a. BSS Soundweb London
   b. Approved equal

1.23 Video Distribution

A. Flat Panel Display - Contractor shall provide mount, back box and installation labor in addition to labor to make the system work.

1. LED L.C.D. (liquid crystal display) technology

2. HDMI input

3. Option for external speaker output

4. Coordinate size with owner

5. Digital signage device shall be mounted behind flat panel

6. Display Sizes: As Noted

7. Models

    a. Samsung
        1.) LH82BENELGA/ZA
        2.) LH75QBNEBGC/GO
        3.) LH49DBJPLGA/GO
        4.) Pre-Approved Equal

B. Video Projectors
    a. Epson L1405U
        1.) ELPU03 Short Zoom Lens
        2.) PowerLite 2247U
    b. Pre-Approved Equal

C. Control Equipment and Programming

1. Audio/video equipment will be connected to and controlled by touch screens, Key Panels or web page as indicated on the drawings. Control elements include input selection, power control, volume, transport controls, channel selection, and operational modes.

    a. Modero MD1002
    b. Modero MT-1002
    c. Massio MKP-108

1.24 FINISHES

A. Any item or component of the Work of this Section which is visible shall comply with the following. Finishes noted or scheduled on the Contract Drawings shall take precedence. Submit all color samples of all items visible to public for approval.

1. Where finishes are not noted or otherwise defined in the Contract Documents, submit manufacturer's standard finish samples for selection by the Owner.

2. Paint loudspeaker cabinets to match exactly the surrounding and adjacent surfaces. Submit paint sample to Owner’s representative for approval.

3. Unless otherwise noted, receptacle or device plates subject to connection or operating force shall be stainless steel or hard anodized aluminum. Provide plates which generally match the appearance of project standard receptacle or device plates in view in the same area. For anodized aluminum, submit samples of standard colors for selection by Owner.

4. Operating panels shall be steel, primed, painted with thermosetting epoxy paint, with legends silk- screened in contrasting color, and coated with clear epoxy thermosetting coating; or aluminum, hard anodized, with legends engraved and filled with contrasting color, all coated with clear epoxy thermosetting coating.

5. All steel surfaces shall be treated with primer equivalent to zinc phosphate and finish painted with baked enamel or painted with a thermo setting epoxy paint.

6. All aluminum surfaces, except those used as operating surfaces, shall be anodized and then painted with a thermo setting epoxy paint.

7. Match the finish of the screws used to mount the custom fabricated plates with the finish of the custom fabricated plate.

B. Ceiling Loudspeaker Grilles

1. Paint loudspeaker grilles to match exactly the surrounding and adjacent surfaces (when speakers are recessed). Apply paint to permit servicing of loudspeakers without damage to finish of adjacent or adjoining surfaces. Provide uniform appearance. Do not obstruct grille openings with paint. Submit paint sample to Owner's representative for approval.

PART 2 - PART 3 EXECUTION

2.1 GENERAL

A. Perform the Work of this Section in accordance with acknowledged industry and professional standards and practices, and the procedures specified herein.

B. Furnish and install (herein, "provide") all materials, devices, components, and equipment required for complete, operational systems.

C. Contractor is to supervise the installation of back boxes and terminal cabinets installed by the Division 26 Contractor.

D. Contractor is to verify that correct boxes are installed in their proper locations before any drywall has been installed.

2.2 EXAMINATION

A. Immediately report to the Consultant any discrepancies between the specifications and drawings. This includes discrepancies between the technical specification documents and actual field dimensions or findings that may hinder installation work, conflict with other trades, or cause delays.

B. Carefully examine all details that affect all aspects of the systems described in the specifications and drawings.

1. Examine, coordinate and confirm all drawings and details.

2. Examine, coordinate and confirm all electrical power requirements, conduits, raceways, boxes, etc.

3. Examine, coordinate and confirm work of other trades that may influence the outcome of the design, specification, and performance of the systems.

2.3 PREPARATION

A. Coordinate work with other trades to avoid causing delays in construction schedule.

B. The process of acceptance testing the System may necessitate moving and adjusting certain component parts (i.e.), loudspeakers. Provide for ±5 degrees of adjustability from initial aiming angle and perform such adjustments without claim for additional payment.

C. Seismic restraints: Abide by all the seismic restraint requirements described in all applicable building codes in force at the work site. If no provisions exist for a particular situation, follow these guidelines:

1. Fixed equipment: Mount and brace to the building structure to minimize potential hazards to personnel and damage to property during any kind of seismic event.

2. Floor mounted equipment: Bolt equipment securely to the floor to prevent from toppling during any kind of seismic event

3. Equipment racks with casters: Provide top and bottom restraints with one end secured to the back wall and the other end secured to the back of the rack. This shall prevent the rack from rolling out by itself during any kind of seismic event.

4. Vertical-mounted columns: Apply braces to the vertical column in four opposing directions back to the mounting surface. This will minimize sway in any direction. Provide a separate, flexible restraint (e.g. aluminum braided aircraft cable) with a capacity of 5 times the weight of the total mounting system. The same applies to the anchor to which the flexible restraint is attached and the method of attachment to the structure.

5. No equipment, equipment supports, or mounts must fail before the structure fails.

6. Seismic restraint measure must not interfere with fire stopping.

7. Notwithstanding compliance with these minimum recommendations, it is the Contractor's responsibility to ensure that the seismic restraint measures taken are adequate for the circumstances, including, if required, verification by an independent structural engineer. The cost of all such engineering shall be the responsibility of the Contractor.

8. Penetration of the Slab: Verify that any mounting or restraint work that requires deep or thorough penetration of the slab shall not damage embedded materials including, but not limited to, slab tensioning devices or conduit. Verify the slab by X-ray or other method before proceeding. The Contractor shall be responsible for all costs associated with this investigation.

D. Radio Frequency Practices: Contractor shall survey the area around the project in relation to existing RF sources, which may radiate RF signals into the project. Contractor shall be responsible to determine and select the operating frequencies of all RF specified products. Contractor shall determine the operating frequencies of all existing or new owners provided RF projects and determine the best operating frequencies so that the specified products operate properly and are free of interference problems.

E. Protect all existing work surfaces, furniture, equipment, fixtures and etc. before commencing installation work. Any damage to the existing physical and electrical property due to installation work shall be the responsibility of the Contractor.

F. Ensure that all equipment rack and equipment locations are clean before commencing installation work.

2.4 INSTALLATION

A. Mount equipment and enclosures plumb and square and affixed to floor or wall as appropriate. Permanently installed equipment to be firmly and safely held in place. Design equipment supports to

support loads imposed with a safety factor of at least three (five to one for loudspeaker mountings). Supply safety cables and/or seismic restraints for equipment mounted overhead or if required by code.

B. Speakers mounted in acoustical tile ceilings to be properly supported with tile bridges or other similar structural bracing.

C. AC Power and Grounding

1. Coordinate final connection of power and ground wiring to racks. Hardwire power wiring directly to power contactors or internal AC receptacles to ensure uninterrupted operation.

2. Install 3-conductor, isolated ground, 120 VAC outlets in each rack. Provide a minimum of two spare outlets in each rack. Label each outlet as to which AC circuit is feeding it and provide the same information in the circuit breaker panel.

3. Install a 1-inch by 1/4 inch copper ground buss bar in each rack, insulated from the rack. Ground equipment chassis not having a three wire power cord to these busses using 6/32 nuts, bolts and

2.5 lock washers with No. 12 wire. Connect green ground wire from each AC outlet in rack to this buss bar.

A. Signal Grounding Procedures

1. Comply with National Electrical Code.

2. Unless otherwise noted maintain a unipoint ground scheme.

3. Signal and electrical system grounds shall be isolated except at the Project ground field connection.

4. Equipment enclosures shall not be permitted to touch each other unless bolted together and electrically bonded.

5. Ground and bond equipment racks and similar equipment enclosures containing powered equipment exclusively via the Isolated Ground conductors provided under Division 26. INSULATE RACK MOUNTING, ANCHORAGE, AND RACEWAY CONNECTIONS.

6. At each rack, provide an Isolated Ground bus within the rack. At each rack provide a lug bonded to the rack frame with a #8 TW stranded wire to the rack Isolated Ground bus.

7. At each ensemble of racks, provide a single labeled Isolated Ground tubular-clamp bus bar terminal strip to land the individual rack Isolated Ground bus ground conductors. Connect the main Isolated Ground conductor from the Technical Power panel board at this point.

8. Equipment signal ground shall be to the Isolated Ground System via the green wire of the equipment power cord. Where equipment uses two wire power cord, provide #12 green bond wire to rack IG bus bar. At equipment, provide crimp lug and suitable hardware for bonding.

9. Shielded cables of this section shall be grounded exclusively to Isolated Ground by a single path. Shield shall be tied to Isolated Ground at one end only, i.e., at the low potential (receiving) end of run, unless otherwise noted.

10. Unless otherwise noted, utilize isolated ground patchbays.

11. Signal Ground provisions shall realize less than 0.15 ohms to the primary ground connection.

B. Equipment Racks

1. Combustible material, other than incidental trim of indicated equipment, is prohibited within equipment racks.

2. Provide a permanent label on the front of each equipment rack including the rack designation, and the circuit breaker number and associated electrical distribution panel designation servicing same.

3. Within each equipment enclosure, provide a full-height multi-circuit ISOLATED

4. GROUND outlet strip with branch circuit count as shown on drawings; locate on the left side of the equipment enclosure, as viewed from the rear. In each enclosure provide number of receptacles required by present and future equipment indicated on drawings, plus at least two spare receptacles. Provide flexible steel raceway and junction box for connection of power service. Bond internal raceway to rack frame.

5. Provide permanent labels for all equipment and devices. Where possible, fasten such labels to the rack frame or to blank or vent panels which will remain in place when active equipment is removed for possible service.

6. Mount equipment in racks and consoles and fully wire and test before delivery to job site. If field conditions prevent prior assembly of racks, notify Consultant in writing that racks will be fabricated on site and the reasons for the change.

7. Looking at the rack from the rear, locate AC power, digital control, DC control, and speaker wiring on the left; microphone, line level audio, and video wiring on the right. Panels or equipment mounted on the rear rack rails shall not block access to any front mounted components.

C. Loudspeaker Assembly Installation

1. Loudspeakers:
   a. Verify proper installation of loudspeaker enclosures and related support.
   b. Verify that no loudspeaker assembly is subjected to stresses or loading effects in any way contributing to possible extraordinary failure.
   c. Connect loudspeaker assemblies to the appropriate 70 volt-line transformer tap as applies. Verify specified polarity. Use insulated crimp connectors or insulated "bobtail" splices applied with manufacturer's recommended ratchet tooling. Wago Wall-Nuts 773 Series or equal are acceptable. Wire nuts or "Scotchlock" connectors shall not be acceptable.
   d. Verify that loudspeaker grille openings and loudspeaker components are clear of paint after finishing.
   e. Perform preliminary loudspeaker tests specified herein. Correct non-conforming conditions.
   f. Adjust 70 volt-line transformer taps as required to realize uniform sound pressure level as specified herein. Document final 70 volt-line transformer taps on the Record Drawings.
   g. Correct all conditions giving rise to noise, rattle or other extraneous sounds owing to operation of a loudspeaker assembly under any specified operating condition.

D. Packaged Loudspeakers:

1. Design, engineer and provide complete, all means of support, suspension, attachment, fastening, bracing, and restraint (hereinafter "support") of packaged loudspeakers. Provide engineering of such support by parties licensed to perform work of this type in the Project jurisdiction. Submit

in timely manner.
a. Comply with applicable Code and the requirements of the Authorities having jurisdiction.
b. Provide safety factor greater than six or as required by Code, whichever is greater.

2. Mounting shall:
a. Permit each packaged loudspeaker to be re-oriented at least plus or minus 5o from angles shown on the Contract Drawings for optimum coverage.
b. Maintain precise location and orientation of each packaged loudspeaker component after such adjustment when subject to vibration of loudspeaker components due to operation at full specified system output level, and when subject to normal building motion and Code defined seismic induced building motion.
c. Use rigid metal support members, such as threaded rod with locking nuts.

3. Test each packaged loudspeaker prior to installation at design locations. Test at least polarity and freedom from buzzes, rattles and objectionable distortion, using procedures specified herein. Correct non-conforming conditions.

4. Do not apply any load to building structure without first obtaining written approval of the Owner. Obtain per Project procedures.

5. During Acceptance Testing, adjust orientation of packaged loudspeakers as directed to achieve optimum coverage. Provide workers and ladders as required. Perform such adjustment with no claim for additional cost or time.

6. Do not suspend or orient the loudspeaker cluster prior to verification by the Owner or Owner's representative, that the intended location is correct with respect to as-built conditions such as the final dimensions of the space.

E. System Wiring

1. Cabling Installation
a. Take precautions to prevent and guard against electromagnetic and electrostatic hum. For line level audio signals, float cable shields at the output of source device. Shields not connected to be folded back over cable jacket and covered with heat-shrink tubing. Do not cut off unused shields.
b. Exercise care in wiring; damaged cables or equipment will not be accepted. Isolate cables of different signals or different levels; and separate, organize, and route to restrict channel crosstalk or feedback oscillation in any amplifier section. Keep wiring separated into groups for microphone and line level circuits, loudspeaker circuits, and power circuits.
c. Contractor shall furnish and install the necessary cable products so as to provide a complete and acceptable operating system(s) in accordance with all contract documents. All products shall be new and shall be fabricated by the Contractors into a system(s) in accordance with all contract documents.
d. Inspect all conduit bends to verify proper radius. Comply with Code for minimum permissible radius and maximum permissible deformation.
e. Apply a chemically inert lubricant to all wire and cable prior to pulling in conduit. Do not subject wire and cable to tension greater than that recommended by the manufacturer.
f. Provide a box loop for all wire and cable routed through junction boxes or distribution panels. Provide tool formed thermal expansion loops at cable at manholes, handholes and at both sides of all fixed mounted equipment. Cable loops and bends shall not be bent at a radius greater than that recommended by the manufacturer.
g. Secure all wire and cable run vertically for continuous distances greater than 30 feet. Secure

robust non-coaxial cables with screw-flange nylon cable ties or similar approved devices appropriate to weight of cable. For all other cables, provide symmetrical conforming nonmetallic bushings or woven cable grips appropriate to weight of cable.

2. Termination
   a. Terminate all field wiring in terminal boxes mounted to the walls in each equipment room prior to connection to any equipment or devices unless otherwise noted. All equipment in each equipment room shall connect to the field wiring at the appropriate terminal box. Field wiring shall not terminate directly in equipment racks unless otherwise noted.
   b. Terminate all coaxial cables on isolated bulkhead type connectors mounted on a metal strip secured to the terminal can backboard. Use proper type and impedance connector for each cable type and use (i.e., BNC for video, F-Connector for RF signals, etc.).
   c. Dress, route, and land CAT6 cables on 110-type punch down blocks and provide an adequate amount of patch cables as necessary to effect the desired work.
   d. Make connections to speaker transformers with properly sized closed end connectors crimped with factory approved ratchet type tool. Wire nut or “Scotchlock” connectors are not acceptable. Do not wrap audio cable splices or connections with adhesive backed tape.
   e. Connect loudspeakers electrically in phase, using the same wire color code for speaker wiring throughout the project.

3. Connector and Signal Polarity Convention

   a. Maintain consistent absolute signal polarity at all connectors, patch points and connection points accessible in the system. Where applicable, a positive polarity electrical signal shall yield positive acoustic pressure from the loudspeakers.
   b. Audio signal connector convention: AES14-1992 (ANSI S4.48-1992) AES standard for professional audio equipment - Application of connectors, Part 1, XLR-type polarity and gender.

PART 3 - Connector and Signal Polarity Convention:		
PART 4 - **Signal**	PART 5 - **Connector**	PART 6 - **Wire**
PART 7 - Signal Phase	PART 8 - Pin 2	PART 9 - Red or White
PART 10 - Signal Anti-Phase	PART 11 - Pin 3	PART 12 - Black
PART 13 - Signal Ground	PART 14 - Pin 1	PART 15 - Drain Wire
PART 16 - Video and RF/MATV Connector Convention:		
PART 17 - **Signal**	PART 18 - **Connector**	PART 19 - **Wire**
PART 20 - Signal Phase	PART 21 - Center Pin	PART 22 - Center Conductor
PART 23 - Signal Anti-Phase	PART 24 - Shell	PART 25 - Shield
PART 26 - Signal Ground	PART 27 - Shell	PART 28 - Shield
PART 29 - Voice/Data Connector Convention: Comply with EIA/TIA-568A		

1. Wiring Practice
   a. Identify all wire and cable clearly with permanent labels wrapped about the full circumference within one inch of each connection. Indicate the number designated on the associated field or shop drawing or run sheet, as applies. Assign wire or cable designations consistently throughout a given system. Each wire or cable shall carry the same labeled designation over its entire run, regardless of intermediate terminations.
   b. Coordinate insulation displacement (quick connect) terminal devices with wire size and type. Comply with manufacturer's recommendations. Make connections with automatic impact type tooling set to recommended force.
   c. Make all connections to screw-type barrier blocks with insulated crimp-type
   d. spade lugs. Lugs are not required at captive compression terminal type blocks. Provide

permanent designation strips designed for use with the terminal blocks provided. Make neat, intelligible markings with indelible markers equivalent to "Sharpie".

e. Tin terminated shield drain wires and insulate with heat shrinkable tubing.
f. Use only rosin core 60/40 tin/lead solder for all solder connections.
g. Dress, lace or harness all wire and cable to prevent mechanical stress on
h. electrical connections. No wire or cable shall be supported by a connection point. Provide service loops where harnesses of different classes cross, or where hinged panels are to be interconnected.
i. Horizontal wiring in rack to be neatly tied in manageable bundles with cable lengths cut to minimize excess cable slack but still allow for service and testing. Provide horizontal support bars if cable bundles sag. Neatly bundle excess AC power cable from rack mounted equipment with plastic cable ties. Rack wiring to be bundled with plastic cable ties or lacing twine. Electrical tape and adhesive backed cable tie anchors are not acceptable.
j. Termination and build out resistors and related circuit correction components shall be visible. Do not install in connector shells or internally modify equipment. Show locations on Record Drawings.
    1.) Deformed, brittle or cracked insulation.
    2.) Insulation shrunken or stripped further than 1/8-inch away from the actual point of connection within a connector, or on a punch block.
    3.) Cold solder joints.
    4.) Flux joints.
    5.) Solder splatter.
    6.) Non-grommet, non-bushed, or non-insulated wire or cable entries.
    7.) Deformation or improper radius of wire or cable
k. Correct any and all of the following unacceptable wiring conditions:

2. Cable Practice.
    a. Horizontal wiring in rack to be neatly tied in manageable bundles with cable lengths cut to minimize excess cable slack but still allow for service and testing. Provide horizontal support bars if cable bundles sag. Neatly bundle excess AC power cable from rack mounted equipment with plastic cable ties. Rack wiring to be bundled with plastic cable ties or lacing twine. Electrical tape and adhesive backed cable tie anchors are not acceptable.
    b. Wiring and connections shall be completely visible and labeled in rack. Termination resistors shall be 1/2 watt 5 percent tolerance; fully visible and not concealed within equipment or connectors.
    c. Execute wiring in strict adherence to “standard broadcast practices,” as excerpted from “Recommended Wiring Practices,” Broadcast Audio Equipment for AM, FM, Television (5th Edition), Radio Corporation of America (RCA), Camden, N.J. 1962, and appendix II, “Recommended Wiring Practices”, Sound System Engineering, (2nd Edition), D. Davis, and performed in accordance with standard professional practice.
    d. All wiring in racks to be installed to allow removal and disconnection of equipment from front of rack without having to cut wire ties and similar devices to effect removal.

3. Wiring Classification

29.2 This section does not apply if the drawings incorporate a wire pull schedule or the wirefill is noted on the drawings.

a. Audio Signal Wiring Classifications:
    1.) Type A-1: Microphone-level wiring less than -20 dBm from 20 hertz to 20 kilohertz.
    2.) Type A-2: Line-level wiring -20dBm to +24 dBm, from 20Hz to 20 kilohertz.
    3.) Type A-3: Loudspeaker-level or circuit wiring greater than +24 dBm, from 20 hertz to

20 kilohertz.

b. Video and related signal wiring classification:
   1.) Type V-1: Baseband and composite video wiring 0 to 4 volts peak-to-peak into 75 ohms, 0 to 10.0 megahertz.
   2.) Type V-2: Synchronization and switching pulse wiring 0 to 4 volts peak-to-peak into 75 ohm, 15.62 to 15.75 kilohertz.
   3.) Type V-3: Color subcarrier wiring 0 to 4 volts peak-to-peak into 74 ohms, 3.57 to 4.43 megahertz.
   4.) Type V-4: Radio communication system wiring 0.12 to 1000 UV peak-to-peak into 50 to 75 ohm, 47 to 890 megahertz.

c. Control signal wiring classifications:
   1.) Type C-1: DC control wiring 0 to 50 volts.
   2.) Type C-2: Synchronous control or data wiring 0 to 40 volts, peak-to-peak, 0 to 122,000 pfr.
   3.) Type C-3: AC control wiring 0 to 48 volts, 60 hertz.

d. Additional Wiring Classifications:
   1.) Type M-1: DC power wiring 0 to 48 VDC.

e. Notwithstanding requirements elsewhere in these specifications, the following wiring combinations are acceptable in conduit, wares, or cable harnesses.
   1.) Types A-1, C-1, and M-1.
   2.) Types A-2, C-2, and M-1 runs less than twenty (20) feet.
   3.) Types A-2, C-2, and M-1.
   4.) Types A-3, C-1, C-2, and M-1.
   5.) Types A-2, V-1, and V-3.
   6.) Types V-1, V-2, V-3, and C-1.
   7.) Types M-1 and C-3.

2. Receptacle Plate Connectors:
   a. Unless otherwise detailed herein, use the following types of panel receptacles on all connection boxes, panels, plates, and wares:
      1.) Audio (microphone): XLR-3 (female) type.
      2.) Audio input/output (line level): XLR-3 (female) type.
      3.) Audio (loudspeaker level): Neutrik speaker.
      4.) Intercom: XLR-3 (male) type.
      5.) Video: BNC type. Insulate from panel.
      6.) Camera: Triax or multi-pin bulkhead type. Insulate from panel.
   b. Receptacle Plate Designation: Clearly engrave all wall mounted receptacle plates with alphanumeric identification of input type (i.e., mic line, speaker, video, etc.), and corresponding audio or video input or patch field designation as the consultant approved shop drawings.

B. Labeling

1. Patch Panel Designation Strips: Utilize alphanumeric identifications and descriptive information on all audio and video patch panel designation strips. All labels shall be machine printed or engraved. Number the jack positions in each horizontal row sequentially from left to right. Include the numeric identification of each jack on the functional block drawings, as well as on reproductions of these drawings, which shall be mounted in an appropriate location near the patch bays. Wire all patch panels so that signal “sources” (outputs from) appear on the upper row of a row pair; and all “loads” (inputs to) appear on the lower row of a row pair.

2. Provide approved labels on the front and rear of active equipment mounted in racks. Mount labels

in a neat, plumb and permanent manner. Embossed labels are not acceptable. Equipment labels to have at least three lines of engraving with the first line listing the general name of the device, i.e., POWER AMPLIFIER or EQUALIZER. The second line to include the schematic reference of the device, i.e., PA-29A or EQ-3. The bottom line to indicate what other devices or areas this equipment controls, i.e., FEEDS HF¬3&4 or FEEDS XOVER-3.

3. Provide an approved label over each user-operated control that describes the function or purpose of the control. Label size to be adjusted to fit available space.

4. Approved labels to have 1/8 inch high characters typical. Labels to be black with white characters except where indicated.

5. Cables and wiring to be logically, legibly and permanently labeled for easy identification. Factory stamped heat shrink tubing may be used in lieu of the adhesive strip style label. Hand-written labels not acceptable.

6. Wiring designations to be an alphanumeric code that is unique for each cable. Locate the cable designation at the start and end of each cable run and within 3 inches of the point of termination or connection. For cable runs that have intermediate splice points at riser junction boxes, the cable shall have the same designation throughout with an additional suffix to indicate each segment of the run. Actual cable designation assignments to be determined by Contractor. Add cable designation codes to system schematic drawings included with Project Record Drawings.

7. Label each Wago terminal strip with a unique identification code in addition to a numerical label for each terminal. Show terminal strip codes on system schematic drawings included with Project Record Drawings.

8. Provide adhesive labels on the rear of equipment where cables attach to indicate the designation of the cable connected at that point.

29.3 TEST EQUIPMENT

A. Provide any test equipment that may be required to test and verify proper operation of the systems supplied under this contract. Due to the wide range of systems covered in this specification the A/V Systems Contractor shall provide a list of equipment being supplied with the testing procedure he is recommending for Consultant approval. All equipment supplied must have calibration certifications (where applicable) within the last 18 months. The equipment must be on site and fully functional for final acceptance testing. Test equipment to be available for the entire period through final system acceptance unless noted.

29.4 CONTRACTOR TESTS, SETUPS, AND ADJUSTMENTS

A. Verify the following before beginning actual tests and adjustments on the system:

1. Electronic devices are properly grounded.

2. Powered devices have AC power from the proper circuit and hot, neutral, and ground conductors are connected correctly.

3. Insulation and shrink tubing are present where required.

4. Dust, debris, solder splatter, etc. is removed.

5. Cable is dressed, routed, and labeled; connections are consistent with regard to polarity.

29.5 CONTRACTOR TESTING (AS APPLICABLE)

A. Prior to energizing or testing the system, ensure the following:

1. All product is installed in a proper and safe manner per the manufacturer's instructions.

2. Insulation and shrink tubing are present where required.

3. Dust, debris, solder splatter, etc. is removed.

4. Cable is dressed, routed, and labeled; connections are consistent with regard to polarity.

5. All labeling has been provided.

6. Temporary facilities and utilities have been properly disconnected, removed and disposed off-site.

7. All products are neat, clean, and unmarred and parts securely attached.

8. All broken work, including glass, raised flooring and supports, ceiling tiles and supports, walls, doors, etc. have been replaced or properly repaired, and debris cleaned up and discarded.

9. Electronic devices are properly grounded.

B. Prior to energizing the system, perform the following tests in compliance with applicable EIA standards. Record the results of each test in the Project Record Manual and have a copy available for the Consultant during inspection.

1. Test each AC power receptacle with a circuit checker for proper hot, neutral and ground connections and verify proper voltage

2. Measure and record the DC resistance between the technical ground in any equipment rack or console and the main building ground. Resistance should be 0.15 ohms or less.

3. Temporarily lift the technical ground from the main electrical ground, measure and record the DC resistance between them. Resistance should be 1000 ohms or greater.

4. Measure the impedance of each speaker line leaving the equipment racks. For full range devices, use a frequency of 1000 Hz, for band limited devices, use a frequency appropriate for the operating range of the transducer. When documenting the results of these tests, include the calculated impedances based on number of units on a line and the size and distance of the run. Correct any field readings that differ more than 20 percent from the calculated impedances.

C. Cable Verification Test – provide a record for each cables test results:

1. Test all field cabling from panels and plates to patch bays or equipment for continuity, phase, and isolation from building ground.

2. Verify that the receptacle under test appears at the correct position on the patch bay or equipment input, and is operating properly using a signal generator.

3. Check all lines for correct labeling.

D. Speaker Circuit Verification Test:- provide a record for each cables test results:

1. Provide a low level, distinctive test tone to each amplifier input.

2. Turn on one channel of Amplifier #1 and verify that the correct speaker or group of speakers is operating. Correct any wiring or other problems found.

3. In a similar manner, check each channel of all remaining amplifiers and their respective speaker circuits.

4. Include the results of the tests in the Project Record Manual.

E. Speaker Polarity Verification Test: - provide a record for each cables test results:

1. Use an electronic polarity checker, or other similar device to test each reinforcement speaker. All speakers should have the same relative polarity.

2. Follow manufacturer's recommendations in conducting the tests.

3. In a similar manner, check all distributed speakers to ensure they have the same polarity.

4. Include the results of the tests in the Project Record Manual.

F. Electronic Tests:

1. Audio Systems – measure and record the following:
   a. Gain at 1 kHz.
   b. Maximum output.
   c. Input clipping level.
   d. Frequency response.
   e. Total harmonic distortion.
   f. Signal-to-Noise ratio.
   g. Signal-to-Crosstalk ratio

G. Using a +4 dBm sine-wave input, set controls of each component to produce a +4 dBm sine-wave output. Under these conditions (unity gain), the presence of any waveform, distortion, interference signals, or oscillations shall be unacceptable.

H. Frequency Response of the System:

1. Adjust all controls for "Flat" response from console input through amplifier outputs.

2. Measure the frequency response of the audio systems using an acceptable measurement device. Alternately, a sign wave sweep generator and oscilloscope may be used.

3. Confirm the frequency response of the system from input to amplifier output is (+/-) 1.0dB, 20Hz to 20,000 Hz and record in the project manual.

I. Signal Delay Adjustment:

1. Adjust the delay to each subsystem to ensure proper synchronization between the main speakers

and the local, delayed speakers.

2. Using an acceptable time based measurement system, measure the arrival time of the distant signal and then measure the arrival of the local signal.

3. Based on the arrival times measured, adjust the delay applied to the local speakers to synchronize them with the distant speakers. Repeat the test to verify the delay has been set to within I ms of the arrival of the distant signal.

4. Continue to test and adjust each separate subsystem with a dedicated delay channel.

5. Provide hard-copy printout of each delay adjustment showing first the arrival times with no delay set and then the result after the delay has been adjusted. Record the settings of each delay in the Project Record Manual.

J. Active Crossover Network Adjustment:

1. Adjust each active crossover to provide the appropriate bandwidth and slope rate for the speaker system in controls.

2. Multiple crossovers controlling speakers in identical areas should be set the same using an acceptable measurement device to adjust crossover points and a RMS reading AC voltmeter to set each output.

3. Record the settings of all the crossovers in the Project Record Manual.

K. Amplifier Level Adjustment — Main Reinforcement System:

1. Adjust the gain of each amplifier to provide a consistent and appropriate volume level throughout the facility.

2. Begin by connecting a pink noise source to one input of the mixing console. Adjust the console output to —10 dB on the VU meter.

3. Using one or a small group of upper level reinforcement speakers, adjust the appropriate amplifiers to achieve 85 dBA in the area covered by the speakers. Use a calibrated sound level meter to make the measurement.

4. If the test group of speakers employs an active crossover, use an acceptable measurement device to balance the spectrum by adjusting the amplifier for each band. Use the amplifier control system to make these adjustments.

5. Once the initial speakers have been properly adjusted, begin adding the speakers in each adjacent area and repeating the same adjustments.

6. When a given area or seating level has been completed, move to the next lower area and repeat the tests and adjustment s for that area.

7. Amplifier settings for speakers covering similar seating areas should have the same gain settings. Investigate any occurrences where an amplifier deviates more than 2 dB from the average.

8. Amplifiers should be set to provide an average of 85 dBA +/- 1.5 dB throughout each seating section. Coverage at 4kHz should be no more than +/- 2 dB.

9. Record the setting of each amplifier in the Project Record Manual and keep backup copies of the data file on disk.

L. Amplifier Level Adjustment- 70 Volt Systems:

1. Drive each ceiling distributed loudspeaker system with one octave of pink noise centered at 1000 Hz at a sound pressure level which is at least 10 dB above the ambient noise. Adjust power amplifiers to provide uniform distribution of sound throughout the seating areas within a tolerance of ±3 dB. Use an ANSI Type 2 sound level meter set for slow meter damping to take readings at seated ear height.

2. After setting the amplifier level for each system, play a pink noise signal over the speakers and walk through each area. Using a sound level meter, identify any areas where the SPL changes by more than 3 dB. Identify the cause of the change and where it is due to mounting height or architectural differences, adjust the transformer taps of the affected speakers to bring the sound level within range.

M. Headroom Verification Test:

1. Once the preceding tests and adjustments have been completed, play a variety of musical programs through the system.

2. Adjust the console gain to achieve peak output levels of +6 VU on the console meters.

3. Observe if any of the components indicate clipping or less than 3 dB of headroom.

4. Replace the musical program with a steady 1000 Hz sine wave. Connect an oscilloscope or similar device to selected amplifiers in each portion of the reinforcement system.

5. Increase output level of the console until the signal displayed on the oscilloscope begins to show distortion. Record the dB level of the signal from the console and which component in the chain is creating the distortion in the Project Record Manual.

N. Apply a sine-wave sweep signal to each loudspeaker system, sweeping from 50 Hz to 5000 Hz at a sound pressure level which is 10 dB below the loudspeaker's rated electrical input power. Listen for rattles or objectionable noise and correct if apparent.

O. Digital Audio Testing:

1. Test AES-EBU inputs and outputs to verify compliance to SMPTE 272M standards.

2. Record results in the Project Record Manual.

P. Video System Testing

1. Test all video equipment for compliance with applicable SMPTE standards. Use published SMPTE Recommended Practices for testing, when available.
   a. Analog Composite Video – SMPTE 170M
   b. Digital Composite Video – SMPTE 244M
   c. Digital Component Video 525, 720, 1080 – SMPTE 293M, 296M, 274M
   d. Standard Definition SDI – SMPTE 259M
   e. High Definition SDI – SMPTE 292M
   f. For other video types use the appropriate SMPTE standards and testing procedures.

2. Adjust video monitors for linearity, color purity, and contrast. For performance monitoring applications adjust to SMPTE standards.

3. In areas with multiple monitors in close proximity match using a color calibration system such as a Sencore ColorPro video calibration system, or equal.

4. Record results in the Project Record Manual.

Q. Fiber System:

1. Conduct optical loss test.

2. Conduct optical time domain reflectometer test.

R. Control System Testing

1. Verify all operational functions at each control console or touch screen device.

2. Verify all control functions for field devices

3. Record results in the Project Record Manual.

S. Emergency Bypass Test

1. Simulate a fire alarm override signal from the fire control panel.

2. Verify that all necessary mixers and related components have recognized the signal and switched to their bypassed mode.

3. Record results in the Project Record Manual.

T. IPTV Testing

1. All category cabling and fiber optic cabling shall be tested and in accordance with TIA/EIA 568 standards. It is recommended that the telecommunications contractor be employed to test all category and fiber optic cables.

2. Record all test results in the Project Record Manual.

U. When all the above tests have been completed and the system is ready for inspection, formally notify the Architect and Consultant. Include in this notice copies of all data recorded, date each test was completed and the results of each test.

29.6 ACCEPTANCE

A. Complete all Work of this Section. Submit Test Report. Submit review copies of Operating and Maintenance Manuals, less reduced set of Record Drawings. Notify the Owner in writing that the Work of this Section is complete and fully complies with the Contract Documents. Request Acceptance Review and Testing in writing to the Consultant. The representative of the Owner will conduct Verification of Submitted Test Data, and otherwise direct testing and adjustment of this Work.

B. Acceptance testing will include operation of each major system and any other components deemed

necessary. Contractor will assist in this testing and will provide required test equipment. Contractor shall provide at least two technicians familiar with installation, available for the entire testing period (day and night), to assist in tests, adjustments, and final modifications. Tools and material required to make any necessary repairs, corrections, or adjustments shall be furnished by the Contractor.

C. Provide three portable radios with chargers and spare batteries for use during acceptance testing. Radios should have a transmission range sufficient to cover entire project. Radios to include rechargeable batteries and recharger along with "holster" for wearing on belt. Radios to be available for duration of testing process, including any follow-up visits required prior to final acceptance. Confirm that radio frequencies used are not in use elsewhere on project site.

D. The following procedures will be performed on each System, including portable equipment:

1. The Contractor shall demonstrate to the Consultant that all functions and equipment for the system work properly when installed as a complete system.

2. The Contractor shall demonstrate the satisfactory operation of all controls and adjustment circuits of the system.

3. Audio fidelity test, coverage verification and final speaker adjustment, and final equalization.

4. Control system functions shall be checked for proper operation, from controlling devices to controlled devices.

5. DSP programming will be checked for audio functionality and GUI ease of use. A DSP programmer shall be present for any adjustments required in the programming for form or function of the program.

6. Video and MATV systems will be spot checked for compliance with the specifications.

7. Provide an inventory for all equipment, both loose and installed for verification of model and quantity.

8. Any other test on any piece or equipment or system deemed appropriate.

E. In the event the need for further adjustment or work becomes evident during equalization or acceptance testing, the Contractor will continue the work while the system is in acceptance at no addition to the contract price. If a delay in the approval process is the fault of the Contractor, the Contractor of will pay for additional time and expenses of the Architect or Consultant at the standard rate in effect at that time, during any extension of the acceptance testing period.

29.7 CLOSEOUT

A. Punch List: Perform any and all remedial work, at no claim for additional cost or time. Where required, retest and submit Test Report. Notify Owner of completion of Punch List.

B. Furnish all portable equipment and spares to the designated representative of the Owner, along with complete documentation of the materials presented. Where applicable, furnish portable equipment in the original manufacturer's packing.

C. Install framed operating and maintenance instructions.

D. Submit Manuals and Project Record Documents

E. Transmit keys to Owner.

F. Conduct specified training and submit training manuals.

G. Submit Warranty dated to run from date of Acceptance of the Work of this Section.

29.8 OWNER'S RIGHT TO USE EQUIPMENT

A. Acceptance of the Work of this Section will be after completion of corrections and adjustments required by the "Punch List" which results from Acceptance Review and Testing of the completed installation. The Owner reserves the right to use equipment, material and services provided as part of the Work of this Section prior to Acceptance without incurring any obligation to Accept any equipment or completed systems until all Punch List work is complete and all systems comply with the Contract Documents; or accept any claim for additional cost or time.

END OF SECTION

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SECTION 274113.00.02 LARGE VENUE TENSIONED PROJECTION SCREENS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: This Section specifies electrically operated large venue projection screens and accessories.

1.2 RELATED SECTIONS

A. Section 05 12 00 - Structural Steel Framing: Secondary support framing.

B. Section 26 05 00 - Common Work Results for Electrical: Power supply, conduit and wiring.

1.3 DEFINITIONS

A. Gain: Indication of screen's luminance or brightness measured perpendicular to screen center and relative to magnesium carbonate block, which serves as standard for 1.0 gain. Higher numbers indicate greater brightness.

B. Viewing Angle: Angle from perpendicular center of screen at which gain or brightness decreases by 50%.

C. Format: Proportion of projection screen viewing area expressed as a ratio of height to width.

1. NTSC or Video Format: 1.00 to 1.33.
2. HDTV Format: 1.00 to 1.78.
3. Wide Format: 1.00 to 1.6.
4. Square: 1.0 to 1.0.
5. Cinemascope or Anamorphic Format: 1.00 to 2.35.
6. Widescreen (Letterbox) Format: 1.00 to 1.85.

1.4 REFERENCES

A. International Code Council (ICC):

1. International Building Code.

B. Society of Motion Picture and Television Engineers (SMPTE):

1. SMPTE RP 94-2000 Gain Determination of Front Projection Screens.

C. Underwriters Laboratories Inc. (UL).

1.5 ACTION SUBMITTALS

A. General: Submit listed action submittals in accordance with Contract Conditions and Section 01 33 00 - Submittal Procedures

B. Product Data: Submit product data, including manufacturer's technical product data sheet, for specified products.

1. Material Safety Data Sheets (MSDS).

C. Shop Drawings: Indicate dimensions, fabrication and installation details.

1. Include electric wiring diagrams.

1.6 INFORMATION SUBMITTALS

A. Quality Assurance:

1. Test Reports: Certified test reports showing compliance with specified performance

characteristics and physical properties.

2. Certificates: Product certificates signed by manufacturer certifying that materials comply with specified performance characteristics, criteria and physical requirements.

3. Manufacturer's installation instructions.

1.7 QUALITY ASSURANCE

A. Qualifications:

1. Worker experienced in performing work of this section who has specialized in work similar to that required of this project.

B. Preinstallation Meetings: Conduct preinstallation meeting to verify project requirements and manufacturer's instructions.

1.8 DELIVERY, STORAGE & HANDLING

A. Storage and Protection:

1. Store electrically operated large venue projection screens protected from exposure to harmful weather and in dry, ventilated conditions at temperature less than 80 degrees F .

B. Handling: Handle electrically operated large venue projection screen materials with care in order to prevent damage.

C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

D. Waste Management and Disposal:

1. Remove packaging materials from site and dispose of at appropriate recycling facilities.

1.9 SEQUENCING

A. Sequence with Other Work: Comply with projection screen manufacturer's written recommendations for sequencing construction operations.

1.10 WARRANTY

A. Project Warranty: Refer to Contract Conditions for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and does not limit, other rights Owner may have under Contract Documents.

C. Warranty: Commencing on date of acceptance by Owner.

1.11 MAINTENANCE MATERIALS

A. Use standard product line parts produced by manufacturer of electrically operated large venue projection screens.

A.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Da-Lite Screen Company, Inc.

1. Contact: P.O. Box 137, 3100 N. Detroit St., Warsaw, IN 46581-0137; Telephone: (800) 622-3737, (574) 267-8101; Fax: (877) 325-4832, (574) 267-7804; E-mail: info@da-lite.com; website: www.da-lite.com.

2.2 PROPRIETARY PRODUCTS/PROJECTION SCREEN SYSTEMS

A. Type 2: Tensioned System.

1. Screen Operation: Electrically operated, UL listed, plenum rated, retractable, heavy duty, with rigid metal roller and motor housed within the roller. Tab guide cable tensioning system to maintain even, lateral tension and hold viewing surface flat. Bottom end of fabric to be inserted into a custom aluminum slat bar with added weight to provide vertical tension on the screen surface.
    a. Motor:
        1.) UL Certified 120 V, 60 Hz, 3-wire permanently lubricated reversal-type, attached to header.
        2.) Amperage: not more than 2.4 amps.
        3.) Include automatic thermal overload protection, integral gears, capacitor and electric brake to prevent coasting.
        4.) Preset, adjustable limit switches to automatically stop viewing surface in UP or DOWN position.
2. Screen Mounting: Ceiling recessed.
3. Screen Case: Extruded aluminum with self-trimming flange. Case is designed to receive mounting hardware and is sized to suit projection screen.
    a. Case Finish:
        1.) Powder coated white.
    b. Case Closure Door: Include automatically operated, hinged powder coated aluminum finish screen closure door on case bottom.
    c. Case Access Door: Hinged, powder coated aluminum finish screen access door on case bottom for maintenance access.
4. Screen Size:
    a. Main Viewing
        1.) Viewing Area: H 108 inches × W 192 inches
    b. Rear Viewing
        1.) Viewing Area: H 54 inches × W 96 inches
5. Acceptable Material: Da-Lite Screen Company, Inc., Large Tensioned Advantage Deluxe Electrol projection screen system.
    a. Screen Viewing Surface:
        1.) Front projection, flame retardant, mildew-resistant seamless vinyl, black backed, standard black borders, easily cleaned with mild soap and water solution.
        2.) Gain: To SMPTE RP 94-2000, 1.1.
        3.) Viewing angle: 60.
        4.) Format: 1.00 to 1.78.
    b. Acceptable Materials: Da-Lite Screen Company, Inc.:
        1.) HD Progressive 1.1 viewing surface with GREENGUARD Certification #90068-11.
6. Optional Accessories:

a. Single Motor Low Voltage Control: Built-In Standard.

b. Serial Control Board SCB-100

2.3 PRODUCT SUBSTITUTIONS

A. Substitutions: In accordance with Section 01 25 13 - Product Substitution Procedures.

B. All substitution requests must be submitted and approved before submission of bid

PART 3 - EXECUTION

3.1 INSTALLERS

A. Provide Manufacturer experienced and qualified technicians to install electrically operated large venue projection screens.

3.2 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions and Da-Lite Screen Company, Inc., technical data sheets.

3.3 EXAMINATION

A. Site Verification of Conditions:

1. Verify that conditions of substrates previously installed under other sections or contracts are acceptable with electrically operated large venue projection screen installation.

2. Ensure secondary support framing for screen has been installed in accordance with Section 05 12 00 - Structural Steel Framing.

3. Ensure electrical power supply is installed to meet electrically operated large venue projection screen requirements, and in accordance with Section 26 05 00 - Common Work Results for Electrical

a. Verify type and location of power supply.

4. Inform Architect of unacceptable conditions immediately upon discovery.

5. Proceed with installation only after unacceptable conditions have been corrected.

3.4 COORDINATION

A. Coordinate large venue projection screen placement with other ceiling and wall mounted components and with Section 01 31 13 - Project Coordination.

3.5 INSTALLATION

A. Install large venue projection screen in accordance with reviewed shop drawings at locations and heights indicated.

1. Verify locations with Architect prior to installation.

2. Attach screen to secondary support framing.

B. Install screen housing and make electrical connections in conjunction with installation of suspended ceiling system.

C. Permanently attach screen fabric to roller.

D. Securely install screen plumb and level to supporting substrate.

3.6 FIELD QUALITY CONTROL

A. Inspection and Testing: Operate each screen 3 times to ensure viewing surfaces extend and retract through full range of motion.

1. Verify that controls, limit switches, automatic doors and other components function as designed.
2. Ensure that viewing surface raising and lowering operation fully engages and moves screen and closure door into closed position.
3. Adjust motors, controls and components to allow for smooth, unobstructed screen operation.

3.7 FINAL CLEANING

A. Perform cleanup in accordance with Section 01 74 00 - Cleaning and Waste Management.

B. Upon completion, remove surplus materials, rubbish, tools and equipment.

3.8 PROTECTION

A. Protect large venue projection screens from damage during construction in accordance with Section 01 76 00 - Protecting Installed Construction.

B. Repair damage to adjacent materials caused by electrically operated large venue projection screen work.

3.9 MAINTENANCE

A. Perform work during regular trade working hours satisfactory to Owner.

END OF SECTION

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SECTION 275000 PUBLIC ADDRESS SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

A. Section includes requirements for a Public Address (PA) system that will function as standalone building system.

B. Coordinate and provide interfaces between the Communications Equipment Room(s) (CER) and the PA subsystem.

1.2 REFERENCE STANDARDS

A. Electronics Industries Alliance (EIA):

1. EIA 160 Sound Systems
2. EIA-101 Amplifiers for Sound Equipment

B. Sound Equipment (SE):

1. SE-103 Speakers for Sound Equipment
2. SE-104 Engineering Specifications for Amplifiers for Sound Equipment

C. National Fire Protection Association (NFPA):

1. NFPA 70 National Electrical Code (NEC)

D. Local noise ordinances

E. Building Industry Consultant Service International (BICSI):

1. Telecommunications Distribution Methods Manual

1.3 SYSTEM DESCRIPTION

A. The PA system shall be used to provide information and emergency messages to passengers, employees, and emergency response personnel. Primary communication of announcements shall be from the Owners phone and Informacast systems

1. PA equipment shall include phone input processing circuits, power amplifiers, premixers / ambient noise compensators, speakers, local, cabling, conduit, and all other equipment necessary for a complete operational system

B. Unless otherwise indicated in the Contract Documents, the PA system equipment shall be located in the new Communication Room(s) This shall also include building(s) conduit and cabling network associated with the PA wiring.

C. Support Engineer in testing the operation of PA system at the building(s)s from all input

systems.

D. Use of any component or device, not expressly specified herein, that is required to implement the work, shall be subject to the Engineer's approval of required submittals.

1.4 DESIGN REQUIREMENTS

A. Public Address (PA): There shall be one PA zone per each building(s) MDF/IDF. Each zone PA volume shall be increased/decreased according to the noise level measured by the corresponding ambient noise level microphone. All building(s) PA measurements shall be performed at 5 feet above the floor level. The new PA system shall provide for the following measurements (measured at 95% of the building(s) platforms):

1. The PA system shall provide intelligible output coverage at a levels 6 dB to 12 dB over measured ambient noise.
2. On building(s) platforms the coverage shall be a uniform level of plus or minus 3 dB @ 1000 Hz Octave band.
3. The speech intelligibility of the PA system announcements (measured in STI- PA female index) shall be minimum 0.6.

B. Sound Level Adjustment: The system shall be programmed to implement timed hang-up function for any sources of PA announcements.

C. All digital processor/digital mixer parameters shall be backed up via FLASH ROM, and not requiring battery backup. System configurations shall be capable of being stored for recall from any system presets from the front panel control, switch closure, via manufactures application software running under Windows O/S or scheduled from the internal real-time clock/calendar. If communication between the host computer and the digital processor/ digital mixer is lost, the unit shall continue to function with the last commands received.

D. The building(s) PA VLAN shall share the building(s) LAN 1000 Mbps Ethernet backbone bandwidth with other building(s) subsystems. The building(s) LAN 1000 Mbps backbone will operate in a physical ring topology via the building(s) single-mode fiber optic cable.

E. For all locations where environmental control is not implemented, all equipment installed shall be treated as equipment exposed to the elements. The equipments' design, materials, installation, mounting, termination and coatings shall be implemented with appropriate protection against exposure to elements. This protection shall still accommodate requirements of good maintenance.

1.5 SUBMITTALS

A. Design submittals: For each design level, include the following as a minimum:

1. Product Data: For each type of equipment. Submit performance data and descriptions or samples of all products furnished under this Section.

2. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, required clearances, method of field assembly, components, and location of each

field connection. This shall include but not be limited to rack layouts and wiring diagrams, termination details, installation and demolition drawings with final equipment placement based on the findings in the field, installation details, design drawings depicting deviations from the bid documents.

3. Product Certificates: Signed by manufacturers of equipment certifying that products furnished comply with specified requirements.

4. Installer Certificates: Signed by manufacturer certifying that installers or technicians are capable of complying with requirements.

5. Manufacturer Certificates: Signed by manufacturers certifying that they comply with requirements.

6. Design documentation depicting termination details and conduit/cabling/terminals labeling.

7. Design documentation describing software and hardware configuration settings for all equipment affected by the project (including network, PA and UPS devices configs and alarm setup, etc.).

B. Submit installation drawings no later than 14 days prior to installation of PA system.

C. Testing: Submit, 30 days prior to system testing, Test Procedures and the description of the intended Test Equipment. The Test Procedures shall demonstrate how the new PA system meets each design requirement from the subpart 1.04 above.

D. Test Results: Submit, within 15 days after conclusion of system testing, a report of final Test Procedures and the Results obtained from these tests.

E. Qualifications: Submit manufacture's certification showing installer qualifications.

F. Maintenance Data: For equipment to include in training and maintenance manuals specified in General Provisions. Training shall include operation, maintenance and trouble shooting of the new PA System.

G. As-Built Documentation: Submit as-built documentation as specified, including all changes to approved Contract Drawings incorporated in the final installation, within 2 weeks after installation completion. The as-built documentation shall describe final equipment layout, installation details and the software configuration settings.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Demonstrate that the team members had previously worked on at least two successful projects of similar nature and similar hardware. Additionally, minimum three years experience installing and maintaining equipment required for this Section; and shall be an authorized representative of equipment manufacturer for both installation and maintenance of equipment required for this Section.

PART 2 - PRODUCTS

2.1 GENERAL

A. For other materials and products, refer to Section 270510, Basic Communications Equipment, Materials, and Methods.

2.2 EQUIPMENT

A. Unless superseded by the individual requirements stated herein, PA system electronic components shall conform to the following general requirements:

1. Solid state design
2. UL listed
3. Latest manufacturer design
4. Balanced outputs

B. SPEAKERS

1. Lay-in Ceiling Speakers:

    a. Excellent voice and music reproduction
    b. 1-watt amplifier built-in
    c. white grille baked enamel finish
    d. integral plenum rated backbox meets or exceeds ASTM E84 flame & smoke test
    e. four seismic tabs provided for additional mounting integrity
    f. Approved Material
        1.) Valcom V-9022A

2. InformaCast Ceiling Speakers:

    a. InformaCast Compliant
    b. RJ-45 Port
    c. Power over Ethernet (PoE) 802.3af compliant
    d. White grille baked enamel finish
    e. High Efficiency Class-D Amplifier four seismic tabs provided for additional mounting integrity
    f. Approved Material
        1.) Valcom VIP-402-IC

C. IP Gateways with Audio Ports:

1. Audio Port enables voice access to a single zone of one-way paging over an IP network, allowing page zones to be extended anywhere network connectivity is available.
2. Audio Port can be programmed as a SIP (Session Initiation Protocol) device for connectivity to virtually any Voice over IP (VoIP) telephone system
3. 1 to 4 Audio Inputs or outputs
4. 2 Form C relays
5. 1 Contact Closure Input

6. 1 SIP identity for registering to a VoIP telephone system
7. RJ-45 jack for network connection
8. Front panel activity LED • Provides audio for up to 40 one-way amplified speaker assemblies
9. AUX audio input via RCA jack
10. Contact closure or VOX operation of audio input
11. Removable screw terminal connectors provided for audio and relay interfaces
12. AUX input music mutes during page
13. Output control contact closure provided during paging output
14. Compatible with 25 or 70 Volt amplifiers
15. Power over Ethernet (PoE) 802.3af compatible
    a. Approved Material
        1.) Valcom VIP-801A-IC

D. Protector Blocks:

1. Terminal Block Design: Protected terminal blocks shall be used for all copper cabling going to the outdoor equipment. All protector terminal blocks shall be assembled in manner, which allows for a 19 inch rack mount installation.

E. Terminal Blocks:

1. Terminal block shall be provided and installed on the side panel for miscellaneous internal interconnections.
    a. 110 style punch block

2.3 Miscellaneous Equipment: Furnish and install the miscellaneous equipment necessary to complete the PA system. This shall include junction boxes, surface conduit between building(s) junction boxes and PA devices, as well as miscellaneous mounting hardware and devices.

2.4 FACTORY ACCEPTANCE TESTS

A. Perform the tests based on the approved Test Procedures and Test Equipment. Demonstrate how the new PA system meets each design requirement of these specifications from the subpart 1.04 above. These tests shall include measurements of STI, coverage areas, sound pressure levels, input priorities implementation, noise filtering, feedback elimination, ambient noise sensing and automatic level control function, operation of the timed hang-up function, UPS/PA Alarm reporting, etc.

B. All equipment circuitry shall be checked for accuracy against the Contract Drawings. Tests shall verify point to point wiring and tags for proper nomenclature and terminal location.

C. All testing shall be witnessed, and, if successful, signed-off by the Contractor and the Engineer. If a test fails because of the Contractor improper execution, the Contractor shall fix and retest the failed or underperforming elements.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install equipment to comply with manufacturer's written instructions, including taking measures to reduce noise, crosstalk, hum, and other audio quality issues.

B. Install PA system as follows:

1. All PA equipment at the building(s)
2. Ac power cable from building(s) UPS power circuit breaker
3. PA speakers and the communication wiring
4. Conduit required to cable speakers to local PA equipment as required
5. PA cable from cabinet/rack to PA speakers, including necessary wiring and devices for noise sensing circuit(s)
6. PA Equipment Network interfaces at Ethernet switches and PA digital I/O alarm wiring as required

C. Verify that all equipment is the appropriate model, properly installed and connected. The quality of the installation shall be demonstrated by tests for continuity, visual inspection and any other tests required by this Section.

D. Have all communications conduits inspected and cleaned prior to cable installation. Conduits shall have a clean, smooth concentric interior surface

E. Install PA cables in a separate bundle than other UTP data cable associated with other subsystems wherever possible. Do not exceed manufacturers maximum distance/quantity recommendations per zone

F. Crossover of cables shall be avoided when cables are pulled into conduits. Care shall be taken not to have the conductors pulled tight or twisted in conduit fittings or boxes. All cables to be installed in a single conduit shall be pulled simultaneously.

G. Verify that all cables are properly routed, supported, terminated and labeled.

H. Verify that all equipment is installed in its proper location in accordance with the Engineer approved design. Verify that all mechanical connections are made and secure.

I. Wires and cables shall be continuous without splices between junction boxes, terminals, pull boxes, manholes and hand holes.

J. Provide protective covering for installed speakers and amplifiers until construction is complete. Prevent operation of system when covered.

3.2 Apply all IP addresses to the PA modules and Gateways as required by the Owners network standards and assigned by Owners Network Manager and recorded in the network Domain Name Server.

3.3 FIELD QUALITY CONTROL

A. Perform the following field tests:

1. Functional tests of equipment for inputs at nominal Sound Pressure Level and STI measurements using STI-PA Female tone generators.

2. Correct phasing of all speakers

3. Noise level sensing and automatic broadcast level compensation

4. The functional tests shall fully exercise the system and determine functional compliance as follows:

    a. Perform end-to-end tests for every control and indication point

    b. Test all components and lines

5. Operational Test: Perform tests that include originating program and page material. Verify proper routing and volume levels and freedom from noise and distortion.

    a. Test and record the gain using a sound level meter at each speaker location and each mid-point between speakers under normal operation. Acceptable gain levels are between 3-15 dB

6. Acoustic Coverage Test: Feed tone generator into the system to measure STI levels at five locations in each zone and establish the SPL level for each zone. In addition, the SPL levels between locations in the same zone and between locations in adjacent zones must not vary more than plus or minus 3 dB.

7. Demonstrate the continued operation of the PA system during outside power outage.

8. STI Testing shall demonstrate the installed PA system outputs' intelligibility as per the design.

9. Retesting: Correct deficiencies, where necessary to optimize volume and uniformity of sound levels, and retest.

10. Schedule all tests with at least seven days advance notice to Engineer.

END OF SECTION 275000

SECTION 281000 - ACCESS CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Integrated security management system. (Win-Pak)

B. Access control cables.

1.2 RELATED SECTIONS

A. Section 26 05 00 - Common Work Results for Electrical.

B. Section 27 05 28.29 – Hangers & Supports for Communication Systems

1.3 REFERENCES

A. Electronic Industries Alliance (EIA):
1. RS232C - Interface between Data Terminal Equipment and Data Communications Equipment Employing Serial Binary Data Interchange.
2. RS485 - Electrical Characteristics of Generators and Receivers for use in Balanced Digital Multi-Point Systems.

B. Federal Communications Commission (FCC):
1. FCC Part 15 - Radio Frequency Device.
2. FCC Part 68 - Connection of Terminal Equipment to the Telephone Network.

C. Federal Information Processing Standards (FIPS):
1. Advanced Encryption Standard (AES) (FIPS 197).
2. FIPS 201: Personal Identity Verification (PIV) of Federal Employees and Contractors.

D. National Fire Protection Association (NFPA):
1. NFPA70 - National Electrical Code.

E. Homeland Security Presidential Directive 12 (HSPD-12).

F. Underwriters Laboratories (UL):
1. UL294 - Access Control System Units.
2. UL1076 - Proprietary Burglar Alarm Units and Systems.

1.4 SECURITY MANAGEMENT SYSTEM DESCRIPTION

A. WIN-PAK: The Integrated Security Management System (ISMS) shall function as an electronic access control system and shall integrate the alarm monitoring, CCTV, digital video, ID badging and database management into a single platform. ISMS shall function as a one-stop gateway for all the access control needs. A modular and network-enabled architecture shall allow maximum versatility for tailoring secure and dependable access and alarm monitoring solutions. The following definitions are applicable for the WIN-PAK system:

1. Access Card: A coded employee card, usually the size of a credit card, recognizable to the access control system and read by a reader to allow access. It can be used for photo identification of the cardholder and for other data collection purposes. Card technologies

ACCESS CONTROL include magnetic strips, wiegand-effect, proximity (active/passive), barium ferrite, and smart/intelligent cards.

2. Abstract Device: An Abstract Device (ADV) is a logical representation of a physical device. The ADVs can be associated with any hardware device, including communication interfaces, panels, alarm points, entrances, and CCTV equipment. The ADVs help in monitoring the device status and controlling the actions of a physical device through the Control Map, Floor Plan, or Alarm View.
3. Access Control System: An interconnected set of controllers, managing the entrance and exit of people through secure areas.
4. Access Level: The door or combination of doors and/or barriers an individual is authorized to pass through.
5. Anti-Pass back (Anti-Tailgating): This feature protects against more than one person using the same card or number. It defines each system card reader and card ID number as IN, OUT or other. Once a card is granted access to an IN reader, it must be presented to an OUT reader before another IN reader access is granted. Cards will continue to have access to all authorized OTHER readers.
6. Alarm: A signal that indicates a problem.
7. Alarm input: A device that is monitored by the access control panel. An alarm signal will be generated if the device is activated.
8. Badge: Badge is a template or a design for creating a card. WIN-PAK includes a full-featured badge layout utility for designing, creating, and printing badges. Badge design includes magnetic stripe encoding, bar coding, signatures, and so on.
9. Bar Code: A method of encoding information using lines and blank spaces of varying size and thickness to represent alphanumeric characters.
10. Biometrics: A general term for the verification of individuals using unique biological characteristics (i.e. fingerprints, hand geometry, voice analysis, the retinal pattern in the eye).
11. Card and Card Holder: A card is an identity proof of a person and a card holder is a person who holds the card. Multiple cards can be assigned to a single card holder to provide different access.
12. Controller: A microprocessor based circuit board that manages access to a secure area. The controller receives information that it uses to determine through which doors and at what times cardholders are granted access to secure areas. Based on that information, the controller can lock/unlock doors, sound alarms, and communicate status to a host computer.
13. Communication Port: A hardware device that allows a computer to communicate with external devices.
14. Card Reader: A device that retrieves information stored on an access card and transmits that information to a controller.
15. Network or Digital Video Recorder (DVR): A security system device that records the video from the surveillance cameras (IP and/or Analog) on a hard disk.
16. Door: A generic term for a securable entry way. In many access control applications, a "door" may actually be a gate, turnstile, elevator door, or similar device.
17. Duress: Forcing a person to provide access to a secure area against that person's wishes.
18. Guard Tour: A defined route of a security guard.
19. Host Computer: The central controlling computer from which access control software applications are run.
20. Input: An electronic sensor on a controller that detects a change of state in a device outside the controller
21. Keypad: An alphanumeric grid which allows a user to enter an identification code. A flat device which has buttons that may be pressed in a sequence to send data to a controller,

and which differs from a typewriter-like computer board.

22. Online Help: A reference program within most software programs that provides basic descriptions and instructions on how to use that software program.
23. Output Relay: A device that changes its state upon receiving a signal from a controller. Typically the state change prompts an action outside of the controller such as activating or inactivating a device. The auxiliary relays found in access control panels or NODES that control external devices.
24. Reader: A device that "receives" an identification code from a card, key tag, magnetic stripe card, bar code card, or related item. Refers to the "front end" that a user must interact with to allow access. Readers can be keypads, card readers, proximity readers, and so on.
25. RS232: A serial communication protocol used for connecting data terminal devices. RS-232 is the most commonly used communication protocol.
26. Server: The host computer, which has the ISMS functions.
27. Shunt Time: The length of time a door open alarm is suppressed (shunted) after a valid card access or free egress request. This time should be just enough to allow a card user to open a door or gate, pass through, and then close it.
28. Time zones: "Schedules" that allow cards to function or not function depending on the time of day. This is used to limit access to the facility. The schedule may include not only time but which days of the week a card is valid.
29. Wiegand Card: An access control card based on the Wiegand effect. Small bits of specially processed wire are embedded in the card in a pattern that uniquely identifies the card. This identification information can then be decoded by a Wiegand reader.
30. Wiegand Reader: A reader capable of reading the information encoded on a Wiegand card.
31. Video Management System (VMS): An enterprise-class video management and storage solution.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.

D. Manufacturer’s Product Data: Submit manufacturer’s data sheets indicating systems and components proposed for use.

E. Shop Drawings: Submit complete shop drawings indicating system components, wiring diagrams and load calculations.

F. Record Drawings: During construction maintain record drawings indicating location of equipment and wiring. Submit an electronic version of record drawings for the Security Management System not later than Substantial Completion of the project.

G. Operation and Maintenance Data: Submit manufacturer’s operation and maintenance data, customized to the Security Management System installed. Include system and operator

manuals.

H. Maintenance Service Agreement: Submit a sample copy of the manufacturer's maintenance service agreement, including cost and services for a two year period for Owner's review.

1.6 QUALITY ASSURANCE

A. Manufacturer: Minimum ten years experience in manufacturing and maintaining Security Management Systems. Manufacturer shall be Microsoft Silver Certified.

B. Installer must be certified by Honeywell Integrated Security Dealer Service Certification Program (DSCP).

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.9 WARRANTY

A. Manufacturer’s Warranty: Submit manufacturer’s standard warranty for the security management system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Approved Manufacturer: http://www.security.honeywell.com

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 INTEGRATED SECURITY MANAGEMENT SYSTEM

A. Product: WIN-PAK Access System as manufactured by the Honeywell Security Group.

B. The Integrated Security Management System (ISMS) shall function as an electronic access control system and shall integrate the alarm monitoring, CCTV, digital and network video, ID badging and database management into a single platform. ISMS shall function as a one-stop gateway for all the access control needs. A modular and network-enabled architecture shall allow maximum versatility for tailoring secure and dependable access and alarm monitoring solutions. The ISMS shall offer a security management software suite that includes all the features bundled in the following three editions:
1. Standard Edition (SE): Shall include the following features: Single/Five user concurrent license, one communication server, 512 readers, 25,000 card holders and PRO3200, PRO2200, NetAXS-123, NetAXS-4, N1000/PW2000, NS2 and NS2+ panel support.

C. ISMS Components:

1. The ISMS shall be divided into three components: Database Server, Communication Server, and User Interface. These components shall run on a single computer or on multiple computers, allowing flexibility in configuring a networked system.
    a. Database Server: The database server is used for storing the database tables. This data is accessible to communication server and user interface for retrieving and generating the reports. The database server shall be installed on the client computer or any other computer connected to the network.
    b. Communication Server: The communication server routes user interface requests as well as the access transactions to the panel. The panel in-turn processes the transactions and sends the information to the database server as well as responses to the user interface through the communication server. When the communication server is sending information to the database server, it can also receive a request from the user interface. In this scenario, the communication server considers the user request as a higher priority and stops the panel-database server communication until the user request is processed. The communication server shall be installed on the client computer or any other computer connected to the network.
    c. User Interface (ISMS Client): The user interface helps ISMS operators to communicate with the access control system. The user interface shall be installed on the computer where the database server or the communication server is installed or any other computer connected to the network. Several client computers can be run simultaneously and can access the single database server simultaneously. The number of client computers varies based on the licensing information of ISMS.
2. The ISMS includes the Command File Server: A command file server provides text files containing device instructions that shall be stored in the command files database. The commands in the command files can be sent to the devices automatically on receiving, acknowledging, or clearing an alarm. Also, the command files can be manually executed.
    a. Guard Tour server: A guard tour is a defined series of check points a guard must activate within a given amount of time. The check points are readers or input points where the guard presents the card or presses the button.
    b. Tracking and Muster Server: A muster server is enabled in the event of an emergency and allows the card holders to swipe the readers. Muster areas are logical areas that contain readers to be used by the card holders, only if there is a call for muster (in the event of a disaster, for example).
    c. Schedule Server: A schedule server schedules the list of events to be performed at a predetermined time and intervals such as hourly, daily, or monthly.
    d. Video Management Server: A video management server provides interface to connect to various DVR's/NVR's. In addition, it also provides CCTV control with live monitor display, PTZ control of cameras and video playback operations.

D. Integrated Security Management System Operational Requirements:
1. The ISMS shall be a modular and network-enabled access control system capable of controlling multiple remote sites, alarm monitoring, video imaging, ID badging, paging, digital video and CCTV switching and control that allows for easy expansion or modification of inputs and remote control stations. The ISMS control at a central computer location shall be under the control of a single software program and shall provide full integration of all components. It shall be alterable at any time depending upon facility requirements. The ISMS reconfiguration shall be accomplished online through system programming.
2. The ISMS application shall have the major functional capabilities (considered essential for the system) categorized as follows:

a. General:
   1.) All the databases shall have the ability to add, delete, report, view, and edit information.
   2.) All the system transactions shall be saved in a retrievable file.
   3.) All the events shall be logged by date and time.
   All the system transactions or selected system transactions shall be saved in a disk file.
   4.) The end-user shall have the provision to make any system configuration changes such as, but not limited to door open time, door contact shunt time, point and reader names, when and where a cardholder is valid, and the ability to add or modify card databases at any time.
   5.) Shall support "Global Anti-pass back", feature allowing cardholder to enter/exit any such defined card reader on the same intelligent control panel or RS-485 drop-line consisting of 2 and 4 door controllers.
   6.) Anti-pass back modes shall include: hard (no forgiveness), soft (allows access but generates an alarm event) and timed for all readers on the intelligent controller, on specified reader or card for a definable period of time up to 32,000 seconds.
   7.) Shall support the "Duress" feature, where a PIN is used in conjunction with a card read; the numbers of digits are selected using the keypad where the PIN number is a value different from the normal PIN.
   8.) Shall support the "Two card holder" rule, where two valid, non-identical "cards" must be used within a 20 second period to grant access.
   9.) Shall have the option to display the time when a card holder using a reader has accessed (opened) the door or the card was used, but the door was not opened.
   10.) Shall support the "Latch mode" operation where the first card read unlocks the door and the second card read locks it.
   11.) Shall provide a mode of system operation that stores system commands not accepted by the hardware.
   12.) Shall provide a mode of system operation that requires the operator to enter a response to an event when acknowledging it from the alarm view window.
   13.) Shall provide a mode of system operation that allows acknowledged alarms to be automatically cleared.
   14.) Shall provide a mode of system operation where when an acknowledged, but not cleared event will be reissued requiring acknowledgement when the event changes to an alarm or trouble state.
   15.) Shall provide a mode of system operation that does not allow the operator to clear an alarm before prior to it being restored to normal.
   16.) Shall provide the ability for manual operator control of system output relays. The manual functions shall include the ability to energize, de-energize, return to time zone, or pulse the output relay. The pulse time shall be a programmable setting.
   Shall provide the ability for manual operator control of system doors. The manual functions shall include the ability to Lock, Un-Lock, Disable, Card only, Card-Pin only, Pin only, exit only and site code only.
   17.) Shall provide the ability to automatically display stored "video image" of cardholder, and switch real-time camera from CCTV or digital video server to card reader location for specific card usage.
   18.) The cardholder "video image" pop-up shall be activated based on a priority level set to the cardholder or reader. Information in the pop-up shall include,

but not be limited to the card holder's primary image a live video pop-up showing the person who initiated the pop-up, entrance name, time, date, cardholder name, and status. User shall be able to display up to 40 note fields. The size of the pop-ups shall be adjustable by the operator.

19.) Shall support multiple card reader technology including: Proximity, Wiegand effect, Biometrics, Magnetic stripe, Bar Code, Keypad, Card/keypad (PIN), High-speed long range Vehicle ID, and Smart Card.

20.) Shall provide an option for taking scheduled automatic backups of any or all database system files. A means to restore these files from a simple menu shall exist.

21.) Shall provide the ability to address up to 255 serial communication ports per communication server, where each port can be configured for either hardwired, or dial-up. When configured for dial-up, any one port can support multiple dial-up locations.

22.) Communication from the access control communication server to the remote intelligent control panels shall be selectable. Communication options shall be RS-232 directly to the intelligent control, via RS-485 converter, dial-up, leased line from a defined communication port or by LAN/WAN using an IP address for direct connection to the intelligent controller via network interface card. When using IP addressing it shall be un-acceptable to use a communication port converter device on the communication server side of the transmission. A minimum of 255 such IP connections shall be allowed per communication server.

23.) All commands and updates to the panels shall be verified and shall automatically retry if communications fail.

24.) Shall provide a system scheduler that shall automatically: Call remote locations to retrieve history transactions and update panel information, including time and date, Activate or deactivate cards locally or at remote dial-up sites, Initiate a pre-programmed command event/action, Synchronize system to intelligent controller time, Run a pre-defined (template) History report, Run a pre-defined (template) Card Holder report, Card frequency report defined by reader(s), over a defined period of time with disposition options to automatically report or report and de-activate card or change the access level of the card, Frequency shall be defined as Never, Now, Once, Hourly, Daily, and Weekly, Once per 2 weeks, and Monthly.

25.) Shall provide drop boxes for all system-required information that the user has previously entered.

26.) Shall provide the ability to initiate an email (via SMTP) or page to a paging system based on a transaction state. A transaction state shall be defined as but not limited to Normal, Alarm, Trouble, Ajar, Trace, Not Found, Anti-Pass back Violation, PIN Violation, Time Zone Violation, Site Code Violation, Door Used, Duress, No Second Card Presented, Trace Card or Expired Card, and System Alarms including, Panel Com, Panel Power Failure, Modem Pool, Guard Tour, and Tamper. Intrusion partition events including but not limited to: Alarm, Alarm Cancel, Aram Away, Arm Stay, Auto Arm, Auto Disarm, Bypass, Disarm, Early Arm, Early Disarm, Fail to Arm, Fail to Disarm, Normal, Not Ready, Part Arm, Quick Arm, Recent Close, Remote Arm, Remote Disarm, Unbypass, User Code Added, User Code Deleted, user Code Edited. Intrusion zone events including but not limited to: Alarm, Alarm Restore, Bypass, Fault, Fault Restore, Normal, Trouble, Trouble Restore, and Unbypass. Intrusion output events including

but not limited to: Alarm, Communication Loss, Normal, Tamper, and Tamper Restore. Intrusion panel events including but not limited to: Access Denied, Automatic Test, Comm Fail, Comm Restore, Faults, Faults Restore, Line Restore, Line Trouble, Manual Test, Pager Restore, Pager Trouble, AC Restore, AC Trouble, Alarm, Battery Low, Battery Low Restore, Disarm, Normal, Recent Close, Reset, Panic Alarm, Power Up, Program begin, Program Changed, Program End, System Shutdown, System Shutdown Restore, Tamper Alarm, Tamper Restore, Test End, Test Start, Time/Date changed.

27.) Shall include a "host grant" mode of operation that requires the host computer to grant accesses to "valid" cards. An alternate host grant mode shall allow the card access information to be downloaded along with unlocking the door for "valid" cards.

b. Cards: Shall provide a simple card and card holder database import utility. The utility shall be password protected and accessible only to administrators of the access control system. Information that can be imported shall include but not be limited to: First Name, Last Name, Card Number, Activation Date, De-activation Date, Status, up to 40 note fields and Photo Images. A simple CSV (comma separated value) file shall be used for the importing of data and image file names.

c. Access Levels: Shall provide an option to define specific access times and specific readers for access. Shall provide a template of a defined access level detail, where changes can be made to the template and saved as a new access level detail.

d. Alarm Monitoring - Alarms Only View:

e. Alarm Monitoring/System Control - Tree View: Shall provide the ability for dynamic alarm monitoring of alarm points in real time on the system computer's video display terminal.

f. Operator Database: Shall allow the assignment of operator levels to define the system components that each operator has access to view, operate, change, or delete.

g. Access Control Panels: Shall provide ability to program Action Messages and assign an alarm event priority. .

h. Reports: Shall provide Card holder report capability with filter options to define door(s) that a card holder has access to, reporting card holder name, Card(s), Access Level/schedules, Activation/Expiration.

i. Tracking/Muster Report: A tracking feature shall allow the system operator to identify an area and the person(s) in that area.

j. ime Zones: Time zone definitions shall include Starting time, Ending time, Days of the week, and Holiday override.

k. Floor Plan Graphic: Shall provide the ability to import floor plan graphics stored in a WMF format.

l. Remote Locations: Shall provide the ability to place remote control panels in an offline mode. In the offline mode, the remote control panels shall retain all panel history events. The amount of historical events shall be limited to the panels' buffer capacity.

m. Guard Tour: Guard Tour shall allow the operator to program a series of guard check points that must be activated to accomplish the task of a Guard Tour.

n. ID Badging System/Video Image System: Shall allow any card data fields to be assigned to a badge.

o. Networking: Shall provide networking capabilities (LAN or WAN) as allowed by the computer's operating system license.

E. ISMS Hardware and Software Requirements:
1. The ISMS shall be installed in a computer that supports 1 to 100 readers, 5,000 cards, and 8 communication ports. The recommended hardware requirements to fulfill this installation are:
a. Processor: Quad Core Intel Xeon®.
b. CPU: 2.4 GHz.
c. RAM: 4 Gigabytes (GB).
d. Hard Disk: 250 GB SATA or SCSI.
e. Serial Communication Ports: 2.
f. Secondary Storage: Tape or DVD burner.
g. Printer port: 1 (2 if badging).
h. Monitor Display: Size: 17 Inches SVGA, Resolution: 1024 x 768, Colors: True color.
i. Pointing Device: Mouse (USB preferred).
j. Operating System: Microsoft Windows 7 SP1.
k. Database: Microsoft SQL Server2012 Express Edition.

F. Hardware Requirements:
1. Intelligent Controllers:
a. Distributed architecture shall allow controllers to operate independently of the host. The architecture shall place key access decisions, event/action processing, and alarm monitoring functions within the controllers, eliminating degraded mode operation.
b. Flash memory management shall support firmware updates and revisions to be downloaded to the system. Upgrades to the hardware and software shall occur seamlessly without the loss of database, configurations, or historical report data.
c. Manufacturers: Subject to compliance with requirements, provide Field Controllers or comparable product by one of the following:
1.) Honeywell NetAXS Controller NetAXS-123
2.) Honeywell P-Series Controller PRO-3200
3.) Intelligent Controller Board: Honeywell Security PRO32IC
2. Field Hardware:
The security management system shall be equipped with access control field hardware required to receive alarms and administer all access granted/denied decisions. All field hardware shall meet UL requirements.
a. Intelligent Controller Board: Honeywell Security PRO32IC
b. Single Reader Module (SRM): Honeywell Security PRO22R1
c. Dual Reader Module (DRM): Honeywell Security PRO32R2
d. Alarm Input Module (AIM): Honeywell Security PRO32IN. 16 Inputs 2 Outputs.
e. Relay Output Module (ROM): Honeywell Security PRO32OUT. 16 Outputs 2 Inputs.
f. NetAXS-4 Access System as manufactured by the Honeywell Security Group
1.) NX4S1: 4 Door Control Panel (Standard Enclosure)
g. Card Readers:
1.) Level 1
a.) OmniClass™ 2.0 Contactless Smart, Multi-Technology and BLE Readers. Wall Switch Size, Mini-Mullion
2.) Level 2
a.) Wall Switch Size with keypad

G. System Integrations:

1. Network and Digital Video Recording Systems:
   a. The Security Management System shall provide fully integrated support for a powerful network and digital video recording and transmission system. The Security Management System shall record, search and transmit video, and shall provide users with live, pre and post- event assessment capabilities. The NVRs/DVRs shall be seamlessly integrated with existing video equipment and incorporated into any TCP/IP network. The NVRs/DVRs shall provide multiple levels of integration with the Security Management System software, providing
   b. WIN-PAK shall support the following Network (NVRs) and Digital Video Recorders (DVRs).
      1.) MAXPRO NVR.
2. Access Control Panels(Controllers):
   a. Honeywell NetAXS Controller
   b. NetAXS Panels shall have the following capabilities:
      1.) NetAXS-123 panel.
3. Intrusion Detection Panels:
   a. Honeywell VISTA-128FBP,
      1.) General Requirements: The Security Management System shall support hardwired and TCP/IP communication for the VISTA 128FBP/VISTA-250 FBP panel. Each panel shall have 8 partitions and 15 zone lists. Zones, partitions, and the top-level panel shall have an events page, with all supported events present. Features:
         a.) Disarm and unlock a door on card swipe.
         b.) Arm and lock a door on card swipe.
         c.) Common area arm/disarm.
         d.) Access denied if intrusion system is in alarm or armed.
         e.) Monitor and log intrusion system events and alarms in the Security Management System.
         f.) Associate intrusion system events and alarms to video surveillance integrations.

2.3 ACCESS CONTROL CABLES

A. Access Control System components shall be connected using the following Honeywell Genesis Series Cables:
   1. Bundled Access Control Cables: 4 components, Profusion unjacketed bundle.
      a. Part #: 2195, Riser Rated, CMR, CL2R, FT4, Sunlight Resistant Listed.
         1.) Component 1: 22 AWG, 6 stranded conductors, shielded.
         2.) Component 2: 18 AWG, 4 stranded conductors.
         3.) Component 3: 22 AWG, 2 stranded conductors.
         4.) Component 4: 22 AWG, 4 stranded conductors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine site conditions to determine site conditions are acceptable without qualifications. Notify Owner in writing if deficiencies are found. Starting work is evidence that site conditions are acceptable.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. System, including but not limited to access control, alarm monitoring and reporting, time management, and user identification cards shall be installed in accordance with the manufacturer's installation instructions.

B. Supervise installation to appraise ongoing progress of other trades and contracts, make allowances for all ongoing work, and coordinate the requirements of the installation of the System.

C. Programming: Provide up to 80 hours programming to the owner’s requirements.

3.4 FIELD TESTING AND CERTIFICATION

A. Testing: The control, alarm monitoring and reporting, time management, and user identification cards shall be tested in accordance with the following:
1. Conduct a complete inspection and test of all installed access control and security monitoring equipment. This includes testing and verifying connection to equipment of other divisions such as life safety and elevators.
2. Provide staff to test all devices and all operational features of the System for witness by the Owner's representative and authorities having jurisdiction as applicable.
3. Correct deficiencies until satisfactory results are obtained.
4. Submit written copies of test results.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

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SECTION 281600 - INTRUSION DETECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Burglary/access control/CCTV intrusion detection system.

B. Intrusion detection cables.

1.2 RELATED SECTIONS

A. Section 26 05 00 - Common Work Results for Electrical.

1.3 REFERENCES

A. Reference Standards: Provide systems which meet or exceed the requirements of the following publications and organizations as applicable to the Work of this Section:
   1. Underwriters Laboratories Inc. (UL):
      a. UL 365: Police Station Connected Burglar Alarm Units and Systems.
      b. UL 636: Holdup Alarm Units and Systems.
      c. UL 684: Local, Central Station, and Remote Station.
      d. UL 985: Household Fire-Warning System Units
      e. UL 1037: Antitheft Alarms and Devices
      f. UL 1610: Central-Station Burglar-Alarm Units.
      g. UL 1635: Installation and Classification of Residential Burglar Alarm Systems.
   2. Federal Communications Commission (FCC):
      a. Code of Federal Regulations Title 47: Part 15: Radio Frequency Devices.
      b. Code of Federal Regulations Title 47: Part 68: Connection of Terminal Equipment to the Telephone Network.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Manufacturer's Product Data: Submit manufacturer's data sheets indicating systems and components proposed for use, including instruction manuals.

C. Shop Drawings: Submit complete shop drawings including connection diagrams for interfacing equipment, list of connected equipment, and locations for major equipment components.

D. Record Drawings: During construction maintain record drawings indicating location of equipment and wiring. Submit an electronic version of record drawings not later than Substantial Completion of the project.

E. Operation and Maintenance Data: Submit manufacturer's operation and maintenance data, customized to the system installed. Include system and operator manuals.

F. Field Tests: Submit results of field testing of every device including date, testing personnel, retesting date if applicable, and confirmation that every device passed field testing.

G. Maintenance Service Agreement: Submit a sample copy of the manufacturer's maintenance service agreement, including cost and services for a one year period for Owner's review.

Maintenance shall include, but not be limited to, labor and materials to repair the system, provide test and adjustments, and regular inspections.

H. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, represent actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Manufacturer: Minimum ten years of experience in manufacturing and maintaining similar systems. Alarm manufacturer shall be certified compliant with ISO 9001.

B. Installer: Minimum two years of experience installing similar systems, and acceptable to the

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
1. Finish areas designated by Architect.
2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's labeled packages. Store and handle in accordance with manufacturer's requirements, in a facility with environmental conditions within recommended limits.

B. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Approved Manufacturer: www.security.honeywell.com.

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 INTRUSION DETECTION CONTROL PANELS

A. Basis-of-design shall be the Honeywell VISTA 128BPT System, a burglary/access control/CCTV switching system that includes the following capabilities:
1. Listed for UL Commercial Burglary.
2. Compatible Detection Devices: Addressable.
3. Addressable Inputs: 120.
4. Access Readers: 8.
5. Onboard Communication: Digital Dialer.
6. Onboard Inputs: 9.
7. Communication Choices: Digital Dialer, TCP/IP, GSM.

8. Event Log: 512.
9. Supports up to 128 zones.
10. Supports up to 8 separate partitions.
11. Supports up to 150 users.
12. Supports commercial wireless devices.
13. Wireless Inputs: 127.
14. Provides integrated security, access control, and CCTV switching capability.
15. Provides supervision of peripheral devices.
16. Supports up to 96 relay outputs.
17. Supports long-range radio (LRR) communication.
18. Provides scheduling capability to allow for automated operations.
19. Supports alarm reporting via Internet.
20. Interfaces with automation software.
21. Monitors smoke detector maintenance signals.
22. Capable of being installed using existing wiring.

B. Environmental Conditions: System shall be designed to function in the following environmental conditions:
1. Storage Temperature: Designed for a storage temperature of -10 degree C to 70 degree C.
2. Operating Temperature: System shall be designed for an operating temperature of 0 degree C to 50 degree C (32 degree F to 120 degree F).
3. Humidity: System shall be designed for normal operation in an 85% relative humidity environment.
4. Electromagnetic Interference: System shall meet or exceed the requirements of FCC Part 15, Class B devices, FCC Part 68, IEC EMC directive.

C. Power Requirements: Components shall have the following electrical specifications. The system shall operate using standard 120 VAC, 50 Hz/60 Hz power.
1. Control Primary Power: Transformer power shall be 16.5 VAC, 40 VA.
2. Backup Battery: Rechargeable 12 VDC, gel type, lead acid backup battery shall be provided. The battery shall be rated between 12 and 34-ampere hours (AH).
3. Alarm Power: 12 VDC, 1.7 amps for each bell output
4. Auxiliary Standby Power: 12 VDC, 0.75 amp maximum.
5. Total Power: Combined auxiliary standby and alarm currents shall be 2.3 amps.
6. Fusing: The battery input, auxiliary, and bell outputs shall be protected using PTC circuit breakers. All outputs shall be power limited.

D. Control Panel Enclosure: A metal cabinet, suitable for wall mounting. Dimensions shall not exceed 14.5 inches (36.8 cm) in height, 12.5 inches (31.8 cm) in width or 3 inches (7.6 cm) in depth.

E. Control Panel: The control panel shall be an 8-partition, UL commercial and burglary control panel that supports zones using basic hardwired, polling loop, and wireless zones, RF receivers, and relay modules. The control shall provide the ability to schedule time-driven events, and allow certain operations to be automated by pressing a single button. The system shall be capable of interfacing with an ECP long range radio (LRR) unit that can send Contact ID messages. The control shall provide integrated access control and CCTV-switching capability with the use of a single downloader and database.
1. Basic Hardwired Zones: Control shall provide 8 style-B hardwire zones with the following characteristics:
a. EOLR supervision (if required for zones 2-8) shall support N.O. or N.C. sensors (EOLR supervision required for UL installations).

b. Zones/Points shall be individually assignable to any partition.
c. Supports up to 16 two-wire smoke detectors on zone 1.
d. Supports four-wire smoke or heat detectors on any zone (power to four-wire smoke detectors must be supervised with an EOL device).

2. Expansion Zones:
   a. Wireless Expansion Zone: Control shall support wireless zones using a 5800 series RF receiver (fewer if using hardwire and/or polling loop zones). Wireless zones shall have the following characteristics:
      1.) Supervised by control panel for check-in signals (except certain non-supervised transmitters).
      2.) Tamper-protection for supervised zones.
      3.) Individually assignable to one of 8 partitions.
      4.) Individually assignable to bell outputs and/or auxiliary relays.
      5.) Support wireless devices listed for Commercial Burglary using the 5881ENHC RF Receiver.
3. Partitions: Control shall provide the ability to operate e8 separate areas, each functioning as if it had its own control. Partitioning features shall include:
   a. A Common Lobby partition (1-8), which can be programmed to perform the following functions:
      1.) Arm automatically when the last partition that shares the common lobby is armed.
      2.) Disarm when the first partition that shares the common lobby is disarmed.
   b. A Master partition (9), used strictly to assign keypads for the purpose of viewing the status of all 8 partitions at the same time (master keypads).
   c. Assignable by zone.
   d. Assignable by keypad/annunciator.
   e. Assignable by relay to one or all 8 partitions.
   f. Ability to display burglary and panic and/or trouble conditions at all other partitions' keypads (as a selectable choice).
   g. Certain system features selectable by partition, such as entry/exit delay and subscriber account number.
4. User Codes: Control shall accommodate user codes, all of which can operate any or all partitions. Certain characteristics must be assigned to each user code, as follows:
   a. Authority level (Master, Manager, or several other Operator levels). Each User Code (other than the installer code) shall be capable of being assigned the same or a different level of authority for each partition that it will operate.
   b. Specific partitions that the code can operate.
   c. Global arming capability (ability to arm all partitions the code has access to in one command).
   d. Use of an RF (button) to arm and disarm the system (RF key must first be enrolled into the system).
5. Peripheral Devices: Control shall support up to 30 addressable ECP devices, which can be any combination of keypads, RF receivers, relay modules, and interactive phone module. Peripheral devices have the following characteristics:
   a. Each device set to an individual address according to the device's instructions.
   b. Each device enabled in system programming.
   c. Each device's address shall be supervisable (via programming).
6. Keypad/Annunciator: Control shall accommodate up to 16 keypads or six (6) touch-screen (i.e.; advanced user interface) keypads. The keypads shall be capable of the following
   a. Performing all system arming functions.

b. Being assigned to any partition.
c. Providing four programmable single-button function keys, which can be used for:
   1.) Panic Functions: activated by wired and wireless keypads; reported separately by partition.
   2.) Keypad Macros: 32 keypad macro commands per system (each macro is a series of keypad commands). Assignable to the A, B, C, and D keys by partition.

7. Output Relays: A total of 96 relay outputs shall be accommodated using relay modules. Each relay module shall provide four (4) Form C (normally open and normally closed) relays for general-purpose use. The relays shall be capable of being:
   a. Programmed to activate in response to system events.
   b. Programmed to activate using time intervals.
   c. Activated manually.
      Assigned an alpha descriptor.
   d. A combination of 4204 (ECP) and 4101SN (polling loop) relays.
8. Integrated Access Control: Control shall be capable of the following:
      Providing a command that activates relays to allow access doors to open (e.g., lobby door), lights to be turned on or off, etc.
   a. Becoming a fully integrated access control system by using numerous VistaKey Single-Door Access Control Modules.
   b. Supporting up to 15 VistaKey Access Control Modules. The VistaKey Access Control Modules shall use the same Compass Downloader as the Vista-250BPT and shall be programmable from the Compass Downloader or the Keypad/Annunciators.
   c. Assigning any number of access control relays to each partition (up to 96 for the system).
   d. Supporting up to 500 access card holders using VistaKey.
9. Commercial Wireless Equipment: Control shall be compatible with UL Listed Commercial Wireless Security equipment including:
   a. ADEMCO 5881ENHC Commercial Wireless Receiver: The receiver shall be capable of receiving as many points as the control panel is rated for. Up to two (2) Receivers may be used on any system. Receivers may be remotely located anywhere on the system Keypad/Annunciator bus.
   b. Honeywell 5808W3 Wireless Photoelectric Smoke and Heat Detector: The device shall be UL 268 listed and shall have Maintenance Alert capability and Automatic Drift Compensation.
   c. ADEMCO 5809 Wireless 135D Fixed Temperature and Rate of Rise Heat Detector: The device shall be UL 521 listed for commercial applications.
   d. ADEMCO 5817CB Wireless Universal Contact Monitoring Transmitter: This device shall be capable of making any conventional UL listed contact device a wireless device. The device shall be UL listed for commercial burglary applications as follows: UL 365, 609, 1023, 1076 and 1610 for security and nurse call.
   e. ADEMCO 5869 Wireless Hold Up Switch/Transmitter: This device shall be UL 636 listed for commercial burglary applications.
10. Voltage Triggers: System shall provide voltage triggers, which change state for different conditions. Used with devices such as a remote keypad sounder or keyswitch ARMED and READY LEDs.
11. Event Log: System shall maintain a log of different event types (enabled in programming). The event log shall provide the following characteristics:
    a. Stories events.

b. Viewable at the keypad or through the use of Compass software.
c. Printable on a serial printer, including zone alpha descriptors.

12. Scheduling: Provides the following scheduling capabilities:
    a. Open/close schedules (for control of arming/disarming and reporting).
    b. Holiday schedules (allows different time windows for open/close schedules).
    c. Timed events (for activation of relays, auto-bypassing and un-bypassing, auto-arming and disarming, etc.).
    d. Access schedules (for limiting system access to users by time).
    e. End User Output Programming Mode (provides 20 timers for relay control).
    f. The system shall automatically adjust for daylight savings time.
13. Communication Features: Supports the following formats and features for the primary and secondary central station receivers:
    a. Formats: ADEMCO Express; ADEMCO Contact ID 4 and 10 Digit Acct number. Backup reporting: The system shall support backup reporting via the following: Secondary phone number; ECP long-range radio (LRR) interface; with ability to select long range radio (LRR) or dialup as the primary reporting method (dynamic signaling feature).
    b. Internet reporting: The system shall be capable of communicating with the central station via the internet using Alarmnet-i. It shall provide the user with the ability to control the system via a browser interface (i.e., AOL, Netscape, Internet Explorer). All packet data transmitted to the monitoring station shall be encrypted with a minimum of 1024 bits of encryption.
14. Cross-Zoning Capability: Helps prevent false alarms by preventing a zone from going into alarm unless its cross-zone is also faulted within 5 minutes.
    a. Alarm notification appliances, including but not limited to sirens horns, bells and strobes.
    b. Auxiliary devices capable of operating using full-wave rectified unfiltered voltage.
15. Exit Error False Alarm Prevention Feature: System shall be capable of differentiating between an actual alarm and an alarm caused by leaving an entry/exit door open. If not subsequently disarmed, the control panel shall:
    a. Bypass the faulted E/E zone(s) and/or interior zones and arm the system.
    b. Generate an Exit Error report by user and by zone so the central station knows it was an exit alarm and who caused it.
16. Built-in User's Manual and Descriptor Review: For end-user convenience, the control panel shall contain a built-in User's Manual. It shall include the following capabilities:
    a. By depressing any of the function keys on the keypad for five (5) seconds, a brief explanation of that function shall scroll across the alphanumeric display.
    b. By depressing the READY key for five (5) seconds, all programmed zone descriptors shall be displayed (one at a time). This feature shall provide a check for installers and ensure all descriptors have been entered properly.
17. Programming: Control shall be capable of being programmed locally or remotely using the ADEMCO Compass Downloader and shall be capable of:
    a. Uploading and downloading all programming information at 300 baud.
    b. Uploading and displaying firmware revision levels from the control.
18. Automation Software: The Control shall be capable of interfacing with automation software via an RS232 input on a single partition.

F. User Interfaces
1. Keypad: Color Graphic Touch Screen Display, ZWAVE, IP Camera, Remote control support: The system keypad shall employ a dynamic, interactive graphic touch screen display. Use the Honeywell Tuxedo Touch Screen keypad or equivalent. The keypad

shall feature the ability to integrate with up to 232 ZWAVE devices, and 32 compatible IP Cameras. The Touch Screen keypad shall provide a web page on the Local Area Network featuring system status and remote control functions. The installer shall follow manufacturer's installation instructions when installing system equipment.

G. VPLEX Addressable Detection Devices. System shall integrate with facility doors, windows, and departments. The system shall also integrate with external systems, such as building appliances and building alert systems for remote control and central collection of external system alerts. When integrated with external systems, the system shall connect to the external system to receive status changes by way of a dry contact output from the external system. The system shall use its user interface to provide local status messages from external systems, providing for the initiation of local building policies. The system may transmit information to an off-site monitoring service to provide initiation of remote policies when appropriate. The installer shall follow manufacturer's instructions when installing and programming system equipment.

1. VPLEX Bus Extensions: Extended system VPLEX bus branch circuits shall be scale able to increase the total size of the bus in larger installations. Branch circuits leading from different buildings or from different floors in multi-story buildings shall be isolated from one another so that a shorted or grounded branch circuit is isolated away from other near-side branch circuits, allowing other VPLEX devices to be isolated so that they can continue to operate. The installer shall furnish Honeywell Model 4297 VPLEX Bus Extender modules for each 128 mA of current required on the VPLEX bus.
2. VSI Bus Isolation and Integrity: System VPLEX bus branch circuits shall be isolated from one another so that a shorted, overloaded, or grounded branch circuit is isolated away from other near-side branch circuits, allowing undamaged VPLEX bus circuits to continue to operate. VSI Isolation modules shall be installed at near-side connections to cable runs leading to additional buildings, at cable runs leading to additional floors in multi-story buildings, and at junction boxes leading to multiple VPLEX branch circuits within the system. The installer shall use the Honeywell VSI module or equivalent.
3. Individual Zone Input: When zone inputs shall be located next to individual detection devices, system zone inputs allow the system to sense the change in state of an output from an external device, such as a door/window position sensor, a motion detector, a relay output from an appliance, the output of an external alert system, or other devices that provide a dry closure output. The installer shall furnish Honeywell Model 4193SN zone input modules for each detection device that will be connected to the VPLEX Bus.
4. Hollow Metal Frame Doors and Windows, Exposed, Armored, VPLEX: Monitor the opened and closed position of doors and windows in the facility. The installer shall install a Honeywell Model 960 Armored Door Sensor, or equivalent. The installer shall follow manufacturer instructions while installing and programming system equipment.
5. Overhead Doors: Monitor the opened and closed position of overhead bay doors in the facility. The installer shall install a Honeywell Model 4959SN Overhead Door sensor, or equivalent. The installer shall follow manufacturer instructions while installing and programming system equipment.
6. Dual-Tec Motion Detector, Wall-Mounted, VPLEX: Selected areas in the protected site will use motion detectors to sense motion in rooms or areas of rooms. Where designated in the plans, install a Honeywell Model DT7500SN VPLEX Dual-Tec Motion Detector or equivalent.
7. Panic Buttons: Include manual panic buttons under desks, in storage rooms, in walk-in refrigeration units and other designated locations. The panic button shall be the Honeywell Model 269SN or equivalent.

H. Sirens, Sounders and Indicators

1. Siren, Outdoor, High Output in Enclosure: Monitor the status of protected openings and areas in the armed and disarmed state. When an audible alarm occurs, the system shall sound a Honeywell Model 702 Siren or equivalent inside of the Model 743BE Enclosure. The installer shall install the siren as directed by manufacturer instructions.

2.3 INTRUSION DETECTION CABLES

A. Intrusion Detection System components shall be connected using the following Honeywell Genesis Series Cables:
   1. Keypads use four conductor, 18AWG with 22AWG, non-shielded cable:
      a. Element 1: 18AWG:
         1.) General Purpose applications: Part #: 1119.
         2.) Riser applications: Part #: 2115.
         3.) Plenum applications: Part #: 3115.
      b. Element 2: 22AWG:
         1.) General Purpose applications: Part #: 1104.
         2.) Riser applications: Part #: 2104.
         3.) Plenum applications: Part #: 3104.
   2. VPLEX Zone Expanders shall connect to a VPLEX data bus using two conductor, 18AWG, non-shielded cable.
      a. General Purpose applications: Part #: 1118.
      b. Riser applications: Part #: 2114.
      c. Plenum applications: Part #: 3114.
      d. Direct burial applications: Part #: 4156.
   3. VPLEX Fire detection devices and two wire fire detection devices connect using two conductor, 18AWG, non-shielded fire alarm cable.
      a. General Purpose applications: Part #: 4106.
      b. Riser applications: Part #: 4306.
      c. Plenum applications: Part #: 4506.
      d. Direct burial applications: Part #: 4156.
   4. Four wire fire detection devices connect using four conductor, 18AWG, non-shielded fire alarm cable.
      a. General Purpose applications: Part #: 4107.
      b. Riser applications: Part #: 4307.
      c. Plenum applications: Part #: 4507.
      d. Direct burial applications: Part #: 4157.
   5. Unpowered detection devices connect to zone inputs using two conductor, 22AWG, non-shielded cable.
      a. General Purpose applications: Part #: 1102.
      b. Riser applications: Part #: 2102.
      c. Plenum applications: Part #: 3102.
   6. Powered detection devices connect to zone inputs using four conductor, 18AWG, non-shielded cable.
      a. General Purpose applications: Part #: 1119.
      b. Riser applications: Part #: 2115.
      c. Plenum applications: Part #: 3115.
      d. Direct burial applications: Part #: 4157.
   7. The Bell output shall use two conductor, 16AWG, non-shielded cable.
      a. General Purpose applications: Part #: 1125.
      b. Riser applications: Part #: 2121.
      c. Plenum applications: Part #: 3121.
   8. Power connections for control panels shall be made using two conductor, 16AWG,

non-shielded cable.
a. General Purpose applications: Part #: 1125.
b. Riser applications: Part #: 2121.
c. Plenum applications: Part #: 3121.

9. Ground connections to control panels shall be made using 14AWG solid insulated copper ground wire.
a. General Purpose applications: Part #: 1131.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine site conditions prior to installation. Notify Architect and Owner in writing if unsuitable conditions are encountered. Do not start installation until site conditions are acceptable.

3.2 INSTALLATION

A. Intrusion detection and fire alarm control panel system shall be installed and tested in accordance with manufacturer's installation instructions.
1. Coordinate interfaces with Owner's representative where appropriate.
2. Provide backboxes, pullboxes, connectors, supports, conduit, cable, and wire for a complete and reliable installation. Obtain Owner's approval for exact location of all boxes, conduit, and wiring runs prior to installation.
3. Install conduit, cable, and wire parallel and square with building lines, including raised floors areas. Do not exceed forty percent fill in conduits. Gather wires and tie to create an orderly installation.
4. Coordinate with other trades to provide proper sequencing of installation.

3.3 FIELD COMMISSIONING AND CERTIFICATION

A. Field Commissioning: Test system as recommended by manufacturer, including the following:
1. Conduct complete inspection and testing of equipment, including verification of operation with connected equipment.
2. Test devices and demonstrate operational features for Owner's representative and authorities having jurisdiction as applicable.
3. Correct deficiencies until satisfactory results are obtained.
4. Submit written copies of test results.

3.4 TRAINING

A. Conduct on-site system training, with the number of sessions and length of sessions as recommended by the manufacturer. Training shall include administration, provisioning, configuration, operation and diagnostics.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

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SECTION 282319 - NETWORK VIDEO RECORDING SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Provide a complete IP video recording system, including engineering, components, installation and commissioning.

1.2 RELATED SECTIONS

A. Section 28 13 00 – Security Management System, for interface and coordination with electronic access control systems.

B. Section 28 23 13 – Video Management System, for interface to a digital video management system.

C. Section 28 23 23 – Video Surveillance System Infrastructure.

1.3 REFERENCES

A. Reference Standards: Provide systems which meet or exceed the requirements of the following publications and organizations as applicable to the Work of this Section:

1. Canadian ICES-003
2. Consultative Committee for International Radio (CCIR)
3. Conformity for Europe (CE)
4. Electronic Industry Association (EIA)
5. Federal Communications Commission (FCC)
6. Joint Photographic Experts Group (JPEG)
7. Moving Pictures Experts Group (MPEG)
8. Motion Joint Photographic Experts Group (MJPEG)
9. National Television Systems Committee (NTSC)
10. Phase Alternating by Line (PAL)
11. Underwriters Laboratories Inc. (UL)
12. Institute for Electrical and Electronics Engineers (IEEE)
13. ITU-T Video Coding Experts Group (VCEG)
14. Physical Security Interoperability Alliance (PSIA)
15. Open Network Video Interface Forum (ONVIF)
16. Real Time Streaming Protocol (RTSP)

1.4 DEFINITIONS

A. HD (High-definition) – refers to video having resolution substantially higher than traditional television systems. HD has one or two million pixels per frame.

B. CIF (Common Intermediate Format) – refers to a standard video format, which is categorized based on the resolution.

1.5 SYSTEM DESCRIPTION

A. The Network Video Recorder (NVR) supports simultaneous recording, remote viewing and search, and system management for up to 64 IP cameras including high definition formats. Multiple NVRs may be deployed for system expansion using a distributed architecture and integrated with the multi-site software or enterprise video management system.

B. Basis-of-design is the Honeywell MAXPRO NVR PE.

1.6 SUBMITTALS

A. Manufacturer's Product Data: Submit manufacturer's data sheets indicating systems and components proposed for use, including instruction manuals.

B. Shop Drawings: Submit complete shop drawings including connection diagrams for interfacing equipment, list of connected equipment, and locations for major equipment components.

C. Record Drawings: During construction maintain record drawings indicating location of equipment and wiring. Submit an electronic version of record drawings not later than Substantial Completion of the project.

D. Operation and Maintenance Data: Submit manufacturer's operation and maintenance data, customized to the system installed. Include system and operator manuals.

E. Field Tests: Submit results of field testing of every device including date, testing personnel, retesting date if applicable, and confirmation that every device passed field testing.

F. Maintenance Service Agreement: Submit a sample copy of the manufacturer's maintenance service agreement, including cost and services for a one year period for Owner's review. Maintenance shall include, but not be limited to; labor and materials to repair the system, provide test and adjustments, and regular inspections.

1.7 QUALITY ASSURANCE

A. Manufacturer: Minimum ten years experience in manufacturing and maintaining IP video recording systems. Manufacturer shall provide toll-free technical assistance and support available 24/7.

B. Manufacturing Location: Provide equipment assembled in the United States.

C. Installer: Minimum five years experience installing similar systems, and acceptable to the manufacturer of the IP video recording system.

D. Environmental Conditions: The NVR shall be designed to function in the following environmental conditions:

1. Operating Temperature: 32°F to 95°F (0°C to 35°C).
2. Emissions: FCC part 15B Class A; EN 55022 Class A
3. Immunity: EN 50130-4
4. Safety: ANSI / UL 60950-1; CAN / CSA C22.2 No. 60950-1; IEC 60950-1.
5. RoHS: EN 50581

E. Power Requirements: NVR shall have the following electrical specifications:

1. Input Voltage: 110/220 VAC 50/60 Hz
2. Operating Voltage: 110V/220V Auto Sensing
3. Power Dissipation:
   a. Average BTU rating = 880 BTU/HR
   b. Peak BTU rating = 2800 BTU/HR

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's labeled packages. Store and handle in accordance with manufacturer's requirements, in a facility with environmental conditions within recommended limits.

1.9 WARRANTY

A. Manufacturer's Warranty: The warranty period shall be thirty six (36) months from the delivery date of the system under normal use and service.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Network Video Recording System (NVR) Manufacturer: Honeywell MAXPRO NVR PE Network Video Recording System, www.honeywell.com/security.

B. Accepted Alternates: None.

2.2 SYSTEM COMPONENTS

A. NVR Server: The NVR Server shall contain the recording engine, database of all network-connected cameras and encoders, integrated components and their configurations. Server shall be provided as a combined hardware and software device.

B. Workstation Software (NVR Client): The NVR Client software shall render video and act as a main human/machine interface.

2.3 OPERATIONAL REQUIREMENTS

A. NVR shall provide a user-friendly graphical user interface (GUI) to configure the cameras, create schedules for recording, perform video surveillance and recording operations, and view various reports.

B. NVR shall be configured to store and to view images captured by 64 cameras.

C. NVR shall have following major capabilities:

1. Record and monitor up to 64 IP channels at 1920 fps @ 4CIF/VGA or 1920 fps @ 720p HD or 1920 fps @ 1080p (4 Mbps bitrate) HD per MAXPRO NVR PE. Network bandwidth/throughput supported per NVR with Incoming: 256 Mbps, Outgoing: 425 Mbps providing a Total: 681 Mbps. Archival support of 25 channels @ 4 Mbps bitrate each (100 Mbps total archival throughput capacity per MAXPRO NVR PE), with outgoing archival storage throughput of 275 Mbps. Multi-stream support with maximum 128 streams per MAXPRO NVR PE. Support for configuring one (1) preferred stream for continuous recording and one (1) preferred stream for live video/motion based recording per camera. Support for One-Way Audio (for specific IP cameras) with live, playback and clip export on NVR desktop client for up to 64 IP channels.

2. Live viewing of up to 64 IP cameras on a single remote workstation with up to two (2) monitors set up at CIF resolution. For 4CIF and HD resolution, the number of live streams needs to be benchmarked based on client hardware configuration deployed. Cost-effective enhanced HD video rendering on remote desktop clients with support for monitoring of up to 23 1080p HD cameras in real time (30 fps)/690 fps 1080p HD with no-time lapse using the GPU capabilities of in-built processor graphics with 6th generation Intel® Core™ Processors for client systems. Up to 4 1080p HD @ 30 fps/120 fps on local client.

3. Powerful investigation and video archive search tools from remote client.

4. Native device integrations supporting equIP® Series cameras' new features: 4K resolution, H.265 video compression codec, 3D PTZ control, 360° camera support, and intelligence events.

5. Capable of managing motion detection-based recording with pre-event and post-event recording based on camera based motion detection or Server based motion detection events (SMART VMD) and "advanced" search on recordings from remote client.

6. Preview and Calendar Search permitting search for videos and events based on user-selected date and time from remote client. SMART motion search — fast and efficient forensic search and investigation for objects/motion on recorded video using Honeywell SMART motion detection Analytics algorithms on the client PC without impacting the NVR Server load.

7. Simultaneous use of multiple video compressions including MJPEG, MPEG-4, H.265 and H.264.

8. Internationalization – supports the following languages: French, German, Russian, Italian, Spanish, Dutch, Arabic and English.

9. Email on alarm.
10. Instant clip creation from snapshot.
11. Dynamic IP Camera Discovery – Automatically discover all compatible cameras connected to NVR.
12. Multi-level user access rights for viewing and manages access to the recorder functions.
13. Capable of managing continuous, scheduled, manual, event-based, and alarm-based recording features.
14. Advanced security features with encryption support for communication between desktop client to NVR and secure https login for Web Client and mobile apps.
15. Support for web client and mobile apps.

D. Mode for User Login: NVR shall have the option of two modes of user logins:

1. Windows Authentication: Uses Windows logged-in user name.
2. User DB Authentication: Uses preconfigured user name and password.

E. Workstation (NVR Client) shall provide the following operator options:

1. Configuration: The operator (with Administrator privileges) shall have the option to configure the NVR. Live update of all configurations is supported. The following configurations shall be possible:
    a. System Configuration: Provide options to configure the system level settings.
    b. Camera Configuration: Provide options to add/edit/delete IP cameras and encoders.
    c. Schedules: Provide options to configure schedule based recording for cameras connected to the NVR.
    d. Input and Output: Provide options to configure camera input and output.
    e. Sequences: Provide options to group a fixed number of cameras to view video.
    f. User Management (Users and Roles): Provide option to add/edit/delete users.
    g. Clip Deletion Settings: Provide the ability to automatically utilize more storage on event-initiated recording.
    h. Independent deletion setting for continuous recording.
    i. Independent deletion setting for event recording.
    j. Surrounding Cameras: Provide option to grant a user the ability to view a single camera surrounded by the cameras programmed as the “Surrounding Cameras”.
    k. 3D Positioning: The user shall be able to view a specific object in the live video in a 3-dimensional view. This feature is available in the Context menu options and is only supported with New equIP PTZs HDZ302DE, HDZ302D, and HDZ302DIN.

3D positioning options include: Click-based camera positioning, Rectangle selection 3D positioning, and Restore to last PTZ position.

l. Profile Cameras: Multi-zoom views on HD video and support to create virtual cameras by digitally zooming into the field of view. For example: zooming in on a cash register in one view of the HD camera while at the same time monitoring the cashier in the zoomed out view of that HD camera.

F. Configurations for cameras connected to NVR:

1. Camera Configuration: The user shall be able to configure the following parameters for each camera connected to the NVR.

a. Camera Name

b. IP Address

c. Camera Type

d. Fixed/PTZ

e. Continuous Recording: All cameras added shall be defaulted to "24/7" recording with the option to select other recording modes.

f. Event Based Recording: Shall be “None” by default, with the option to select motion-based recording.

g. User name: Shall display and enable setting the user name for a camera.

h. Password: Shall enable setting the password for a camera.

i. Camera Advanced Settings: Shall enable configuration of Video Format, Compression Format, Resolution, Compression, Video Frame Rate, GOP, Record Quality Settings, Clip Deletion Settings, Launching Web View of camera for Advanced Setup, Motion detection zones configuration for Server based motion detection, Video Archival Settings, Multi-Stream Settings and Video Preview. Shall enable configuration of RTSP URL for cameras or encoders added with camera type – Generic RTSP.

2. The following video recording options shall be supported:

a. Scheduled based recording: The system shall support the ability to schedule recordings for each individual camera for times in the future. By default, the NVR shall be pre-loaded with the following four schedules: 24x7, Weekday, Daytime, and Nighttime, which cannot be edited. A maximum of 50 schedules can be created in the NVR.

b. User based recording: The user shall be able to configure user activated settings for recording moments of interest while viewing live video from a camera. After configuring the user activated settings, the operator can start recording of video when needed. The video is recorded for the time period specified in the System settings for user activated recording. The User based Recording Time Duration shall be selectable from a list of values ranging between 30 seconds and 5 minutes.

c. Event based recording: Event based recording shall be possible on SMART Video Motion Detection and alarm triggers. The NVR must be capable of managing motion detection-based recording with pre-event and post event recording based on camera and Server-based motion detection events. The server-based SMART VMD analytics must be object-based and not traditional pixel-based, reducing false alarms due to changing light conditions, video noise, rain or other false alarm triggers that occur using pixel-based (traditional) VMD.

G. Viewer: The NVR Viewer shall have the following minimum capabilities:

1. Main video viewing screen capable of showing 1, 4, 9, 16, and other customized split salvos of live or recorded video. Standard presets shall be customizable to the user preferences.

2. Capable of saving current salvo as a View and allowing the user to drag this view at any later point in time.

3. Capable of configuring and running scan sequences.

4. Capable of adjusting the contrast, brightness, and saturation settings for each camera independently.

5. Capable of exporting user selected image or video clips in simple .wmv, .asf, .mpvc and .bmp formats. Capable of attaching a digital signature for authentication of exported clips in .wmv format.

6. Capability to play back the video clips exported. Each video channel that is being recorded by the recording system shall be overlaid with text and a time stamp that is customizable by the user.

7. MAXPRO Video Container (.mpvc) format support — only playable in MAXPRO desktop clients and standalone Clip Player. Features quicker exports of raw video and support for estimating clip size and split to multiple clips to ensure clip storage media matches. Include the clip player with exported clip for easier review of video evidence and efficient investigation. Clip Player — Portable standard secure player for archived and exported clips (*.mpvc), 360 camera de-warping and 2x2 Salvo support. Smooth playback support with up to 256x review speed. No software needed to run on a Windows PC, with the option to include the clip player with the exported clip.

8. Allow the user to initiate recording through the GUI or a controller.

9. Capability of complete alarm management for the alarms coming from the NVR.

10. Facility of surrounding camera view.

11. Option to perform various operations through context menu on a particular video (live/recorded/sequence). These operations include: Full screen, point and drag, maintain aspect ratio, toggle text, digital PTZ, add bookmark, start recording, stop recording, mark in, mark out, save image, save image as, show surrounding cameras.

12. Ability to manage timeline control of the recording device, which provides camera recording statistics. Timeline control shall have the following features: Mark input (with looping facility), bookmark, snapshot, time slider, time jump, play controls.

13. Preference configuration including: frame rate of unselected panels, rendered type, preview pane, text display format.

H. Search: The Search facility shall include search for recorded video and events based on date and time.

I. Reports: The Report facility shall include event history report and audit log report.

2.4 NVR INTEGRATIONS

A. NVR shall be compatible with the following interoperability standards:

1. Physical Security Interoperability Alliance (PSIA)

2. Open Network Video Interface Forum Profile S (ONVIF Profile S)

3. Real Time Streaming Protocol (RTSP)

B. NVR shall be compatible with the following Fixed and PTZ IP cameras

1. Honeywell Performance Series, equIP® Series and New equIP® Series IP cameras

2. Supports IP cameras from the following manufacturers. Please contact Honeywell for the complete list of manufacturers and models.

a. AXIS® Communications

b. Sony

c. Panasonic

d. Bosch

e. Samsung

f. Vivotek

g. Pelco

C. NVR shall be compatible with the following encoders:

1. Honeywell HVE Series Encoders

2. Supports Encoders from the following manufacturers. Please contact Honeywell for the complete list of manufacturers and models.

a. AXIS® Communications

b. Sony

c. Panasonic

d. Bosch

e. Samsung

f. Vivotek

D. NVR shall be compatible with the following 360° Camera solutions. Please contact Honeywell for the complete list of models.

1. Honeywell equIP® Series Fisheye IP Cameras: HFD6GR1
2. Oncam Grandeye
3. Immervision Enables® - Panomorph Lenses
4. AXIS® 360°/180°
5. Arecont 360°/180°

E. NVR shall be compatible with the following IP Surveillance Control Keyboards:

1. Honeywell HJK7000 UltraKey Plus
2. Honeywell HJC5000 UltraKey Lite

F. NVR shall be compatible with the following Multi-site Video Management Systems:

1. Honeywell MAXPRO® Viewer

G. NVR shall be compatible with the following Video Management Systems:

1. Honeywell MAXPRO® VMS

H. NVR shall be compatible with the following Access Control Security System:

1. Honeywell Pro-Watch® Access Control System through MAXPRO® VMS and MAXPRO® Viewer
2. Honeywell WIN-PAK® Access Control System

I. Video Analytics supported through MAXPRO® VMS:

1. Honeywell Active Alert

J. IP Surveillance Control Keyboards supported through MAXPRO® VMS:

1. Honeywell HJK7000 UltraKey Plus
2. Honeywell HJC5000 UltraKey Lite
3. Honeywell HJC4000 UltraKey Touch

2.5 SYSTEM HARDWARE

A. MAXPRO NVR PE Server: NVR Server shall operate with no performance degradation using the following minimum hardware and operating system configuration:

1. 2U 8 bay storage unit with SAS hard drives
2. Processor: Intel® Core™ i7-4790, 3.6 GHz, Intel® HD Graphics 4600
3. Memory: 8 GB
4. Power supply: Dual redundant 820 W
5. OS Drives: 2 x 2.5" 128 GB SATA solid state drives, RAID 1 support
6. Operating system: Windows Embedded Standard 7, 64-bit SP1
7. Database: Microsoft SQL Server Express 2008 R2
8. Storage capacities: 4 TB to 48 TB raw storage, Video storage redundancy with RAID 5/6 support
9. Video Storage Hard Disk Options: 8 field-upgradable 1 TB, 2 TB, 3 TB, 4 TB or 6 TB SAS Hard Disk Drive options
10. Optical drive: DVD-RW
11. Network interface: Dual 1 Gigabit Ethernet
12. RAID card: 6 GB SAS/SATA RAID card, PCI Express x8, supports RAID levels up to 6+0
13. Human Interface: 102-key keyboard and a mouse pointing device
14. Monitor Output: HDMI with DVI-D to HDMI adapter or VGA or DVI-D or Display Port (1 monitor support)
15. Rack kit: Rack kit for use with 2U chassis
16. Total live recording storage
    a. 45 Days

B. NVR Workstation: NVR Workstation shall operate with no performance degradation using the following recommended hardware and operating system configuration for rendering up to twenty-three (23) 1080p HD cameras in real time (30 fps)/690 fps @ 1080p HD with no time-lapse. Workstation configuration assumes two-monitor setup. Workstation is required for remote clients only; a local client is available on the NVR PE unit for configuration and monitoring. The performance specifications below are recommended for systems with fixed or PTZ cameras only. Oncam Grandeye 360 cameras and H.265 cameras are not supported with GPU rendering and use CPU rendering by default. On Windows 7 workstations, GPU rendering is only supported through the motherboard monitor outputs and any additional graphics cards should be disabled in BIOS. On Windows 8.1 and Windows 10 workstations with Intel GPU

and any additional graphics cards, at least one monitor should be connected to the motherboard monitor output.

1. Processor: Intel® Core™ i7-6700, 3.4 GHz or equivalent 6th generation Intel® Core™ Processors for client systems.
2. Graphics Adapter: In-built Processor Graphics (GPU): Intel® HD Graphics 530, 4600 or equivalent.
3. System Memory (RAM): 8 GB
4. Optical Drive: DVD-RW
5. Hard Disk Drives: Single Disk or RAID 0 or 0+1 10K SATA 80GB or 10K to 15K SAS 73 GB.
6. Network Interface Card (NIC): 1 Gbps
7. Human Interface: 102-key keyboard and a mouse pointing device
8. Operating System: Microsoft® Windows 7 Professional 64-bit SP1, Windows 8.1 Professional 64-bit, or Windows 10 Professional 64-bit.

2.6 MANUFACTURER SUPPORT

A. Manufacturer shall provide customer service, pre-sales applications assistance, after-sales technical assistance, access to technical online support, and online training using Web conferencing.

B. Manufacturer shall provide 24/7 technical assistance and support via a toll-free telephone number at no extra charge.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine site conditions prior to installation. Notify Architect and Owner in writing if unsuitable conditions are encountered. Do not start installation until site conditions are acceptable.

3.2 INSTALLATION

A. Test all components before shipping to the project location.

B. NVR system shall be installed, programmed, and tested in accordance with manufacturer’s installation instructions.

1. Coordinate interfaces with Owner’s representative where appropriate.
2. Provide backboxes, racks, connectors, supports, conduit, cable, and wire for a complete and reliable installation. Obtain Owner’s approval for exact location of all boxes, conduit, and wiring runs prior to installation.
3. Install conduit, cable, and wire parallel and square with building lines, including raised floors areas. Do not exceed forty percent fill in conduits. Gather wires and tie to create an orderly installation.

4. Coordinate with other trades to provide proper sequencing of installation.

3.3 FIELD COMMISSIONING AND CERTIFICATION

A. Field Commissioning: Testing the IP Video Recording system as recommended by manufacturer, including the following:

1. Conduct complete inspection and testing of equipment, including verification of operation with connected equipment.

2. Test devices and demonstrate operational features for Owner's representative and authorities having jurisdiction as applicable.

3. Correct deficiencies until satisfactory results are obtained.

4. Submit written copies of test results.

3.4 TRAINING

A. Conduct on-site system administrator and security/surveillance operator training, with the number of sessions and length of sessions as recommended by the NVR system manufacturer. Training shall include administration, provisioning, configuration, operation, and diagnostics.

END OF SECTION

SECTION 282329 - VIDEO SURVEILLANCE REMOTE DEVICES & SENSORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cameras.

B. Cable and accessories.

1.2 RELATED SECTIONS

A. Section 28 1600 - Intrusion Detection.

B. Section 28 1300 - Access Control.

1.3 REFERENCES

A. NFPA 70 - National Electrical Code; National Fire Protection Association; 2005.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide showing electrical characteristics and connection requirements for each component.

C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

D. Project Record Documents: Record actual locations of cameras and routing of cable.

E. Operation Data: Instructions for starting and operating system.

F. Maintenance Data: Routine trouble shooting procedures.

1.5 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Installer Qualifications: Authorized installer of specified manufacturer with service facilities within 50 miles of Project.

C. Products: Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.

PART 2 - PRODUCTS

2.1 General Product Requirements" Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.

A. Materials and equipment shall be the standard products of the manufacturer regularly engaged in the manufacture of the products and shall be the manufacturer's latest standard design that has been in satisfactory use for at least 2 years prior to bid opening, and as approved by submittal.

2.2 COMPONENTS

A. Manufacturers:
   1. Honeywell Security: www.security.honeywell.com.
   2. Arecontvision: www. arecontvision.com
   3. Substitutions: See Section 01 6000 - Product Requirements.

B. Cameras:
1. General Purpose
2. Integrated Dome
a. 1/2.8" 2 MP or 1/3" 4 MP progressive scan imager
b. 2.8 mm fixed lens
c. True day/night (IR-cut filter)
d. Wide dynamic range up to 120 dB
e. Low-light performance down to 0.03/0.07 lux (color) or 0 lux with IR LEDs on
f. Up to 66 ft (20 m) IR illumination, depending on scene reflectance
g. H.265 Smart Codec
h. Triple stream support
i. Built-in microphone
j. Support up to 128GB Micro SDHC card class 10
k. PoE (802.3af) or 12 VDC support
l. Plug-and-play compatible with Honeywell Performance Series Embedded NVRs
m. IP66 and IK10-rated rugged housing
n. Approved Product
1.) Honeywell H2WPER3

3. 270-360 Degree Cameras
a. 12MP Resolution
b. 4 x 2.8mm Lenses
c. 3-Axis Gimbal
d. Remote Focus
e. SNAPstream™ Capability to Reduce Bandwidth without Impacting Image Quality
f. True Day/Night
g. Surface Mount
h. Power Over Ethernet (PoE)
i. Indoor/Outdoor
j. IP66 Weather Rated
k. IK-10 Impact Resistant
l. Approved Product
1.) ArecontVision AV12275DN
2.) Supply lenses per owners' requirements

4. Appurtenances
a. Provide all manufacturer mounting hardware recommended for a complete installation

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.2 INTERFACE WITH OTHER PRODUCTS

A. Interface installation of video surveillance with security access and intrusion detection systems.

3.3 DEMONSTRATION

A. Demonstrate system operation and provide two hours of instruction with manufacturer's training personnel.

B. Conduct walking tour of project and briefly describe function, operation, and maintenance of each component.

END OF SECTION

SECTION 283100 – FIRE ALARM

PART 1 - GENERAL

1.1 SUMMARY

A. This section the furnishing, installation, and connection of a microprocessor controlled, intelligent reporting fire alarm equipment required to form a complete coordinated system ready for operation. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, control panel, auxiliary control devices, and wiring as shown on the drawings and specified herein.

B. The system specified shall be that of Siemens Fire Safety which meets the project requirements. Other systems shall be submitted 10 days prior to bid date for approval by the Engineer. All systems approved shall meet all the requirements spelled out in this specification. System approval shall be in writing by the Engineer and a copy shall be submitted with the system submittals.

1.2 RELATED SECTIONS

A. Section 260000, GENERAL ELECTRICAL PROVISIONS

B. Section 262700, BASIC MATERIALS AND METHODS

1.3 REFERENCES

A. National Fire Protection Association (NFPA)

B. ANSI/NFPA 70, National Electrical Code (NEC)

C. Underwriters’ Laboratories (UL)

D. Office of the Fire Marshall

E. Americans with Disabilities Act (ADA)

1.4 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 260500.

1. Provide sufficient information to show compliance with the drawings and specifications.
2. Provide manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.

3. Provide complete operating manuals listing the manufacturer's name(s), including technical data sheets.
4. Provide wiring diagrams indicating internal wiring for each device and the interconnections between the items of equipment.
5. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.

PART 2 - PRODUCTS

2.1 GENERAL

A. The fire alarm system shall be UL listed and Factory Mutual (FM) approved.

B. The fire alarm control panel shall meet UL Standard 864. The fire alarm system shall comply with requirements of NFPA Standard No. 72 for protected premises signaling systems except as modified and supplemented by this specification. The system field wiring shall be supervised either electrically or by software-directed polling of field devices.

C. The fire alarm system shall meet the requirements of BS EN9001: ANSI/ASQC Q9001-1994.

D. The FACP and peripheral devices shall be manufactured 100% by a single U.S. manufacturer (or division thereof).

2.2 CONTROL PANEL

A. The FACP shall contain a microprocessor based Central Processing Unit (CPU). The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent detectors, addressable modules, and other system-controlled devices.

B. System Capacity and General Operation

1. The control panel shall provide or be capable of expansion to 198 intelligent/addressable devices.
2. The system shall include Form-C alarm, Form-C trouble, and Form-A supervisory relays rated at a minimum of 2.0 amps @ 30 VDC. It shall also include two programmable Notification Appliance Circuits that can be wired as Class A or B (Style Y or Z).
3. The Fire Alarm Control Panel shall include a full featured operator interface control and annunciation panel that shall include a backlit Liquid Crystal Display, individual, color coded system status LEDs, and an alphanumeric keypad for the field programming and control of the fire alarm system.
4. All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the Fire Alarm Control Panel.
5. The FACP shall provide the following features:

    a. Sensitivity Test, meeting requirements of NFPA 72, Chapter 5.
    b. Maintenance Alert to warn of excessive smoke detector dirt or dust accumulation.

c. System Status Reports to display or printer.
d. Alarm Verification.
e. PAS presignal, meeting NFPA 72 3-8.3 requirements.
f. Rapid manual station reporting (under 2 seconds).
g. Periodic Detector Test conducted automatically by software.
h. Walk Test

6. The FACP shall be capable of coding Notification circuits in March Time (120 PPM), Temporal (NFPA 72 A.2.2.2.2), and California Code.
7. Alarm signals arriving at the main FACP shall not be lost following a power failure (or outage) until the alarm signal is processed and recorded.

C. Central Microprocessor

1. The Microprocessor shall communicate with, monitor, and control all external interfaces with the control panel. It shall include EPROM for system program storage, non-volatile memory for building-specific program storage, and a "watch dog" timer circuit to detect and report microprocessor failure.
2. The nonvolatile memory shall not maintain programming information if system primary and secondary power supplies fail.
3. The microprocessor shall provide a real-time clock for time annotation of system displays, printer, and history file. The time-of-day and date shall not be lost if system primary and secondary power supplies fail.

D. Display

1. The display shall provide all the controls and indicators used by the system operator and may also be used to program all system operational parameters.
2. The display shall include status information and custom alphanumeric labels for all intelligent detectors, and addressable modules.
3. The display shall provide an 40-character back-lit alphanumeric Liquid Crystal Display (LCD). It shall also provide 5 Light-Emitting-Diodes (LEDs), that will indicate the status of the following system parameters: AC POWER, FIRE ALARM, SYSTEM TROUBLE, ALARM SILENCE, and SUPERVISORY.
4. The Display shall provide an 18-key touch key-pad with control capability to command all system functions, entry of alphabetic or numeric information, and field programming. Two different password levels shall be provided to prevent unauthorized system control or programming.
5. The Display shall include the following operator functions: ALARM SILENCE, SYSEM RESET, DRILL, and ACKNOWLEDGE.

E. Signaling Line Circuit (SLC)

1. The SLC interface shall provide power to and communicate with up to 99 intelligent detectors (Ionization, Photoelectric, or Thermal) and 99 intelligent modules (monitor or control) for a system capacity of 198 devices. This shall be accomplished over a single SLC loop and shall be capable of NFPA 72 Style 4, Style 6, or Style 7 wiring.
2. The loop interface shall receive analog information from all intelligent detectors that shall be processed to determine whether normal, alarm, or trouble conditions exist for each detector. The software shall automatically maintain the detector's desired sensitivity

level by adjusting for the effects of environmental factors, including the accumulation of dust in each detector. The analog information shall also be used for automatic detector testing and for the automatic determination of detector maintenance requirements.

3. The detector software shall meet NFPA 72, chapter 7 requirements and be certified by UL as a calibrated sensitivity test instrument.
4. The detector software shall allow manual or automatic sensitivity adjustment.
5. A single ground or open on the system Signaling Line Circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.

F. Serial Interfaces

1. An EIA-232 interface between the Fire Alarm Control Panel and UL Listed Electronic Data Processing (EDP) peripherals shall be provided.
2. The EIA-232 interface shall allow the use of printers, and the connection of a computer for Upload/Download of system programming.
3. An EIA-485 interface shall be available for the serial connection of remote annunciators and LCD displays.

G. Enclosures:

1. The control panel shall be housed in a UL listed cabinet suitable for surface or semi-flush mounting. Cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.
2. The door shall provide a key lock and shall include a glass or other transparent opening for viewing of all indicators.

H. Power Supply:

1. The Power Supply shall operate on 120 VAC, 60 Hz, and shall provide all necessary power for the FACP.
2. It shall provide 3.0 amps of usable power for external devices, using a switching 24 VDC regulator. The main power supply shall be expandable to 6 amps.
3. It shall provide a battery charger capable of charging batteries up to 17 AH.
4. It shall provide a very low frequency sweep earth detect circuit, capable of detecting earth faults.
5. It shall be power-limited per 1995 UL864 standards.

I. Auxiliary Field Power Supply - Addressable

1. The auxiliary addressable power supply is a remote 24 VDC power supply used to power Notification Devices and field devices that require regulated 24VDC power. The power supply shall also include and charge backup batteries.
2. The addressable power supply shall provide up a minimum of 6.0 amps of 24 volt DC regulated power for Notification Appliance Circuit (NAC) power or 5 amps of 24 volt DC general power. The power supply shall have an additional .5 amp of 24 VDC auxiliary power for use within the same cabinet as the power supply. It shall include an integral charger designed to charge 7.0 - 25.0 amp hour batteries.
3. The addressable power supply shall provide four individually addressable Notification Appliance Circuits that may be configured as two Class "A" and two Class "B" or four Class "B" only circuits. All circuits shall be power-limited per UL 864 requirements.

4. The addressable power supply shall provide built-in synchronization for certain Notification Appliances on each circuit without the need for additional synchronization modules. The power supply's output circuits shall be individually selected for synchronization. A single addressable power supply shall be capable of supporting both synchronized and non-synchronized Notification Devices at the same time.
5. The addressable power supply shall operate on 120 or 240 VAC, 50/60 Hz.
6. The interface to the power supply from the Fire Alarm Control Panel (FACP) shall be via the Signaling Line Circuit (SLC) or other multiplexed means Power supplies that do not use an intelligent interface are not suitable substitutes. The required wiring from the FACP to the addressable power supply shall be a single unshielded twisted pair wire. Data on the SLC shall be transmitted between 24 VDC, 5 VDC and 0 VDC at approximately 3.33k baud.
7. The addressable power supply shall supervise for battery charging failure, AC power loss, power brownout, battery failure, NAC loss, and optional ground fault detection. In the event of a trouble condition, the addressable power supply shall report the incident and the applicable address to the FACP via the SLC.
8. The addressable power supply shall have an AC Power Loss Delay option. If this option is utilized and the addressable power supply experiences an AC power loss, reporting of the incident to the FACP will be delayed. A delay time of eight or sixteen hours shall be Dip-switch selected.
9. The addressable power supply shall be capable of mounting in either the FACP backbox or it's own dedicated surface mounted backbox with cover.
10. Each of the power supply's four output circuits shall be DIP-switch selected for Notification Appliance Circuit or General Purpose 24 VDC power. Any output circuit shall be able to provide up to 2.5 amps of 24 VDC power.
11. The addressable power supply's output circuits shall be individually supervised when they are selected to be either a Notification Appliance Circuit when wired Class "A" or by the use of and end-of-line resistor. When the power supply's output circuit is selected as General 24VDC power, the circuit shall be individually supervised when an end-of-line relay is used.
12. When selected for Notification Appliance Circuits, the output circuits shall be individually DIP-switch selectable for Steady, March Time, Dual Stage or Temporal.
13. When selected as a Notification Appliance Circuit, the output circuits of the addressable power supply shall have the option to be coded by the use of a universal zone coder.
14. The addressable power supply shall interface and synchronize with other power supplies of the same type. The required wiring to interface multiple addressable power supplies shall be a single unshielded, twisted pair wire.
15. An individual or multiple interfaced addressable power supplies shall have the option to use an external charger for battery charging. Interfaced power supplies shall have the option to share backup battery power.

J. Field Charging Power Supply

1. The FCPS is a device designed for use as either a remote 24 volt power supply or used to power Notification Appliances.
2. The FCPS shall offer up to 6.0 amps (4.0 amps continuous) of regulated 24 volt power. It shall include an integral charger designed to charge 7.0 amp hour batteries and to support 60 hour standby.

3. The Field Charging Power Supply shall have two input triggers. The input trigger shall be a Notification Appliance Circuit (from the fire alarm control panel) or a relay. Four outputs (two Style Y or Z and two style Y) shall be available for connection to the Notification devices.
4. The FCPS shall include a surface mount backbox.
5. The Field Charging Power Supply shall include the ability to delay the AC fail delay per 1993 NFPA requirements.
6. The FCPS include power limited circuitry, per 1995 UL standards.

K. Operators Controls

1. Acknowledge Switch

   a. Activation of the control panel Acknowledge switch in response to new alarms and/or troubles shall silence the local panel piezo electric signal and change the alarm and Trouble LEDs from flashing mode to steady-ON mode. If multiple alarm or trouble conditions exist, depression of this switch shall advance the 40-character LCD display to the next alarm or trouble condition.
   b. Depression of the Acknowledge switch shall silence all remote annunciator piezo sounders.

2. Signal Silence Switch

   a. Activation of the Signal silence switch shall cause all programmed alarm notification appliances and relays to return to the normal condition after an alarm condition. The selection of notification circuits and relays that are silenceable by this switch shall be fully field programmable within the confines of all applicable standards. The FACP software shall include silence inhibit and auto-silence timers.

3. System Reset Switch

   a. The system reset switch shall cause all electronically-latched initiating devices, appliances or software zones, as well as all associated output devices and circuits, to return to their normal condition.

4. Drill (Evacuate) Switch

   a. The drill switch shall activate all notification appliance circuits. The drill function shall latch until the panel is silenced or reset.

L. Field Programming

1. The system shall be programmable, configurable and expandable in the field without the need for special tools or electronic equipment and shall not require field replacement of electronic integrated circuits.
2. All programming may be accomplished through the standard FACP keypad.
3. All field defined programs shall be stored in non-volatile memory.

4. The programming function shall be enabled with a password that may be defined specifically for the system when it is installed. Two levels of password protection shall be provided in addition to a key-lock cabinet. One level is used for status level changes such as zone disable. A second (higher-level) is used for actual changes of program information.
5. Program edit shall not interfere with normal operation and fire protection. If a fire condition is detected during programming operation, the system shall exit programming and perform fire protection functions as programmed.
6. A program check function shall be provided to detect common operator errors.
7. An Auto-Program (self-learn) function shall be provided to quickly install initial functions and make the system operational.
8. An off-line programming function, with batch upload/download, shall be provided.

M. Specific System Operations

1. A means shall be provided for adjusting the sensitivity of any or all analog intelligent smoke detectors in the system from the control panel. Sensitivity range shall be within the allowed UL window.
2. Any device in the system may be enabled or disabled through the system keypad.
3. The system shall be able to display or print the following point status diagnostic functions:

    a. Device status
    b. Device types
    c. Custom device labels
    d. Device zone assignments

4. Upon command from an operator of the system, a status report will be generated and printed, listing system status.
5. The Fire Alarm Control Panel shall contain a History Buffer that will be capable of storing up to 500 system alarms/troubles/operator actions. Each of these activations will be stored and time and date stamped with the actual time of the activation. The contents of the History Buffer may be manually reviewed, one event at a time, or printed in its entirety.
6. The Fire Alarm Control Panel shall automatically interrogate each intelligent smoke detector and shall analyze the detector responses over a period of time. If any intelligent smoke detector in the system responds with a reading that is below or above normal limits, then the system will enter the Trouble Mode, and the particular detector will be annunciated on the system display, and printed on the optional printer. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.
7. The FACP shall provide 56 software zones. All addressable devices may be field programmed to be grouped into software zones for control activation and annunciation purposes.

N. All interfaces and associated equipment are to be protected so that they will not be affected by voltage surges or line transients, consistent with UL standard 864.

2.3 SYSTEM COMPONENTS

A. Signaling Devices

1. Visual Devices

a. Visual devices shall consist of strobe lights meeting the requirements of the ADA, UL Standard 1971. Strobe lights shall be as follows:

1) The maximum pulse duration shall be 2/10 of one second.
2) Strobe intensity shall meet the requirements of UL 1971.
3) The flash rate shall meet the requirements of UL 1971.
4) Strobe lights shall operate on 24Vdc.

2. Audible Devices

a. Audible devices shall be field programmable without the use of special tools, to provide slow whoop, continuous, or interrupted tones. Audible devices shall be as follows:

1) They shall operate on 24 VDC nominal.
2) They shall provide a tone with an output sound level of at least 90 dBA measured at 10 feet from the device.

3. Audible/Visual Combination Devices

a. Audible/Visual combination devices shall meet all the requirements for audible devices and visual devices listed above.

B. Addressable Devices

1. Addressable Devices shall provide an address-setting means using rotary decimal switches.
2. Addressable Devices shall use simple to install and maintain decade (numbered 0 to 9) type address switches or a binary address setting method, such as a dip switch.
3. Devices shall be intelligent and addressable, and shall connect with two wires to the Fire Alarm Control Panel Signaling Line Circuits.
4. Addressable smoke and thermal detectors shall provide dual alarm and power LEDs. Both LEDs shall flash under normal conditions indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. If required, the flashing mode operation of the detector LEDs shall be optional through the system field program. An output connection shall also be provided in the base to connect an external remote alarm LED.
5. The fire alarm control panel shall permit detector sensitivity adjustment through field programming of the system.
6. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7.

7. Addressable Pull Box (manual station)

    a. Addressable pull boxes shall, on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status.
    b. Manual fire alarm stations shall be non-breakglass type. They shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.
    c. All operated stations shall have a positive, visual indication of operation and utilize a key type reset.
    d. Manual stations shall be constructed of Lexan with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches or larger.

8. Addressable Photoelectric Smoke Detector

    a. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.
    b. Some detectors shall have visual alarm indication.
    c. Smoke detectors shall not go into alarm when exposed to air velocities of up to 3000 feet per minute.

9. Addressable Thermal Detectors

    a. Thermal detectors shall be intelligent addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. It shall connect via two wires to the fire alarm control panel signaling line circuit.
    b. Automatic heat detectors shall be a low profile, ceiling mount.
    c. The rate of rise element shall consist of an air chamber, a flexible metal diaphragm, and a factory calibrated, moisture-proof, trouble free vent, and shall operate when the rate of temperature rise exceeds 15 degrees F (9.4 degrees C) per minute.
    d. The fixed temperature element shall consist of a fusible alloy retainer and actuator shaft.

10. Addressable Duct Smoke Detector

    a. The duct smoke detector housing shall accommodate addressable photoelectric smoke detector. It shall provide continuous analog monitoring and alarm verification from the panel.
    b. Duct smoke detectors shall have visual alarm and power indicators.
    c. Duct detectors shall be installed upon the composite supply/return air ducts(s), with properly sized air sampling tubes.
    d. When sufficient smoke is sensed, an alarm signal is initiated at the FACP, and appropriate action taken to change over air handling systems to help prevent the rapid distribution of toxic smoke and fire gases throughout the areas served by the duct system.

11. Addressable Monitor Module

    a. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to one of the fire alarm control panel SLC loops.
    b. The monitor module shall mount in a 4-inch square, 2-1/8 inch deep electrical box.
    c. The IDC zone shall be suitable for Style D or Style B operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.

12. Addressable Control Module

    a. Addressable control modules shall be provided to supervise and control the operation of one conventional NACs of compatible, 24 VDC powered, polarized audio/visual notification appliances. For fan shutdown and other auxiliary control functions, the control module may be set to operate as a dry contract relay.
    b. The control module shall mount in a standard 4-inch square, 2-1/8 inch deep electrical box, or to a surface mounted backbox.
    c. The control module NAC may be wired for Style Z or Style Y (Class A/B) with up to 1 amp of inductive A/V signal, or 2 amps of resistive A/V signal operation, or as a dry contact (Form-C) relay. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.
    d. Audio/visual power shall be provided by a separate supervised power loop from the main fire alarm control panel or from a supervised, UL listed remote power supply.
    e. The control module shall be suitable for pilot duty applications and rated for a minimum of 0.6 amps at 30 VDC.

13. Addressable Relay Module

    a. Addressable Relay Modules shall be available for HVAC control and other building functions. The relay shall be form C and rated for a minimum of 2.0 Amps resistive or 1.0 Amps inductive. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.

C. Isolator Module

1. Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC loop. The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC Loop. At least one isolator module shall be provided for each floor or protected zone of the building.
2. If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC loop. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.

3. The isolator module shall not require any address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.
4. The isolator module shall mount in a standard 4-inch deep electrical box or in a surface mounted backbox. It shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

D. Batteries

1. Shall be 12 volt, Gell-Cell type (two required).
2. Battery shall have sufficient capacity to power the fire alarm system for not less than twenty-four hours plus 5 minutes of alarm upon a normal AC power failure.
3. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks refilling, spills and leakage shall not be required.

2.4 ACCEPTABLE MANUFACTURERS

A. Fire alarm system shall be as manufactured by Siemens by OEM, Simplex, Notifier & Edwards System Technology, or approved equal.

PART 3 - EXECUTION

3.1 GENERAL

A. Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the equipment manufacturer.

3.2 WIRING METHODS

A. All fire alarm system wiring shall be new.

B. All wiring methods shall be in accordance with the NEC and NFPA 72A, and as recommended by the manufacturer of the fire alarm system.

C. Number and size of conductors shall not be less than 18 AWG for Initiating Device Circuits and Signaling Line Circuits, and 14 AWG for Notification Appliance Circuits. Wiring used for the multiplex communication loop shall be twisted and shielded and support a minimum wiring distance of 10,000 feet.

D. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.

E. Fire alarm system cables shall be separated from any open conductors of Power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, per NEC Article 760-29.

F. Wiring for 24 volt control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.

G. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on an NFPA Style 4 (Class B) Signaling Line Circuit (SLC).

H. Initiation Device Circuits (IDC) shall be wired Class A (NFPA Style D).

I. Notification Appliance Circuits (NAC) shall be wired Class A (NFPA Style Z).

3.3 CONDUIT

A. All wiring shall be installed in conduit.

B. Conduit shall be 3/4” minimum.

C. Conduits shall not enter the Fire Alarm Control Panel except where conduit entry is specified by the FACP manufacturer.

3.4 SYSTEM OPERATION

A. When a fire alarm condition is detected and reported by one of the system initiating devices, the following functions shall immediately occur:

1. The system alarm LED shall flash.
2. A local piezo electric signal in the control panel shall sound.
3. A backlit 40 character LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
4. History storage equipment shall log the information associated each new fire alarm control panel condition, along with time and date of occurrence.
5. All system output devices programmed to be activated by the particular point in alarm shall be executed and the associated system outputs (alarm Notification appliances and/or relays) shall be activated, including mechanical controls to de-activate the air handling equipment as required.
6. A supervised signal to notify the local fire department shall be activated.

B. Electrical supervision of circuits for both signal and alarm initiating devices shall indicate open and/or shorts and operate an audible and visual trouble signal at the control panel. This trouble signal shall operate continuously until manually cut off. Open and/or shorts in the system shall not cause the operation of false evacuation alarms nor render the system inoperable.

3.5 INSTALLATION

A. Install the fire alarm system in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the manufacturer.

B. Mount/locate tamper switches so as not to interfere with the normal operation of the valve. Adjust switches to operate within two revolutions toward the closed position of the valve control, or when the stem has moved no more than one-fifth of the distance from its normal position.

C. Waterflow switches should be located a minimum of one (1) foot from a fitting which changes the direction of the flow and a minimum of three (3) feet from a valve.

D. Waterflow and tamper switches shall be installed under Division 15 and connected under Division 16.

3.6 TESTING

A. A factory-trained representative of the manufacturer shall supervise the final connections and testing of the system, and it shall be subject to approval and acceptance of the Owners Representative. All testing shall be in accordance with NFPA 72, Chapter 7.

1. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
2. Verify activation of all flow switches.
3. Open initiating device circuits and verify that the trouble signal actuates.
4. Open and short signaling line circuits and verify that the trouble signal actuates.
5. Open and short Notification Appliance Circuits and verify that trouble signal actuates.
6. Ground all circuits and verify response of trouble signals.
7. Check presence and audibility of tone at all alarm notification devices.
8. Check installation, supervision, and operation of all intelligent smoke detectors using the Walk Test.
9. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.

B. Upon completion of acceptance tests, the Owner's Representative shall be fully instructed in the proper operation of the system.

C. The system shall be certified as conforming to NFPA Standards by a contractor licensed by the Arizona Fire Marshal's Office and all applicable forms shall be submitted to the Owner's Representative in duplicate.

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SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Removing existing vegetation.
2. Clearing and grubbing.
3. Stripping and stockpiling topsoil.
4. Stripping and stockpiling rock.
5. Removing above- and below-grade site improvements.
6. Temporary erosion and sedimentation control.

1.3 DEFINITIONS

A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects larger than 2 inches (50 mm) in diameter; and free of weeds, roots, toxic materials, or other non-soil materials.

1.4 MATERIAL OWNERSHIP

A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 INFORMATIONAL SUBMITTALS

A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.

1. Use sufficiently detailed photographs or video recordings.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plant designated to remain.

B. Topsoil stripping and stockpiling program.

C. Rock stockpiling program.

1.6 QUALITY ASSURANCE

A. Topsoil Stripping and Stockpiling Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.

B. Rock Stockpiling Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.

1.7 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on premises determined by Owner.

C. Utility Locator Service: Notify Arizona 811 at least two full working days before you begin excavation.

D. Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place.

E. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 EXISTING UTILITIES

A. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect not less than five (5) days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.

3.4 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Grind down stumps and remove roots larger than 2 inches in diameter, obstructions, and debris to a depth of 18 inches below exposed subgrade.
3. Chip removed tree branches and dispose of off-site.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches and compact each layer to a density equal to adjacent original ground.

3.5 TOPSOIL STRIPPING

A. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

1. Limit height of topsoil stockpiles to 72 inches.
2. Stockpile surplus topsoil to allow for re-spreading deeper topsoil.

3.6 STOCKPILING ROCK

A. Stockpile rock away from edge of excavations without intermixing with other materials. Cover to prevent windblown debris from accumulating among rocks.

1. Limit height of rock stockpiles to 36 inches.
2. Do not stockpile rock within protection zones.
3. Stockpile surplus rock to allow later use by the Owner.

3.7 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 311000

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade, sidewalks, pavement, rock, and plants.
3. Excavating and backfilling for buildings and structures.
4. Drainage course for concrete, pipes, and rip rap.
5. Subbase course for concrete, sidewalk, and pavement.
6. Subbase course and base course for asphalt paving.
7. Subsurface drainage backfill for water harvesting and trenches.
8. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Requirements:
1. Section 311000 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
2. Section 329300 "Plants" for finish grading in planting areas and tree and shrub pit excavation and planting.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect.
2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by a geotechnical testing agency, according to ASTM D 1586.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

K. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Controlled low-strength material, including design mixture.
2. Warning tapes.

B. Samples for Verification: For the following products, in sizes indicated below:

1. Warning Tape: 12 inches long; of each color.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D 2487.
2. Laboratory compaction curve and material types according to site geotechnical report.

C. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth-moving operations. Submit before earth moving begins.

1.6 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.

1.7 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Do not commence earth-moving operations until erosion- and sedimentation-control measures are in place.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

1. Liquid Limit: 30 (Max) per geotechnical report.
2. Plasticity Index: 15 (Max) per geotechnical report.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; refer to geotechnical report.

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; refer to geotechnical report.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; refer to geotechnical report.

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; refer to geotechnical report.

H. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; refer to geotechnical report.

I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; refer to geotechnical report.

J. Sand: fine aggregates, refer to Geotechnical report.

K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
3. Permittivity: 0.2 per second, minimum; ASTM D 4491.
4. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

2.3 CONTROLLED LOW-STRENGTH MATERIAL

A. Controlled Low-Strength Material: Self-compacting, flowable concrete material produced from the following:

1. Portland Cement: ASTM C 150/C 150M.
2. Normal-Weight Aggregate: ASTM C 33/C 33M, 3/4-inch and 1/2-inch nominal maximum aggregate size.
3. Water: ASTM C 94/C 94M.

B. Produce low-density, controlled low-strength material with the following physical properties:

2.4 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.

3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 EXPLOSIVES

A. Explosives: Do not use explosives.

3.3 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:

a. 24 inches outside of concrete forms other than at footings.
b. 12 inches outside of concrete forms at footings.

c. 6 inches outside of minimum required dimensions of concrete cast against grade.
d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
e. 6 inches beneath bottom of concrete slabs-on-grade.
f. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe or 42 inches wide.

3.4 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Place footings and foundations on engineered fill as directed in the geotechnical report.
2. Excavation for Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.6 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: width according to specified utility construction requirements.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.

3. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.
4. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.7 SUBGRADE INSPECTION

A. Notify Architect when excavations have reached required subgrade.

B. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.8 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.9 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.10 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.

2. Surveying locations of underground utilities for Record Drawings.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring, bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.11 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud or frost.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings.

D. Trenches under Roadways: Provide 4-inch thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase course.

E. Backfill voids with satisfactory soil while removing shoring and bracing.

F. Initial Backfill:

1. Soil Backfill: Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

    a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

G. Final Backfill:

1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.

H. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.12 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

C. Place soil fill on subgrades free of mud or frost.

3.13 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy or contain frost.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry density.

3.14 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 10 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry density according to ASTM D 698:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.
5. See Fill compaction requirements of geotechnical report for additional information.

3.15 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.

2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch.
3. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.16 SUBSURFACE DRAINAGE

A. Subdrainage Pipe: Specified in Section 334600 "Subdrainage."

B. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench. Place a 6-inch course of filter material on subsurface drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum of 12 inches of filter material, placed in compacted layers 6 inches thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to 85 percent of maximum dry density according to ASTM D 698 with a minimum of two passes of a plate-type vibratory compactor.

C. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with one layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to 85 percent of maximum dry density according to ASTM D 698 with a minimum of two passes of a plate-type vibratory compactor.
2. Place and compact impervious fill over drainage backfill in 6-inch thick compacted layers to final subgrade.

3.17 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place subbase course and base course on subgrades free of mud or frost.

B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:

1. Place base course material over subbase course under hot-mix asphalt pavement.
2. Shape subbase course and base course to required crown elevations and cross-slope grades.
3. Place subbase course and base course 6 inches or less in compacted thickness in a single layer.

4. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
5. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry density according to ASTM D 698.
6. Compact Aggregate base placed beneath pavements at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 100 percent of maximum dry density according to ASTM D 698.

C. Pavement Shoulders: Place shoulders along edges of subbase course and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry density according to ASTM D 698.

3.18 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

A. Place drainage course on subgrades free of mud or frost.

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place drainage course 6 inches or less in compacted thickness in a single layer.
3. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
4. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry density according to ASTM D 698.

3.19 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
2. Determine that fill material classification and maximum lift thickness comply with requirements.
3. Determine, during placement and compaction, that in-place density of compacted fill complies with requirements.

B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2937, and ASTM D 6938, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft or less of paved area or building slab but in no case fewer than three tests.
2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100 feet or less of wall length but no fewer than two tests.
3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length but no fewer than two tests.

F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.20 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Architect.

1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

SECTION 313116 - TERMITE CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Soil treatment with termiticide.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include the EPA-Registered Label.

B. Product certificates.

C. Soil Treatment Application Report: Include the following:

1. Date and time of application.
2. Moisture content of soil before application.
3. Brand name and manufacturer of termiticide.
4. Quantity of undiluted termiticide used.
5. Dilutions, methods, volumes, and rates of application used.
6. Areas of application.
7. Water source for application.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located, and who employs workers trained and approved by bait-station system manufacturer to install manufacturer's products.

B. Regulatory Requirements: Formulate and apply termiticides according to the EPA-Registered Label.

1.4 WARRANTY

A. Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.

1. Warranty Period: Five years from date of Substantial Completion.

1.5 MAINTENANCE SERVICE

A. Continuing Service: Beginning at Substantial Completion, provide 12 months' continuing service including monitoring, inspection, and re-treatment for occurrences of termite activity. Provide a standard continuing service agreement. State services, obligations, conditions, and terms for agreement period; and terms for future renewal options.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Termiticides:

a. Aventis Environmental Science USA LP; Termidor.
b. Bayer Corporation; Premise 75.
c. Dow AgroSciences LLC; Dursban TC.
d. FMC Corporation, Agricultural Products Group; Prevail FT Torpedo.
e. Syngenta; Demon TC.

2.2 SOIL TREATMENT

A. Termiticide: Provide an EPA-registered termiticide complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Provide termite treatment under building slabs. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.

B. Soil Treatment Preparation: Loosen, rake, and level soil to be treated except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.

3.2 APPLYING SOIL TREATMENT

A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.

1. Slabs-on-Grade and Basement Slabs: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
2. Foundations: Adjacent soil including soil along the entire inside perimeter of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating the slab, and around interior column footers, piers, and chimney bases; also along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
3. Crawlspaces: Soil under and adjacent to foundations as previously indicated. Treat adjacent areas including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.
4. Masonry: Treat voids.
5. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.

B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.

C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

D. Post warning signs in areas of application.

E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

END OF SECTION 313116

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Hot-mix asphalt paving.
2. Hot-mix asphalt overlay.

B. Related Requirements:

1. Section 312000 "Earth Moving" for subgrade preparation, fill material, unbound-aggregate subbase and base courses, and aggregate pavement shoulders.
2. Section 321373 "Concrete Paving Joint Sealants" for joint sealants and fillers at pavement terminations.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include technical data and tested physical and performance properties.
2. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each paving material, contractor shall submittal material certificates for approval by the Architect.

B. Material Test Reports: For each paving material, by a qualified testing agency.

C. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the DOT of state in which Project is located.

B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.

C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of Pima Association of Governments (PAG) for asphalt paving work.

1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

1. Prime Coat: Minimum surface temperature of 60 deg F.
2. Tack Coat: Minimum surface temperature of 60 deg F.
3. Slurry Coat: Comply with weather limitations in ASTM D 3910.
4. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
5. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. General: Use materials and gradations that have performed satisfactorily in previous installations.

B. Coarse Aggregate: ASTM D 692/D 692M, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.

C. Fine Aggregate: ASTM D 1073 sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.

1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

D. Mineral Filler: ASTM D 242/D 242M, rock or slag dust, hydraulic cement, or other inert material.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: AASHTO M 320, PG 70-10.

B. Tack Coat: CSS-1 conforming to Section 406 of the PAG specifications.

C. Water: Potable.

2.3 AUXILIARY MATERIALS

A. Herbicide: Commercial chemical for weed control, registered by the EPA, and not classified as "restricted use" for locations and conditions of application. Provide in granular, liquid, or wettable powder form.

B. Sand: ASTM D 1073, Grade No. 2 or No. 3.

2.4 MIXES

A. Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction; designed according to procedures in AI MS-2, "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types"; and complying with the following requirements:

1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
2. Base Course: Refer to PAG specifications for further information.
3. Surface Course: Refer to PAG specifications for further information.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to begin paving.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

C. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 PLACING HOT-MIX ASPHALT

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
2. Spread mix at a minimum temperature of 250 deg F.
3. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.

4. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Overlap mix placement about 1 to 1-1/2 inches from strip to strip to ensure proper compaction of mix along longitudinal joints.
2. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.3 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
3. Offset transverse joints, in successive courses, a minimum of 24 inches.
4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.4 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density: Should meet or exceed requirements of PAG specifications and the geotechnical report.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.5 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: Plus or minus 1/2 inch.
2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: 1/4 inch.
2. Surface Course: 1/8 inch.
3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.

C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to PAG specifications.

1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.

    a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than three cores taken.
    b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.

E. Replace and compact hot-mix asphalt where core tests were taken.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

END OF SECTION 321216

SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes Concrete Paving.

1. Driveways.
2. Curbs and gutters.
3. Walks.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for general building applications of concrete.
2. Section 321373 "Concrete Paving Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and asphalt paving or adjacent construction.
3. Section 321713 "Parking Bumpers."
4. Section 321723 "Pavement Markings."
5. Section 321726 "Tactile Warning Surfacing" for detectable warning strips.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Verification: For each type of product or exposed finish, prepared as Samples of size indicated below:

1. Exposed Aggregate: 10-lb Sample of each mix.

C. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified installer of stamped detectable warnings, ready-mix concrete manufacturer, and testing agency.

B. Material Certificates: For the following, from manufacturer:

1. Cementitious materials.
2. Admixtures.
3. Curing compounds.
4. Applied finish materials.
5. Bonding agent or epoxy adhesive.
6. Joint fillers.

C. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Stamped Detectable Warning Installer Qualifications: An employer of workers trained and approved by manufacturer of stamped concrete paving systems.

B. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

C. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

D. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups of full-thickness sections of concrete paving to demonstrate typical joints; surface finish, texture, and color; curing; and standard of workmanship.
2. Build mockups of concrete paving in the location and of the size indicated or, if not indicated, build mockups where directed by Architect and not less than 96 inches by 96 inches.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified independent testing agency to perform preconstruction testing on concrete paving mixtures.

1.8 FIELD CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Cold-Weather Concrete Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

C. Hot-Weather Concrete Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap, so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless otherwise indicated.

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.3 CONCRETE MATERIALS

A. Regional Materials: Concrete shall be manufactured within 500 miles of Project site from aggregates and cementitious materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

B. Regional Materials: Concrete shall be manufactured within 500 miles of Project site.

C. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:

1. Portland Cement: ASTM C 150 gray Portland cement per Section 1006 of PAG specifications.

D. Normal-Weight Aggregates: Refer to section 1006-2.03 of PAG specifications.

1. Maximum Coarse-Aggregate Size: Refer to Section 1006 of PAG specifications.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

E. Exposed Aggregate: Selected, hard, and durable; washed; free of materials with deleterious reactivity to cement or that cause staining; from a single source, with gap-graded coarse aggregate as follows:

1. Aggregate Sizes: Refer to Section 1006 of PAG specifications.

F. Air-Entraining Admixture: ASTM C 260/C 260M.

G. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material. Refer to Section 1006 of PAG specifications

H. Water: Potable and complying with ASTM C 94/C 94M.

2.4 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

2.5 RELATED MATERIALS

A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork in preformed strips.

B. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.

C. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy-Bonding Adhesive: ASTM C 881/C 881M, two-component epoxy resin capable of humid curing and bonding to damp surfaces; of class suitable for application temperature, of grade complying with requirements, and of the following types:

E. Chemical Surface Retarder: Water-soluble, liquid, set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch.

F. Rock Salt: Sodium chloride crystals, kiln dried, coarse gradation with 100 percent passing 3/8-inch sieve and 85 percent retained on a No. 8 sieve.

2.6 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that comply with or exceed requirements.

B. Cementitious Materials: Refer to Section 1006 of PAG specifications.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:

1. Air Content: Refer to Section 1006 of PAG specifications nominal maximum aggregate size.

D. Limit water-soluble, chloride-ion content in hardened concrete per Section 1006 of PAG specifications.

E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

F. Concrete Mixtures: Normal-weight concrete.

1. Compressive Strength (28 Days): 2500 psi per to Section 908 of PAG specifications.
2. Maximum W/C Ratio at Point of Placement: Refer to Section 1006 of PAG specifications.
3. Slump Limit: Refer to Section 1006 of PAG specifications.

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94 and ASTM C 1116. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For concrete batches of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For concrete batches larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Section 312000 "Earth Moving."

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.

1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
1. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
2. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
3. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 45 feet unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows, to match jointing of existing adjacent concrete paving:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

a. Tolerance: Ensure that sawed joints are within 3 inches either way from centers of dowels.

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.5 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation, and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

F. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating joint devices.

G. Screed paving surface with a straightedge and strike off.

H. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

3.6 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
2. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface, perpendicular to line of traffic, to provide a uniform, fine-line texture.

3.7 DETECTABLE WARNING INSTALLATION

A. Blockouts: Form blockouts in concrete for installation of detectable paving units specified in Section 321726 "Tactile Warning Surfacing."

1. Tolerance for Opening Size: Plus 1/4 inch, no minus.

B. Cast-in-Place Detectable Warning Tiles: Form blockouts in concrete for installation of tiles specified in Section 321726 "Tactile Warning Surfacing." Screed surface of concrete where tiles are to be installed to elevation, so that edges of installed tiles will be flush with surrounding concrete paving. Embed tiles in fresh concrete to comply with Section 321726 "Tactile Warning Surfacing" immediately after screeding concrete surface.

1. Remove residual release agent according to manufacturer's written instructions, but no fewer than three days after stamping concrete. High-pressure-wash surface and joint patterns, taking care not to damage stamped concrete. Control, collect, and legally dispose of runoff.

3.8 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period, using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.9 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 3/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-feet-long; unleveled straightedge not to exceed 1/2 inch.
4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
5. Lateral Alignment and Spacing of Dowels: 1 inch.
6. Vertical Alignment of Dowels: 1/4 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Testing Services: Testing and inspecting of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.

a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231/C 231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.

a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mixture will be satisfactory if average of any three-consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Concrete paving will be considered defective if it does not pass tests and inspections.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

I. Prepare test and inspection reports.

3.11 REPAIR AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

SECTION 321373 - CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cold-applied joint sealants.
2. Hot-applied joint sealants.
3. Cold-applied, fuel-resistant joint sealants.
4. Hot-applied, fuel-resistant joint sealants.
5. Joint-sealant backer materials.
6. Primers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

C. Paving-Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Product Certificates: For each type of joint sealant and accessory.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency.

1.6 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2.2 COLD-APPLIED JOINT SEALANTS

A. Single-Component, Nonsag, Silicone Joint Sealant: ASTM D 5893/D 5893M, Type NS.

B. Single-Component, Self-Leveling, Silicone Joint Sealant: ASTM D 5893/D 5893M, Type SL.

C. Multicomponent, Nonsag, Urethane, Elastomeric Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use T.

D. Single Component, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Use T.

E. Multicomponent, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C 920, Type M, Grade P, Class 25, for Use T.

2.3 HOT-APPLIED JOINT SEALANTS

A. Hot-Applied, Single-Component Joint Sealant: ASTM D 6690, Type II or III.

2.4 COLD-APPLIED, FUEL-RESISTANT JOINT SEALANTS

A. Fuel-Resistant, Single-Component, Pourable, Modified-Urethane, Elastomeric Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Use T.

B. Fuel-Resistant, Multicomponent, Pourable, Modified-Urethane, Elastomeric Joint Sealant: ASTM C 920, Type M, Grade P, Class 12-1/2 or 25, for Use T.

2.5 HOT-APPLIED, FUEL-RESISTANT JOINT SEALANTS

A. Hot-Applied, Fuel-Resistant, Single-Component Joint Sealants: ASTM D 7116, Type III.

2.6 JOINT-SEALANT BACKER MATERIALS

A. Joint-Sealant Backer Materials: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint-sealant manufacturer, based on field experience and laboratory testing.

B. Round Backer Rods for Cold- and Hot-Applied Joint Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

C. Round Backer Rods for Cold-Applied Joint Sealants: ASTM D 5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of sealant.

D. Backer Strips for Cold- and Hot-Applied Joint Sealants: ASTM D 5249; Type 2; of thickness and width required to control joint-sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

2.7 PRIMERS

A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Before installing joint sealants, clean out joints immediately to comply with joint-sealant manufacturer's written instructions.

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

A. Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

B. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions.

C. Install joint-sealant backings to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of joint-sealant backings.
2. Do not stretch, twist, puncture, or tear joint-sealant backings.
3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install joint sealants immediately following backing installation, using proven techniques that comply with the following:

1. Place joint sealants so they fully contact joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants according to the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:

1. Remove excess joint sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

3.4 CLEANING AND PROTECTION

A. Clean off excess joint sealant as the Work progresses, by methods and with cleaning materials approved in writing by joint-sealant manufacturers.

B. Protect joint sealants, during and after curing period, from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

3.5 PAVING-JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Joints within concrete paving.

1. Joint Location:

   a. Expansion and isolation joints in concrete paving.
   b. Contraction joints in concrete paving.
   c. Other joints as indicated.

2. Joint Sealant: Single-component, nonsag, silicone joint sealant.

B. Joint-Sealant Application: Joints within concrete paving and between concrete and asphalt paving.

1. Joint Location:

   a. Joints between concrete and asphalt paving.
   b. Joints between concrete curbs and asphalt paving.
   c. Other joints as indicated.

2. Joint Sealant: Hot-applied, single-component joint sealant.

C. Joint-Sealant Application: Fuel-resistant joints within concrete paving.

1. Joint Location:

   a. Expansion and isolation joints in concrete paving.
   b. Contraction joints in concrete paving.
   c. Other joints as indicated.

2. Joint Sealant: Fuel-resistant, single-component, pourable, modified-urethane, elastomeric joint sealant.

END OF SECTION 321373

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SECTION 321500 - AGGREGATE SURFACING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and the General Requirements, apply to this Section.

1.2 SUMMARY

A. Work Included:

1. The work under this section shall consist of furnishing, hauling and placing imported materials for plating designated areas on the project plans in accordance with the details shown on the project plans and the requirements of these specifications.
2. The work under this item consists of furnishing and placing crushed screened granite, including any necessary eradication of existing weeds, excavation, backfilling and compaction, and furnishing and applying pre-emergent herbicide in accordance with the details shown on the project plans and these special provisions.
3. Provide samples and sieve analysis for approval by the Contracting Officer prior to purchase.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Decomposed Granite: Hard, durable stone, washed free of loam, sand, clay, and other foreign substances, of following type, size range, and color. Decomposed Granite shall be free of lumps or balls of clay and shall not contain calcareous coatings, caliche, organic matter or foreign substances. All material shall be from a single production source and shall present a uniform appearance. The requirements shall be as follows:

1. Size: ½". Contractor to provide sieve analysis with representative sample for approval prior to placement.
2. Color: Coronado Brown; or approved equal.

B. Site Boulders: Shall not contain calcareous coatings, caliche, organic matter or foreign substances. Boulders shall be fractured, irregular granite intended for decorative use. The requirements shall be as follows:

1. Size: As indicated on plans.
2. Color: Coronado Brown; or approved equal.

C. Rock Mulch: Hard, durable stone, washed free of loam, sand, clay, and other foreign substances, of following type, size range, and color. Rock mulch shall be fractured, irregular granite.

1. Size: 4” to 10”. Contractor to provide sample for approval prior to placement.
2. Color: Coronado Brown; or approved equal.

D. Tumbled Landscape Glass:

1. Size: 1” to 2”. Contractor to provide sample for approval prior to placement.
2. Color: Blue, as manufactured by American Specialty Glass; or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Decomposed Granite:

1. Surfaces upon which the decomposed granite is to be placed shall be graded and compacted to a density of not less than 85 percent of the maximum density in accordance with the requirements of the Materials Testing Manual of the Material Services.
2. The areas on which the decomposed granite is to be placed shall be reasonably smooth and firm and all deleterious material and rocks larger than 1 inch in diameter shall be removed and disposed of at the Contractor's expense.
3. The areas to receive decomposed granite shall receive an application of pre-emergent herbicide in the manner recommended by the manufacturer. The contractor shall stake out the area and put an application of a weed inhibitor prior to placement of the decomposed granite. Contractor shall kill all weeds by manual or chemical control and remove after dead. Any pesticides used must be applied in strict accordance with Pima County requirements.
4. The contractor shall keep a record of all applications. The contractor shall record the type of herbicides used, such as pre or post-emergent; the rate and method of applications; and the date and location of such applications. A copy of this report shall be furnished to the Owner every month.
5. The decomposed granite shall be evenly distributed over the designated areas to a 2-inch depth. The finish grade of the crushed screened granite shall be 1 inch below curb, sidewalk edge, or paving edge.
6. Care shall be taken in the placement of the decomposed granite not to disturb or damage any plant material. The watering basins and trenches covered with decomposed granite shall be the depth as shown on the project plan.
7. After placing and grading the decomposed granite, the contractor shall lightly water the granite to remove fine material from the surface, water settle, and roll the granite with a roller to the extent satisfactory to the Landscape Architect. The contractor shall again apply the approved pre-emergent weed control agent according to the manufacturer's recommendations. Water in pre-emergent thoroughly. Decomposed granite shall be compacted to 90%.
8. All erosion within the decomposed granite areas shall be corrected by the Contractor to maintain the final grade of the decomposed granite as placed under this item. If soil

settling occurs through the Warranty period, the contractor shall provide and install additional material at no additional expense to the owner.

B. Site Boulders:

1. Care shall be taken in the placement of the boulders so as to not disturb or damage any plant material.
2. The Contractor shall stake out the approximate center point of each boulder to be placed in all landscaped areas. All locations shall be approved by the Landscape Architect or Owner prior to placement.
3. The areas on which the boulders are to be placed shall be fine graded according to the project plans after the boulders have been placed with care taken to ***ensure that all boulders are buried relative to finished grades at least one fourth but not more than one third of their average height. Boulders that are not installed per the plan details and specifications will be rejected.***

C. Rock Mulch:

1. The surfaces upon which the rock mulch is to be placed shall be graded and compacted to a standard plant bed density.
2. The areas to receive rock mulch shall receive an application of pre-emergent herbicide in the manner recommended by the manufacturer. The contractor shall stake out the area and put an application of a weed inhibitor prior to placement of the rock mulch. Contractor shall kill all weeds by manual or chemical control and remove after dead. Any pesticides used must be applied in strict accordance with Pima County requirements.
3. The contractor shall keep a record of all applications. The contractor shall record the type of herbicides used, such as pre or post-emergent; the rate and method of applications; and the date and location of such applications. A copy of this report shall be furnished to the Owner every month.
4. The rock mulch shall be evenly distributed over the plant beds in to a 6-inch depth. The finish grade of the rock mulch shall be 1 inch below curb, sidewalk edge, paving edge or planter edge.
5. Care shall be taken in the placement of the rock mulch not to disturb or damage any plant material, irrigation component, lighting fixture, or other project element.
6. After placing and grading the rock mulch, the contractor shall lightly water the granite to remove fine material from the surface.
7. All settlement within the rock mulch beds shall be corrected by the Contractor to maintain the final grade of the rock mulch as placed under this item. If soil settling occurs through the Warranty period, the contractor shall provide and install additional rock mulch at no additional expense to the owner.

D. Tumbled Landscape Glass:

1. The surfaces upon which the tumbled landscape glass is to be placed shall be graded and compacted to a standard plant bed density.
2. The areas to receive tumbled landscape glass shall receive an application of pre-emergent herbicide in the manner recommended by the manufacturer. The contractor shall stake out the area and put an application of a weed inhibitor prior to placement of the glass. Contractor shall kill all weeds by manual or chemical control and remove after dead. Any pesticides used must be applied in strict accordance with Pima County requirements.

3. The contractor shall keep a record of all applications. The contractor shall record the type of herbicides used, such as pre or post-emergent; the rate and method of applications; and the date and location of such applications. A copy of this report shall be furnished to the Owner every month.
4. The tumbled landscape glass shall be evenly distributed over the plant beds in to a 4-inch depth. The finish grade of the glass shall be 1 inch below curb, sidewalk edge, paving edge or planter edge.
5. Care shall be taken in the placement of the tumbled landscape glass not to disturb or damage any plant material, irrigation component, lighting fixture, or other project element.
6. After placing and grading the tumbled landscape glass, the contractor shall lightly water the glass to remove fine material from the surface.
7. All settlement within the tumbled landscape glass beds shall be corrected by the Contractor to maintain the final grade of the tumbled landscape glass as placed under this item. If soil settling occurs through the Warranty period, the contractor shall provide and install additional tumbled landscape glass at no additional expense to the owner.

END OF SECTION 321500

SECTION 321713 - PARKING BUMPERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes wheel stops.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection: For each type of exposed finish requiring color selection.

C. Samples for Verification: For wheel stops, 6 inches long, showing color and cross section; with fasteners.

PART 2 - PRODUCTS

2.1 PARKING BUMPERS

A. Concrete Wheel Stops: Precast, steel-reinforced, air-entrained concrete, 4000-psi minimum compressive strength, 6 inches high by 6 (Top) to 8 (Bottom) inches wide by 72 inches long. Provide chamfered corners, transverse drainage slots on underside, and a minimum of two factory-formed or -drilled vertical holes through wheel stop for anchoring to substrate.

1. Surface Appearance: Free of pockets, sand streaks, honeycombs, and other obvious defects. Corners shall be uniform, straight, and sharp.
2. Mounting Hardware: Two #4 x 3-foot rebar anchors minimum as standard with wheel-stop manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that pavement is in suitable condition to begin installation according to manufacturer's written instructions.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install wheel stops according to manufacturer's written instructions unless otherwise indicated.

B. Install wheel stops in bed of adhesive before anchoring.

C. Securely anchor wheel stops to pavement with hardware in each preformed vertical hole in wheel stop as recommended in writing by manufacturer. Recess head of hardware beneath top of wheel stop.

END OF SECTION 321713

SECTION 321723 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes painted markings applied to asphalt pavement.

B. Related Requirements:

1. Section 099113 "Exterior Painting" for painting exterior concrete surfaces other than pavement.
2. Section 099123 "Interior Painting" for painting interior concrete surfaces other than pavement.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include technical data and tested physical and performance properties.

B. Shop Drawings: For pavement markings.

1. Indicate pavement markings, colors, lane separations, defined parking spaces, and dimensions to adjacent work.
2. Indicate, with international symbol of accessibility, spaces allocated for people with disabilities.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of Pima Association of Governments (PAG) for pavement-marking work.

1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for alkyd materials and 55 deg F for water-based materials, and not exceeding 95 deg F.

PART 2 - PRODUCTS

2.1 PAVEMENT-MARKING PAINT

A. Pavement-Marking Paint: Alkyd-resin type, lead and chromate free, ready mixed, complying with AASHTO M 248, Type N; colors complying with FS TT-P-1952.

1. Color: White shall be utilized for parking stalls, hatched areas and handicap symbol. Yellow shall be utilized for centerline stripes on the existing adjacent roadway and the far West driveway. Blue shall be utilized for the handicap symbols.

B. Glass Beads: AASHTO M 247, Type 1.

1. Roundness: Minimum 80 percent true spheres by weight.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that pavement is dry and in suitable condition to begin pavement marking according to manufacturer's written instructions.

B. Proceed with pavement marking only after unsatisfactory conditions have been corrected.

3.2 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

B. Allow paving to age for a minimum of 30 days before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils on the parking lot.

E. The final longitudinal striping along Tetakusim shall be 90 mils thick hot-sprayed thermoplastic reflectorized striping.

1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to pavement. Mask an extended area beyond edges of each stencil to prevent paint application beyond the stencil. Apply paint so that it cannot run beneath the stencil.
2. Broadcast glass beads uniformly into wet markings at a rate of 6 lb/gal.

3.3 PROTECTING AND CLEANING

A. Protect pavement markings from damage and wear during remainder of construction period.

B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 321723

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SECTION 321726 - TACTILE WARNING SURFACING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cast-in-place detectable warning tiles.
2. Detectable warning mats.
3. Detectable warning unit pavers.

B. Related Requirements:

1. Section 321313 "Concrete Paving" for concrete walkways serving as substrates for tactile warning surfacing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection: For each type of exposed finish requiring color selection.

C. Samples for Verification: For each type of tactile warning surface, in manufacturer's standard sizes unless otherwise indicated, showing edge condition, truncated-dome pattern, texture, color, and cross section; with fasteners and anchors.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For tactile warning surfacing, to include in maintenance manuals.

1.5 PROJECT CONDITIONS

A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

B. Weather Limitations for Mortar and Grout:

1. Cold-Weather Requirements: Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
2. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602. Provide artificial shade and windbreaks, and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg F and higher.

    a. When ambient temperature exceeds 100 deg F, or when wind velocity exceeds 8 mph and ambient temperature exceeds 90 deg F, set unit pavers within 1 minute of spreading setting-bed mortar.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of tactile warning surfaces that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

    a. Deterioration of finishes beyond normal weathering and wear.
    b. Separation or delamination of materials and components.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 TACTILE WARNING SURFACING, GENERAL

A. Accessibility Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for tactile warning surfaces.

1. For tactile warning surfaces composed of multiple units, provide units that when installed provide consistent side-to-side and end-to-end dome spacing that complies with requirements.
2. Tactile groves shall be installed as directed on plans. Grooves shall be 1 inch apart, ¼ inch wide, 1/8 inch deep. Grooves may be sawcut or tooled.

B. Source Limitations: Obtain each type of tactile warning surfacing, joint material, setting material, anchor, and fastener] from single source with resources to provide materials and products of consistent quality in appearance and physical properties.

2.2 DETECTABLE WARNING TILES

A. Cast-in-Place Detectable Warning Tiles: Accessible truncated-dome detectable warning tiles configured for setting flush in new concrete walkway surfaces, with slip-resistant surface treatment on domes and field of tile.

1. Material: Cast-fiber-reinforced polymer concrete tile.
2. Color: Federal yellow.
3. Shapes and Sizes:

    a. Rectangular panel, 24 by 36 inches.

4. Dome Spacing and Configuration: 2.35-inch spacing pattern.
5. Mounting:

    a. Permanently embedded detectable warning tile wet-set into freshly poured concrete.

2.3 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of tactile warning surfaces, noncorrosive and compatible with each material joined, and complying with the following:

1. Furnish Type 304 stainless-steel fasteners for exterior use.
2. Fastener Heads: For nonstructural connections, use flathead or oval countersunk screws and bolts with tamper-resistant heads, colored to match tile.

B. Adhesive: As recommended by manufacturer for adhering tactile warning surfacing unit to pavement.

C. Sealant: As recommended by manufacturer for sealing perimeter of tactile warning surfacing unit.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that pavement is in suitable condition to begin installation according to manufacturer's written instructions. Verify that installation of tactile warning surfacing will comply with accessibility requirements upon completion.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF TACTILE WARNING SURFACING

A. General: Prepare substrate and install tactile warning surfacing according to manufacturer's written instructions unless otherwise indicated.

B. Place tactile warning surfacing units in dimensions and orientation indicated. Comply with location requirements of AASHTO MP 12.

3.3 INSTALLATION OF DETECTABLE WARNING TILES

A. Cast-in-Place Detectable Warning Tiles:

1. Concrete Paving Installation: Comply with installation requirements in Section 321313 "Concrete Paving." Mix, place, and finish concrete to conditions complying with detectable warning tile manufacturer's written requirements for satisfactory embedment of tile.
2. Set each detectable warning tile accurately and firmly in place and completely seat tile back and embedments in wet concrete by tamping or vibrating. If necessary, temporarily apply weight to tiles to ensure full contact with concrete.
3. Set surface of tile flush with surrounding concrete and adjacent tiles, with variations between tiles and between concrete and tiles not exceeding plus or minus 1/8 inch from flush.
4. Protect exposed surfaces of installed tiles from contact with wet concrete. Complete finishing of concrete paving surrounding tiles. Remove concrete from tile surfaces.
5. Clean tiles using methods recommended in writing by manufacturer.

3.4 CLEANING AND PROTECTION

A. Remove and replace tactile warning surfacing that is broken or damaged or does not comply with requirements in this Section. Remove in complete sections from joint to joint unless otherwise approved by Architect. Replace using tactile warning surfacing installation methods acceptable to Architect.

B. Protect tactile warning surfacing from damage and maintain free of stains, discoloration, dirt, and other foreign material.

END OF SECTION 321726

SECTION 321816 – PLAYGROUND EQUIPMENT AND SURFACING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Layout, grading, and subgrade preparation for the playground area
2. Supply and installation of playground equipment
3. Supply and installation of resilient surfacing materials
4. Inspection, testing, and certification of the installed equipment and surfacing

The extent of the playground equipment and surfacing is shown on the project drawings and details.

1.3 RELATED WORK

A. Related work includes, but is not limited to:

1. Site grading and drainage work
2. The construction of landscape, hardscape, and irrigation improvements

1.4 COORDINATION

A. The Contractor shall coordinate all playground equipment and surfacing work with the Owner's Representative. Work that is completed or in-progress shall be protected during the installation of the equipment and surfacing. The Contractor shall notify the Owner's Representative of field conditions which prevent installation of the equipment and surfacing as shown.

1.5 REQUIRED LICENSURE

A. All work shall be performed by a Contractor licensed by the State of Arizona Registrar of Contractors. The commercial license classification held by the Contractor shall be appropriate for the work to be performed.

1.6 INSTALLER QUALIFICATION AND CERTIFICATION REQUIREMENTS

A. Installation Contractor Qualifications: The playground/fitness equipment and surfacing shall be installed by an National Playground Contractor's Association (NPCA) qualified contractor.

B. Installation Superintendent Qualifications: The installation of the playground equipment shall be performed under the direct supervision of an individual that is currently certified by the National Playground Safety Institute (NPSI) as a Certified Playground Safety Inspector.

1.7 COMPLIANCE WITH APPLICABLE REGULATIONS

A. The Contractor shall comply with all local, state, and federal regulations regarding materials, methods of work, and disposal of excess and waste materials. The Contractor shall provide notices required by governmental authorities, request required inspections, obtain required permits, and pay for all associated fees.

1.8 REFERENCE SPECIFICATIONS

A. Reference Specifications: The following specifications are, by reference, made a part of these project specifications. To the extent applicable, the project work shall be implemented in accordance with these reference specifications.

B. American Society for Testing and Materials (ASTM):

1. ASTM F-1487-01 Playground Equipment for Public Use
2. ASTM F-1292-04 Impact Attenuating Surfacing
3. ASTM F-1951 Accessibility of Resilient Surfacing

C. Americans with Disabilities Act:

1. Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines, Published in the Federal Register on September 15, 2010, Chapter 10 Recreation Facilities, Section 1008 Play Areas

D. Consumer Products Safety Commission:

1. Public Playground Safety Handbook, Publication # 325 (Rev. November 2010).

1.9 SUBMITTAL REQUIREMENTS

A. Playground Equipment Manufacturer's Statement of Compliance: The Contractor shall submit a letter, signed by the playground equipment manufacturer, stating that the playground equipment supplied is certified by the International Play Equipment Manufacturers Association (IPEMA) to be in compliance with ASTM 1487-11. The Statement of Compliance shall be submitted to the Owner's Representative for approval prior to the start of installation work.

B. Rubberized Resilient Surfacing Material Manufacturer's Statement of Compliance: The Contractor shall submit a letter, signed by the rubberized resilient surfacing material manufacturer, stating that the resilient surfacing material supplied is certified by the International Play Equipment Manufacturers Association (IPEMA) to be in compliance with ASTM F-1292-13. The Statement of Compliance shall be submitted to the Owner's Representative for approval prior to the start of installation work.

C. Equipment Installation / Use Zone Diagram: The Contractor shall submit a diagram, as provided by the playground equipment manufacturer, illustrating the layout of the specified playground equipment and the limits of the required use zone(s) as specified in ASTM F 1487-11. The Installation / Use Zone Diagram shall be submitted to the Owner's Representative for approval prior to the start of installation work.

D. Color Chips: The Contractor shall submit to the Owner's Representative, for review and approval, color chips for the powder coated and plastic components of the playground.

E. Inspection, Maintenance and Repair Instructions: The Contractor shall submit the following items to the Owner's Representative prior to the issuance of a Certification of Substantial Completion.

1. One (1) copy of the Playground Equipment Manufacturer's Inspection, Maintenance, and Repair Instructions.
2. One (1) copy of the Rubberized Resilient Surfacing Manufacturer's Inspection, Maintenance, and Repair Instructions.
3. One (1) copy of the Playground Equipment Installation Instructions.

1.10 CONTRACTOR PROVIDED MAINTENANCE TOOLS AND SUPPLIES

A. Maintenance Tools and Supplies: The Contractor shall supply and turn-over to the Owner's Representative, prior to Final Acceptance of the Work, the following items:

1. One (1) copy of the playground equipment installation manual.
2. One (1) set of specialized tools required for the installation and maintenance of the playground equipment.
3. One (1) quart size can of paint for each color used to finish the metal components of the play structure.

1.11 DELIVERY AND STORAGE OF PLAYGROUND EQUIPMENT AND SURFACING MATERIALS

A. Notification of Equipment and Material Deliveries: The Contractor shall notify the Owner's Representative within 48 hours of the time the playground equipment and surfacing materials are delivered to the site so that the Owner can inspect the condition of the delivered materials.

B. Delivery of Playground Equipment: Playground equipment shall be shipped and delivered to the site in protective shipping containers, boxes, or wrappings. All equipment damaged during shipping or delivery, as determined by the Owner's Representative, will be rejected.

C. Delivery of Rubberized Resilient Surfacing Materials: Rubberized resilient surfacing materials shall be delivered to the site in the manufacturer's original, unopened containers.

D. Storage of Playground Equipment: All playground equipment shall be stored in a secure location and protected from moisture, vandalism, or other damage.

E. Storage of Rubberized Resilient Surfacing Materials: The rubberized resilient surfacing materials shall be stored under conditions as recommended by the material manufacturer.

PART 2 - PRODUCTS

2.1 CONCRETE FOR FOOTINGS

A. Concrete for Footings: Concrete shall be Class B concrete per Section 1006 of the Pima Association of Governments (PAG) Standard Specifications for Public Improvements (2014 or most recent Edition).

2.2 DRAINAGE AGGREGATE

A. Drainage Aggregate: Drainage aggregate shall be clean crushed rock or gravel. Gradation shall be as 3/4" size, or as noted on the Project Plans.

2.3 FILTER FABRIC

A. Filter Fabric: Filter Fabric for the separation of drainage aggregate and resilient surfacing materials shall be a non-woven, needle-punched, heat bonded polypropylene material designed for use as a soil separator and drainage filter.

2.4 RUBBERIZED RESILIENT SURFACING MATERIALS

A. General Requirements: The rubberized resilient surfacing shall be of the poured-in-place type. It shall carry the International Play Equipment Manufacturer's Association's (IPEMA's) Seal of Approval. If the surface is part of the accessible route it shall comply with ASTM F-1951-14, Standard Specification for Determination of Accessibility to Surface Systems Under and Around Playground Equipment.

B. Aggregate Base Course Material: The aggregate base course material used as base course for the rubberized resilient surfacing material shall be aggregate base course (ABC) material as per Section 303 of the Pima Association of Governments (PAG) Standard Specifications for Public Improvements (2014 or most recent Edition).

C. Rubberized Resilient Surfacing:

1. General Requirements: The surfacing shall be a poured-in-place system with an impact attenuating substrate and a bonded wear surface.

2. Impact Attenuating Substrate: The substrate shall consist of shredded styrene butadiene rubber (SBR) adhered with a 100% solids polyurethane binder to form a resilient, porous material. Strands of SBR may vary from 0.5 mm to 2 mm in thickness. Foam or granular rubber shall not be utilized in the substrate. The binder shall be between 10 and 14 percent of the total weight of the rubber and shall provide 100 percent coating of the particles. The substrate shall be compatible with the wearing surface.

    a. Thickness of Substrate: The substrate shall have a minimum thickness of 2-1/2 inches. The Contractor shall verify that the thickness of the substrate is adequate to meet the standards and specifications referenced herein.

3. Wearing Surface: The wear surface shall consist of ethylene propylene diene monomer (EPDM), Thermal Plastic Vulcanized (TPV), or Treated SBR (Styrene Butadiene Rubber) particles adhered with a polyurethane binder formulated to produce a uniform, even surface. EPDM particles shall meet the requirements of ASTM D-412-06a (2013) for tensile strength and elongation. EPDM shall be peroxide cured with an EPDM content of 26% and shall include a processing aid to prevent hardness. The size of the rubber particles shall be not less than 2 mm or greater than 4 mm across. Binder shall not be less than 20% of the total weight of the rubber used in the wearing surface and shall provide a 100% coating of the particles. The wearing surface shall be porous.

    a. Thickness of Wearing Surface: The wearing surface shall have a minimum thickness of ½ inch.
    b. Color of Wearing Surface: The wearing surface color shall be as noted on the Project Plans.

4. Binder: Binder shall be a material specifically designed for use with rubber granule material and outdoor installations. It shall be a single component polyurethane prepolymer formulated using a polymeric form of MDI. No Toluene Diphenel Isocyanate shall be used.

2.5 PLAYGROUND EQUIPMENT

A. General Requirements: All playground equipment shall carry the Seal of Approval from the International Play Equipment Manufacturer's Association (IPEMA) and shall comply with the standards and specifications referenced herein.

B. Playground Equipment: The playground equipment shall be of the make, model, and manufacturer as noted on the Project Plans.

C. Equipment Materials and Finishes:

1. Colors: The playground equipment shall be of the color noted on the Project Plans. If color is not noted, the Contractor shall submit a color schedule to the Owner's Representative for review and color selection. The color schedule shall be submitted to the Owner prior ordering the required equipment.

2.6 INCIDENTAL ITEMS

A. Other Items: Other items required for the installation of the playground equipment shall be as per the manufacturer's written instructions, shall be in accordance with applicable codes, and shall be appropriate for the Work to be performed.

PART 3 - EXECUTION

3.1 BLUE STAKING

A. Blue Staking: The Contractor shall request that the project site be Blue Staked prior to the start of any excavation work. Blue Staking shall be kept current during the course of the project. All utilities damaged by the Contractor shall be repaired or replaced by the Contractor, as required by the Owner or appropriate utility company, at the Contractor's expense.

3.2 LAYOUT AND STAKING

A. Layout of Playground Area and Component Equipment: Prior to the start of playground construction, the Contractor shall lay out and stake the limits of the overall play area and the layout of the play equipment. The Contractor shall verify that there are adequate use zones and setbacks between each component piece of the play structure and other pieces of equipment and/or perimeter pavements. All deficiencies shall be called to the attention of the Owner's Representative. If necessary, the Contractor shall make adjustments to the layout and/or configuration of the play area. Adjustments shall be as approved by the Owner's Representative.

3.3 EXCAVATION FOR RESILIENT SURFACING

A. Excavation and Grading: The Contractor shall excavate existing soil as required to provide for the installation of the resilient surfacing and associated drainage aggregate. The Contractor shall remove and dispose of all excess soil.

3.4 PLAYGROUND EQUIPMENT AND FITNESS EQUIPMENT INSTALLATION

A. Temporary Fencing: Prior to the start of playground equipment installation, a temporary, 6' high (minimum) chain-link fence, or other Owner approved barrier, shall be installed around the playground to restrict access to the play equipment prior to completion of the playground equipment and surfacing work. The fence shall remain in place until the post installation inspection and certification work have been successfully completed.

B. Installation of Posts and Concrete Footings: Equipment posts and concrete footings shall be constructed and installed in accordance with the playground equipment manufacturer's written instructions. The base of all posts anchored in concrete shall be marked to denote the appropriate elevation for the top of the concrete footing and the appropriate elevation for the top of the resilient surfacing to be installed later.

1. Resilient Surfacing Finished Grade Markers: All markers indicating the finished grade of the resilient surfacing shall be protected and shall remain affixed to the playground equipment for future reference by the Owner's maintenance staff.

C. Assembly and Testing of Playground Equipment: All playground equipment components and fasteners shall be assembled, checked, and tested in accordance with the equipment manufacturer's written instructions.

1. Age Appropriate Warning Labels: All age appropriate warning labels provided by the manufacturer shall remain affixed to the playground equipment for future reference by the Owner's maintenance staff.

3.7 RUBBERIZED RESILIENT SURFACING INSTALLATION

A. Project Site Conditions: The rubberized resilient surfacing shall be installed on a dry sub-surface with no rain forecast during the initial drying/curing period. The ambient temperatures and relative humidity during the installation and curing period shall be within the range recommended by the manufacturer.

B. Subgrade Preparation and Compaction: The subgrade shall be cleaned of all concrete, excess soil, and other debris and shall be graded to provide a clean and uniform subgrade surface. Areas that have been over-excavated and all fill material shall be compacted to not less than 95% of the maximum laboratory density.

C. Placement and Compaction of Aggregate Base Course Material: The aggregate base course material shall be placed in lifts not exceeding six inches (6"), moistened, and compacted to a density of not less than 95% of the maximum laboratory density. The aggregate base course shall be graded to provide a uniform surface as required for the rubberized resilient surfacing.

D. Mixing: All rubberized resilient surfacing material shall be mixed on site in a rotating tumbler in accordance with the manufacturer's written instructions.

E. Substrate Installation: The substrate material shall be installed as one continuous pour without interruption. Installation techniques shall be as per the manufacturer's written instructions. The depth of the material shall be as detailed and as required to provide the impact attenuation required for the play equipment installed.

F. Wearing Course Installation: Adhesive, as recommended by the manufacturer, shall be applied to the substrate and the wearing course material installed before the adhesive dries. The wearing course surface shall be troweled to a smooth even finish. The wearing course material shall be installed as a continuous pour without interruption. Installation techniques shall be as per the manufacturer's written instructions. The wearing course shall be installed without depressions or other irregularities that will result in the ponding of water on the surface of the rubberized resilient surfacing.

G. Curing and Protection: The wearing course shall be allowed to cure for a minimum of 48 hours or as per the manufacturer's written instructions. During the curing period the surfacing material shall be protected from all traffic.

3.9 POST-INSTALLATION INSPECTION AND CERTIFICATION

A. Post-Installation Inspection and Certification: After completion of the playground equipment and playground surfacing, the Contractor shall have the installation inspected by a third-party independent inspector who has current certification as a National Playground Safety Institute (NPSI) Certified Playground Safety Inspector. The inspection shall include performance of the Critical Fall Height Test per ASTM-F-1292 with resulting g-max and HIC scores provided. If deficiencies are noted, they shall be repaired, replaced, or otherwise remedied and the installation re-inspected. A report, certifying that the installation meets all applicable requirements and signed by the inspector, shall be provided to the Owner prior to Substantial Completion of the Work.

3.10 CLEAN-UP

A. Site Clean-up: The Contractor shall perform cleaning operations during the installation of the playground equipment and playground surfacing and upon completion of the project. The Contractor shall remove from the site all excess materials, debris, and equipment and shall legally dispose of all excess and waste materials. The Contractor shall repair all damage resulting from playground equipment and playground surfacing installation.

3.11 GUARANTEE

A. Playground Equipment Guarantee: The playground equipment manufacturer shall guarantee the playground equipment installed to be free from defects in materials and workmanship for a period of two (2) years commencing on the date of Substantial Completion of the Work. A written letter of guarantee, signed by the equipment manufacturer, shall be submitted to the Owner's Representative prior to Final Acceptance of the Work. The letter shall include the name, mailing address, phone number, and e-mail address of the manufacturer's representative to be contacted regarding guarantee issues. The letter shall specifically state that the manufacturer will make all necessary repairs to the equipment during the guarantee period in accordance with these specifications, at no cost to the Owner. The Contractor shall be responsible for obtaining the manufacturer's Letter of Guarantee and for submitting this information to the Owner's Representative.

B. Rubberized Resilient Surfacing Guarantee: The rubberized resilient surfacing manufacturer shall guarantee the surfacing material installed to be free from defects in materials and workmanship for a period of five (5) years commencing on the date of Substantial Completion of the Work. A written letter of guarantee, signed by the surfacing manufacturer, shall be submitted to the Owner's Representative prior to Final Acceptance of the Work. The letter shall include the name, mailing address, phone number, and e-mail address of the manufacturer's representative to be contacted regarding guarantee issues. The letter shall specifically state that the manufacturer will make all necessary repairs to the surfacing during the guarantee period in accordance with these specifications, at no cost to the Owner. The Contractor shall be responsible for obtaining the manufacturer's Letter of Guarantee and for submitting this information to the Owner's Representative.

C. Notification of Deficiencies: The Owner will provide written notification to the manufacturer(s) of deficiencies that occur during the guarantee period(s).

D. Manufacturer's Response to Written Notification: The manufacturer shall perform the required repair or replacement work or provide the Owner with an acceptable schedule for the completion of the repair work within ten (10) calendar days of receipt of written notice. If the manufacturer fails to respond and perform the required repair work within the specified period, the Owner shall have the right to have the work performed by others and invoice the manufacturer for the cost of the work. The manufacturer agrees to pay all such charges.

END OF SECTION 321816

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SECTION 323113 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes chain-link fences and swing gates.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of chain-link fence and gate, from manufacturer.

B. Product Test Reports: For framework strength according to ASTM F 1043.

C. Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 WARRANTY

A. Special Warranty: Manufacturer’s standard form in which manufacturer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, deterioration of metals, metal finishes, and other materials beyond normal weathering.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CHAIN-LINK FENCE FABRIC

A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with CLFMI Product Manual and requirements indicated below:

1. Fabric Height: One piece as indicated on Drawings.
2. Steel Wire for Fabric: Wire diameter of 9 gauge.

    1) Mesh Size: 2 inches (50 mm).
    2) Zinc-Coated Fabric: ASTM A 392, Type II, Class 2, 2.0 oz./sq. ft. (610 g/sq. m, with zinc coating applied before weaving.

3. Selvage: Knuckled at both selvages.

2.2 FENCE FRAMING

A. Posts and Rails: Comply with ASTM F 1043 for framework, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F 1043 based on the following:

1. Fence Height: As indicated on Drawings.
2. Heavy-Industrial-Strength Material: Group IA, round steel pipe, Schedule 40.

    a. Line Post: 2.375 inches (60 mm) in diameter and 2.875 inches (73 mm) in diameter.
    b. End, Corner, and Pull Posts: 4.0 inches (102 mm) in diameter.

3. Horizontal Framework Members: Intermediate top rails according to ASTM F 1043
4. Brace Rails: Comply with ASTM F 1043.
5. Metallic Coating for Steel Framework:

    a. Type A zinc coating.

2.3 TENSION WIRE

A. Metallic-Coated Steel Wire: 0.177-inch- (4.5-mm-) diameter, marcelled tension wire according to ASTM A 817 or ASTM A 824, with the following metallic coating:

1. Type II: Zinc coated with minimum coating weight matching chain-link fabric coating weight.

2.4 SWING GATES

A. General: ASTM F 900 for gate posts and [**single**] [**double**] swing gate types.[

1. Gate Leaf Width: As indicated.
2. Gate Fabric Height: As indicated.

B. Pipe and Tubing:

1. Zinc-Coated Steel: ASTM F 1043 and ASTM F 1083; protective coating and finish to match fence framework.
2. Gate Posts: Round tubular steel.
3. Gate Frames and Bracing: Round tubular steel.

C. Frame Corner Construction: Welded.

D. Hardware:

1. Hinges: 180-degree outward swing.
2. Latch: Permitting operation from both sides of gate with provision for padlocking accessible from both sides of gate.

2.5 FITTINGS

A. Provide fittings according to ASTM F 626.

B. Finish:

1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz. /sq. ft. (366 g/sq. m) of zinc.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for a verified survey of property lines and legal boundaries, site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.

1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet (152.5 m) or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

D. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements indicated.

E. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in form, undisturbed soil.

F. Post Setting: Set posts in concrete at indicated spacing info firm, undisturbed soil.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.

2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

a. Exposed Concrete: Extend 2 inches (50 mm) above grade; shape and smooth to shed water.

b. Posts Set into Concrete: Footing size: 8 x 30 inches deep.

G. Terminal Posts: Locate terminal end, corner, and gate posts according to ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more.

H. Line Posts: Space line posts uniformly at 10 feet (3 m) o.c.

I. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Provide horizontal tension wire at the following locations:

1. Extended along bottom of fence fabric.

J. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 1 inch (25.4 mm) between finish grade or surface and bottom selvage unless otherwise indicated.

K. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches (380 mm) o.c.

L. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

M. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

END OF SECTION 323113

323115 AUTOMATED GATE OPERATORS AND CONTROLS

PART 1 – GENERAL

1.01. SUMMARY

A. Pre-wired gate operator for swing gates, including all selected attachments, accessory equipment, and mounting brackets.

B. Pre-wired gate operator for horizontal sliding gate including all attachments, accessory equipment and mounting brackets.

1.02. RELATED SECTIONS

A. Electrical service and connections: See Division 26.

1.03. SUBMITTALS

A. Shop drawings: Submit shop drawings under the provisions of Section 01300. Submit drawings showing connections to adjacent construction, range of travel, and all electrical and mechanical connections to the operator. All underground runs of electrical lines and inductive vehicle obstruction loop locations shall be indicated on drawings. Drawings shall also show the size and location of the concrete mounting pad.

B. Installation instructions: Submit two copies of manufacturer's installation instructions for this specific project.

C. Test reports:

1. Submit affidavits from the manufacturer demonstrating that the gate mechanism has been tested to 200,000 cycles without breakdown.

2. Each operator shall bear a label indication that the operator mechanism has been tested to full power stress of all mechanical components and electrical tests of all overload devices.

1.04. QUALITY ASSURANCE

A. Manufacturer: A company specializing in the manufacture of security gate operators of the type specified, with a minimum of seven years experience and minimum of five years experience with gate operators of this type and design.

B. Installer: A minimum of three years experience installing similar equipment.

1.05. CODES AND REGULATORY REQUIREMENTS

A. Operators shall be built to UL 325 standards and be listed by a testing laboratory. Complete all electrical work according to local codes and National Electrical code. All fieldwork shall be performed in a neat and professional manner, completed to journeyman standards.

B. Current safety standards require the use of multiple external sensors to be capable of reversing the gate in either direction upon sensing an obstruction. See also 2.02 E.

C. Vehicle gates should never be used by pedestrians. Separate pedestrian gates must always be provided when foot traffic is present.

D. Current safety standards require gate operators to be designed and labeled for specific usage classes. Gate operator shall be listed for use in all UL 325 Usage Classes: I, II, III, and IV.

1.06. PRODUCT DELIVERY AND STORAGE

A. Store products upright in the original shipping containers, covered, ventilated and protected from all weather conditions.

1.07. WARRANTY

A. Provide a five year warranty against all defects in materials or workmanship. Defective materials shall be replaced with new materials furnished by the manufacturer, at no cost to the owner. Freight, labor and other incidental costs shall also be included in the warranty.

PART 2 – PRODUCTS

2.01. GATE OPERATORS

A. Sliding gates: HySecurity “SlideDriven” industrial hydraulic gate operator with smart controller. Model 40-M.

2.02. OPERATION

A. Gate Capacities: Slider Gate

4,000 lb no gate width limit

300 lb draw bar pull

B. Standard mechanical components shall include as a minimum:

1. Two piece linear low density polyethylene cover with locking toggle action latches. Access to electronics does not require removal of gate arm linkage.

2. Articulating linkage for actuation of gate with covers to protect bystanders from pinch hazards and provision to bolt linkage as well as weld linkage. Spherical connection at gate.

3. Electronic circuit boards to be conformal coated to resist moisture induced failures.

4. Frame to be constructed of ¼" thick steel plate, welded.

5. Finish: Frame to be zinc plated. Other components zinc plated or non-corroding.

6. Easily adjustable limit switches to limit travel in each direction.

C. Minimum standard electrical components: Industrial grade.

1. Motor: ½ HP brushed DC motor with ball bearings. – Swing gate

2. Motor: 1 HP – Slider gate

3. All components shall have overload protection.

4. Controls: Smart DC Controller Board with 512K memory containing:

a. inherent entrapment sensor;

b. built in "warn before operate" system;

c. built in timer to close;

d. 2 line liquid crystal display for reporting of functions;

e. 24 programmable output relay options;

f. anti-tailgate mode;

g. built-in multi-level power surge/lightening strike protection using gas discharge and optoisolation technology;

h. multi-stage intelligent battery charging under microprocessor control;

i. capable, with optional software, of viewing EEPROM stored event logs for troubleshooting diagnostics;

j. RS232 and USB port for connection to laptop or other computer peripheral and RS485 connection of Master/Slave systems.

k. Pulse width modulated control of brushed DC motor using 110 Amp rated solid state switching devices.

5. Accessory power: 12 VDC, 24 VDC.

D. Reset switch, accessible from outside.

E. Required external sensors: See 1.05B. Provide a combination of photo eyes and gate edges and install so that the gate is capable of reversing in either direction upon sensing an obstruction.

F. Optional control devices:

1. Telephone entry and access control keypad. DoorKing 1812 Access Plus series or approved equal. Provide dual height arm for incoming and outgoing traffic with two keypads at each location for car (low) and truck (high) use. Keypad shall include voice communication device to allow communication with staff inside facility and for staff to open gate remotely.

2. Programmable radio control receiver and transmitters. Transmitter Solutions or approved equal. One receiver at each control pedestal location (see item 1 above) for incoming and outgoing traffic. Provide 20 transmitters to owner.

2.03. FACTORY TESTING

A. Fully assemble and test, at the factory, each gate operator to assure smooth operation, sequencing and electrical connection integrity. Apply physical loads to the operator to simulate field conditions. Tests shall simulate physical and electrical loads equal to the fully rated capacity of the operator components.

B. Check all mechanical connections for tightness and alignment. Check all welds for completeness and continuity. Check welded corners and edges to assure they are square and straight.

C. Inspect zinc finish for completeness. Touch up any imperfections prior to shipment.

D. Check all electrical wires to assure that chafing cannot occur during shipping or operation.

PART 3 – EXECUTION

3.01. SITE EXAMINATION

A. Locate concrete mounting pad in accordance with approved shop drawings.

B. Make sure that supporting posts or pilasters are adequate to support the gate and operator. Do not proceed with installation if supports are inadequate.

3.02. INSTALLATION

A. Install gate operator in accordance with the manufacturers printed instructions, current at the time of installation. Coordinate locations of operators with contract drawings; other trades and shop drawings.

B. Installer shall insure that the service to the operator is at least 15 AMPS. Electrical wiring to conform to NEC and manufacturer’s installation instructions. Operator wattage is 500W.

3.03. FIELD QUALITY CONTROL

A. Test gate operators through ten full cycles and adjust for operation without binding, scraping or uneven motion.

B. All anchor bolts shall be fully concealed in the finished installation.

C. Owner, or owner’s representative, shall complete “punch list” with installing contractor prior to final acceptance of the installation and submit completed warranty documentation to manufacturer.

3.04. CONTINUED SERVICE AND DOCUMENTATION

A. Train owner's personnel in the general maintenance of the gate operator and accessories and provide copy of "Installation and Maintenance Manual" for the owner. Manual will identify parts of the equipment for future procurement.

END OF SECTION 323115

SECTION 323116 – WELDED WIRE PANEL FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Welded wire grid panels, including gate panels.
2. Panel channel and angle trim.
3. Panel posts.
4. Necessary clips, straps and spacers.
5. Powdercoat finish.

1.3 RELATED WORK

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

1. Section 03 30 00, CAST-IN-PLACE CONCRETE; Concrete footings.
2. Section 32 93 00, PLANTS; Furnishing and installing related plants.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog details for specified products demonstrating compliance with referenced standards. Provide list of fittings being provided with descriptions and either photographs or drawings for each type.

B. Shop Drawings: Submit Shop Drawings for fabrication and installation. Include the following:

1. Plans, elevations, and detail sections showing sizes, critical dimensions, panel layout constraints using a 2 x 2 inch modular grid, and details and locations of accessories.

2. Indicate materials, methods, finishes, fittings, fasteners, anchorages, and accessory items.

C. Verification Samples: Two samples representing actual products and finishes as follows:

1. Welded wire grid panel, 6 in. x 6 in., with one edge of channel trim and one edge of angle trim, all as one unit.

2. Color Submittals: Submit metal chips, 2 in. x 3-1/2 in. minimum, showing color and texture to be provided.

1.5 QUALITY ASSURANCE

A. Manufacturer: Minimum 5 years experience in manufacturing and supplying welded wire panel systems of the type required for this Project.

1.6 DELIVERY, STORAGE AND HANDLING

A. Protect materials from damage. Store panels flat. Provide edge protection when strapping is used. Do not apply loads to panel edges.

B. Inspect products upon delivery in order to submit timely freight claim for any damaged materials.

C. Store products in manufacturer's packaging until ready for installation.

D. Handle and store products according to manufacturer's recommendations. Leave products wrapped or otherwise protected and under clean and dry storage conditions until required for installation.

E. Exercise care not to scratch, mark, dent, or bend metal components during delivery, storage, and installation.

1.7 PROJECT CONDITIONS

A. Verify actual openings by field measurements before fabrication; show recorded measurements on shop drawings.

B. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

A. greenscreen®, 1743 La Cienega Blvd., Los Angeles, CA 90035; Tel: 1-800-450-3494; Fax: 310-837-0523, www.greenscreen.com.

B. Other manufacturers will be considered if submitted for prior approval prior to bid date.

2.2 PANELS

A. Panels shall be rigid, three dimensional welded wire grid fabricated of 14 gage galvanized steel wire.

1. Metallic-Coated Steel Wire: Welded-wire, galvanized in accordance with ASTM A641.

B. Face Grid: Wires shall be welded at each intersection to form a 2 x 2 inch face grid on the front and back of panels,

C. Trusses: Face grids shall be separated by bent wire trusses spaced at 2-inch centers and welded to front and back face grids at each truss apex.

D. Thickness: 3 inches.

E. Length and Width: 4’ wide panels x 6’ tall/length; locations per drawings.

F. Tolerance: 1/8 inch in width and 1/8 inch in length.

2.3 ACCESSORIES

A. Trim:

1. Fabricate from 20-gage ASTM A879 galvanized steel.

2. Channel Trim: Thickness of panel x ½ inch legs.

3. Locations: at top of all panels and panel edges where required.

B. Clips and Straps: Provide manufacturer’s standard types of clips and straps suitable for mounting conditions. Fabricate from ASTM A879 galvanized steel. Adjustable clips shall have ¼ inch diameter 18-8 stainless steel bolt, washer, and nut.

C. Fence Posts: 3-inch square ASTM A500, Grade B steel tube. The steel strip used in the manufacture of the post shall conform to ASTM A1011. Minimum yield strength shall be 45,000 psi. Provide steel post caps. Overall post length shall be as indicated on the Drawings.

D. Fasteners for Mounting Clips to Fence Posts: Self drilling, self tapping hex washer head screws, with strength of Type 410 stainless steel, and corrosion resistance of Type 304 stainless steel.

2.4 FABRICATION

A. Cut to size.

B. Weld trim to panels and grind smooth exterior surfaces of welds.

2.5 FINISH

A. Metal components (except fasteners) shall receive commercial grade finish system after fabrication.

B. Finish System:

1. Pretreat with general purpose, alkaline, water based cleaner / degreaser applied at 240 degrees F.

2. Prime with fusion bond epoxy powder coat.

3. Topcoat with polyester-urethane powder coat with a minimum total dry film thickness of not less than 6 mils (0.15 mm).

C. Salt Spray Resistance: Finish shall remain rust free when tested 1680 hours in accordance with ASTM B117.

D. Finish and Color: Color selected by Architect from manufacturer's standards.

E. Touch-Up Paint: Provide high quality, exterior-grade spray paint suitable for conditions of use.

2.6 MISCELLANEOUS MATERIALS

A. Concrete: Refer to Section 03 30 00, CAST-IN-PLACE CONCRETE.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, construction layout, and other conditions affecting performance of the Work.

B. Do not begin installation before final grading is completed unless otherwise permitted by Architect.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of fence lines and posts. Do not exceed intervals of 500 feet (152.5 m) or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

1. Construction layout and field engineering are specified in Division 01 Section "Execution".

B. Verify alignment, support dimensions, and tolerances are correct.

C. Inventory components to ensure all required items are available for installation. Inspect components for damage. Remove damaged components from site and replace.

3.3 INSTALLATION - GENERAL

A. Spans: For freestanding fences and screens, span between structural supports should not exceed 8’ for 3” thick panels without thorough review of specific site conditions and mounting details. For overhead horizontal or inclined panels span between structural supports should not exceed 4’. All curved panel spans should be reviewed based on specific panel radius and center to center of proposed structural support spacing.

B. Install panels plumb and square, centered within area designated for panels, and aligned to maintain modular grid.

C. Avoid cutting panels in field. Where field cutting is essential, clean and dry area and apply touch-up paint to cut edges.

D. Install securely with fasteners located to meet manufacturer’s requirements.

E. Repair bent or damaged panels. If panels cannot be repaired to satisfaction of Architect, remove from jobsite and replace with new panels.

3.4 INSTALLATION

A. Install welded wire panel plant support system according to manufacturer's written instructions.

B. Install welded wire panel plant support system by setting posts as indicated on the Drawings and fastening panels to posts according to manufacturer's written instructions.

3.5 ADJUSTING AND CLEANING

A. Remove temporary coverings and protection of adjacent work areas. Clean installed products in accordance with manufacturer's instructions before Owner's acceptance.

B. Do not use abrasive cleaners.

C. Remove from project site and legally dispose of construction debris associated with this work.

3.6 PROTECTION

A. Protect installed products until completion of Project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

C. Protect installed products and finished surfaces from damage during construction.

D. Replace defective or damaged components as directed by Architect.

3.7 PLANT INSTALLATION

A. Refer to Section 32 93 00, PLANTS.

END OF SECTION 323116

SECTION 323300 - SITE FURNISHINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Litter Receptacle
2. Bench
3. Bicycle Parking Rack
4. Picnic Table
5. Decorative Trench Grate
6. Decorative Area Drain Grate
7. Bollard

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For units with factory applied color finishes.

C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Size: Not less than 6-inch long linear components and 4-inch square sheet components.

D. Product Schedule: For site furnishings. Use same designations indicated on Drawings.

E. Maintenance Data: For all site furnishings provided by manufacturer's or material from suppliers, for inclusion in project maintenance manual.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of site furnishings and components through one source or from a single manufacturer.

1.5 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents after acceptance of work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Litter Receptacle

1. Model: Steel Slat Trash Receptacle with Liner
2. Manufacturer: Belson
3. Size: 36 Gallon
4. Color: TBD
5. Spec #: CBTR-36

B. Bench

1. Model: Wilmington Collection Park Bench
2. Manufacturer: Belson
3. Finish: Powdercoat
4. Size: 6’
5. Color: TBD
6. Spec #: 974-S6

C. Bicycle Parking Rack

1. Model: Bike Coil Bike Rack
2. Manufacturer: Belson
3. Finish: Powdercoat
4. Size: 6’
5. Color: TBD
6. Spec #: BRBC-10 with BC-IGM(3 per rack)

D. Picnic Table

1. Model: Round Surface Mounted Picnic Table with Umbrella Hole
2. Manufacturer: Belson
3. Finish: Powdercoat
4. Color: TBD
5. Spec #: SXR-4PE-S 3 Seats

E. Trench Grate

1. Model: Fibonacci
2. Manufacturer: Urban Accessories
3. Finish: Recycled Aluminum

4. Size: 6” x 18”

F. Area Drain Grate

1. Model: Oblio
2. Manufacturer: Iron Age Designs
3. Finish: Cast Aluminum
4. Size: 24” Sq., Heel Proof

G. Bollards

1. Model: Semi – Dome Top Concrete Bollard
2. Manufacturer: Belson
3. Finish: Cast Aluminum
4. Size: 12” Dia. X 36”H
5. Color: TBD
6. Spec #: TF6021-CUS1 Anchor Style B

2.2 FABRICATION

A. Metal Components: Form to required shapes and sizes with true, consistent curves, lines, and angles. Separate metals from dissimilar materials to prevent electrolytic action.

B. Exposed Surfaces: Polished, sanded, or otherwise finished; all surfaces smooth, free of burrs, barbs, splinters, and sharpness; all edges and ends rolled, rounded, or capped, unless otherwise indicated.

C. Factory Assembly for Receptacles: Assemble components in the factory to greatest extent possible to minimize field assembly. Clearly mark units for assembly in the field.

2.3 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions

affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

B. Unless otherwise indicated, install site furnishings after planting, irrigation and paving have been completed.

C. Excavating: Perform all excavations as required for installation of work included under this Section. Coordinate excavation with utility plans and Blue Stake service prior to proceeding with work. Restore all surfaces, existing underground installations, etc., damaged or cut as a result of the excavations to their original condition.

D. Should utilities not shown on the plans be found during excavations, promptly notify Architect for instructions. Failure to do so will make Contractor liable for any and all damage arising from his operations subsequent to discovery. Indicate utility crossings on the Record Drawings promptly.

E. Site furnishings which do not conform to requirements, details and plans due to unauthorized changes or poor installation practices shall be immediately corrected at no additional cost to the owner.

3.3 CLEANING

A. After completing site furnishing installation, inspect components. Remove spots, dirt, and debris. Repair damaged finishes to match original finish and color or replace component.

B. Maintain continuous cleaning operation throughout duration of work. Dispose of, off-site at no additional cost to Owner, all trash or debris generated by installation of site furnishings.

C. Clean up, remove from project area and lawfully and properly dispose of all debris from the entire work area prior to Final Acceptance to satisfaction of Architect.

END OF SECTION 323300

SECTION 328400 - PLANTING IRRIGATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Piping.
2. Reduced pressure backflow prevention assembly.
3. Pressure-reducing valves.
4. Automatic control valves.
5. Transition fittings.
6. Drip irrigation specialties.
7. Controllers.
8. Boxes for automatic control valves.

1.3 DEFINITIONS

A. Circuit Piping: Downstream from control valves to drain valves. Piping is under pressure during flow.

B. Main Piping: Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under water-distribution-system pressure.

C. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.4 PERFORMANCE REQUIREMENTS

A. Irrigation zone control shall be automatic operation with controller and automatic control valves.

B. Minimum Working Pressures: Refer to Drawings for minimum pressure requirements for irrigation system.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories.

B. Wiring Diagrams: For power, signal, and control wiring.

1.6 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Irrigation systems, drawn to scale, on which components are shown and coordinated with each other, using input from Installers of the items involved. Also include adjustments necessary to avoid plantings and obstructions such as signs and light standards.

B. Qualification Data: For qualified Installer.

C. Zoning Chart: Show each irrigation zone and its control valve.

D. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.

E. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For controllers and automatic control valves to include in operation and maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Emitters: Equal to 10 percent of amount installed for each type indicated, but no fewer than five units.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers that include a Professional Technical Class member of the American Society of Irrigation Consultants.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.11 PROJECT CONDITIONS

A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:

1. Notify Construction Manager no fewer than two days in advance of proposed interruption of water service.
2. Do not proceed with interruption of water service without Construction Manager's written permission.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

A. Comply with requirements in the piping schedule for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.

B. PVC Pipe: ASTM D 1785, PVC 1120 compound, Schedule 40 and 80.

1. PVC Socket Fittings: ASTM D 2466, Schedules 40 and 80.
2. PVC Threaded Fittings: ASTM D 2464, Schedule 80.
3. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket ends.

2.2 PIPING JOINING MATERIALS

A. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

B. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.3 MANUAL VALVES

A. Brass Ball Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Flow-Tek, Inc.
b. Jomar Valve.
c. NIBCO INC.

2. Description:

a. Standard: MSS SP-110.
b. SWP Rating: 150 psig.

c. CWP Rating: 600 psig.
d. Body Design: Two piece.
e. Body Material: Forged brass.
f. Ends: Threaded or solder joint if indicated.
g. Seats: PTFE or TFE.
h. Stem: Brass.
i. Ball: Chrome-plated brass.
j. Port: Full.

B. Plastic Ball Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Asahi/America.
b. NIBCO INC.
c. Spears Manufacturing Company.

2. Description:

a. Standard: MSS SP-122.
b. Pressure Rating: 150 psig.
c. Body Material: PVC.
d. Type: Union.
e. End Connections: Socket or threaded.
f. Port: Full.

2.4 PRESSURE-REDUCING VALVES

A. Pressure Regulators:

1. Manufacturers: Subject to compliance with requirements, provide products by the following, or approved equal:

a. Senninger PMR35MF.

2.5 AUTOMATIC CONTROL VALVES

A. Plastic, Automatic Control Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by the following, or approved equal:

a. Rain Bird Corporation, 100-PEB.

2. Description: Molded-plastic body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24-V ac solenoid.

2.6 TRANSITION FITTINGS

A. General Requirements: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.

B. Transition Couplings:

1. Description: AWWA C219, metal sleeve-type coupling for underground pressure piping.

C. Plastic-to-Metal Transition Fittings:

1. Description: PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-socket or threaded end.

D. Plastic-to-Metal Transition Unions:

1. Description: MSS SP-107, PVC four-part union. Include one brass threaded end, one solvent-cement-joint or threaded plastic end, rubber O-ring, and union nut.

2.7 DRIP IRRIGATION SPECIALTIES

A. Manufacturers: Subject to compliance with requirements, provide product indicated on Drawings by the following:

1. Rain Bird Corporation.

B. Multiple-Outlet Emitter Systems: Emitter with tubing and button-type outlets.

1. Emitter: With multiple outlets to deliver water to remote outlets.

a. Body Material: ABS or other plastic.
b. Pattern: 6-port.
c. Operation: Automatic pressure compensating.
d. Flow: 3.0 gpm to 12.0 gpm
e. Mounting Height: 3” below box lid.

C. Filter Units: Brass or plastic housing, with corrosion-resistant internal parts; of size and capacity required for devices downstream from unit.

2.8 CONTROLLERS

A. Manufacturers: Subject to compliance with requirements, provide product indicated on Drawings:

1. Rain Bird Corporation, ESP16LXMEF 16-Station (site).
2. Rainbird Corporation, ESP8LXMEF 8-Station (interior courtyards).

B. Wall-mountable, stainless-steel cabinet with a key-locking cabinet suitable for outdoor installation.

1. Field wiring connections shall occur in the controller.
2. The metal case shall be sized such that the standard plastic case of the controller shall fit properly and securely in the case without altering the controller.
3. The controller shall be field installed into the metal case and wall-mounted.
4. The metal wall-mountable case shall include all necessary mounting bolt, nuts, and washers.
5. The metal wall-mount case shall be lockable.
6. The metal case shall be powder-coated steel.

2.9 BOXES FOR AUTOMATIC CONTROL VALVES

A. Plastic Boxes:

1. Description: Box and cover, with open bottom and openings for piping; designed for installing flush with grade.

    a. Size: As required for valves and service.
    b. Shape: Per Drawings.
    c. Lettering: “IRRIGATION”.

B. Drainage Backfill: Cleaned gravel or crushed stone, graded from 3/4 inch minimum to 3 inches maximum.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Section 312000 "Earth Moving."

B. Install warning tape directly above pressure piping, 6 inches maximum below finished grades.

C. Provide minimum cover over top of underground piping according to the following:

1. Irrigation Main Piping: Minimum depth of 24 inches where not under pavement or minimum depth of 30 inches where under pavement below finished grade.
2. Circuit Piping: Per Drawings.
3. Sleeves: Per Drawings.

3.2 PREPARATION

A. Set stakes to identify locations of proposed irrigation system. Obtain Architect's approval before excavation.

3.3 PIPING INSTALLATION

A. Location and Arrangement: Drawings indicate location and arrangement of piping systems. Install piping as indicated unless deviations are approved on Coordination Drawings.

B. Install piping at minimum uniform slope of 0.5 percent down toward end plugs.

C. Install piping free of sags and bends.

D. Install groups of pipes parallel to each other, spaced to permit valve servicing.

E. Install fittings for changes in direction and branch connections.

F. Install unions adjacent to valves and to final connections to other components with NPS 2 or smaller pipe connection.

G. Install flanges adjacent to valves and to final connections to other components with NPS 2-1/2 or larger pipe connection.

H. Install underground thermoplastic piping according to ASTM D 2774 and ASTM F 690.

I. Install expansion loops in control-valve boxes for plastic piping.

J. Lay piping on solid subbase, uniformly sloped without humps or depressions.

K. Install PVC piping in dry weather when temperature is above 40 deg F. Allow joints to cure at least 24 hours at temperatures above 40 deg F before testing.

L. Install piping in sleeves under parking lots, roadways, and sidewalks.

M. Install sleeves made of Schedule 40 PVC pipe and socket fittings, and solvent-cemented joints.

3.4 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Flanged Joints: Select rubber gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

E. Copper-Tubing Soldered Joints: Apply ASTM B 813 water-flushable flux to tube end unless otherwise indicated. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy (0.20 percent maximum lead content) complying with ASTM B 32.

F. PVC Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. PVC Pressure Piping: Join schedule number, ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
3. PVC Nonpressure Piping: Join according to ASTM D 2855.

3.5 VALVE INSTALLATION

A. Pressure-Reducing Valves: Install in boxes for automatic control valves as detailed on Drawings.

3.6 DRIP IRRIGATION SPECIALTY INSTALLATION

A. Install multiple-outlet emitter systems with tubing to outlets. Plug unused emitter outlets. Install outlets on off-ground supports at height indicated.

B. Install application pressure regulators and filter units in piping near device being protected, and in control-valve boxes.

3.7 BACKFLOW PREVENTER INSTALLATION

A. Type: Reduced pressure type, as indicated on Drawings and Details, and manufactured for maintenance and service without removal from the line.

B. Material: Brass.

C. Components:

1. Check valves: Two separate spring-loaded “Y” type.
2. Pressure relief valve: One differential type with 2 diaphragms that are separated by spaces.
3. Shut-off valves.
4. Test cocks for field-testing.
5. Enclosure.

D. Install an enclosure with a locking device over the backflow preventer assembly per the Drawing detail.

E. Finish: Paint as described in Drawing detail.

F. Operation: Automatically reduces water pressure in the zone between the check valves to a pressure differential of 3 psi.

3.8 AUTOMATIC IRRIGATION-CONTROL SYSTEM INSTALLATION

A. Equipment Mounting: Install interior controllers on wall.

1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.

B. Install control cable in same trench as irrigation piping and at least 2 inches below or beside piping. Provide conductors of size not smaller than recommended by controller manufacturer. Install cable in separate sleeve under paved areas.

3.9 CONNECTIONS

A. Comply with requirements for piping specified in Section 221113 "Facility Water Distribution Piping" for water supply from exterior water service piping, water meters, protective enclosures, and backflow preventers. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment, valves, and devices to allow service and maintenance.

C. Connect wiring between controllers and automatic control valves.

3.10 IDENTIFICATION

A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

B. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplates and signs on each automatic controller.

1. Text: In addition to identifying unit, distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.

C. Warning Tapes: Arrange for installation of continuous, underground, detectable warning tapes over underground piping during backfilling of trenches. See Section 312000 "Earth Moving" for warning tapes.

3.11 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Any irrigation product will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.12 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Verify that controllers are installed and connected according to the Contract Documents.
3. Verify that electrical wiring installation complies with manufacturer's submittal.

3.13 ADJUSTING

A. Adjust settings of controllers.

3.14 CLEANING

A. Flush dirt and debris from piping before installing sprinklers and other devices.

3.15 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain automatic control valves and controllers.

3.16 PIPING SCHEDULE

A. Install components having pressure rating equal to or greater than system operating pressure.

B. Piping in control-valve boxes and aboveground may be joined with flanges or unions instead of joints indicated.

C. Underground irrigation main piping, size per Drawings, shall be the following:

1. Schedule 40 PVC pipe and socket fittings, and solvent-cemented joints.

D. Circuit piping, size per Drawings, shall be the following:

1. Schedule 40, PVC pipe and socket fittings; and solvent-cemented joints.

E. Underground Branches and Offsets at Devices: Schedule 80, PVC pipe; threaded PVC fittings; and threaded joints.

1. Option: Plastic swing-joint assemblies, with offsets for flexible joints, manufactured for this application.

F. Drain piping shall be the following:

1. Schedule 40, PVC pipe and socket fittings; and solvent-cemented joints.

END OF SECTION 328400

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SECTION 329113 - SOIL PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes amended planting backfill mix (planting soil).

B. Related Requirements:

1. Section 129300 "Site Furnishings" for placing planting soil in exterior unit planters.
2. Section 311000 "Site Clearing" for topsoil stripping and stockpiling.
3. Section 329200 "Turf and Grasses" for placing planting soil for turf and grasses.
4. Section 329300 "Plants" for placing planting soil for plantings.

1.3 ALLOWANCES

A. Field quality-control testing is part of testing and inspecting allowance.

1.4 DEFINITIONS

A. AAPFCO: Association of American Plant Food Control Officials.

B. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended, or unamended soil as indicated.

C. CEC: Cation exchange capacity.

D. Organic Matter: The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."

E. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

F. SSSA: Soil Science Society of America.

G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

H. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

I. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.

J. USCC: U.S. Composting Council.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For each testing agency.

B. Preconstruction Test Reports: For preconstruction soil analyses specified in "Preconstruction Testing" Article.

C. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction soil analyses on existing, on-site soil.

1. Notify Architect seven days in advance of the dates and times when laboratory samples will be taken.

B. Preconstruction Soil Analyses: For each unamended soil type, perform testing on soil samples and furnish soil analysis and a written report containing soil-amendment and fertilizer recommendations by a qualified testing agency performing the testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.

1. Have testing agency identify and label samples and test reports according to sample collection and labeling requirements.

1.8 SOIL-SAMPLING REQUIREMENTS

A. General: Extract soil samples according to requirements in this article.

B. Sample Collection and Labeling: Have samples taken and labeled by Contractor in presence of Architect under the direction of the testing agency.

1. Number and Location of Samples: Minimum of three representative soil samples from varied locations.
2. Procedures and Depth of Samples: According to USDA-NRCS's "Field Book for Describing and Sampling Soils."
3. Division of Samples: Split each sample into two, equal parts. Send half to the testing agency and half to Owner for its records.
4. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.

1.9 TESTING REQUIREMENTS

A. General: Perform tests on soil samples according to requirements in this article.

B. Physical Testing:

1. Soil Texture: Soil-particle, size-distribution analysis by one of the following methods according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods":

    a. Sieving Method: Report sand-gradation percentages for very coarse, coarse, medium, fine, and very fine sand; and fragment-gradation (gravel) percentages for fine, medium, and coarse fragments; according to USDA sand and fragment sizes.
    b. Hydrometer Method: Report percentages of sand, silt, and clay.

2. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
3. Water Retention: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
4. Saturated Hydraulic Conductivity: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods"; at 85% compaction according to ASTM D 698 (Standard Proctor).

C. Chemical Testing:

1. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
2. Clay Mineralogy: Analysis and estimated percentage of expandable clay minerals using CEC by ammonium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 1- Physical and Mineralogical Methods."
3. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.
4. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.

D. Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of SSSA NAPT NCR-13, including the following:

1. Percentage of organic matter.
2. CEC, calcium percent of CEC, and magnesium percent of CEC.
3. Soil reaction (acidity/alkalinity pH value).
4. Buffered acidity or alkalinity.
5. Nitrogen ppm.
6. Phosphorous ppm.
7. Potassium ppm.
8. Manganese ppm.
9. Manganese-availability ppm.
10. Zinc ppm.
11. Zinc availability ppm.
12. Copper ppm.
13. Sodium ppm and sodium absorption ratio.
14. Soluble-salts ppm.
15. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.
16. Other deleterious materials, including their characteristics and content of each.

E. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."

F. Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients.

1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 sq. ft. for 6-inch depth of soil.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Do not move or handle materials when they are wet or frozen.
4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

PART 2 - PRODUCTS

2.1 AMENDED PLANTING BACKFILL MIX

A. Mix shall consist of ½ part ‘native’ site soil (no caliche in backfill) and ½ part humus mulch.

B. Humus mulch shall consist of natural fertile, friable soil. Mulch may contain additional soil amendments/fertilizers based on testing recommendations.

2.2 PLANTING SOILS SPECIFIED BY COMPOSITION

A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.

2.3 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through a No. 8 sieve and a minimum of 75 percent passing through a No. 60 sieve.
2. Class: O, with a minimum of 95 percent passing through a No. 8 sieve and a minimum of 55 percent passing through a No. 60 sieve.
3. Form: Provide lime in form of ground dolomitic limestone.

B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 sieve and a maximum of 10 percent passing through a No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Perlite: Horticultural perlite, soil amendment grade.

E. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 sieve.

F. Sand: Clean, washed, natural or manufactured, free of toxic materials, and according to ASTM C 33/C 33M.

2.4 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance.”

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture with 100 percent passing through a 1/2-inch sieve, a pH of 3.4 to 4.8, and a soluble-salt content measured by electrical conductivity of maximum 5 dS/m.

C. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

2.5 FERTILIZERS

A. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.

B. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

PART 3 - EXECUTION

3.1 GENERAL

A. Place planting soil and fertilizers according to requirements in other Specification Sections.

B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.

C. Proceed with placement only after unsatisfactory conditions have been corrected.

3.2 BLENDING PLANTING SOIL IN PLACE

A. General: Mix amendments with in-place, unamended soil to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Preparation: Till unamended, existing soil in planting areas to a minimum depth of 6 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

C. Mixing: Apply soil amendments and fertilizer, if required, evenly on surface, and thoroughly blend them into full depth of unamended, in-place soil to produce planting soil.

1. Mix fertilizer with planting soil no more than seven days before planting.

D. Compaction: Compact blended planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698 except where a different compaction value is indicated on Drawings.

E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.3 CLEANING

A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.

B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.

1. Dispose of excess subsoil and unsuitable materials on-site where directed by Owner.

END OF SECTION 329113

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SECTION 329200 - TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Hydroseeding.

B. Related Requirements:

1. Section 329300 "Plants" for trees, shrubs, ground covers, and other plants.

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

C. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

D. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation" drawing designations for planting soils.

E. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For landscape Installer.

B. Certification of Native Seed: From seed vendor for each mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

C. Product Certificates: For fertilizers, from manufacturer.

D. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of meadows during a calendar year. Submit before expiration of required maintenance periods.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful meadow establishment.

1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
2. Experience: Five years' experience in turf installation in addition to requirements in Section 014000 "Quality Requirements."
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
4. Personnel Certifications: Installer's **field supervisor** shall have certification in the following category from the Professional Landcare Network:

    a. Landscape Industry Certified Technician - Exterior.

5. Pesticide Applicator: State licensed, commercial.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

1.8 FIELD CONDITIONS

A. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be

obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 SEED

A. Native Seed: Fresh, clean, and dry new seed, of mixed species. Refer to Drawings for specific seed mix.

B. Seed Carrier: Inert material, sharp clean sand or perlite.

2.2 FERTILIZERS

A. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.3 MULCHES

A. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

B. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.

C. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

2.4 PESTICIDES

A. General: Pesticide, registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
3. Uniformly moisten excessively dry soil that is not workable or which is dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
2. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 SEEDED AREA PREPARATION

A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Soil Preparation."

B. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 HYDROSEEDING

A. Hydroseeding: Mix specified seed, slow-release fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Mix slurry with fiber-mulch manufacturer's recommended tackifier.

2. Spray-apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry coat at a rate so that mulch component is deposited at not less than 500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate. Apply slurry cover coat of fiber mulch (hydromulching) at a rate of 1000 lb/acre.

3.5 SEEDED AREA MAINTENANCE

A. Maintain and establish seeded area by watering, weeding, mowing, trimming, replanting, and performing other operations as required to establish a healthy, viable meadow. Roll, regrade, and replant bare or eroded areas and remulch. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and meadow damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply treatments as required to keep meadow and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Seeded areas will not be irrigated.

3.6 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents according to requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

3.7 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property.

C. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

3.8 MAINTENANCE SERVICE

A. Seeded Area Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in "Meadow Maintenance" Article. Begin maintenance immediately after each area is planted and continue until acceptable meadow is established, but for not less than maintenance period below.

1. Maintenance Period: 60 days from date of Substantial Completion.

END OF SECTION 329200

SECTION 329300 - PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Plants.
2. Tree stabilization.
3. Landscape edgings.

B. Related Requirements:

1. Section 329200 "Turf and Grasses" for turf (lawn) and meadow planting, hydroseeding, and erosion-control materials.
2. Section 329600 "Transplanting" for transplanting non-nursery-grown trees.

1.3 ALLOWANCES

A. Allowances for plants are specified in Section 012100 "Allowances."

1. Perform planting work under quantity allowances and only as authorized. Authorized work includes work required by Drawings and the Specifications and work authorized in writing by Architect.
2. Notify Architect weekly of extent of work performed that is attributable to quantity allowances.
3. Perform work that exceeds quantity allowances only as authorized by Change Orders.

1.4 UNIT PRICES

A. Work of this Section is affected by unit prices specified in Section 012200 "Unit Prices."

B. Unit prices apply to authorized work covered by quantity allowances.

C. Unit prices apply to additions to and deletions from the Work as authorized by Change Orders.

1.5 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

C. Finish Grade: Elevation of finished surface of planting soil.

D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.

E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

F. Planting Area: Areas to be planted.

G. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation" for drawing designations for planting soils.

H. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

I. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

J. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

K. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
2. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

B. Samples for Verification: For each of the following:
1. Edging Materials and Accessories: Manufacturer's standard size, to verify color selected.
2. Root Barrier: Width of panel by 12 inches.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.

B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:

1. Manufacturer's certified analysis of standard products.
2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

D. Sample Warranty: For special warranty.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of plants.

1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
2. Experience: Five years' experience in landscape installation in addition to requirements in Section 014000 "Quality Requirements."
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
4. Personnel Certifications: Installer's field supervisor shall have certification in at least one of the following categories from the Professional Landcare Network:

    a. Landscape Industry Certified Technician - Exterior.
    b. Landscape Industry Certified Interior.
    c. Landscape Industry Certified Horticultural Technician.

5. Pesticide Applicator: State licensed, commercial.

B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

1. Selection of plants purchased under allowances is made by Architect, who tags plants at their place of growth before they are prepared for transplanting.

C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip.
2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

D. Plant Material Observation: Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

1. Notify Architect of sources of planting materials seven days in advance of delivery to site.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

C. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

D. Handle planting stock by root ball.

E. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.

1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.

F. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

G. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1. Do not remove container-grown stock from containers before time of planting.
2. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

1.11 FIELD CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.12 WARRANTY

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.
b. Structural failures including plantings falling or blowing over.
c. Faulty performance of edgings.
d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Periods: From date of Substantial Completion.

a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.

3. Include the following remedial actions as a minimum:

a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
c. A limit of one replacement of each plant is required except for losses or replacements due to failure to comply with requirements.

d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inches in diameter; or with stem girdling roots are unacceptable.
2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

C. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant.

D. If formal arrangements or consecutive order of plants is indicated on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

2.2 FERTILIZERS

A. Planting Tablets: Tightly compressed chip-type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.

1. Size: 21-gram tablets.
2. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

2.3 PESTICIDES

A. General: Pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as

required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

2.4 TREE-STABILIZATION MATERIALS

A. Trunk-Stabilization Materials:

1. Upright Stakes: New pressure treated wood as indicated on Drawings, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated, pointed at one end.
2. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes.
3. Guys and Tie Wires: ASTM A 641/A 641M, Class 1, galvanized-steel wire, two-strand, twisted, 0.106 inch in diameter.

2.5 LANDSCAPE EDGINGS

A. Steel Edging: Standard commercial-steel edging, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Border Concepts, Inc.
    b. Collier Metal Specialties, Inc.
    c. Sure-loc Edging Corporation.

2. Edging Size: 3/16 inch thick by 4 inches deep.

3. Stakes: Tapered steel, a minimum of 15 inches long.
4. Accessories: Standard tapered ends, corners, and splicers.
5. Finish: Manufacturer's standard paint.

    a. Paint Color: Brown.

2.6 MISCELLANEOUS PRODUCTS

A. Wood Pressure-Preservative Treatment: AWPA U1, Use Category UC4a; acceptable to authorities having jurisdiction, and containing no arsenic or chromium.

B. Root Barrier: Black, molded, modular panels 24 inches high (deep), 85 mils thick, and with vertical root deflecting ribs protruding 3/4 inch out from panel surface; manufactured with minimum 50 percent recycled polyethylene plastic with UV inhibitors.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. DeepRoot Green Infrastructure, LLC.
    b. NDS Inc.
    c. Villa Root Barrier.

C. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.

D. Burlap: Non-synthetic, biodegradable.

E. Planter Drainage Gravel: Washed, sound crushed stone or gravel complying with ASTM D 448 for Size No. 8.

F. Planter Filter Fabric: Woven geotextile manufactured for separation applications and made of polypropylene, polyolefin, or polyester fibers or combination of them.

G. Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per lb of vesicular-arbuscular mycorrhizal fungi and 95 million spores per lb of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.
3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable or which is dusty.

B. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by planting operations.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.

D. Lay out plants at locations directed by Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

3.3 PLANTING AREA ESTABLISHMENT

A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Soil Preparation."

B. Placing Planting Soil: Place and mix planting soil in-place over exposed subgrade.

C. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

D. Application of Mycorrhizal Fungi: At time directed by Architect, broadcast dry product uniformly over prepared soil at application rate according to manufacturer's written recommendations.

3.4 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits.

1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
2. Excavate approximately three times as wide as ball diameter for container-grown stock.
3. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
4. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
5. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
6. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
7. Maintain supervision of excavations during working hours.

8. Keep excavations covered or otherwise protected after working hours.

B. Backfill Soil: Subsoil and topsoil removed from excavations may be used as backfill soil unless otherwise indicated.

C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

1. Hardpan Layer: Drill 6-inch- diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.

D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, AND VINE PLANTING

A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

1. Backfill: For trees, use excavated soil for backfill.
2. Carefully remove root ball from container without damaging root ball or plant.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets equally distributed around each planting pit when pit is approximately one-half filled. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.

a. Quantity: Three for each caliper inch of plant.

5. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 TREE, SHRUB, AND VINE PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape.

B. Prune, thin, and shape trees, shrubs, and vines as directed by Architect.

C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

D. Do not apply pruning paint to wounds.

3.7 TREE STABILIZATION

A. Trunk Stabilization by Upright Staking and Tying: Install trunk stabilization as follows unless otherwise indicated:

1. Upright Staking and Tying: Stake trees of 2- through 5-inch caliper. Stake trees of less than 2-inch caliper only as required to prevent wind tip out. Use a minimum of two stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend to the dimension indicated on Drawings above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
2. Upright Staking and Tying: Stake trees with two stakes for trees up to 12 feet high and 2-1/2 inches or less in caliper; three stakes for trees less than 14 feet high and up to 4 inches in caliper. Space stakes equally around trees.
3. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
4. Support trees with two strands of tie wire indicated on Drawings. Allow enough slack to avoid rigid restraint of tree.

3.8 ROOT-BARRIER INSTALLATION

A. Install root barrier where trees are planted within 60 inches of paving or other hardscape elements, such as walls, curbs, and walkways, unless otherwise indicated on Drawings.

B. Align root barrier with bottom edge angled at 20 degrees away from the paving or other hardscape element, and run it linearly along and adjacent to the paving or other hardscape elements to be protected from invasive roots.

C. Install root barrier continuously for a distance of 60 inches in each direction from the tree trunk, for a total distance of 10 feet per tree. If trees are spaced closer, use a single continuous piece of root barrier.

1. Position top of root barrier according to manufacturer's written recommendations.
2. Overlap root barrier a minimum of 12 inches at joints.
3. Do not distort or bend root barrier during construction activities.
4. Do not install root barrier surrounding the root ball of tree.

3.9 PLACING SOIL IN PLANTERS

A. Place a layer of drainage gravel at least 4 inches thick in bottom of planter. Cover bottom with filter fabric and wrap filter fabric 6 inches up on all sides. Duct tape along the entire top edge of the filter fabric, to secure the filter fabric against the sides during the soil-filling process.

B. Fill planter with planting soil per plans. Place soil in lightly compacted layers to an elevation of 1-1/2 inches below top of planter, allowing natural settlement.

3.10 GROUND COVER AND PLANT PLANTING

A. Use planting soil per plans for backfill.

B. Dig holes large enough to allow spreading of roots.

C. For rooted cutting plants supplied in flats, plant each in a manner that minimally disturbs the root system but to a depth not less than two nodes.

D. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

E. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

F. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.11 EDGING INSTALLATION

A. Steel Edging: Install steel edging where indicated according to manufacturer's written instructions. Anchor with steel stakes spaced approximately 30 inches apart, driven below top elevation of edging.

3.12 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.

B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.13 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Pre-Emergent Herbicides (Selective and Nonselective): Apply to tree, shrub, and ground-cover areas according to manufacturer's written recommendations. Do not apply to seeded areas.

C. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.14 REPAIR AND REPLACEMENT

A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Architect.

1. Submit details of proposed pruning and repairs.
2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.

B. Remove and replace trees that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.

1. Provide new trees of same size as those being replaced for each tree.
2. Species of Replacement Trees: Species selected by Architect.

3.15 CLEANING AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

D. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

E. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

3.16 MAINTENANCE SERVICE

A. Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:

1. Maintenance Period: 12 months from date of Substantial Completion.

B. Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:

1. Maintenance Period: 12 months from date of Substantial Completion.

END OF SECTION 329300

SECTION 334100 - STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1. Pima Association of Governments (PAG), Standard Specifications for Public Improvements, 2015 Edition, Volume 1, http://apps.pagnet.org/standardspecifications, if more stringent than herein specified.

1.2 SUMMARY

A. Section Includes:

1. Pipe and fittings.
2. Nonpressure transition couplings.
3. Pressure pipe couplings.
4. Expansion joints and deflection fittings.
5. Backwater valves.
6. Cleanouts.
7. Drains.
8. Encasement for piping.
9. Manholes.
10. Channel drainage systems.
11. Catch basins.
12. Stormwater inlets.
13. Stormwater detention structures.
14. Pipe outlets.
15. Dry wells.
16. Stormwater disposal systems.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Catch basins and stormwater inlets. Include plans, elevations, sections, details, frames, covers, and grates.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic manholes, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle manholes according to manufacturer's written rigging instructions.

D. Handle catch basins and stormwater inlets according to manufacturer's written rigging instructions.

PART 2 - PRODUCTS

2.1 POLYPROPYLENE PIPE AND FITTINGS

A. Polypropylene drainage pipe:

1. Polypropylene dual and triple wall high performance gasketed integral bell and spigot drainage pipe, fittings, couplings, and ends 12 inches in diameter to 30 inches in diameter shall conform to the requirements of ASTM F2736 and AASHTO M330.
2. Gaskets shall conform to the requirements of ASTM F477.
3. Polypropylene pipe joints shall be watertight and shall conform to the requirements of ASTM D 3212.
4. A water stop designed for polypropylene pipe shall be used at all connections to concrete structures. Water stop shall meet the physical properties of ASTM C923. Expanding sealants or ASTM F477 gasket supplied with the pipe to make the bell spigot connection on pipe and fittings does NOT meet these requirements for polypropylene pipe. Installation of water stops shall be per manufacturer recommendations.

2.2 PVC PIPE AND FITTINGS

A. PVC Gravity Sewer Piping:

1. Pipe and Fitting materials shall conform to the requirements of PAG Standard Specifications.

2.3 NONPRESSURE TRANSITION COUPLINGS

A. Sleeve and coupling materials shall conform to the requirements of PAG Standard Specifications.

2.4 CLEANOUTS

A. Cleanouts materials shall conform to the requirements of PAG Standard Specifications.

2.5 DRAINS

A. Area and trench drains shall conform to the requirements of PAG Standard Specifications.

2.6 ENCASEMENT FOR PIPING

A. Material shall conform to the requirements of PAG Standard Specifications.

2.7 CONCRETE

A. Cast-in-place concrete shall conform to the requirements of PAG Standard Specifications.

2.8 CATCH BASINS

A. Standard Precast Concrete Catch Basins shall conform to the requirements of PAG Standard Specifications.

2.9 STORMWATER INLETS

A. Stormwater Inlets shall conform to the requirements of PAG Standard Specifications and project plans.

2.10 PIPE OUTLETS

A. Head Walls: Cast-in-place reinforced concrete, with apron and tapered sides shall conform to the requirements of PAG Standard Specifications and project plans.

B. Riprap Aprons: Rock shall be sound and durable, free from clay or shale seams, cracks or other structural defects conforming to the requirements of PAG Standard Specifications.

1. Color: Coronado brown, or approved equal.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

A. Install pipe according to PAG construction requirements.

3.3 PIPE JOINT CONSTRUCTION

A. Install joints according to PAG construction requirements.

3.4 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from pipes according to PAG construction requirements.

3.5 DRAIN INSTALLATION

A. Install type of drains in locations indicated according to PAG construction requirements.

3.6 CATCH BASIN INSTALLATION

A. Construct catch basins to sizes and shapes indicated according to PAG construction requirements.

3.7 STORMWATER INLET AND OUTLET INSTALLATION

A. Construct inlet head walls, aprons, and sides of reinforced concrete, as indicated according to PAG construction requirements.

B. Construct riprap according to PAG construction requirements.

C. Install outlets that spill onto grade, anchored with concrete, where indicated.

D. Install outlets that spill onto grade, with flared end sections that match pipe, where indicated.

E. Construct energy dissipaters at outlets, as indicated.

3.8 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to PAG construction requirements.

3.9 CHANNEL DRAINAGE SYSTEM INSTALLATION

A. Assemble channel sections to form slope down toward drain outlets. Use sealants, adhesives, fasteners, and other materials recommended by system manufacturer.

B. Embed channel sections and drainage specialties in concrete per manufacturer recommendations.

C. Fasten grates to channel sections if indicated.

D. Assemble channel sections with flanged or interlocking joints.

3.10 CONNECTIONS

A. Connect nonpressure, gravity-flow drainage piping in building's storm building drains specified in Section 221413 "Facility Storm Drainage Piping."

B. Pipe couplings, expansion joints, and deflection fittings shall be watertight and shall conform to the requirements of ASTM D 3212.

3.11 IDENTIFICATION

A. Materials and their installation are specified in Section 312000 "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.

1. Use identification measures according to PAG construction requirements.

3.12 FIELD QUALITY CONTROL

A. Inspect and test according to PAG construction requirements.

3.13 CLEANING

A. Clean interior of piping of dirt and superfluous materials according to PAG construction requirements.

END OF SECTION 334100

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APPENDIX A

PASCUA YAQUI TRIBE
HEALTH SERVICES CENTER II

Geotechnical Engineering Report

PYT – Health Services Center II

Tucson, Arizona

June 12, 2018

Terracon Project No.63185041

Prepared for:

Swaim Associates, Ltd.

Tucson, AZ

Prepared by:

Terracon Consultants, Inc.

Tucson, Arizona

terracon.com

Environmental ■ Facilities ■ Geotechnical ■ Materials

June 12, 2018

Swaim Associates, Ltd.
7350 East Speedway Blvd., Suite 210
Tucson, AZ 85710

Attn: Mr. Kevin Barber, AIA
P: (520) 326.3700
E: kbarber@swaimaia.com

Re: **Geotechnical Engineering Report**
PYT – Health Services Center II
Southeast Corner of South Camino De Oeste and West Tetakusim Road
Tucson, Arizona
Terracon Project No.63185041

Dear Mr. Barber:

We have completed the Geotechnical Engineering services for the proposed Pascua Yaqui Tribe (PYT) Health Services Center II to be located in Tucson, Arizona. This study was performed in general accordance with Terracon Proposal No. P63185041 dated April 10, 2018. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations, floor slabs and pavements for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

Louis D. Braun, P.E.
Project Engineer

Donald R. Clark, P.E.
Senior Principal

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Note: This report was originally delivered in a web-based format. **Orange Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the Terracon GeoReport logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

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REPORT SUMMARY

Topic [1]	Overview Statement [2]
Project Description	The project will include a single-story Health Center with an approximate footprint of 101,000 square feet and a single-story warehouse building with an approximate footprint of 3,000 square feet. Max. Column loads: 60 kips, Max. Wall loads: 4 kips per lineal foot Little excavation other than for foundation construction is anticipated Expected traffic for pavement areas: ■ Autos/Light Trucks Drives and Parking Areas: 7,000 ESALs ■ Truck Parking: 27,000 ESALs ■ Truck Drives: 110,000 ESALs
Geotechnical Characterization	Primarily medium dense to very dense clayey sand to a depth of approximately 21 feet Groundwater was not encountered
Earthwork	Existing on-site soils are considered suitable for use as engineered fill
Shallow Foundations	Shallow foundations supported on engineered are recommended for support of the proposed buildings Expected settlements: < 1 inch total, < ½ inch differential Foundations should be supported on a minimum of 3 feet of engineered fill as noted in **Earthwork**
Pavements	With subgrade prepared as noted in **Earthwork** Concrete: ■ 5” PCC in Autos/Light Trucks Drives and Parking Areas ■ 6” PCC in Truck Parking ■ 7” PCC in Truck Drives Asphalt: ■ 2.5” AC over 4” ABC in Autos/Light Trucks Drives and Parking Areas ■ 3.0” AC over 6” ABC in Truck Parking ■ 4.5” AC over 6” ABC in Truck Drives
General Comments	This section contains important information about the limitations of this geotechnical engineering report.

1. If the reader is reviewing this report as a pdf, the topics above can be used to access the appropriate section of the report by simply clicking on the topic itself.
2. This summary is for convenience only. It should be used in conjunction with the entire report for design purposes.

Geotechnical Engineering Report

PYT – Health Services Center II
Southeast Corner of South Camino De Oeste and West Tetakusim Road
Tucson, Arizona

Terracon Project No.63185041
June 12, 2018

INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed Pascua Yaqui Tribe (PYT) Health Services Center II to be located at Southeast Corner of South Camino De Oeste and West Tetakusim Road in Tucson, Arizona. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Pavement design and construction
- Foundation design and construction
- Floor slab design and construction
- Seismic site classification per IBC
- Lateral earth pressures

The geotechnical engineering scope of services for this project included the advancement of ten (10) test borings to depths ranging from approximately 6½ to 21 feet below existing site grades.

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. Logs of the borings, and the results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs and as separate graphs in the **Exploration Results** section of this report.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located on the Pascua Yaqui Tribe property at the Southeast Corner of South Camino De Oeste and West Tetakusim Road in Tucson, Arizona. See **Site Location**
Section, Township, Range	The project site is located in the northwest corner of Section 19, Township 15S, Range 13E (Gila and Salt River Base Line and Meridian)
Existing Improvements	The site is currently undeveloped
Current Ground Cover	The site is moderately vegetated.
Existing Topography	The site slopes slightly down towards the northeast.
Site Geology (Basin and Range)	The project area is located in the Basin and Range physiographic province ([1]Cooley, 1967) of the North American Cordillera ([2]Stern, et al, 1979) of the southwestern United States. The southern portion of the Basin and Range province is situated along the southwestern flank of the Colorado Plateau and is bounded by the Sierra Nevada Mountains to the west. Formed during middle and late Tertiary time (100 to 15 m.y. ago), the Basin and Range province is dominated by fault controlled topography. The topography consists of mountain ranges and relatively flat alluviated valleys. These mountain ranges and valleys have evolved from generally complex movements and associated erosional and depositional processes. Structurally, the site lies within the Tucson Basin. Drainage flows to the Santa Cruz River during late Tertiary time, coupled with structural activity discussed above, are generally responsible for the present-day topography within the basin. Typically, the ranges in this area are of small areal extent, but protrude significantly above adjacent wide alluviated plains and valleys. The basin rims are formed by the mountain ranges which consist of sedimentary, igneous and metamorphic materials which have been subjected to recurrent faulting and tilting, and in some places volcanic and intrusive events. As a result of erosion, the valleys have experienced partial infilling with sedimentary material which has been deposited as alluvial fans. Occasionally, the valleys may become interlocking as a result of coalescing alluvial fans which are referred to as bajadas.

[1]*Cooley, M.E., 1967,* ***Arizona Highway Geologic Map****, Arizona Geological Society.*

[2]*Stern, C.W., et al, 1979,* ***Geological Evolution of North America****, John Wiley & Sons, Santa Barbara, California.*

Item	Description
Site Specific Geologic Conditions	**Q: Quaternary Surficial deposits, undivided,** Unconsolidated to strongly consolidated alluvial and eolian deposits. This unit includes: coarse, poorly sorted alluvial fan and terrace deposits on middle and upper piedmonts and along large drainages; sand, silt and clay on alluvial plains and playas; and wind-blown sand deposits. (0 - 2 Ma)

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed in the project planning stage. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Proposed Structures	Based on the information provided, we understand the project will include one single-story Health Services Center building with an approximate footprint of 101,000 square feet and one single-story warehouse building with an approximate footprint of 3,000 square feet.
Building Construction	The Health Services Center building will include a steel-framed superstructure with wood roof framing. The warehouse will be a steel-framed structure. We anticipate these structures will be supported on reinforced concrete foundations and shallow spread footings.
Maximum Loads	■ Columns: 60 kips ■ Walls: 4 kips per linear foot (klf) ■ Slabs: 150 pounds per square foot (psf)
Grading/Slopes	The site is relatively flat; therefore, grading operations across the site are anticipated to include relatively minor amounts of cuts and fills.
Pavements	On-site drives and parking area pavements for automobile and truck traffic are anticipated to consist of asphalt concrete and Portland cement concrete. The following are the anticipated design equivalent single axle loads (ESALs) for the on-site pavements: Autos/Light Trucks Drives and Parking Areas: 7,000 ESALs Truck Parking: 27,000 ESALs Truck Drives: 110,000 ESALs The pavement design period is 20 years

EXPLORATION AND TESTING PROCEDURES

Field Exploration

A total of 10 borings were drilled at the site. The approximate boring locations are shown on the Exploration Plan (Exhibit A-2) and are summarized in the following table:

Number of Borings	Boring Depth (feet)	Planned Location
8	15½ to 21	Buildings
2	6½	Pavement

Boring Layout and Elevations: Terracon personnel provide the boring layout. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about ±10 feet).

Subsurface Exploration Procedures: The borings were advanced with a truck-mounted CME-75, rotary drill rig using continuous 7-inch diameter hollow stem flight augers. A continuous lithologic log of each boring was recorded by the field engineer during the drilling operations. At selected intervals, samples of the subsurface materials were taken by driving split-spoon (SPT) or ring-lined barrel samplers. Bulk samples of subsurface materials were also obtained from auger cuttings.

In the split-spoon sampling procedure, the number of blows required to advance a standard 2-inch O.D. split-barrel-sampler the last 12 inches of the typical total 18-inch penetration by means of a 140-pound C.M.E. auto-hammer with a free fall of 30 inches, is the standard penetration resistance value (SPT-N). A similar sampling procedure is used to advance a 3-inch O.D. split-barrel, ring-lined, sampler a total of 12 inches. This value is used to estimate the in-situ relative density of cohesionless soils and consistency of cohesive soils.

The sampling depths, penetration distances, and other sampling information were recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a geotechnical engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs include visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. The final boring logs were prepared from the field logs. The final boring logs represent the geotechnical engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned various laboratory tests to better understand the engineering properties of the various soil strata as necessary for this project. The laboratory testing program included examination of the soil samples by the geotechnical engineer. Based on the material's texture and plasticity, the soil samples were classified in accordance with the Unified Soil Classification System.

Procedural standards for the laboratory testing program noted below are for reference to methodology in general. In some cases, variations to methods are applied because of local

practice or professional judgment. Standards noted below include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D422 Standard Test Method for Particle-Size Analysis of Soils
- ASTM D2435/D2435M Standard Test Methods for One-Dimensional Consolidation Properties of Soils Using Incremental Loading
- ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))
- ASTM D516 Standard Test Method for Sulfate Ion in Water

GEOTECHNICAL CHARACTERIZATION

Subsurface Profile

We have developed a general characterization of the subsurface soil and groundwater conditions based upon our review of the data and our understanding of the geologic setting and planned construction. The following table provides our geotechnical characterization of the site based on the results of the subsurface exploration and the results of the laboratory testing.

The geotechnical characterization forms the basis of our geotechnical engineering evaluation and the development of our engineering recommendations for site preparation, foundation options and pavement options. As noted in **General Comments**, the characterization is based upon widely spaced exploration points across the site, and variations are likely.

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/Density
1	21	Clayey Sand	Medium Dense to Very Dense, with relative density generally increasing with depth

Laboratory tests were conducted on selected soil samples and the test results are presented in the **Exploration Results**. Results of the laboratory testing indicate the near surface clayey sand soils exhibit medium plasticity characteristics. These materials are classified as SC according to the Unified Soil Classification System.

The results of the laboratory testing indicate the near surface undisturbed native soils at approximate foundation depth exhibit significant potential for compressibility and slight to significant potential for hydro-compaction when elevated in moisture content. Hydro-compactive soils, sometimes referred to as collapsible soils, are capable of supporting typical building loads at natural moisture contents, these same materials however, undergo volume decrease (settlement/consolidation) when subjected to increases in moisture content under constant load.

When water was added to a sample of laboratory compacted surface soils, the compacted soils exhibited low expansive potential when subjected to light loading conditions such as those imposed by floor slabs.

Groundwater Conditions

Groundwater was not observed in the test boring at the time of field exploration. These observations represent groundwater conditions at the time of the field exploration and may not be indicative of other times, or at other locations. Groundwater conditions can change with varying seasonal and weather conditions, and other factors.

Based on information obtained from the Arizona Department of Water Resources – Groundwater Data website (http://gisweb2.azwater.gov/gwsi), the depth to groundwater was measured in 2016 to be approximately 130 feet below the ground surface (approximate elevation of 2462 feet above mean sea level) at an Arizona Department of Water Resources (ADWR) monitored well site located 2¼ miles to the east of the site.

GEOTECHNICAL OVERVIEW

Based on the information obtained from our subsurface exploration, the site is considered suitable for development of the proposed project provided the geotechnical engineering recommendations included in this report are implemented in the design and construction of the project. The following geotechnical considerations were identified:

- The near surface site soils consist of clayey sands with trace amounts of gravel. Laboratory consolidation/compression testing on relatively undisturbed samples indicate the near surface soils exhibit significant compression and slight to significant hydro-compaction (collapse) potentials. Remolded swell testing indicated a low expansive potential of on-site soils when compacted at moisture contents below optimum with light loading conditions such as those imposed by floor slabs.

- Due to the presence of soils with variable strength properties, we recommend the proposed buildings and related structural elements be founded on shallow spread footings

supported on a minimum of 3 feet of engineered fill. The on-site native soils consisting of clean granular materials are considered suitable for use as engineered fill beneath proposed foundations, interior and exterior slabs.

- In floor slab areas, subgrade soils should be scarified to a minimum depth of 10 inches, moisture conditioned and recompacted.

- The recommended pavement section for automobile parking areas is a minimum of 2½ inches of asphalt concrete over a minimum of 4 inches of aggregate base course. The recommended pavement section for truck parking is a minimum of 3 inches of asphalt concrete over a minimum of 6 inches of aggregate base course. The recommended pavement section for truck drives is a minimum of 4½ inches of asphalt concrete over a minimum of 6 inches of aggregate base course.

- Estimated movements/settlements described in this report are based on effective drainage for the life of the building and cannot be relied upon if effective drainage is not maintained. Exposed ground, extending at least 10 feet from the perimeter, should be sloped a minimum of 5% away from the building to provide positive drainage away from the structure. Grades around the structure should be periodically inspected and adjusted as part of the maintenance program for the facility.

The **General Comments** section provides an understanding of the report limitations.

EARTHWORK

The following recommendations include site preparation, excavation, subgrade preparation and placement of engineered fills on the project. The recommendations presented for design and construction of earth supported elements including foundations, slabs and pavements are contingent upon following the recommendations outlined in this section. All grading should incorporate the limits of the proposed structure plus a minimum pad extension of five feet beyond proposed perimeter building walls and any exterior columns.

Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during the construction of the project.

Site Preparation

Strip and remove vegetation, debris, and other deleterious materials from the proposed building areas. Exposed surfaces should be free of mounds and depressions which could prevent uniform compaction. The site should be initially graded to create a relatively level surface to receive fill, and provide for a relatively uniform thickness of fill beneath the proposed building and related structures.

Although evidence of fill or underground facilities such as septic tanks, cesspools, and basements, was not observed during the site reconnaissance, such features may be encountered during construction. If any unexpected underground facilities are encountered, such features should be removed and the excavation thoroughly cleaned prior to backfill placement and/or construction.

Excavation

It is anticipated that excavations for the proposed construction can be accomplished with conventional earthmoving equipment.

The individual contractor(s) is responsible for designing and constructing stable, temporary excavations as required to maintain stability of both the excavation sides and bottoms. Excavations should be sloped or shored in the interest of safety following local and federal regulations, including current OSHA excavation and trench safety standards.

Subgrade Preparation

Due to the variable engineering characteristics of the near surface soils, foundations should be supported on engineered fill as follows:

Building/Structure	Depth of Fill Below Footings	Lateral Extent of Fill Beyond the Edges of Footings
Column and Wall Footings	A minimum of 36 inches below footings, or a minimum of 36 inches below original grade, whichever is deeper.	A minimum of 24 inches.

If engineered fill is placed beneath an entire building, it should extend horizontally a minimum distance of 5 feet beyond the outside edge of perimeter footings.

Exposed areas which will receive fill, once properly cleared and benched where necessary, should be scarified to a minimum depth of 10 inches, moisture conditioned, and compacted per the compaction requirements as stated below.

Fill Material Types

All fill materials should be inorganic soils free of vegetation, debris, and fragments larger than 6 inches in size. Pea gravel or other similar non-cementatious, poorly-graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer.

Clean on-site or existing fill soils or approved imported materials may be used as fill material for the following:

- general site grading
- foundation areas
- interior floor slab areas
- foundation backfill
- pavement areas
- exterior slab areas

Imported soils (if required) for use as fill material within proposed building and structure areas should conform to low volume change materials as indicated in the following specifications:

Gradation	Percent Finer by Weight (ASTM C 136)
6"	100
3"	70-100
No. 4 Sieve	50-100
No. 200 Sieve	50 (max)
Liquid Limit	30 (max)
Plasticity Index	15 (max)
Maximum expansive potential (%)*	1.5

*Measured on a sample compacted to approximately 95 percent of the ASTM D698 maximum dry density at about 3 percent below optimum water content. The sample is confined under a 100 psf surcharge and submerged/inundated.

Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift. Fill lifts should not exceed 10 inches loose thickness.

Fill Compaction Requirements

Recommended compaction and moisture content criteria for engineered fill materials are as follows:

Material Type and Location	Per the Standard Proctor Test (ASTM D 698)		
	Minimum Compaction Requirement (%)	Range of Moisture Contents for Compaction	
		Minimum	Maximum
On-site granular or approved imported fill soils:			
Beneath foundations	95	-3%	+3%
Beneath Slabs	95	-1%	+3%
Beneath Asphalt Pavements	95	-3%	+3%
Beneath Concrete Pavements	95	-3%	+3%
For Fills Greater than 5 feet Below Finished Grade	98	-3%	+3%
Aggregate Base (beneath slabs)	95	-3%	+3%
Aggregate base (beneath pavements)	100	-3%	+3%
Miscellaneous backfill	95	-3%	+3%

Utility Trench Backfill

Utility trenches are a common source of water infiltration and migration. Utility trenches penetrating beneath the building should be effectively sealed to restrict water intrusion and flow through the trenches, which could migrate below the building. The utility trenches should be provided with an effective trench plug that extends at least 5 feet from the face of the building exterior. The plug material should consist of cementitious flowable fill or low permeability clay. The trench plug material should be placed to surround the utility line. If used, the clay trench plug material should be placed and compacted to comply with the water content and compaction recommendations for engineered fill previously outlined in this report.

Grading and Drainage

Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of slabs and pavements. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over, or adjacent to, construction areas should be removed. If the subgrade desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted, prior to floor slab construction.

All finished grades must provide effective drainage away from each building during and after construction and should be maintained throughout the life of the structure. Water retained next to the buildings can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements,

cracked slabs and walls, and roof leaks. Planters and other surface features which could retain water in areas adjacent to the building or pavements should be sealed or eliminated

In areas where sidewalks or paving do not immediately adjoin a structure, we recommend that protective slopes be provided with a minimum grade of approximately five percent for at least 10 feet from perimeter walls. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. Where paving or flatwork abuts the structure a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Downspouts, roof drains or scuppers should discharge into splash blocks or extensions when the ground surface beneath such features is not protected by exterior slabs or paving. Sprinkler systems should not be installed within five feet of foundation walls. Landscaped irrigation adjacent to the foundation systems should be minimized or eliminated.

After building construction and landscaping, final grades should be verified to document effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted as necessary as part of the structure's maintenance program.

Construction Observation and Testing

All earthwork completed on the project should be monitored under the direction of the Geotechnical Engineer. Monitoring should include documentation of adequate removal of vegetation and top soil, proof-rolling and mitigation of areas delineated by the proof-roll to require mitigation.

In areas of foundation excavations, the bearing subgrade should be evaluated under the direction of the Geotechnical Engineer. In the event that unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

Each lift of compacted fill should be tested, evaluated, and reworked as necessary until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. One density and water content test for every 50 linear feet of compacted utility trench backfill.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

SHALLOW FOUNDATIONS

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations.

Design Parameters – Spread Footings for Compressive Loads

Design Item	Description/Recommendation		
Foundation Type	Conventional shallow spread footing foundation.		
Structures	The proposed buildings and any retaining walls		
Bearing Material	Engineered fill within the geometric configurations as described in the **Earthwork** Section of this report.		
Allowable Bearing Pressure	2,500 psf	3,250 psf	4,000 psf
Minimum footing embedment depth below finished grade	18 inches	24 inches	30 inches
Minimum Footing Dimensions	Columns: 24 inches Walls: 18 inches		
Total Estimated Settlement	1 inch		
Estimated Differential Settlement	Approximately 2/3 the total settlement		

Finished grade is defined as the lowest adjacent grade within five feet of the foundation for perimeter (or exterior) footings and finished floor level for interior footings. The allowable foundation bearing pressures apply to dead loads plus design live load conditions. The design bearing pressures may be increased by one-third when considering total loads that include wind or seismic conditions. The weight of the foundation concrete below grade may be neglected in dead load computations.

Footings and foundations should be reinforced as necessary to reduce the potential for distress caused by differential foundation movement. The use of joints at openings or other discontinuities in masonry walls is recommended.

Foundation Construction Considerations

As noted in **Earthwork**, the footing excavations should be evaluated under the direction of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete.

Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively

wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7.

Description	Value
2012/2015 ASCE 7 Site Classification [1]	D[2]
Site Latitude	32.11399°N
Site Longitude	111.06113°W
S_S Spectral Acceleration for a Short Period [3]	0.272g
S_1 Spectral Acceleration for a 1-Second Period [3]	0.077g
F_a Site Coefficient for a Short Period	2.583
F_v Site Coefficient for a 1-Second Period	2.400

1. The site is classified in accordance with Chapter 20 of ASCE 7 as required by the 2012 International Building Code.
2. ASCE 7 requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100-foot soil profile determination. Borings extended to a maximum depth of 21 feet, and this seismic site class definition considers that very dense soil continues below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration.
3. These values were obtained using online seismic design maps and tools provided by the USGS (http://earthquake.usgs.gov/hazards/designmaps/).

FLOOR SLABS

Construction of floor slabs directly on undisturbed soils or compacted fills composed of on-site soils are considered acceptable for the project. Design parameters for floor slabs assume the requirements for **Earthwork** have been followed. Specific attention should be given to positive drainage away from the structure.

Floor Slab Design Parameters

Item	Description
Floor Slab Support [1]	A minimum of 10-inches of scarified and recompacted native soil subgrade materials or engineered fill soils placed and compacted in accordance with the **Earthwork** section of this report. Floor slabs should be supported on a minimum of 4 inches of ABC placed directly on prepared subgrade soils or engineered fills.[3]
Subbase	A minimum of 4-inches of Aggregate Base Course (ABC) materials.[3]
Estimated Modulus of Subgrade Reaction [2]	250 pounds per square inch per inch (psi/in)

1. Floor slabs should be structurally independent of building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation.
2. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in **Earthwork**, and the floor slab support as noted in this table. It is provided for point loads. For large area loads the modulus of subgrade reaction would be lower.
3. Aggregate Base Course should meet the material and compaction requirements outlined in the **Earthwork** section of this report.

The near surface on-site soils near the building are medium plastic clayey sands, and these soils are expected to exhibit low expansive potential when compacted and subjected to light loading conditions such as those imposed by floor slabs. Construction of floor slabs directly on compacted engineered fills composed of on-site soils or approved imported soils are considered acceptable for the project, provided that the soils are moisture conditioned and compacted as outlined in the **Earthwork** section of this report.

Positive separations and/or isolation joints should be provided between slabs and all foundations, columns or utility lines to allow independent movement. Interior trench backfill placed beneath slabs should be compacted in accordance with recommendations outlined in the Earthwork section of this report. Other design and construction considerations, as outlined in the ACI Design Manual, Section 302.1R are recommended.

Saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or cracks should be sealed with a water-proof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the

length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

The use of a vapor retarder or barrier should be considered beneath concrete slabs on grade that will be covered with wood, tile, carpet or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer and slab contractor should refer to ACI 302 and ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder/barrier.

Floor Slab Construction Considerations

Some differential movement of a slab-on-grade floor system is possible should the subgrade soils become elevated in moisture content. Such movements are anticipated to be within general tolerance for normal slab-on-grade construction. To reduce potential slab movements, the subgrade soils should be prepared as outlined in the **Earthwork** section of this report.

Finished subgrade within and for at least 10 feet beyond the floor slab should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed and structural fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should approve the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

LATERAL EARTH PRESSURES

Design Parameters

The following lateral earth pressure parameters are presented for use in the design of foundations and retaining walls at the site. These values are based on using the on-site soils as fill and backfill material.

For soils above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements are:

Earth Pressure Design Case[1]	Design Recommendation[2,4]
Active Case (Ka)	45 psf/ft
Passive Case (Kp)	345 psf/ft
At-Rest Case(Ko)	65 psf/ft
Coefficient of Base Friction	0.45[3]

1. For active earth pressure, wall must rotate about base, with top lateral movements 0.002 H to 0.004 H, where H is wall height. For passive earth pressure, wall must move horizontally to mobilize resistance.
2. The design values are based on utilizing on-site soils as backfill placed and compacted as outlined in the Earthwork section of this report. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors.
3. The coefficient of base sliding should be reduced to 0.30 when used in conjunction with passive pressure.
4. The lateral earth pressures herein do not include any factor of safety, they assume drained conditions, and they are not applicable for submerged soils/hydrostatic loading. Additional recommendations may be necessary if such conditions are to be included in the design.

PAVEMENTS

General Pavement Comments

Pavement designs are provided for the traffic conditions and pavement life conditions as noted in **Project Description** and in the following sections of this report. A critical aspect of pavement performance is site preparation. Pavement designs, noted in this section, must be applied to the site, which has been prepared as recommended in the **Earthwork** section.

Pavement Design Parameters

Design of Asphaltic Concrete (AC) pavements are based on the procedures outlined in the National Asphalt Pavement Association (NAPA) Information Series 109 (IS-109). These design procedures are specific to low-volume (low traffic) pavements such as those that will be constructed at this site. Design of Portland Cement Concrete (PCC) pavements are based upon American Concrete Institute (ACI) 330R-01; Guide for Design and Construction of Concrete Parking Lots.

The design of the recommended pavement sections was based on the following NAPA criteria:

- Traffic Class I for the auto/light truck drives and parking areas includes a maximum of 7,000 Equivalent Single 18-kip Axle Loads (ESAL's) over the design life of the pavement
- Traffic Class II for the truck parking areas includes a maximum of 27,000 ESAL's over the design life of the pavement

- Traffic Class III for the truck dives includes a maximum of 110,000 ESAL's over the design life of the pavement
- A soil characterization of "medium" based on the clayey sand subgrade soils encountered at the site and expected at pavement subgrade elevation
- A pavement design life of 20 years

Pavement Section Thicknesses

Pavement sections based upon a more detailed pavement design could be provided if specific traffic loading, frequencies, and desired pavement design life are provided. As a minimum, we suggest the following typical pavement sections be considered:

Traffic Area	Alternative	Recommended Pavement Section Thickness (inches) [2]			
		Asphalt Concrete Surface	Portland Cement Concrete[1]	Aggregate Base Course	Total
Automobile Drives Parking Areas	A	2½	---	4	6½
	B	---	5	4	9
Truck Parking Areas	A	3	---	6	9
	B	---	6	4	9½
Truck Drives	A	4½	---	6	10½
	B	4	---	8	12
	C	---	7	4	11

1. Rigid concrete pavement, a minimum of 6 inches in thickness, is recommended at the location of dumpsters where trash trucks will park and load
2. These pavement sections are considered minimal sections based upon the expected traffic and the existing subgrade conditions. However, they are expected to function with periodic maintenance and overlays if good drainage is provided and maintained.

Pavement Construction Considerations

Materials and construction of pavements for the project should be in accordance with the requirements and specifications of the Pima Association of Governments (PAG)[3].

[3] *Pima Association of Governments (PAG) 2015,* ***Standard Specifications for Public Improvements****.*

Base course or pavement materials should not be placed when the surface is wet. Surface drainage should be provided away from the edge of paved areas to minimize lateral moisture transmission into the subgrade.

All concrete for rigid pavements should have a minimum 28-day compressive strength of 4,000 psi, and be placed with a maximum slump of four inches. Although not required for structural support, a minimum four-inch thick base course layer is recommended beneath concrete pavements to help reduce potentials for slab curl, shrinkage cracking, and subgrade "pumping" through joints. Proper joint spacing will also be required to prevent excessive slab curling and shrinkage cracking. PCC pavement details for joint spacing, joint reinforcement, and joint sealing should be prepared in accordance with American Concrete Institute (ACI 330R-01 and ACI 325R.9-91). All joints should be sealed to prevent entry of foreign material and dowelled where necessary for load transfer.

Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Maintenance consists of both localized maintenance (e.g. crack and joint sealing and patching) and global maintenance (e.g. surface sealing). Preventive maintenance is usually the priority when implementing a pavement maintenance program. Additional engineering observation is recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

- Final grade adjacent to paved areas should slope down from the edges at a minimum 2%.
- Subgrade and pavement surfaces should have a minimum 2% slope to promote proper surface drainage.
- Install joint sealant and seal cracks immediately.
- Seal all landscaped areas in or adjacent to pavements to reduce moisture migration to subgrade soils.
- Place compacted, low permeability backfill against the exterior side of curb and gutter.
- Place curb, gutter and/or sidewalk directly on subgrade soils rather than on unbound granular base course materials.

CORROSIVITY

Results of soluble sulfate testing indicate that ASTM Type I/II portland cement is suitable for all concrete on and below grade. Foundation concrete should be designed for negligible sulfate exposure in accordance with the provisions of the ACI Design Manual, Section 318, Chapter 4.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in the final report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

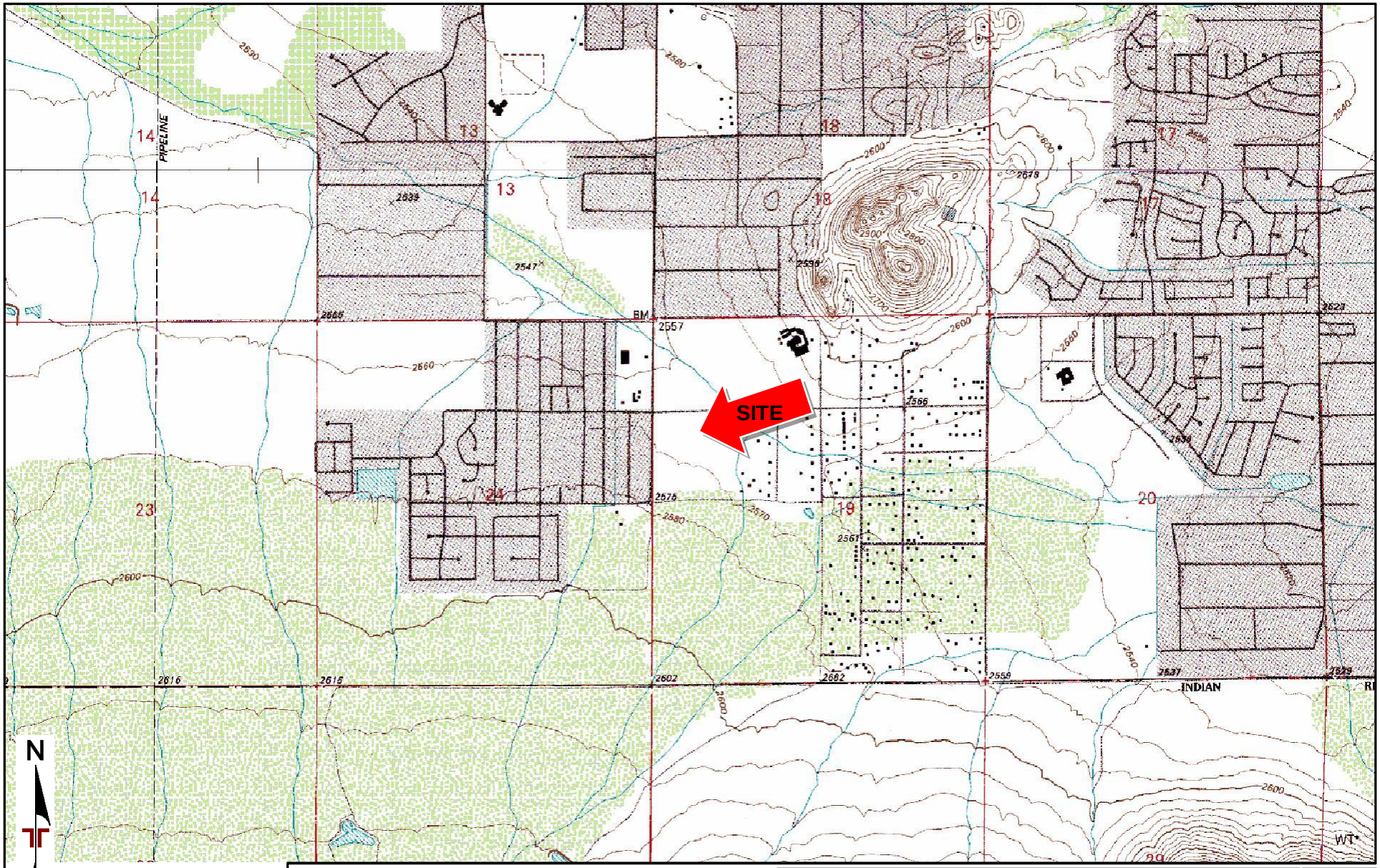
Our scope of services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

ATTACHMENTS

SITE LOCATION AND EXPLORATION PLANS



TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY QUADRANGLES INCLUDE: CAT MOUNTAIN, AZ (1/1/1996) and SAN XAVIER MISSION, AZ (1/1/1992).

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Manager:	LDB
Drawn by:	LDB
Checked by:	DRC
Approved by:	DRC

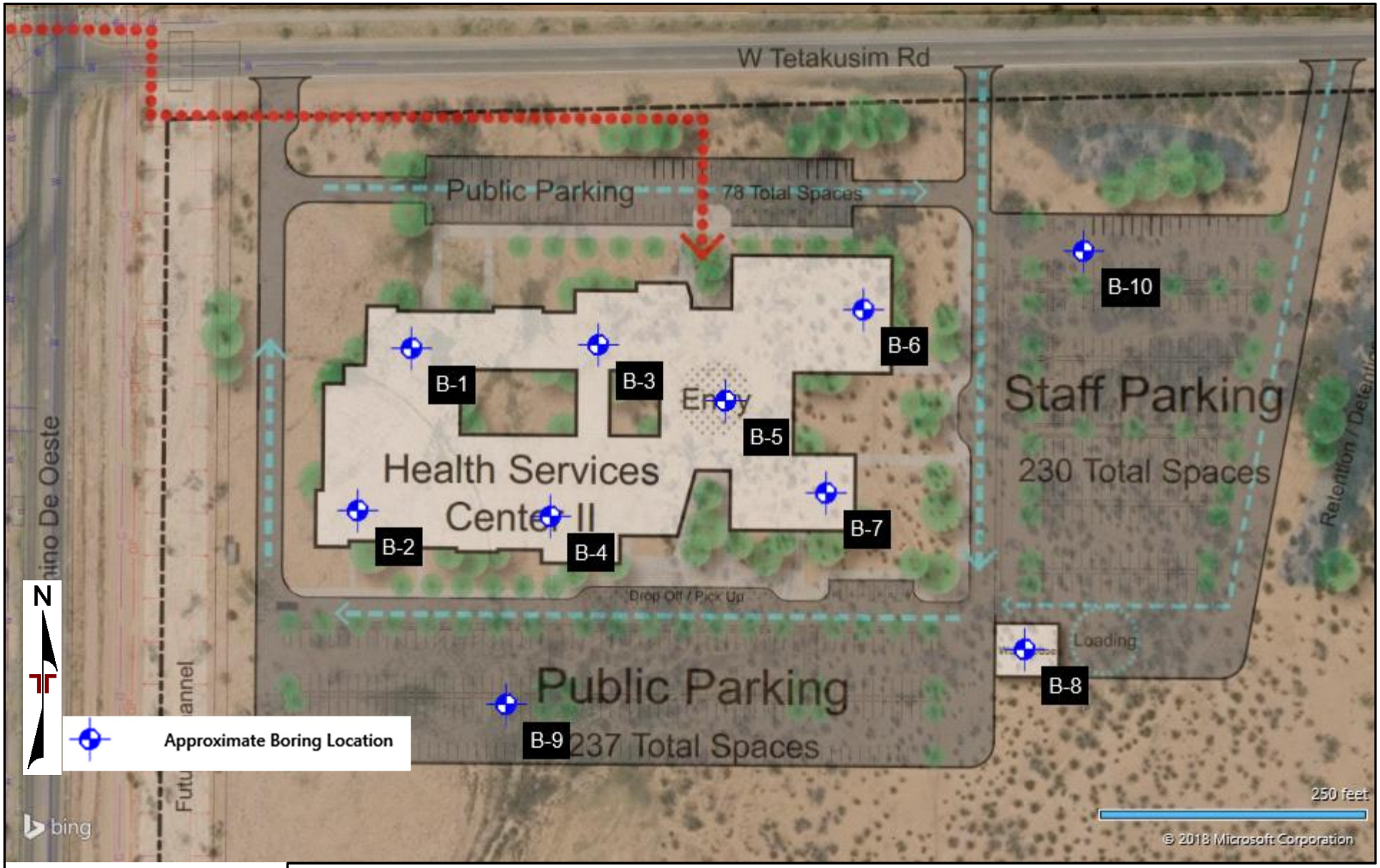
Project No.	63185041
Scale:	1"=2,000'
File Name:	63185041
Date:	05/2018

Terracon
355 S Euclid Ave, Ste 107
Tucson, AZ 85719-6654

SITE LOCATION

PYT - Health Services Center II
SEC of S Camino De Oeste and W Tetakusim Rd
Tucson, AZ

Exhibit
A-1



AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Manager:	LDB
Drawn by:	LDB
Checked by:	DRC
Approved by:	DRC

Project No.	63185041
Scale:	AS SHOWN
File Name:	63185041
Date:	05/2018

Terracon
355 S Euclid Ave, Ste 107
Tucson, AZ 85719-6654

EXPLORATION PLAN

PYT - Health Services Center II

SEC of S Camino De Oeste and W Tetakusim Rd
Tucson, AZ

Exhibit

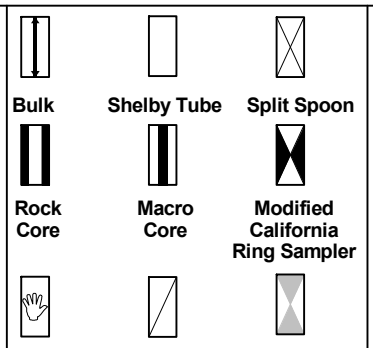
A-2

EXPLORATION RESULTS

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING



WATER LEVEL



- Water Initially Encountered
- Water Level After a Specified Period of Time
- Water Level After a Specified Period of Time

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

(HP)	Hand Penetrometer
(T)	Torvane
(b/f)	Standard Penetration Test (blows per foot)
N	N value
(PID)	Photo-Ionization Detector
(OVA)	Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.			CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength, Qu, psf**	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**
Very Loose	0 - 3	0 - 6	Very Soft	less than 500	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	500 to 1,000	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium-Stiff	1,000 to 2,000	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	2,000 to 4,000	8 - 15	10 - 18
Very Dense	> 50	≥ 99	Very Stiff	4,000 to 8,000	15 - 30	19 - 42
			Hard	> 8,000	> 30	> 42

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F,G,H]
			Fines classify as CL or CH		GC	Clayey gravel [F,G,H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G,H,I]
			Fines classify as CL or CH		SC	Clayey sand [G,H,I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A" line [J]		CL	Lean clay [K,L,M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K,L,M,N]
			Liquid limit - not dried			Organic silt [K,L,M,O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K,L,M]
			PI plots below "A" line		MH	Elastic Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K,L,M,P]
			Liquid limit - not dried			Organic silt [K,L,M,Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

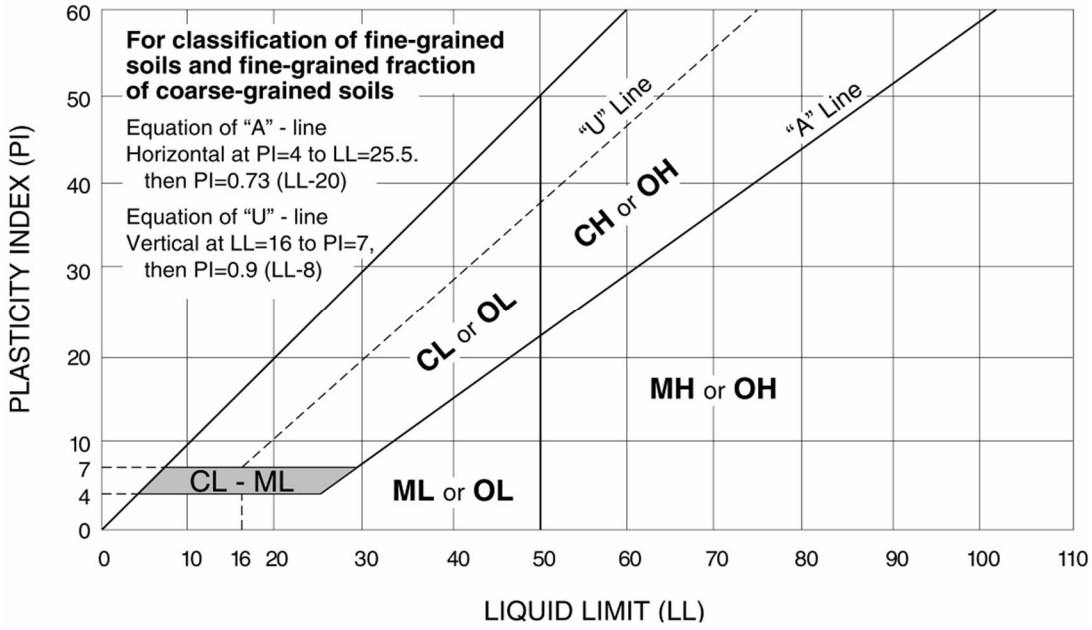
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



Terracon

Exhibit A-4

BORING LOG NO. B-01

PROJECT: PYT - Health Services Center II

CLIENT: Swaim Associates
Tucson, AZ

SITE: SEC of S Camino De Oeste and
W Tetakusim Rd Tucson, Arizona

LOCATION See Exhibit A-2

Latitude: 32.1146° Longitude: -111.0623°

Approximate Surface Elev: 2565 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
CLAYEY SAND (SC), trace gravel, brown, loose, no cementation								
				9-9	5	96	35-19-16	36
medium dense, weak cementation		5		7-15	7	93		
				10-27	9	92		
dense		10		23-47	9	89		
moderate cementation		15		43-50/3"				
16.0	2549+/-							
Boring Terminated at 16 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix A for explanation of symbols and abbreviations.
Elevations were interpolated from Google Earth.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
355 S Euclid Ave, Ste 107
Tucson, AZ

Boring Started: 05-18-2018 | Boring Completed: 05-18-2018

Drill Rig: CME 75 | Driller: Southlands

Project No.: 63185041 | Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/5/18

BORING LOG NO. B-02

PROJECT: PYT - Health Services Center II

CLIENT: Swaim Associates
Tucson, AZ

SITE: SEC of S Camino De Oeste and
W Tetakusim Rd Tucson, Arizona

LOCATION See Exhibit A-2

Latitude: 32.1142° Longitude: -111.0624°

Approximate Surface Elev: 2566 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0		**CLAYEY SAND (SC)**, trace gravel, light brown, dense, moderate cementation				
		24-40	7	95		
5		31-42	7	96		
		23-46	4	102		
10		very dense, moderate cementation 22-36-50/5"				
15		18-50/5"				
20		36-50/4"				
21.0	2545+/-	***Boring Terminated at 21 Feet***				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix A for explanation of symbols and abbreviations.

Elevations were interpolated from Google Earth.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
355 S Euclid Ave, Ste 107
Tucson, AZ

Boring Started: 05-18-2018 | Boring Completed: 05-18-2018

Drill Rig: CME 75 | Driller: Southlands

Project No.: 63185041 | Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/5/18

BORING LOG NO. B-03

PROJECT: PYT - Health Services Center II

CLIENT: Swaim Associates
Tucson, AZ

SITE: SEC of S Camino De Oeste and
W Tetakusim Rd Tucson, Arizona

LOCATION See Exhibit A-2

Latitude: 32.1147° Longitude: -111.0616°

Approximate Surface Elev: 2565 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), trace gravel, brown, medium dense, weak cementation							
				12-13	4	98		
		5		9-25	7	98		
	dense, moderate cementation			29-50/5"				
		10		27-50				
	very dense, moderate cementation							
15.5	2549.5+/-	15		50/5"				
	Boring Terminated at 15.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix A for explanation of symbols and abbreviations.
Elevations were interpolated from Google Earth.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
355 S Euclid Ave, Ste 107
Tucson, AZ

Boring Started: 05-18-2018 | Boring Completed: 05-18-2018

Drill Rig: CME 75 | Driller: Southlands

Project No.: 63185041 | Exhibit: A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/5/18

BORING LOG NO. B-04

PROJECT: PYT - Health Services Center II

CLIENT: Swaim Associates
Tucson, AZ

SITE: SEC of S Camino De Oeste and
W Tetakusim Rd Tucson, Arizona

LOCATION See Exhibit A-2

Latitude: 32.1142° Longitude: -111.0617°

Approximate Surface Elev: 2566 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
CLAYEY SAND (SC), trace gravel, light brown to brown, medium dense, weak cementation					11-20	5	102		
		5			17-40				
dense, moderate cementation					20-50/5"				
very dense, moderate cementation		10			16-29-50 N=79				
		15			16-46-50/4"				
16.5	2549.5+/-								
Boring Terminated at 16.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix A for explanation of symbols and abbreviations.
Elevations were interpolated from Google Earth.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
355 S Euclid Ave, Ste 107
Tucson, AZ

Boring Started: 05-18-2018 | Boring Completed: 05-18-2018

Drill Rig: CME 75 | Driller: Southlands

Project No.: 63185041 | Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/5/18

BORING LOG NO. B-05

PROJECT: PYT - Health Services Center II

CLIENT: Swaim Associates
Tucson, AZ

SITE: SEC of S Camino De Oeste and
W Tetakusim Rd Tucson, Arizona

LOCATION See Exhibit A-2

Latitude: 32.1145° Longitude: -111.0612°

Approximate Surface Elev: 2565 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), trace gravel, light brown to brown, medium dense, weak cementation							
				11-16	5	96		
		5						
				17-28	5	99		
	dense, moderate cementation			24-50/5"				
		10		18-23-20 N=43				
	very dense, moderate cementation	15		32-50/4"				
16.0	2549+/-							
	Boring Terminated at 16 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix A for explanation of symbols and abbreviations.
Elevations were interpolated from Google Earth.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
355 S Euclid Ave, Ste 107
Tucson, AZ

Boring Started: 05-18-2018 | Boring Completed: 05-18-2018

Drill Rig: CME 75 | Driller: Southlands

Project No.: 63185041 | Exhibit: A-9

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/5/18

BORING LOG NO. B-06

PROJECT: PYT - Health Services Center II

CLIENT: Swaim Associates
Tucson, AZ

SITE: SEC of S Camino De Oeste and
W Tetakusim Rd Tucson, Arizona

LOCATION See Exhibit A-2

Latitude: 32.1148° Longitude: -111.0606°

Approximate Surface Elev: 2565 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0		**CLAYEY SAND (SC)**, trace gravel, brown, medium dense, weak cementation				
3.5		10-19	7	96	34-21-13	44
5		dense, moderate cementation				
5		26-38	6	99		
8		28-42	7	96		
10		very dense, moderate cementation				
10		17-46-21 N=67				
15		37-50/4"				
20		18-50/5"				
21.0	2544+/-	***Boring Terminated at 21 Feet***				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix A for explanation of symbols and abbreviations.

Elevations were interpolated from Google Earth.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
355 S Euclid Ave, Ste 107
Tucson, AZ

Boring Started: 05-18-2018 | Boring Completed: 05-18-2018

Drill Rig: CME 75 | Driller: Southlands

Project No.: 63185041 | Exhibit: A-10

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/5/18

BORING LOG NO. B-07

PROJECT: PYT - Health Services Center II

CLIENT: Swaim Associates
Tucson, AZ

SITE: SEC of S Camino De Oeste and
W Tetakusim Rd Tucson, Arizona

LOCATION See Exhibit A-2

Latitude: 32.1143° Longitude: -111.0608°

Approximate Surface Elev: 2566 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
CLAYEY SAND (SC), trace gravel, light brown, medium dense, weak cementation										
						16-26	5	97		
			5							
						16-28	5	96		
dense, moderate cementation						26-50/5"				
very dense, moderate cementation			10			16-28-42 N=70				
15.5	2550.5+/-		15			50/5"				
Boring Terminated at 15.5 Feet										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix A for explanation of symbols and abbreviations.
Elevations were interpolated from Google Earth.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
355 S Euclid Ave, Ste 107
Tucson, AZ

Boring Started: 05-18-2018 | Boring Completed: 05-18-2018

Drill Rig: CME 75 | Driller: Southlands

Project No.: 63185041 | Exhibit: A-11

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/5/18

BORING LOG NO. B-08

PROJECT: PYT - Health Services Center II

CLIENT: Swaim Associates
Tucson, AZ

SITE: SEC of S Camino De Oeste and
W Tetakusim Rd Tucson, Arizona

LOCATION See Exhibit A-2

Latitude: 32.114° Longitude: -111.0602°

Approximate Surface Elev: 2567 (Ft.) +/-

DEPTH	ELEVATION (Ft.)	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
CLAYEY SAND (SC), trace gravel, brown, medium dense, weak cementation										
						13-18	5	97		
			5			18-26	6	95		
						16-42	9	93		
very dense, moderate cementation			10			26-42-30 N=72				
15.5	2551.5+/-		15			50/5"				
Boring Terminated at 15.5 Feet										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix A for explanation of symbols and abbreviations.
Elevations were interpolated from Google Earth.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
355 S Euclid Ave, Ste 107
Tucson, AZ

Boring Started: 05-18-2018 | Boring Completed: 05-18-2018

Drill Rig: CME 75 | Driller: Southlands

Project No.: 63185041 | Exhibit: A-12

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/5/18

BORING LOG NO. B-09

PROJECT: PYT - Health Services Center II

CLIENT: Swaim Associates
Tucson, AZ

SITE: SEC of S Camino De Oeste and
W Tetakusim Rd Tucson, Arizona

LOCATION See Exhibit A-2

Latitude: 32.1136° Longitude: -111.0619°

Approximate Surface Elev: 2567 (Ft.) +/-

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), trace gravel, brown, dense, moderate cementation								26-17-9	34
			5			14-17-24 N=41				
	6.5	2560.5+/-								
	Boring Terminated at 6.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix A for explanation of symbols and abbreviations.

Elevations were interpolated from Google Earth.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
355 S Euclid Ave, Ste 107
Tucson, AZ

Boring Started: 05-18-2018 | Boring Completed: 05-18-2018

Drill Rig: CME 75 | Driller: Southlands

Project No.: 63185041 | Exhibit: A-13

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/5/18

BORING LOG NO. B-10

PROJECT: PYT - Health Services Center II

CLIENT: Swaim Associates
Tucson, AZ

SITE: SEC of S Camino De Oeste and
W Tetakusim Rd Tucson, Arizona

LOCATION See Exhibit A-2

Latitude: 32.1149° Longitude: -111.06°

Approximate Surface Elev: 2565 (Ft.) +/-

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), trace gravel, brown, dense, moderate cementation									
			5			14-18-19 N=37				
	6.5	2558.5+/-								
	Boring Terminated at 6.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix A for explanation of symbols and abbreviations.

Elevations were interpolated from Google Earth.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
355 S Euclid Ave, Ste 107
Tucson, AZ

Boring Started: 05-18-2018 | Boring Completed: 05-18-2018

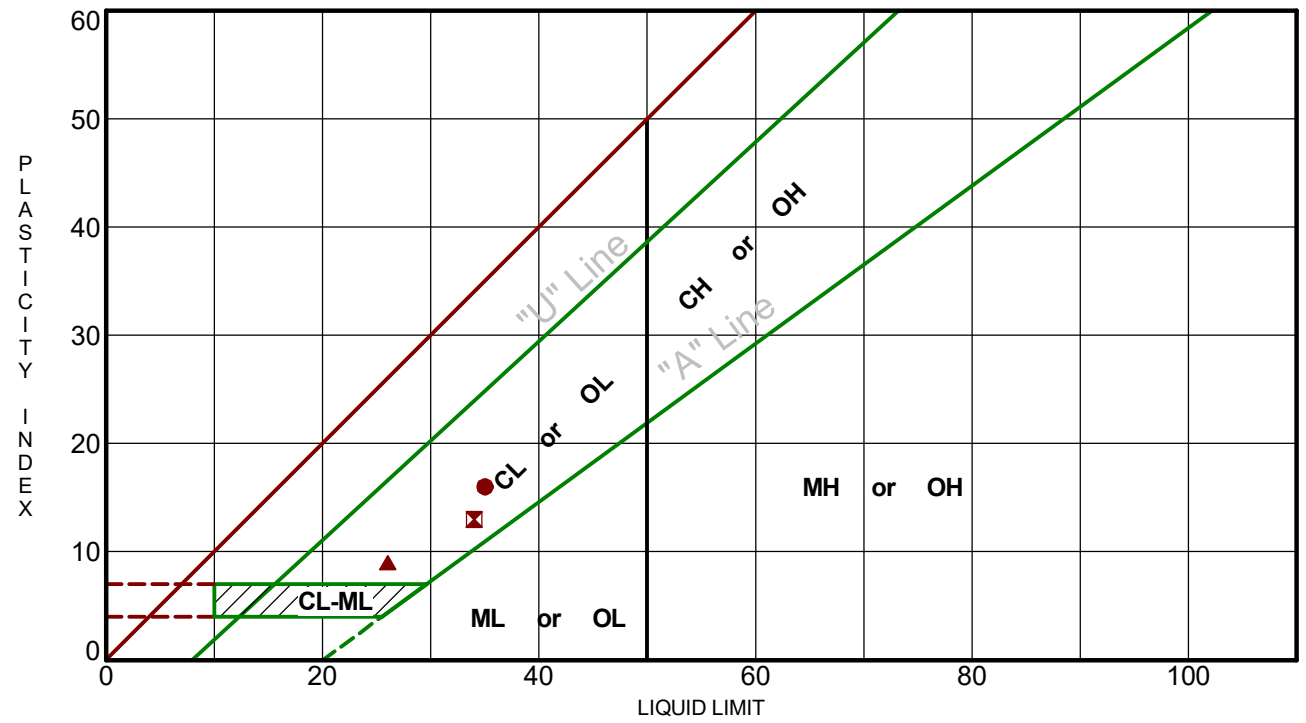
Drill Rig: CME 75 | Driller: Southlands

Project No.: 63185041 | Exhibit: A-14

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/5/18

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID	Depth	LL	PL	PI	Fines	USCS	Description
● B-01	0 - 5	35	19	16	36	SC	CLAYEY SAND
⊠ B-06	0 - 5	34	21	13	44	SC	CLAYEY SAND
▲ B-09	0 - 5	26	17	9	34	SC	CLAYEY SAND

PROJECT: PYT - Health Services Center II

SITE: SEC of S Camino De Oeste and W Tetakusim Rd Tucson, Arizona

Terracon
355 S Euclid Ave, Ste 107
Tucson, AZ

PROJECT NUMBER: 63185041

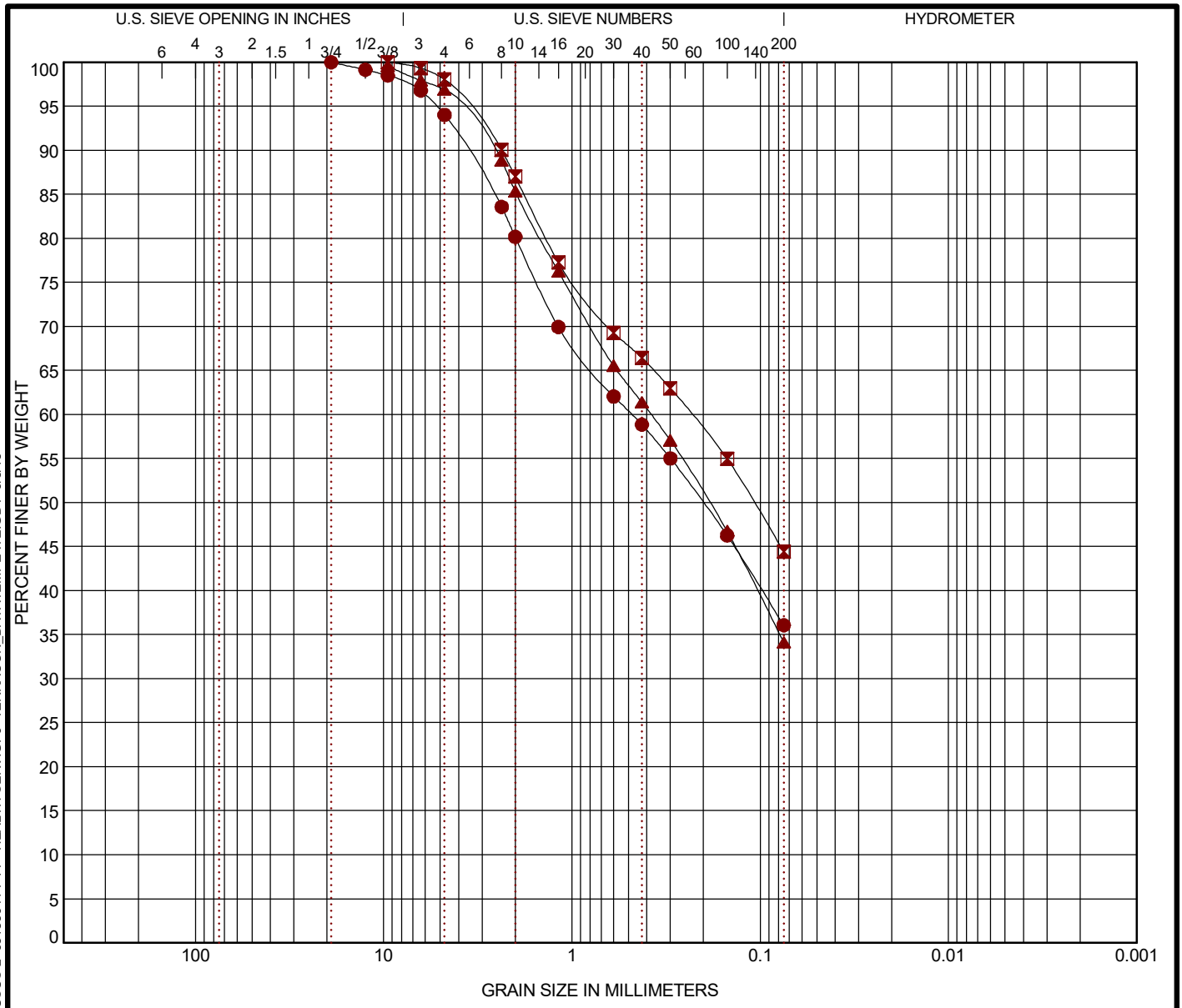
CLIENT: Swaim Associates
Tucson, AZ

EXHIBIT: B-1

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/5/18

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-01	0 - 5	CLAYEY SAND (SC)		35	19	16		
⊠	B-06	0 - 5	CLAYEY SAND (SC)		34	21	13		
▲	B-09	0 - 5	CLAYEY SAND (SC)		26	17	9		

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-01	0 - 5	19	0.481			6.0	58.0		36.1	
⊠	B-06	0 - 5	9.5	0.232			1.9	53.6		44.4	
▲	B-09	0 - 5	9.5	0.38			2.7	62.8		34.1	

PROJECT: PYT - Health Services Center II

SITE: SEC of S Camino De Oeste and W Tetakusim Rd Tucson, Arizona

Terracon
355 S Euclid Ave, Ste 107
Tucson, AZ

PROJECT NUMBER: 63185041

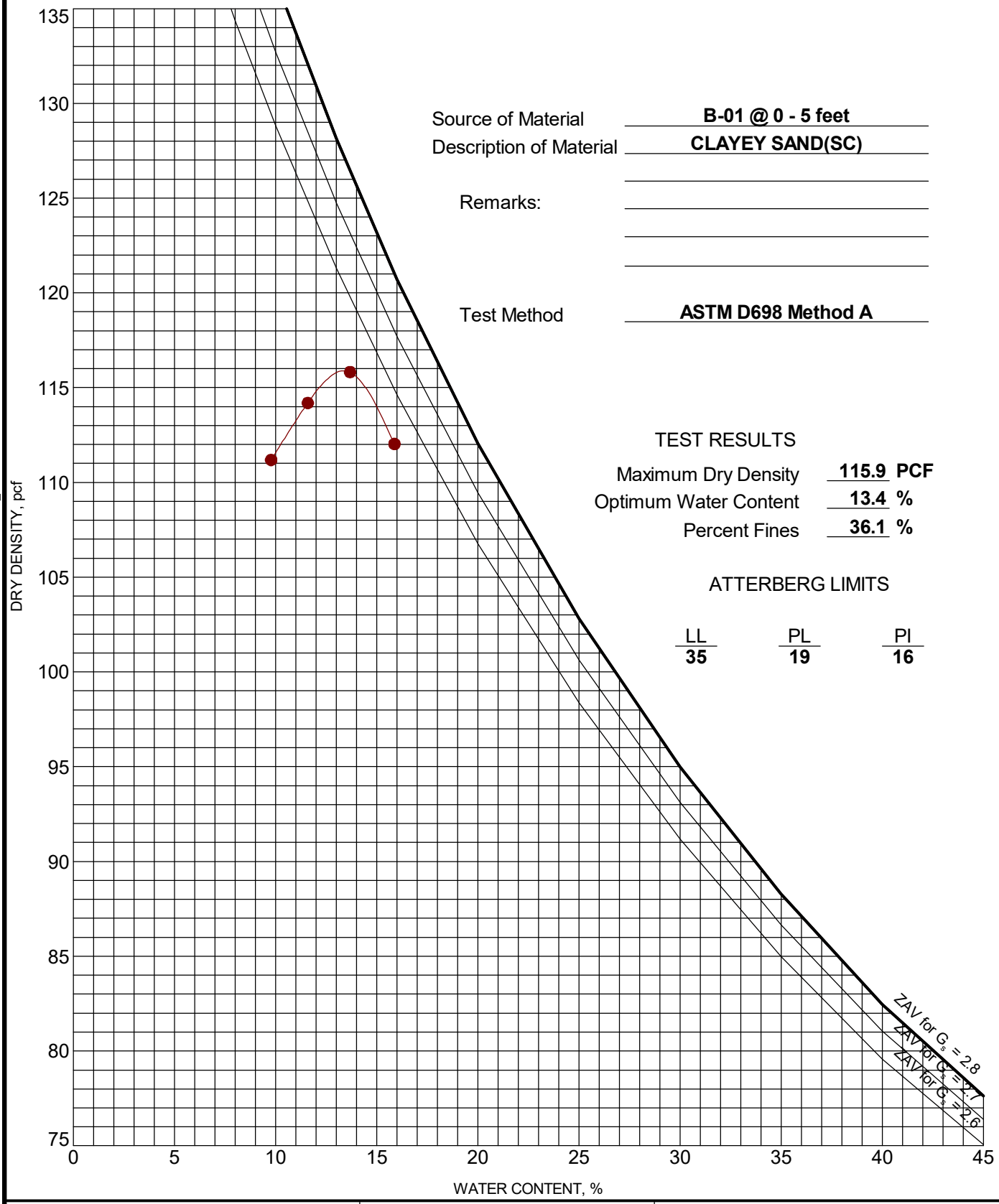
CLIENT: Swaim Associates
Tucson, AZ

EXHIBIT: B-2

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GRAIN SIZE: USCS-2 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/5/18

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: **B-01 @ 0 - 5 feet**

Description of Material: **CLAYEY SAND(SC)**

Remarks:

Test Method: **ASTM D698 Method A**

TEST RESULTS

Maximum Dry Density	**115.9**	**PCF**
Optimum Water Content	**13.4**	**%**
Percent Fines	**36.1**	**%**

ATTERBERG LIMITS

LL	PL	PI
35	**19**	**16**

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V2 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/5/18

PROJECT: PYT - Health Services Center II

SITE: SEC of S Camino De Oeste and W Tetakusim Rd Tucson, Arizona

Terracon
355 S Euclid Ave, Ste 107
Tucson, AZ

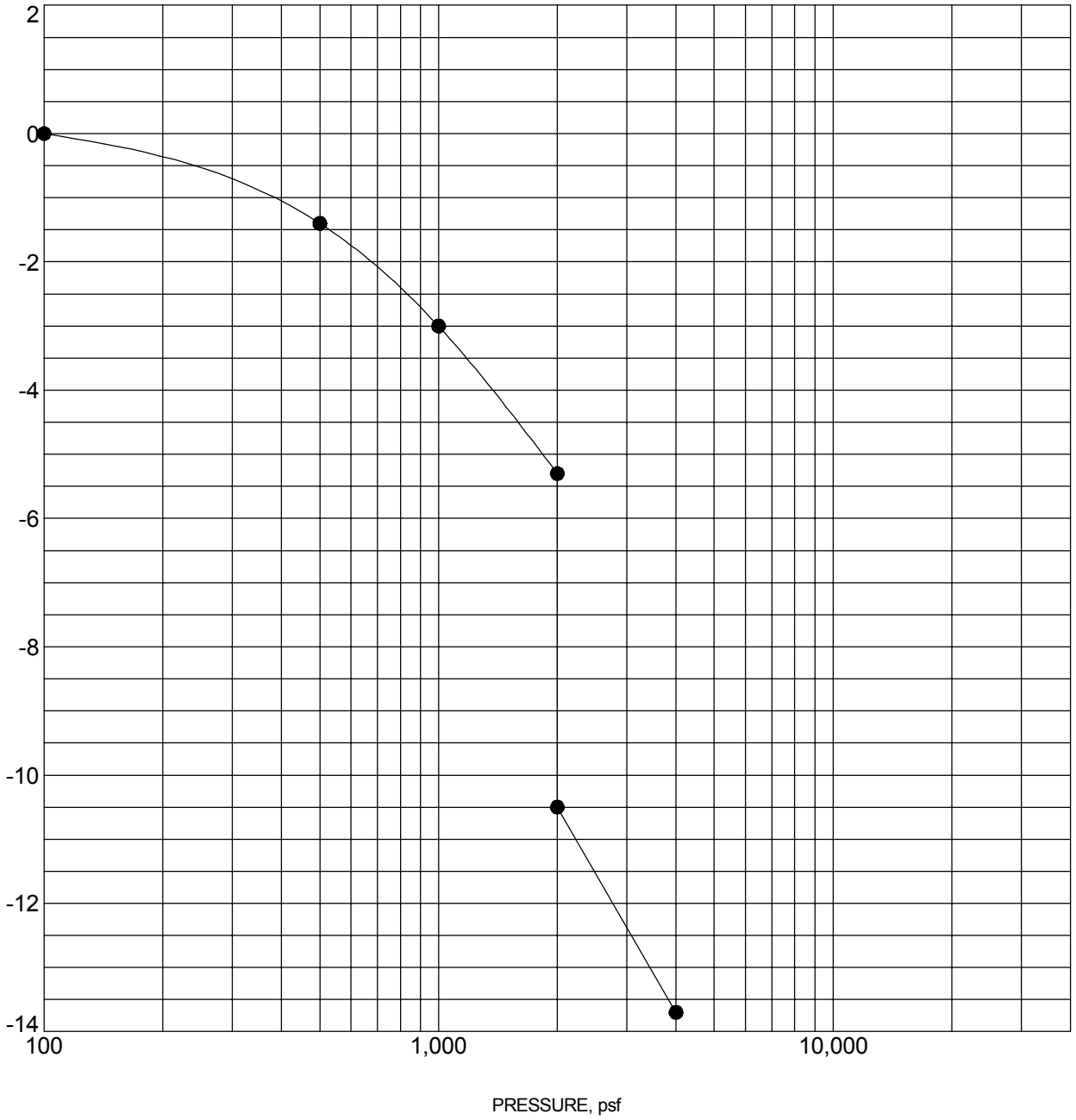
PROJECT NUMBER: 63185041

CLIENT: Swaim Associates
Tucson, AZ

EXHIBIT: B-3

SWELL CONSOLIDATION TEST

ASTM D2435



Specimen Identification			Classification	γ_d, pcf	WC, %
●	B-01	2 - 3 ft	CLAYEY SAND (SC)	96	5

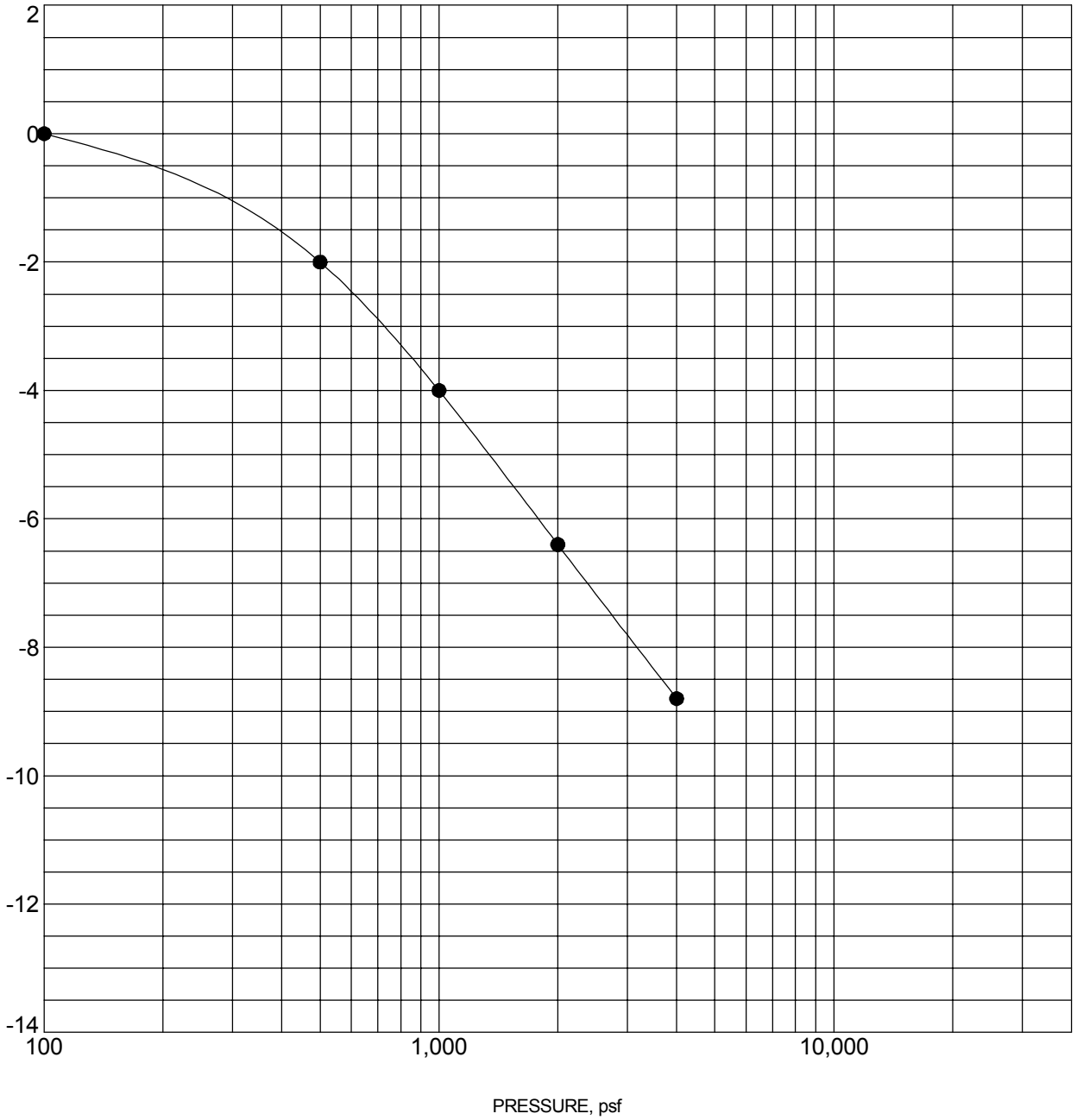
NOTES: Water added at 2000 psf.

PROJECT: PYT - Health Services Center II	Terracon 355 S Euclid Ave, Ste 107 Tucson, AZ	PROJECT NUMBER: 63185041
SITE: SEC of S Camino De Oeste and W Tetakusim Rd Tucson, Arizona		CLIENT: Swaim Associates Tucson, AZ
		EXHIBIT: B-4

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TC_CONSOL_STRAIN-USCS 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/5/18

SWELL CONSOLIDATION TEST

ASTM D2435



Specimen Identification			Classification	γ_d, pcf	WC, %
●	B-04	2 - 3 ft	CLAYEY SAND (SC)	102	5

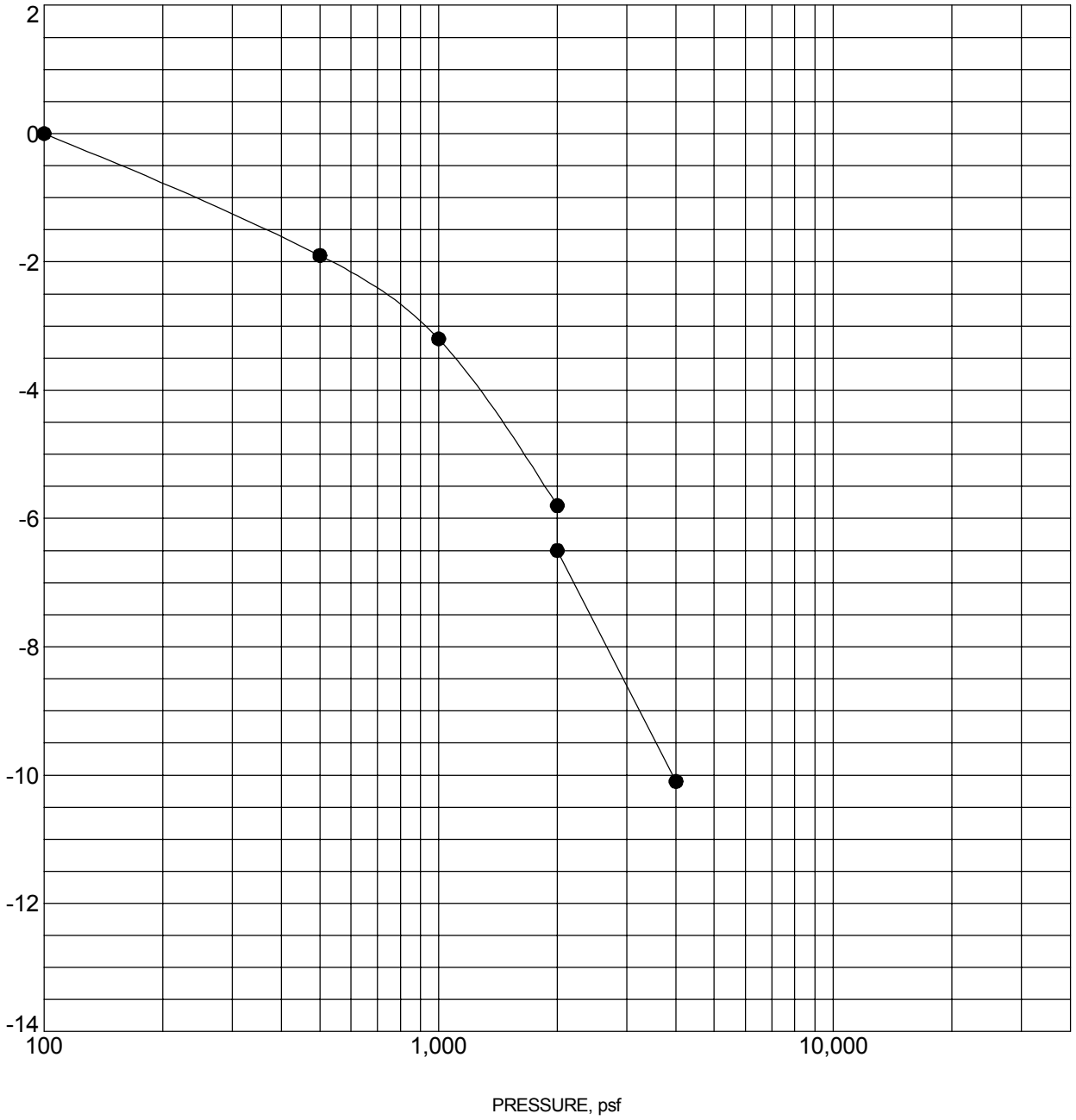
NOTES: Water added at 2000 psf.

PROJECT: PYT - Health Services Center II	Terracon 355 S Euclid Ave, Ste 107 Tucson, AZ	PROJECT NUMBER: 63185041
SITE: SEC of S Camino De Oeste and W Tetakusim Rd Tucson, Arizona		CLIENT: Swaim Associates Tucson, AZ
		EXHIBIT: B-5

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TC_CONSOL_STRAIN-USCS 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/5/18

SWELL CONSOLIDATION TEST

ASTM D2435



Specimen Identification			Classification	γ_d, pcf	WC, %
●	B-07	5 - 6 ft	CLAYEY SAND (SC)	96	5

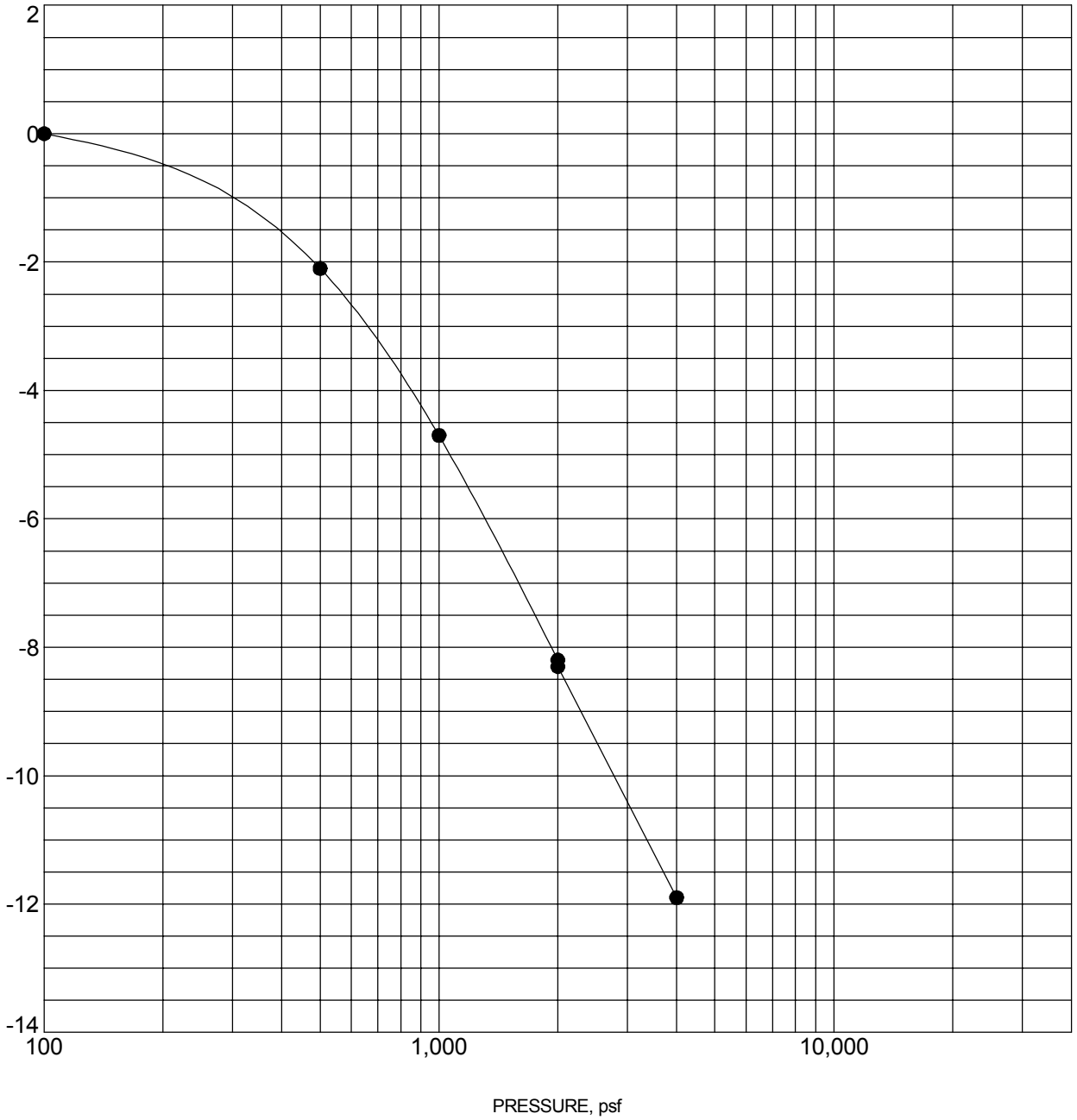
NOTES: Water added at 2000 psf.

PROJECT: PYT - Health Services Center II	Terracon 355 S Euclid Ave, Ste 107 Tucson, AZ	PROJECT NUMBER: 63185041
SITE: SEC of S Camino De Oeste and W Tetakusim Rd Tucson, Arizona		CLIENT: Swaim Associates Tucson, AZ
		EXHIBIT: B-6

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TC_CONSOL_STRAIN-USCS 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/5/18

SWELL CONSOLIDATION TEST

ASTM D2435



Specimen Identification			Classification	γ_d, pcf	WC, %
●	B-08	2 - 3 ft	CLAYEY SAND (SC)	97	5

NOTES: Water added at 2000 psf.

PROJECT: PYT - Health Services Center II	Terracon 355 S Euclid Ave, Ste 107 Tucson, AZ	PROJECT NUMBER: 63185041
SITE: SEC of S Camino De Oeste and W Tetakusim Rd Tucson, Arizona		CLIENT: Swaim Associates Tucson, AZ
		EXHIBIT: B-7

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TC_CONSOL_STRAIN-USCS 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/5/18

SUMMARY OF LABORATORY RESULTS

Borehole No.	Depth (ft.)	USCS Soil Class.	In-Situ Properties		Classification				Expansion Testing					Corrosivity				Remarks
			Dry Density (pcf)	Water Content (%)	Passing #200 Sieve (%)	Atterberg Limits			Dry Density (pcf)	Water Content (%)	Surcharge (psf)	Expansion (%)	Expansion Index EI_{50}	pH	Resistivity (ohm-cm)	Sulfates (ppm)	Chlorides (ppm)	
						LL	PL	PI										
B-01	0.0 - 5.0	SC			36	35	19	16	110	10.4	100	1.2						
B-01	2.0 - 3.0	SC	96	5														
B-01	5.0 - 6.0	SC	93	7														1, 2
B-01	7.0 - 8.0	SC	92	9														1, 2
B-01	10.0 - 11.0	SC	89	9														1, 2
B-02	2.0 - 3.0	SC	95	7														1, 2
B-02	5.0 - 6.0	SC	96	7														1, 2
B-02	7.0 - 8.0	SC	102	4														1, 2
B-03	2.0 - 3.0	SC	98	4														1, 2
B-03	5.0 - 6.0	SC	98	7														1, 2
B-04	2.0 - 3.0	SC	102	5														
B-05	2.0 - 3.0	SC	96	5														1, 2
B-05	5.0 - 6.0	SC	99	5														1, 2
B-06	0.0 - 5.0	SC			44	34	21	13										
B-06	2.0 - 3.0	SC	96	7														1, 2
B-06	5.0 - 6.0	SC	99	6														1, 2
B-06	7.0 - 8.0	SC	96	7														1, 2
B-07	0.0 - 5.0	SC														57		2
B-07	2.0 - 3.0	SC	97	5														1, 2
B-07	5.0 - 6.0	SC	96	5														
B-08	2.0 - 3.0	SC	97	5														
B-08	5.0 - 6.0	SC	95	6														1, 2
B-08	7.0 - 8.0	SC	93	9														1, 2
B-09	0.0 - 5.0	SC			34	26	17	9										

REMARKS

1. Dry Density and/or moisture determined from one or more rings of a multi-ring sample.
2. Visual Classification.
3. Submerged to approximate saturation.
4. Expansion Index in accordance with ASTM D4829-95.
5. Air-Dried Sample

PROJECT: PYT - Health Services Center II

SITE: SEC of S Camino De Oeste and W Tetakusim Rd Tucson, Arizona

Terracon
355 S Euclid Ave, Ste 107
Tucson, AZ
PH. 520-770-1789 FAX. 520-792-2539

PROJECT NUMBER: 63185041

CLIENT: Swaim Associates
Tucson, AZ

EXHIBIT: B-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. SOIL PROPERTIES 2 63185041 PYT - HEALTH SERV.GPJ TERRACON_DATATEMPLATE.GDT 6/7/18

SANITARY SEWER MAINTENACE PROGRAM RECOMMENDATIONS

Due to the relatively low flows from the site, the extended distance to the warehouse, and the shallow slopes; a program of inspections, flushings, and cleanings is recommended. In addition, water tight and activated carbon odor filter insert manhole rims will be installed.

Maintenance program recommendations are listed below and are considered included in the Contractor's warranty period.
-Activated carbon odor-eater manhole inserts replaced periodically (https://www.nassco.org/sites/default/files/manhole-parson06.pdf or approved equal). See manufacturer's recommendations.
-Periodic flushing of the system from internal plumbing and from the water service located near the sewer pipe terminal reach.
-Periodic inspections of the system to check for acceptable flows and odors.

UTILITY INFORMATION

The contractor shall contact "Arizona 811" (dial 811 or 1-800-782-5348) a minimum of two (2) business days prior to commencing construction activities. The contractor shall keep all underground facility location requests up-to-date and comply with Arizona revised statutes (A.R.S.), title 40, chapter 1, Article 6.3, section 40-360.22. Concerns regarding the accuracy between the underground facility markings and the project plans shall be immediately reported to the Engineer.

The contractor shall contact the representatives of the following utility companies concerning the status of their utility, any required adjustments, and/or extensions of utilities in the project area:

Owner	Contact	Phone Number
CenturyLink	Yadira Delgado	(480) 243-0009
	Wendell Nelson	(520) 838-3050
Pima County Regional Waste Water Reclamation Department	Field Engineering	(520) 724-2651
	Roy Flores	(520) 724-6372
Southwest Gas Corporation	Toni Carrol	(520) 794-6136
	Chris Gin	(520) 794-6265
Tucson Electric Power	Chuck Leon	(520) 917-8739
Tucson Water Department	Richard Herran	(520) 837-2130

Both Tucson Water and Southwest Gas anticipate utility easement approval prior to the start of this project.

The existence and locations of underground utilities indicated on the plans are not guaranteed and shall be investigated and verified in the field by the Contractor before starting work. Excavations in the vicinity of existing structures and utilities shall be carefully done. At least two full working days prior to commencing excavation, the Contractor shall call Blue Stake Center, 1-800-STAKE-IT, between the hours of 7:00 a.m. and 4:30 p.m., Monday through Friday, for information relative to the location of buried utilities.

It shall be the responsibility of the Contractor to contact the utility companies in order for them to determine if there is a need to brace, shore, support and protect their facilities during the construction of the project.

Utility locations shown on the Plans are approximate, and all utilities are not necessarily shown. The possibility of conflicts with existing utilities-in-service exists.

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