

GENERAL NOTES

- GENERAL CONTRACTOR (G.C.) SHALL READ AND UNDERSTAND ALL NOTES INCLUDED HEREWITHE AND ADHERE CAREFULLY TO THEM THROUGHOUT ALL PHASES OF THE PROJECT.
- ALL NEW CONSTRUCTION SHALL BE IN STRICT COMPLIANCE WITH LOCAL BUILDING CODES AND THE AMERICANS WITH DISABILITIES ACT (A.D.A.) REGULATIONS AND TEXAS ACCESSIBILITY STANDARDS.
- ALL WORK SHALL BE DONE IN COMPLIANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA).
- DIMENSIONS GIVEN IN FIGURES ON THE PLANS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. ALL DIMENSIONS SHALL BE VERIFIED IN FIELD. DIMENSIONS ARE NOT ADJUSTABLE UNLESS NOTED (+/-).
- ALL DIMENSIONS ARE GIVEN FROM FACE OF STUD TO FACE OF STUD UNLESS OTHERWISE NOTED.
- "EQUAL" WHEN USED SHALL MEAN AN EQUIVALENT PRODUCT OR MATERIAL AS APPROVED BY TENANT.
- ALL HEIGHTS ARE DIMENSIONED FROM FINISHED FLOOR UNLESS OTHERWISE NOTED.
- THE CONTRACTOR SHALL VERIFY THAT NO CONFLICTS EXIST IN LOCATIONS OF ANY AND ALL MECHANICAL, TELEPHONE, DATA, ELECTRICAL, LIGHTING, PLUMBING AND SPRINKLER EQUIPMENT (TO INCLUDE ALL PIPING, DUCTWORK AND CONDUIT) THAT ALL REQUIRED CLEARANCES FOR INSTALLATION OR MAINTENANCE OF THE ABOVE EQUIPMENT IS PROVIDED.
- ALL GYPSUM WALL BOARD PARTITIONS SHALL BE TAPE, BEDDED AND SANDED SMOOTH WITH NO VISIBLE JOINTS, AND ALL CORNERS SHALL RECEIVE METAL CORNER BEAD UNLESS OTHERWISE NOTED.
- ALL RATED WALLS SHALL HAVE THEIR RATING MAINTAINED AND ALL NEW PENETRATIONS SEALED TO MEET CURRENT CODE REQUIREMENTS.
- ALL MATERIALS FURNISHED AND INSTALLED SHALL BE FREE FROM DEFECTS. ALL MATERIALS AND WORKMANSHIP SHALL BE INSPECTED FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE. DURING THIS PERIOD, PROBLEMS RELATING TO DEFECTIVE MATERIALS OR FAULTY WORKMANSHIP SHALL BE CORRECTED AT NO COST TO TENANT. ANY PROBLEMS THAT OCCUR DURING CONSTRUCTION SHALL BE CORRECTED IMMEDIATELY TO THE SATISFACTION OF TENANT.
- GENERAL CONTRACTOR SHALL PROVIDE ADEQUATE BRACING AS REQUIRED TO SECURE WORK TO STRUCTURE ABOVE CEILING WHERE REQUIRED AND SHALL BE TOTALLY RESPONSIBLE FOR HIS WORK.
- DURING AND AT THE COMPLETION OF THE CONTRACTORS DAILY WORK, CONTRACTORS ARE RESPONSIBLE FOR THE CLEANING UP AND REMOVAL OF ALL RUBBISH AND DEBRIS BEFORE LEAVING THE JOB SITE.
- THE FOLLOWING ARE STRICTLY PROHIBITED WORK AND PRACTICES:
 - ANY COMBUSTIBLE MATERIALS ABOVE FINISHED CEILING.
 - IMPOSING ANY STRUCTURAL LOAD, TEMPORARY OR PERMANENT, ON ANY PART OF BUILDING STRUCTURE WITHOUT PRIOR WRITTEN APPROVAL.
 - CUTTING ANY HOLES IN FLOOR SLABS, WALLS OR ROOF WITHOUT PROPER APPROVAL, BEFORE STARTING ANY UNDER SLAB WORK, CHECK TO DETERMINE IF ANY COMMON UTILITY OR OTHER UTILITY LINES EXIST WITHIN THE SPACE.
 - CONTRACTORS SHALL CARRY ADEQUATE LIABILITY INSURANCE AS SET FORTH BY TENANT AND THE SHOPPING CENTER AND/OR MALL OWNER.
 - A CERTIFICATE OF OCCUPANCY MUST BE OBTAINED UPON COMPLETION OF ALL WORK AND FINAL INSPECTIONS. THE ORIGINAL CO. TO BE SUBMITTED TO TENANT STORE MANAGER AND (1) COPY TO BE SUBMITTED TO TENANT CONSTRUCTION & PLANNING MANAGER.
 - IN EVENT OF CONFLICT, DISCREPANCY, ETC. OBLIGATION TO G.C. TO CONTACT DESIGNER FOR CLARIFICATION PRIOR TO PROCEEDING.
 - PROVIDE ALL INSURANCE, LICENSES, BONDING, AND RELEASE OF LIENS REQUIRED BY TENANT AND LANDLORD. PROVIDE COPIES OF DOCUMENTATION UPON REQUEST.
 - PROVIDE COMPLETE OPERATING MAINTENANCE AND SPECIFICATION MANUALS TO TENANT FOR ALL EQUIPMENT WITHIN (15) DAYS OF FINAL COMPLETION OF JOB.
 - PROVIDE A WRITTEN LIST OF SERVICE SUB-CONTRACTORS TO TENANT INCLUDING NAMES, ADDRESSES, PHONE NUMBERS, AND CONTACT PERSONS, FOR FUTURE SERVICE NEEDS WITHIN (15) DAYS OF COMPLETION OF JOB.
 - TENANTS/REPRESENTATIVE AND/OR TENANTS' CONTRACTORS SHALL NOT BE ALLOWED TO USE, STORE OR DISPOSE OF ANY HAZARDOUS, FLAMMABLE, EXPLOSIVE, RADIOACTIVE, TOXIC, CONTAMINATING, POLLUTING MATERIALS OR SUBSTANCES RELATED TO INJURIOUS OR CHEMICALLY REGULATED MATERIALS ON THE JOB SITE.
 - ALL INTERIOR WALLS SHALL HAVE ONE COAT OF WHITE PRIMER.
 - GENERAL CONTRACTOR IS TO CONSTRUCT INTERIOR WALLS FROM METALS STUDS. GENERAL CONTRACTOR MUST USE FIRE RETARDANT WOOD STUDS AT CRITICAL LOCATIONS DIMENSIONED ON PLANS FOR MOUNTING OF FIXTURE HARDWARE BY OTHER TRADES. ALL WALLS SHALL BE SQUARE AND PLUMB.
 - TENANT SHALL VERIFY THAT ALL STUDS (FOR RECESSED STANDARDS) ARE LOCATED IN WALLS PROPERLY BEFORE G.W.B. IS INSTALLED OR PATCHED. GENERAL CONTRACTOR SHALL SCHEDULE INSPECTION BY TENANT PRIOR TO G.W.B. INSTALLATION.
 - GENERAL CONTRACTOR SHALL PROVIDE ADEQUATE PROTECTION OF WORK, MATERIALS, FIXTURES, ETC. ON JOB SITE FROM LOSS OR DAMAGE FROM FIRE, THEFT OR VANDALISM.
 - GENERAL CONTRACTOR SHALL USE AN ENTRANCE PROVIDED BY TENANT FOR TRANSPORTING MATERIALS TO AND FROM JOB SITE. ALL EMPLOYEES OF G.C. SHALL USE THESE SAME ENTRANCES. G.C. SHALL CONFINING ALL VEHICLES TO DESIGNATED AREA AS REQUIRED BY TENANT.
 - GENERAL CONTRACTOR'S BILL QUOTATIONS SHALL INCLUDE THE USE OF EQUIPMENT AND MATERIALS EXACTLY AS SPECIFIED HEREIN.
 - GENERAL CONTRACTOR IS TO VERIFY ALL EXISTING CONDITIONS. CONDITIONS WHICH ARE NOT INDICATED AS EXISTING CONDITION ARE APPROXIMATE AND SHOULD BE VERIFIED ON SITE.
 - IT IS THE RESPONSIBILITY OF THE G.C. TO DETERMINE THE EXISTING CONDITIONS WHICH MAY AFFECT THE COMPLETION OF THE PROJECT IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS. NOTIFY THE DESIGNER OF EXISTING CONDITIONS VARY SUCH THAT IMPLEMENTATION OF THE DOCUMENTS WILL ADVERSELY AFFECT THE PROJECT COST OR PROJECT SCHEDULE.
 - IT IS NOT WITHIN THE SCOPE OF WORK OF THE DESIGNER TO DISCOVER, LOCATE, HANDLE, REMOVE OR DISPOSE OF ANY HAZARDOUS MATERIALS INCLUDING, BUT NOT LIMITED TO, ASBESTOS, ASBESTOS PRODUCTS, POLYCHLORINATED BIPHENYL (PCB), HYDROCARBONS OR ANY OTHER TOXIC SUBSTANCES. SHOULD THE G.C. OR ANY OTHER ENTITY WORKING ON BEHALF OF THE G.C. OR THE OWNER DISCOVER OR ENCOUNTER ANY HAZARDOUS MATERIALS, THE G.C. SHALL NOTIFY THE APPROPRIATE AUTHORITIES IMMEDIATELY AND PROCEED IN ACCORDANCE WITH ALL APPLICABLE LAWS AND REGULATIONS.
 - GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO THE TENANT FOR ANY DAMAGE TO THE FACILITY DURING CONSTRUCTION.
 - G.C. SHALL DISPOSE ALL DEMOLISHED MATERIALS NOT RETAINED BY THE TENANT IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.
 - G.C. SHALL MAINTAIN REQUIRED DOCUMENTS AND UP-TO-DATE CONSTRUCTION PLANS ON THE JOB SITE.
 - G.C. SHALL NOTIFY THE TENANT'S CONSTRUCTION COORDINATOR IF MATERIAL OR EQUIPMENT DOES NOT ARRIVE AT THE JOB SITE PRIOR TO THE TIME REQUIRED. G.C. SHALL INSPECT FOR DAMAGE, SHORTAGES, AND ERRORS IN SHIPPING/REPORT PROBLEMS TO TENANT'S CONSTRUCTION COORDINATOR IMMEDIATELY.
 - GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL CLEANING PRIOR TO TURNING THE SPACE OVER TO THE TENANT. CLEANING SHALL INCLUDE, BUT NOT BE LIMITED TO: REMOVAL OF GREASE, MASTIC ADHESIVES, DUST, DIRT, STAINS, FINGERPRINTS, LABELS, AND OTHER FOREIGN MATERIALS FROM EXPOSED INTERIOR AND EXTERIOR SURFACES; PRESSURE WASH EXTERIOR PAVED SURFACES.
 - SUBCONTRACTORS ARE DISCOURAGED TO CONTACT TENANT STORES AND DESIGNER FOR SOLICITING A "BIDDERS LIST".
 - G.C. TO VERIFY THE DIMENSIONS OF ALL RELATED PLAN, ELEVATION, SECTIONS, SCHEDULES, AND DETAILS. REPORT DISCREPANCIES TO DESIGNER.

BUILDING CODE ANALYSIS - 2018 INTERNATIONAL BUILDING & FIRE CODE

1 BUILDING PLANNING & DESCRIPTION

<input type="checkbox"/> NEW CONSTRUCTION	<input checked="" type="checkbox"/> SHELL BUILDING
<input type="checkbox"/> LEASE SPACE BUILD-OUT (LSBO)	<input type="checkbox"/> CHANGE OF OCCUPANCY
<input type="checkbox"/> SUBSTANTIAL IMPROVEMENT	<input type="checkbox"/> OTHER

<input type="checkbox"/> SINGLE OCCUPANCY N/A	<input type="checkbox"/> MIXED OCCUPANCY N/A
<input type="checkbox"/> SEPARATED USE	<input type="checkbox"/> NON-Separated USE

(SECTION 508.3 OR 508.4 IBC 2018)

OCCUPANCY TYPE: "S-1" WAREHOUSE

REQUIRED SEPARATION OF OCCUPANCIES: N/A (TABLE 508.4)

PROVIDED SEPARATION BETWEEN OCCUPANCIES: N/A

TYPE OF CONSTRUCTION: II-B (CHAPTER 6 IBC 2018)

HEIGHT LIMITATION: 55'

AREA LIMITATION: 17,500 SF (TABLE 506.2 IBC 2018)

FRONTAGE INCREASE CALCULATIONS ARE SHOWN ON SHEET: N/A

PROPOSED GROSS SQUARE FOOTAGE: 6,000 SF # OF FLOORS: 1 HEIGHT: 20'

LIST BELOW THE PURPOSE/USE OF THE BUILDING OR AREA BEING REVIEWED. INCLUDE DETAILS ON THE PRODUCTS/MATERIALS BEING STORED/FABRICATED AND NOTE HOW THEY ARE BEING PACKAGED.

THE CONSTRUCTION OF THE OFFICE / WAREHOUSE BUILDING WILL BE DONE AS A SPECULATIVE BUILDINGS. THERE ARE NO CURRENT TENANTS AT THIS TIME. IT IS DESIGNED FOR FUTURE "B" OFFICE OCCUPANCY AND S-1 OCCUPANCY IN THE WAREHOUSE.

2 OCCUPANCY TYPE AND LOAD
CHAPTER 2, 3 & TABLE 1004.5 IBC 2018

OCCUPANCY CLASSIFICATION TYPES

A-1	A-2	A-3	A-4	A-5	B	E
F-1	F-2	H-1	H-2	H-3	H-4	H-5
I-1	I-2	I-3	I-4	M	R-1	R-2
R-3	R-4	S-1	S-2	U		

BREAK DOWN AREAS AND OCCUPANT LOADS PER FLOOR

OCCUP. CLASS.	SPECIFIC USE	SQUARE FOOTAGE	SF PER OCCUPANT	DESIGN OCCUPANTS
S-1	WAREHOUSE	6,000	500	12

TOTAL 6,000 12

3 MEANS OF EGRESS
CHAPTER 10 IBC 2018

MEANS OF EGRESS	# OF REQUIRED EXITS	# OF EXITS PROVIDED	sheet #
STAIRWAYS (PER FLOOR)	N/A		
EGRESS @ 1ST FL	2	6	A2.0

(SECTION 1005.3 IBC 2018)

PANIC HARDWARE ON EXIT DOORS? YES NO (SECTION 1008.1.9 IBC 2018)

STAIRWAYS (SECTION 1011 IBC 2018)

MINIMUM CLEAR WIDTH SHOWN: N/A (EACH STAIRWELL)

EGRESS WIDTHS ARE SHOWN ON: N/A

ACCESSIBLE AREAS OF REFUGEE & 2-WAY COMMUNICATIONS SHOWN ON: N/A

(SECTION 1009.3 TO 1009.8 IBC 2018)

EXIT SIGN/SEGREGATE ILLUMINATION (SECTION 1008 & 1013 IBC 2018)

REQUIRED AND SHOWN ON: A2.0 (HIGHLIGHT ON PLANS)

EXTERIOR MEANS OF EGRESS LIGHTING PROVIDED? YES

(SECTION 1008 IBC 2018)

EXIT TRAVEL DISTANCE (SECTION 1017.2 IBC 2018)

occupancy type	max travel distance	provide travel distance	sheet #
S-1	200'	59'	A2.0

4 INTERIOR FINISH
CHAPTER 8 & TABLE 803.13 IBC 2018

NOT APPLICABLE

(SECTION 1005.3 IBC 2018)

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5 FIRE PROTECTION & LIFE SAFETY SYS.
CHAPTER 9 IBC & IFC 2018

AUTOMATIC FIRE SPRINKLER SYSTEM/ALTERNATIVE AUTOMATIC FIRE EXTINGUISHING SYSTEM
ALL SPRINKLERS SHALL COMPLY WITH MONITORING AND OCCUPANT NOTIFICATION PER 903.4.2.1
(SECTION 903 HC FICe AMENDMENTS & SECTION 903.4 IFC 2018)

□ PROVIDED AS NOTED ON: _____ NOT REQUIRED PER SECTION 903

SYSTEM PROVIDED: SPRINKLER HEAD PROVIDED: FIRE PUMP PROVIDED: PER SECTION 903.2.9 GROUP S-1: 12,000 SF. THEREFORE NO FIRE SPRINKLER SYSTEM IS REQUIRED.

□ NFPA 13 STANDARD YES

□ NFPA 13R ELO NO

□ NFPA 13D ESFR

□ OTHER: _____ QUICK RESPONSE

FIRE DEPARTMENT ACCESS TO SPRINKLER CONTROLS:

□ SPRINKLER RISER ROOM OR POST INDICATOR VALVE SHOWN ON: N/A (SECTION 901.4.6 HC AMENDMENTS IFC 2018)

□ FDC SHOWN ON: N/A (FDC SHALL COMPLY WITH SECTION 912 IFC 2018)

SUPPRESSION SYSTEM PROVIDED (SECTION 904 IFC 2018)

□ REQUIRED AND SHOWN ON: _____

□ NOT REQUIRED

STANDPIPE SYSTEM & HOSE CONNECTIONS (SECTION 905 IFC 2018) (I.E. IN STAIRWAYS, STAGES, MALLS)

□ PROVIDED AS NOTED ON: _____, TYPE OF SYSTEM PROVIDED: (CLASS I, II OR III)

■ NOT REQUIRED PER SECTION 905

PORTABLE FIRE EXTINGUISHERS (SECTION 906 IFC 2018)

■ PROVIDED AS NOTED ON: A2.0, NUMBER PROVIDED: 2 (HIGHLIGHT ON PLANS)

FIRE ALARM & DETECTION SYSTEMS (SECTION 907 & HC AMENDMENTS IFC 2018)

□ FIRE ALARM SYSTEM (DEFERRED SUBMITTAL)

■ NOT REQUIRED PER SECTION 907

□ EMERGENCY VOICE EVACUATION

□ DEDICATED FUNCTION (SPRINKLER MONITORING, ELEVATOR RECALL, PRE-ACTION, EMERGENCY ALARM, SMOKE CONTROL)

□ OTHER: _____

HVAC & AIR DISTRIBUTION SYSTEM CONTROLS (SECTION 906 IFC 2018)

□ SMOKE DETECTORS PROVIDED TO SHUT DOWN UNITS OVER 2,000 CFM PROVIDED ON: _____

■ NO HVAC UNITS OVER 2,000 CFM

□ FIRE/SMOKE DAMPERS IN THE BUILDING SHOWN ON: _____

□ NO FIRE/SMOKE DAMPERS IN THE BUILDING

SMOKE CONTROL SYSTEMS (SECTION 909 IFC 2018) (I.E. FOR HIGH RISE, ATRIUMS OR STAIRWAY PRESSURIZATION)



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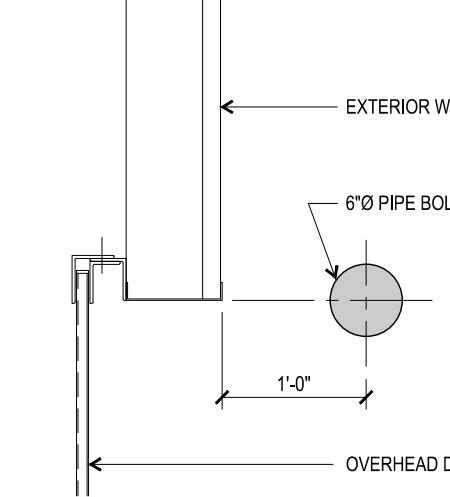
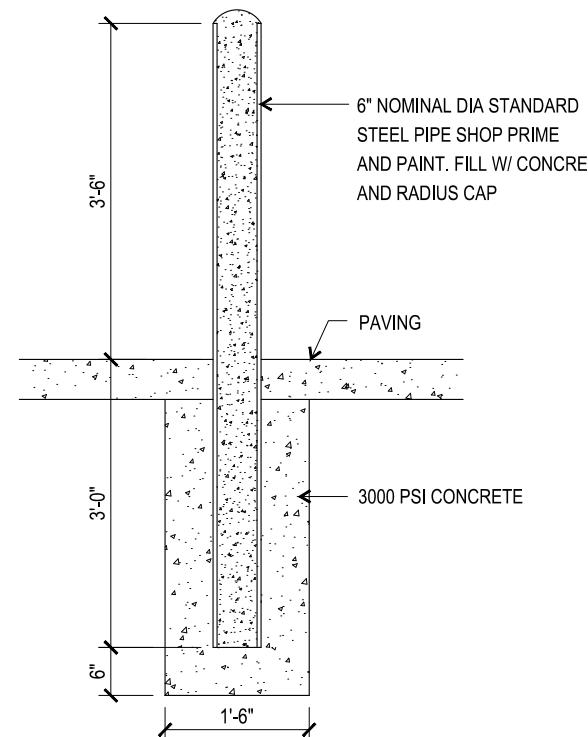
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SHEET TITLE: FLOOR PLAN

FLOOR PLAN

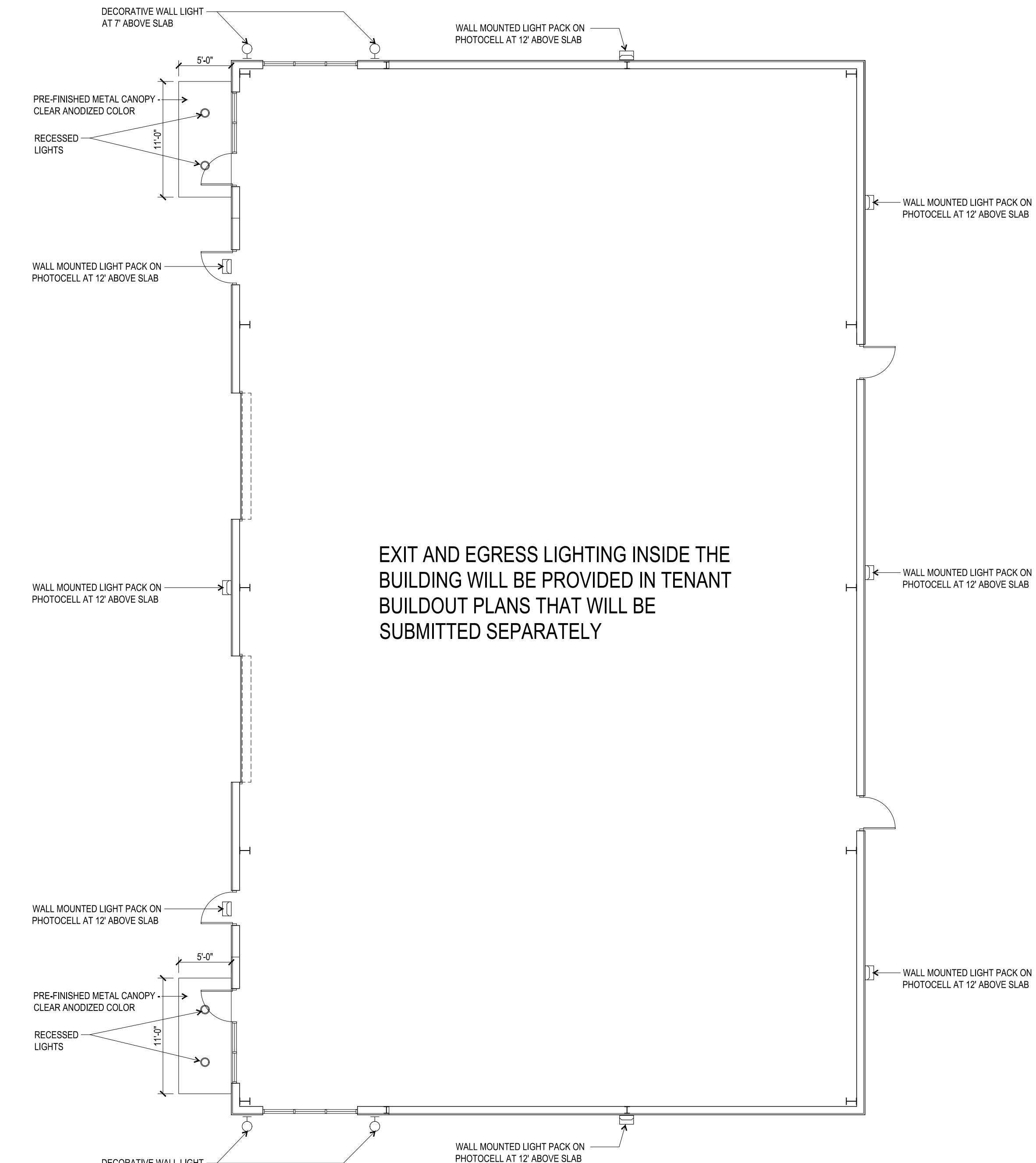
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A2.0



4 BOLLARD DETAIL

SCALE: 1/2"=1'-0"



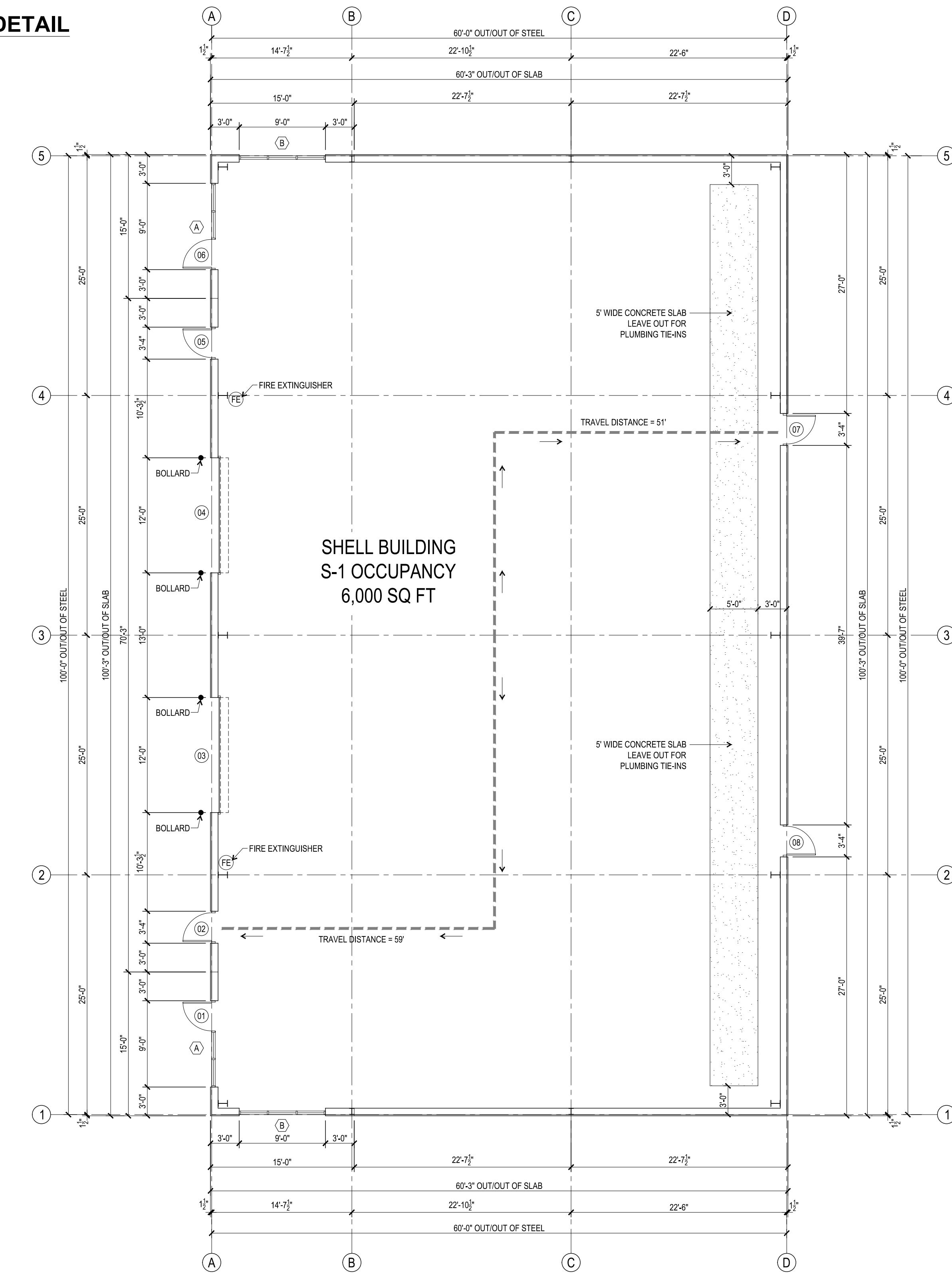
EXIT AND EGRESS LIGHTING INSIDE THE
BUILDING WILL BE PROVIDED IN TENANT
BUILDOUT PLANS THAT WILL BE
SUBMITTED SEPARATELY

CEILING/LIGHTING PLAN

SCALE: 1/8"=1

3 BOLLARD PLAN

SCALE: 3/4"=1'-0"



1 FLOOR PLAN

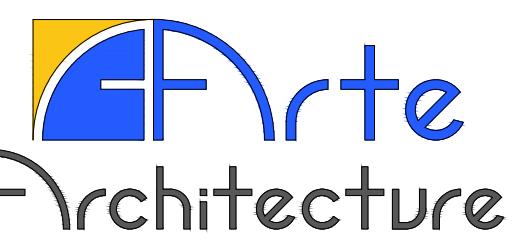
SCALE: 1/8"=1'-0"

DOOR HARDWARE SCHEDULE					
HARDWARE SET 1	HARDWARE SET 2	HARDWARE SET 3	HARDWARE SET 4	HARDWARE SET 5	HARDWARE SET 6
2 PIVOT HINGES 1 CLOSER 1 PUSH BAR INSIDE 1 PULL BAR OUTSIDE 1 CYLINDER LOCK W/ INDICATOR BY PRIME-LINE MODEL: J-4528 1 THRESHOLD 1 WEATHER STRIPPING	3 BUTT HINGES 1 CLOSER 1 EMERGENCY PUSH BAR DEVICE W/ LEVER HANDLE ON OUTSIDE 1 THRESHOLD 1 WEATHER STRIPPING	OVERHEAD DOOR HARDWARE MANUAL OPERATED PULL CHAIN			

DOOR AND HARDWARE GENERAL NOTES

1. ON ALL EXTERIOR DOORS PROVIDE SIGN ON MAIN ENTRANCE DOOR TO READ THE FOLLOWING: "THESE DOORS TO REMAIN UNLOCKED WHEN BUILDING IS OCCUPIED". THE SIGN SHALL BE IN LETTERS 1 INCH HIGH ON A CONTRASTING BACKGROUND.
2. HANDLES, PULLS, LATCHES, LOCKS, AND OTHER OPERATING DEVICES ON ALL DOORS SHALL HAVE A SHAPE THAT IS EASY TO GRASP WITH ONE HAND AND DOES NOT REQUIRE TIGHT GRASPING, TIGHT PINCHING, OR TWISTING OF THE WRIST TO OPERATE. LEVER-OPERATED MECHANISMS, PUSH-TYPE MECHANISMS, AND U-SHAPED HANDLES ARE ACCEPTABLE DESIGNS. HARDWARE REQUIRED FOR ACCESSIBLE DOOR PASSAGE SHALL BE MOUNTED NO HIGHER THAN 48" ABOVE FINISHED FLOOR.
3. DOOR LATCH SHALL RELEASE WHEN SUBJECTED TO A 5 - POUND FORCE FOR INTERIOR AND A 8.5 - POUND FORCE FOR EXTERIOR DOOR FROM INSIDE WITHOUT THE USE OF A KEY OR ANY SPECIAL FORCE.
4. THRESHOLDS, LANDINGS. THERE SHALL BE A FLOOR OR LANDING ON EACH SIDE OF A DOOR WITH THE SAME ELEVATION ON BOTH SIDES AND THRESHOLDS SHALL NOT EXCEED 1/2" IN HEIGHT.

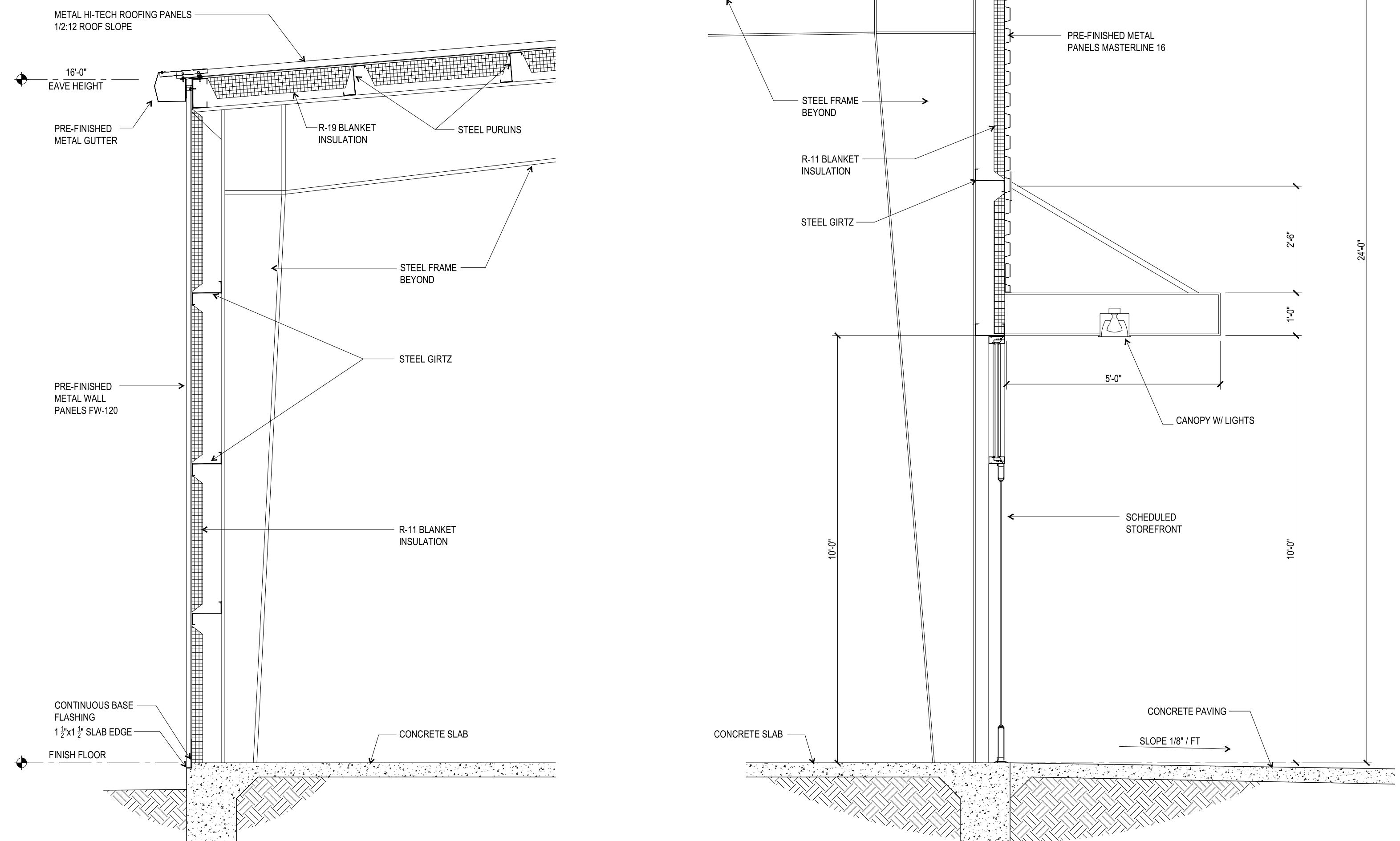
DOOR SCHEDULE									
ID	WIDTH	HEIGHT	THICK	MATERIAL	FINISH	FRAME	FR..FINISH	HWR..SET	REMARKS
01	3'-0"	7'-0"	1 3/4"	ALUM / GLASS	CLEAR ANODIZED	ALUM	CLEAR ANODIZED	1	
02	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	PAINT	HOLLOW METAL	PAINT	2	
03	12'	14'-0"	2"	METAL	PRE-FINISHED	HOLLOW METAL	PRE-FINISHED	3	MANUAL CRANK ROLL UP DOOR
04	12'	14'-0"	2"	METAL	PRE-FINISHED	HOLLOW METAL	PRE-FINISHED	3	MANUAL CRANK ROLL UP DOOR
05	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	PAINT	HOLLOW METAL	PAINT	2	
06	3'-0"	7'-0"	1 3/4"	ALUM / GLASS	CLEAR ANODIZED	ALUM	CLEAR ANODIZED	1	
07	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	PAINT	HOLLOW METAL	PAINT	2	
08	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	PAINT	HOLLOW METAL	PAINT	2	



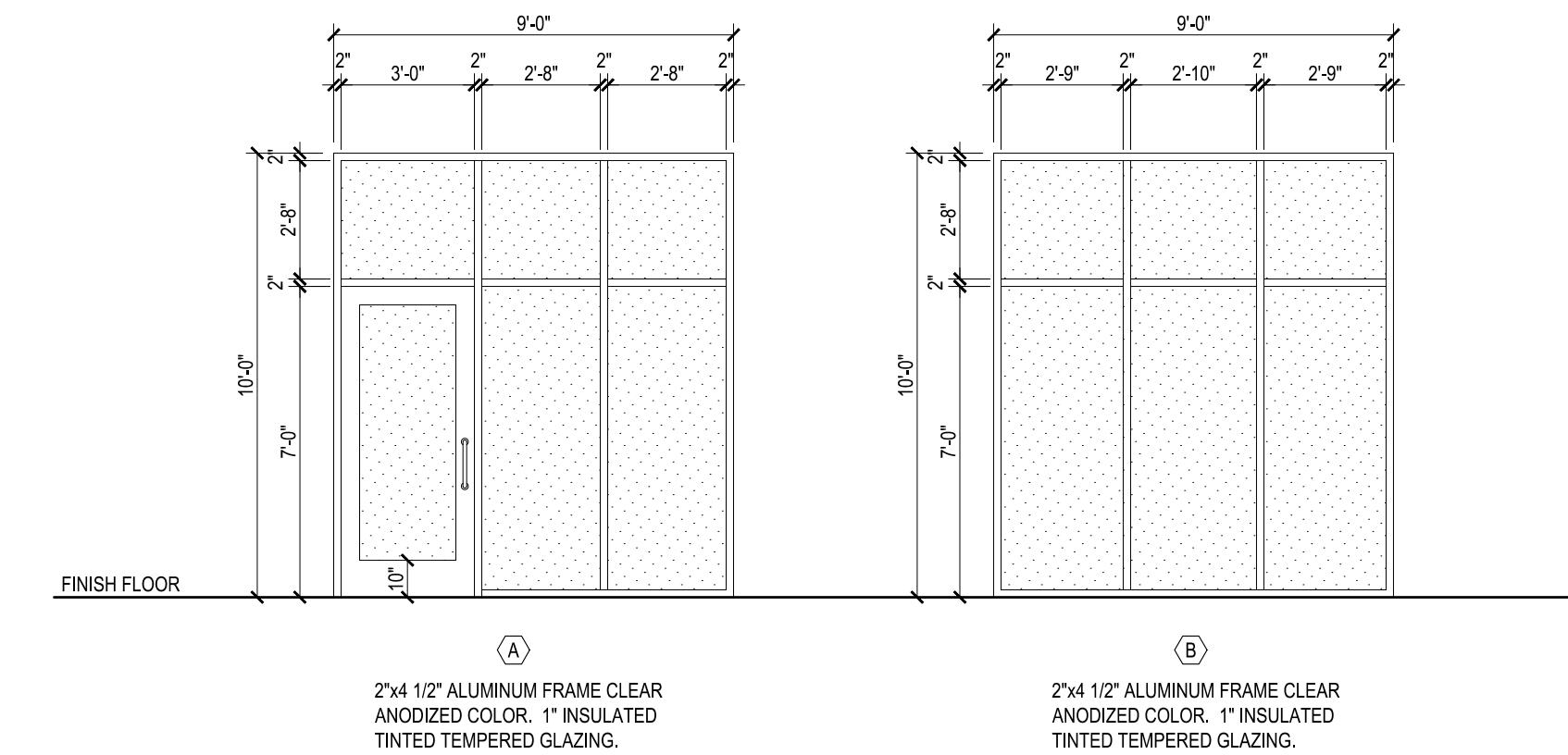
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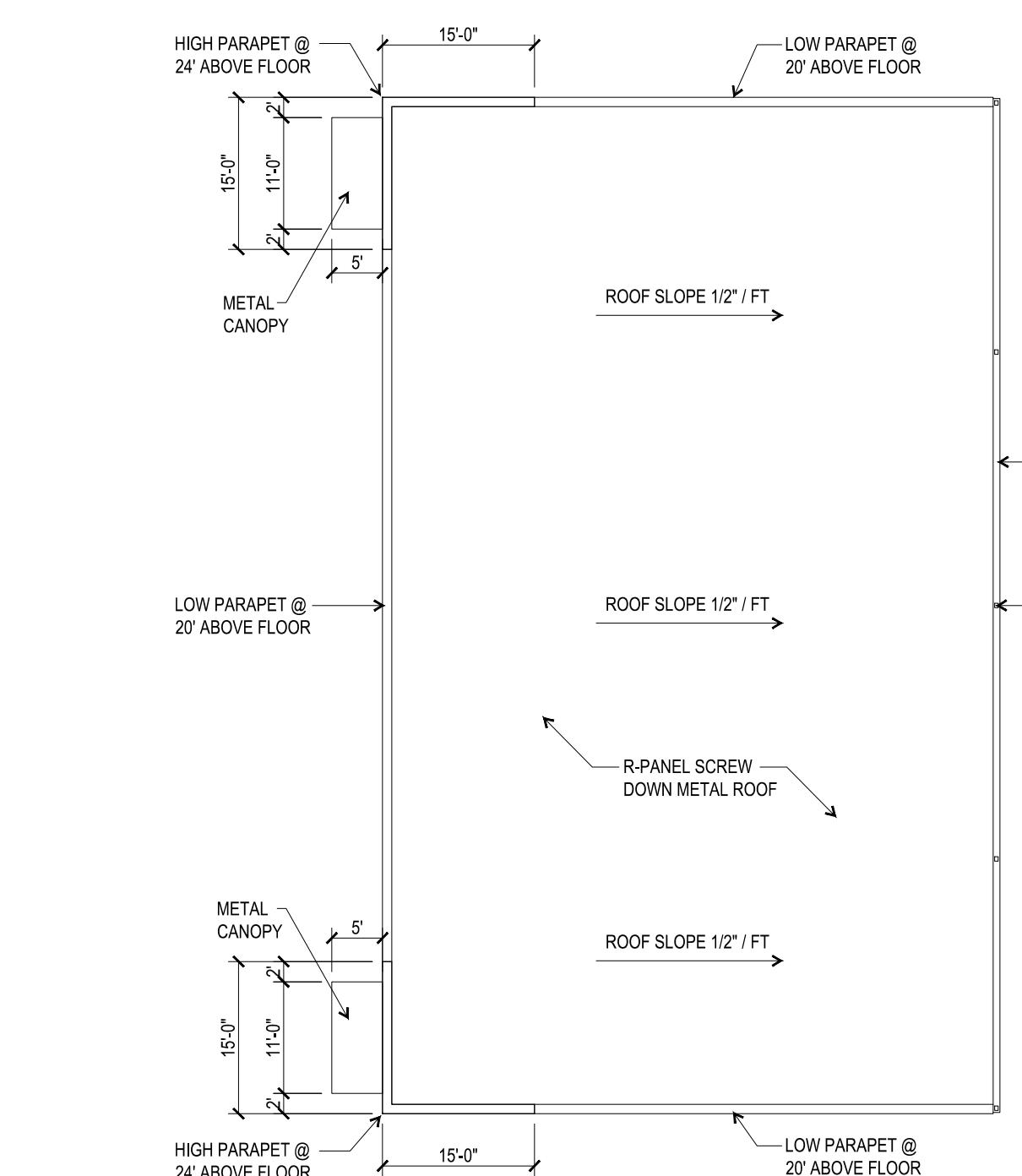
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3 TYPICAL WALL SECTION



4 **WINDOW TYPES**



1 ROOF PLAN

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

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SHEET TITLE:
ROOF PLAN, DOOR SCHEDULE
WALL SECTIONS

SHEET NO:

A2.1

A New Development for
High Meadow Business Park
36660 High Meadow Industrial Ln
Magnolia, TX 77355

REV:	DATE:	DESCRIPTION:
11-8-21		FOR PERMIT



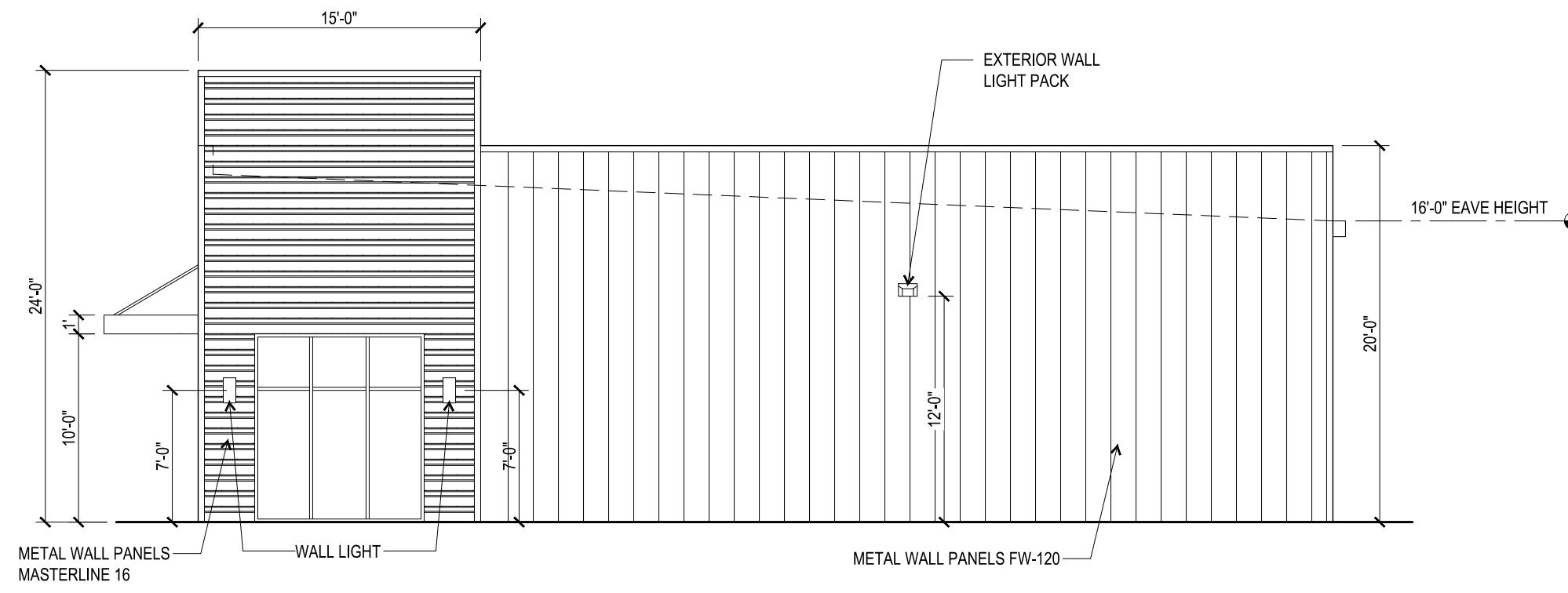
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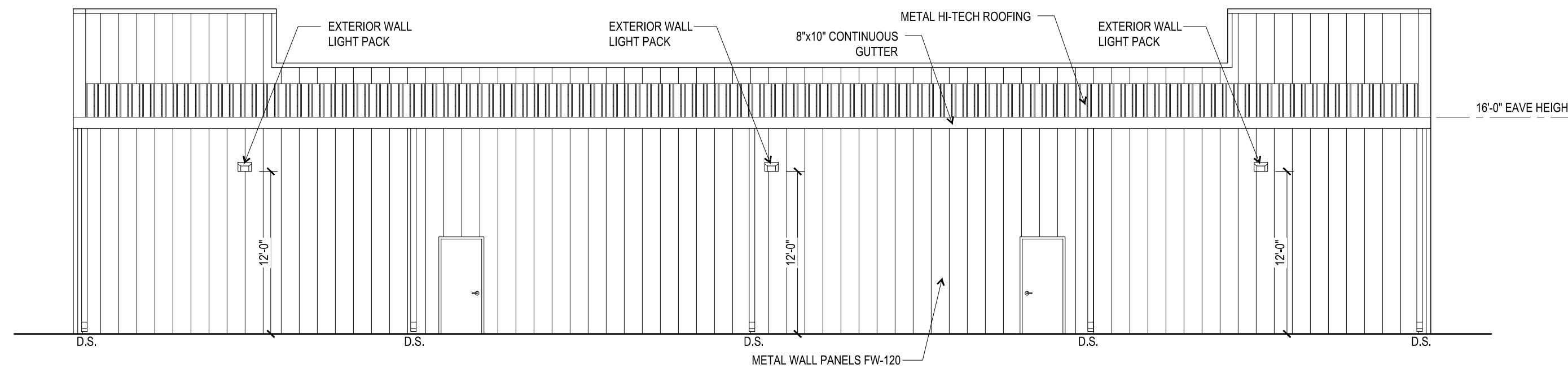
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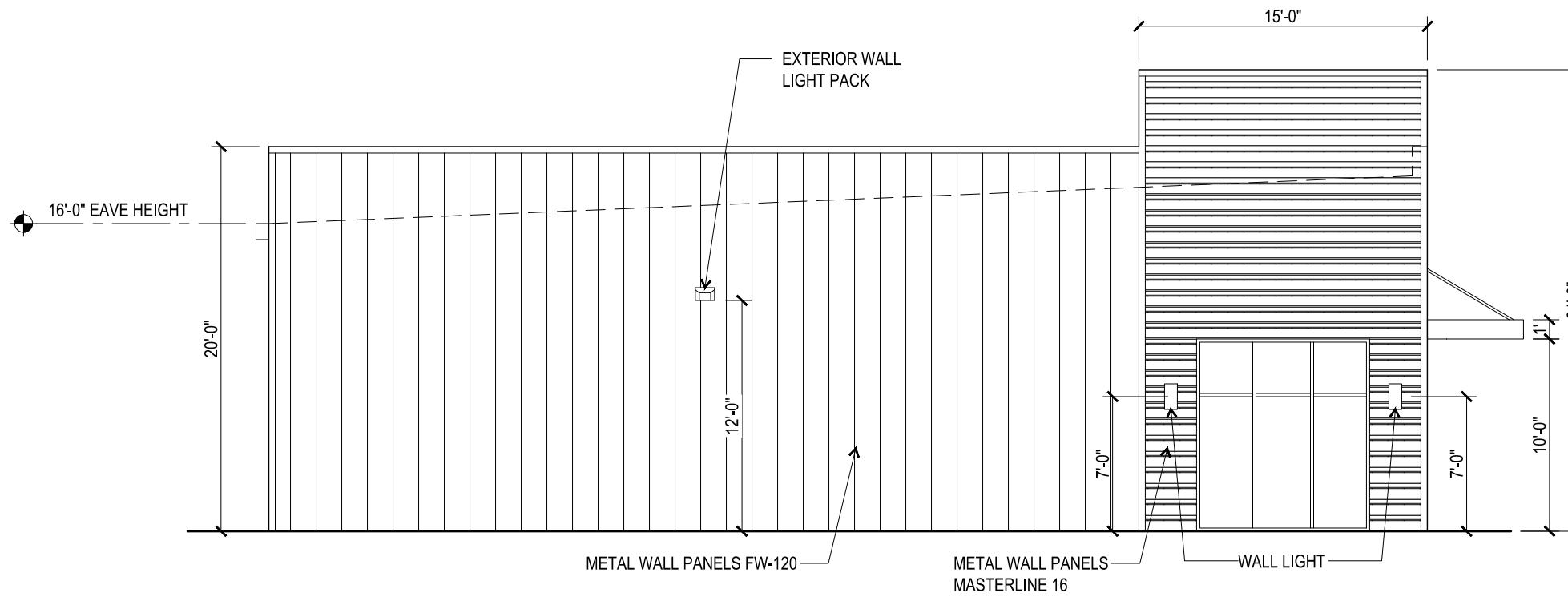
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SHEET NO.:	A3.0	



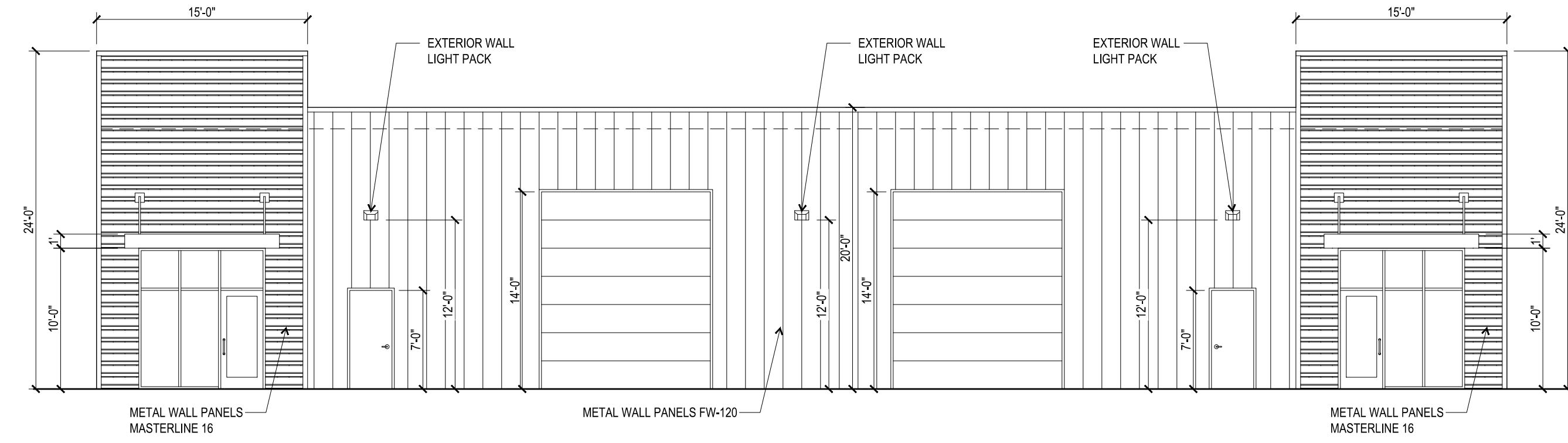
4 RIGHT ELEVATION
SCALE: 1/8"=1'-0"



3 BACK ELEVATION
SCALE: 1/8"=1'-0"

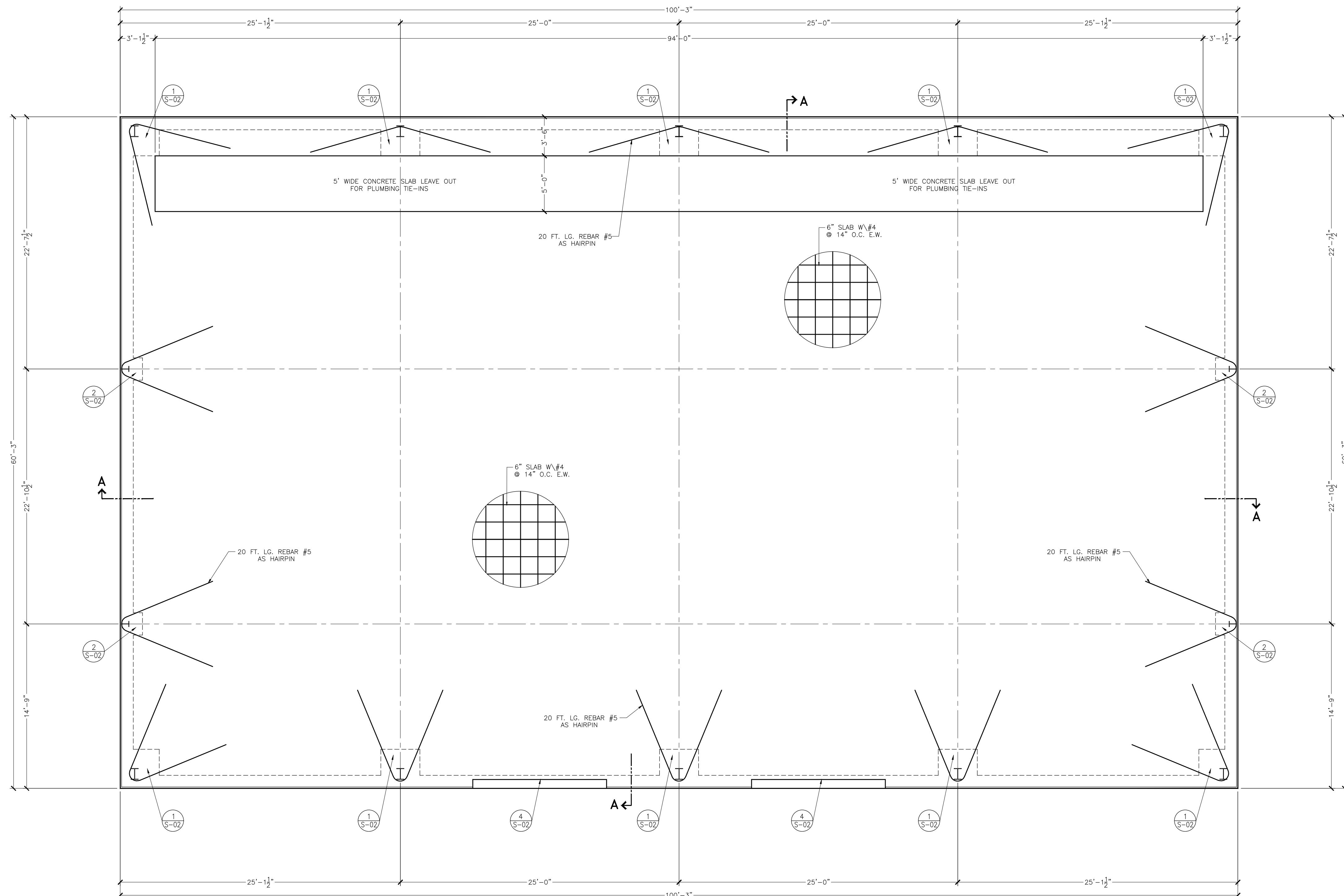


2 LEFT ELEVATION
SCALE: 1/8"=1'-0"



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

FOUNDATION NOTES:	
DESIGN & MISCELLANEOUS	
A. CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE UNIFORM BUILDING CODE LATEST EDITION OR LOCAL BUILDING CODES WHERE APPROPRIATE.	
B. THIS FOUNDATION IS DESIGNED IN ACCORDANCE WITH CURRENT ACCEPTABLE ENGINEERING PRACTICES FOR THE SITE SHOWN ON THE PLANS AND SHALL NOT BE USED IN ANY OTHER LOCATION.	
C. FOOTING DESIGN FOR A NET ALLOWABLE BEARING PRESSURE OF 2,000 PSF FOR DEAD LOAD PLUS SUSTAINED LIVE LOADS AND 3,000 PSF FOR DEAD LOADS PLUS SUSTAINED & TRANSIENT LIVE LOADS (WHICHEVER RESULTS IN A LARGE BEARING AREA (SEE SOIL REPORT))	
D. CONCRETE SHALL BE PLACED THE SAME DAY OF EXCAVATION.	
E. WHERE SHOWN IN SECTIONS, GRADE BEAMS SHALL BE CAST ON WAX-IMPRINCATED CORRUGATED FIBER CARTON VOID BOXES WHICH SHALL BE CENTERED UNDER GRADE BEAMS AND SHALL BE DISCONTINUED AT THE FOUNDATION WALL.	
F. BUILDER SHALL VERIFY ALL DIMENSIONS, DROPS, OFFSETS, BRICK LEDGES, INSERTS AND OPENINGS WITH ARCHITECTURAL DRAWINGS.	
G. THE FOUNDATION IS DESIGN IN ACCORDANCE WITH THE FOLLOWING GEOTECHNICAL INVESTIGATION:	
SOIL REPORT No.: RT21-172	
BY: RAM TESTING & DRILLING, LLC	
DATED: MARCH 4, 2021	
SITEWORK	
A. SITE PREPARATION BENEATH THE SLAB SHALL BE IN ACCORDANCE WITH THE SOIL REPORT AND SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS.	
1. REMOVE 6 INCHES OF TOPSOIL TO REMOVE ALL ORGANIC MATERIAL.	
2. REMOVE EXISTING SOIL AS REQUIRED TO A MINIMUM REQ'D. PLS. SOIL REPORT BELOW BOTTOM OF PROPOSED SLAB. DO NOT REUSE THIS MATERIAL FOR FILL.	
3. PROOF ROLL EXPOSED SUBGRADE, REPLACE ANY SOFT SPOTS WITH SELECT FILL MATERIAL AS SPECIFIED HEREIN.	
4. LARGE TREES AND SHRUBS SHOULD NOT BE ALLOWED CLOSER TO THE FOUNDATION THAN A HORIZONTAL DISTANCE EQUAL TO FOUR-FIFTHS THE VERT. HEIGHT AS TO THEIR SIGNIFICANT MOISTURE DEMAND UPON MATURING.	
5. BRING SUBGRADE TO REQUIRED ELEVATION WITH SELECT FILL MATERIAL AS SPECIFIED IN SOIL REPORT. DO NOT USE CLAYEY SAND, FREE OF ORGANIC MATERIAL, HAVING A PLASTICITY INDEX GREATER THAN 20, BUT LESS THAN 20.	
6. FILL EARTH EMBANKMENT TO A MINIMUM P.D. AND COMPACTED TO 95% OF ITS MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698 (STANDARD PROCTOR).	
B. THE FOUNDATION SHOULDN'T REST ON WELL-COMPACTED BANK SAND OR OTHER CLEAN GRANULAR MATERIAL.	
C. INITIAL SITE GRADING SHALL BE COMPLETED PRIOR TO SETTING FORMS. FINAL GRADE SHALL SLOPE AWAY FROM THE FOUNDATION. GRADE CHANGES SHALL BE SMOOTH SUCH THAT POSITIVE DRAINAGE AWAY FROM SLAB IS ASSURED.	
CONCRETE	
A. CONCRETE SHALL BE SUPPLIED AND CONSTRUCTED IN ACCORDANCE WITH ACI-310 LATEST EDITION AND SHALL HAVE A MINIMUM 20 DAY COMPRESSIVE STRENGTH AS FOLLOWS:	
1. COTTON BAGGED 3000 PSI	
2. SLABS-ON-GROUND 3000 PSI	
B. CONCRETE AGGREGATES SHALL BE IN ACCORDANCE WITH ASTM C33. CONCRETE PLACEMENT AND THE AREA OF CONCRETE TO BE USED WHERE SITE NECESSITATES CONCRETE TO BE PUMPED.	
C. WATER SHALL NOT BE ADDED TO CONCRETE AT THE JOBSITE UNLESS THE CONCRETE PLANT IS NOT CAPABLE OF ADDING IT. IF NEEDED, CONTRACTOR SHALL SPECIFY REQUIRED SLUMP ON JOB ORDER. CONCRETE PLANT TO INCREASE WORKABILITY BY ADDING WATER, ADDITIONAL CEMENT, ADDITIONAL CEMENT, OR OTHER APPROVED ADMIXTURES.	
D. CONCRETE SHALL NOT BE PLACED AT TEMPERATURES BELOW 40°F. CONCRETE SHALL NOT BE PLACED IN HEAT OR IN OTHER DVERSE WEATHER CONDITIONS.	
E. A 6 MIL POLYETHYLENE VAPOR BARRIER SHALL BE PLACED UNDER ALL SLABS-ON-GROUND AND SHOTBLASTED.	
F. CURE ALL SLABS WITH A CHEMICAL CURING COMPOUND OR KEEP MOIST 7 DAYS AFTER PLACEMENT.	
G. CONCRETE SHALL NOT BE PLACED LESS THAN 24 HOURS AND NO MORE THAN 6 DAYS AFTER PLACEMENT OF CONCRETE.	
REINFORCING STEEL	
A. REINFORCING STEEL SHALL BE ASTM A615 GRADE 60 WITH DIMENSIONS AS PER ASTM A505 AND SHALL BE DETAILED AND INSTALLED PER ACI-318 LATEST EDITION.	
B. WELDED WIRE FABRIC SHALL BE 6x6#2.9xW2.9 WWF (6 GAUGE) PER ASTM A152. WIRE FABRIC SHALL BE PLACED ON THE BOTTOM AND SUPPORTED AT 18 INCHES EACH WAY ON WWF CHAIRS.	
C. MINIMUM REINFORCING STEEL AND WWF COVERAGE SHALL BE AS FOLLOWS:	
DRILED FOOTINGS 2 1/2" SIDES, 6" BOTTOM SLABS-ON-GROUND 2 1/2" FROM EARTH GRADE BEAMS 3" BOTTOM, 2" TOP & SIDES	
D. WHERE FIELD SPLICES IN THE CONTINUOUS REINFORCING OCCUR, REINFORCING LAPPED AT 150% OF THE BAR DIAMETER. WWF LAPS SHALL BE 10 INCHES MINIMUM.	
E. PROVIDE CORNER BARS IN THE OUTSIDE FACE OF EXTERIOR GIRDERS AND PROVIDE REINFORCING STEEL FROM THE INTERSECTING INTERIOR AND EXTERIOR BEAMS.	
F. AT ALL RE-ENTRANT CORNERS, PLACE 2, #4 x 5'-0" IN THE SLAB.	
G. EXISTING FILL SHALL BE REPLACED IN ACCORDANCE WITH THE SOILS REPORT.	
H. IF AMBIENT TEMPERATURES WILL REACH ABOVE 60°F, THE ENTIRE SLAB SURFACE SHALL BE ADDITIONALLY CURED BY KEEPING IT WET FOR A MINIMUM OF 72 HOURS, COMMENCING THE MORNING AFTER CONCRETE PLACEMENT.	



FOUNDATION PLAN

-SEE FOUNDATION DETAILS IN DWG. S-02

SEE DOORS & ANCHOR BOLTS LOCATIONS IN ANCHOR BOLT SETTING PLAN OF METAL BUILDING FABRICATORS

DESIGN LOADS & CODES

ROOF :
DEAD LOAD = 5 PSF
LIVE LOAD = 20 PSF

WINDLOAD :
110 MPH, 3 SEC. GUSTS EXP. "C"

APPLICABLE CODES :
2015 IBC, IN ADDITION TO LOCAL CODE REQ'S.
AISC STEEL CONSTRUCTION MANUAL (15th EDITION)

COMPACTED SELECT FILL NOTE:
THE COMPACTED SELECT FILL SHOULD BE ACCORDING TO SOIL REPORT RECOMMENDATIONS

POSITIVE DRAINAGE GRADE NOTE:
THE FOUNDATION SHOUL HAVE POSITIVE DRAINAGE ACCORDING TO THE SOIL REPORT.

GEOTECHNICAL EVALUATION NOTE:
THIS FOUNDATION IS DESIGN IN ACCORDANCE WITH THE FOLLOWING GEOTECHNICAL INVESTIGATION:
SOIL REPORT No.: RT21-172
BY: RAM TESTING & DRILLING, LLC
DATED: MARCH 4, 2021

ABC DESIGN STUDIO

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abcsdesignstudio@yahoo.com

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DESIGN BY: JLT
SCALE: 3/16" = 1'-0"
ABC PROJ. NO.: ABC22-43

FLOOR/PLAN ZONE:
FEMA MAP PANEL:
KEY MAP:

PROPOSED METAL BUILDING AT
LOT 14, HIGH MEADOW INDUSTRIAL LANE
MAGNOLIA, TX 77355
MONTGOMERY COUNTY, TEXAS

TITLE: FOUNDATION PLAN

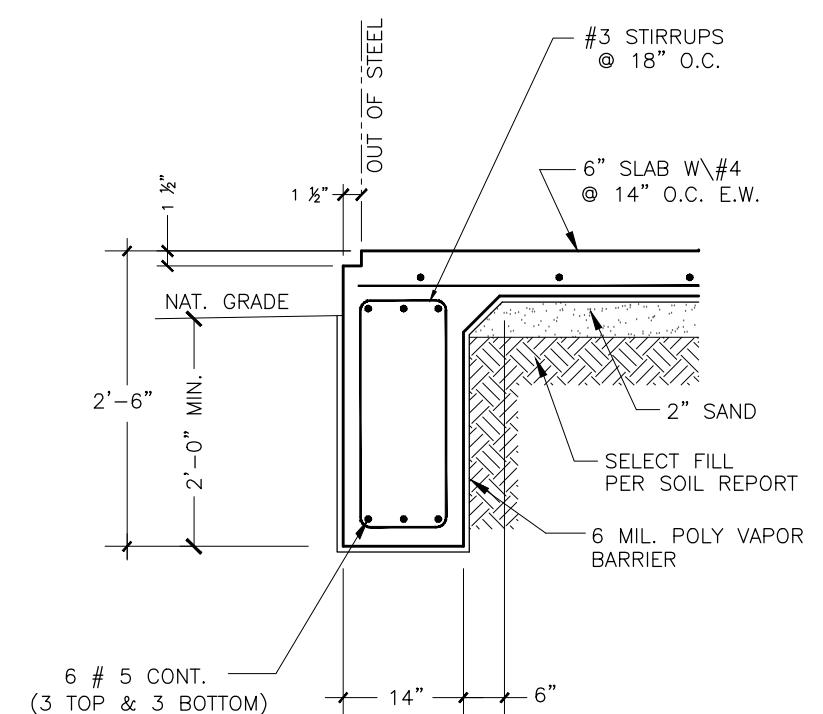
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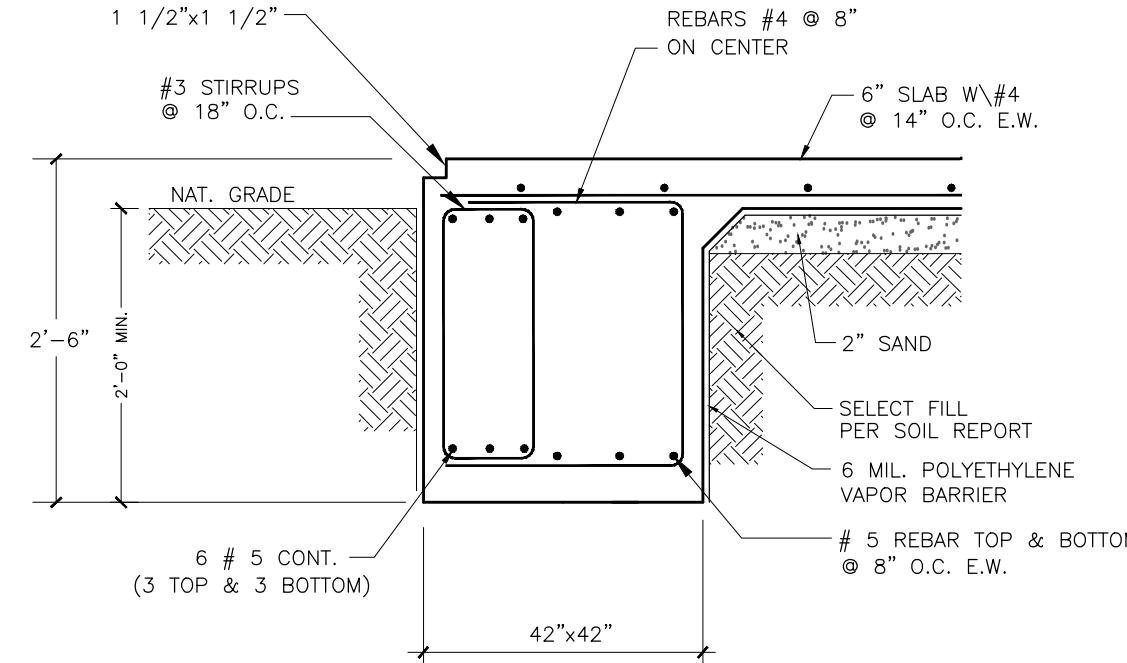
8-4-2021

F-10510

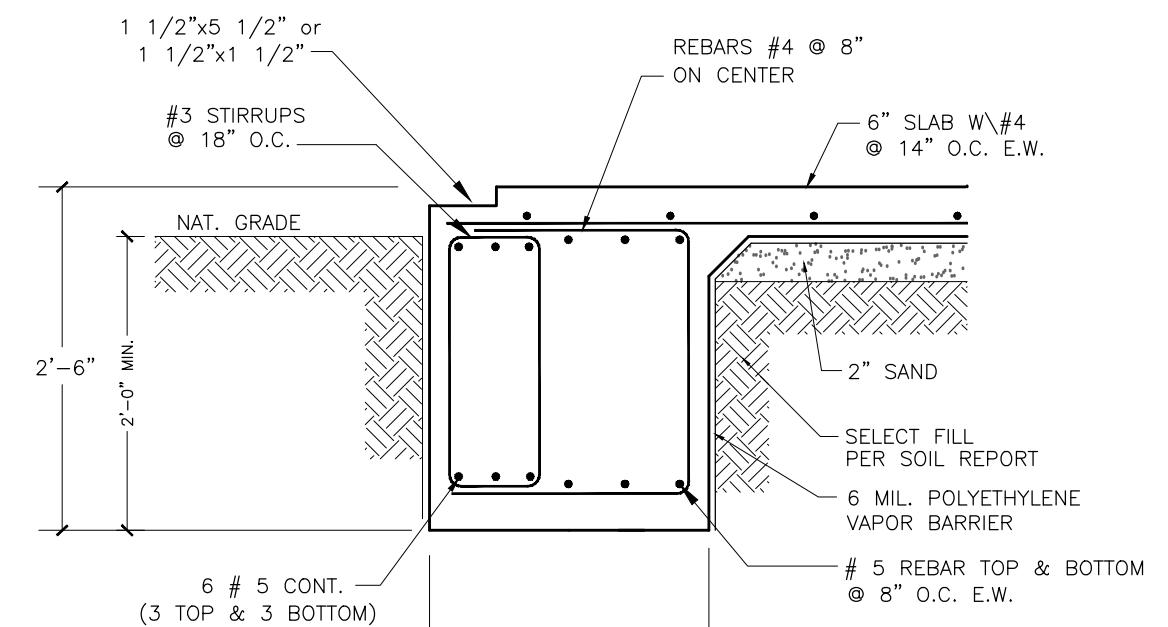
FOUNDATION NOTES:	
DESIGN & MISCELLANEOUS	
A. CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE UNIFORM BUILDING CONSTITUTE EDITION OR LOCAL BUILDING CODES WHERE APPLICABLE.	
B. THIS FOUNDATION IS DESIGNED IN ACCORDANCE WITH CURRENT ACCEPTABLE ENGINEERING PRACTICE FOR THE SITE SHOWN ON THE FOUNDATION PLAN. IT IS NOT USED IN ANY OTHER LOCATION.	
C. FOOTING DESIGN FOR A NET ALLOWABLE BEARING PRESSURE OF 2,000 PSF FOR DEAD LOAD PLUS SUSTAINED LIVE LOADS AND 3,000 PSF FOR DEAD LOADS PLUS SUSTAINED & TRANSIENT LIVE LOADS WHICHEVER RESULTS IN A LARGE BEARING AREA. (SEE SOIL REPORT)	
D. POUR CONCRETE IN ONE DAY. CONCRETE SHALL NOT BE PLACED OVER CONCRETE SHALL BE PLACED THE SAME DAY OF EXCAVATION.	
E. WHERE SHOWN IN SECTION, GRADE BEAMS SHALL BE CAST ON WAX-IMPERMEATED CORRUGATED FIBER CARTON VOID BOXES WHICH SHALL BE PLACED ON SELECT FILL. GRADE BEAMS SHALL BE CENTERED UNDER GRADE BEAMS AND SHALL BE DISCONTINUED AT THE LOAD TRANSFER POINTS.	
F. BUILDER SHALL VERIFY ALL DIMENSIONS, DROPS, OFFSETS, BRICK LEDGES, INSERTS AND OPENINGS WITH ARCHITECTURAL DRAWINGS.	
G. THE FOUNDATION IS DESIGN IN ACCORDANCE WITH THE FOLLOWING GEOTECHNICAL INVESTIGATION:	
SOIL REPORT NO.: RT21-172 BY: RAM TESTING & DRILLING, LLC DATED: MARCH 4, 2021	
SITEWORK	
A. SITE PREPARATION BENEATH THE SLAB SHALL BE IN ACCORDANCE WITH THE SOIL REPORT AND SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS:	
1. STRIP 6 INCHES OF TOPSOIL TO REMOVE ALL ORGANIC MATERIAL.	
2. LEVEL EXISTING SOIL AS REQUIRED TO A MINIMUM R.E.D. PER SOIL REPORT. BELOW BOTTOM OF PROPOSED SLAB, DO NOT REUSE THIS MATERIAL FOR FILL.	
3. PROOF ROLL EXPOSED SUBGRADE, REPLACE ANY SOFT FIELDS WITH SELECT FILL MATERIAL AS SPECIFIED HEREIN.	
4. LARGE TREES AND SHRUBS SHOULD NOT BE ALLOWED CLOSER THAN THE FOUNDATION TO A HORIZONTAL DISTANCE EQUAL TO ROUGHLY THEIR MATURE HEIGHT DUE TO THEIR SIGNIFICANT MOISTURE DEMAND UPON MATURING.	
5. BRING SUBGRADE TO REQUIRED ELEVATION WITH SELECT FILL MATERIAL. USE A 6 MIL POLYETHYLENE VAPOR BARRIER OR CLAYEY SAND, FREE OF ORGANIC MATERIAL, HAVING A PLACIETY INDEX GREATER THAN 20 BUT LESS THAN 20.	
6. FILL SOILS TO PLAIN MAXIMUM DENSITY, BUT NOT COMPACTED TO 95% OF ITS MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698 (STANDARD PROCTOR).	
B. THE ONE INCH SLAB SHALL BE WELL-COMPACTED BANK SAND OR OTHER CLEAR GRANULAR MATERIAL.	
C. INITIAL SITE GRADING SHALL BE COMPLETED PRIOR TO SETTING FORMS. FINAL GRADE SHALL SLOPE AWAY FROM THE FOUNDATION. GRADE BEAMS SHALL BE CENTERED UNDER THE FOUNDATION. SUCH THAT POSITIVE DRAINAGE AWAY FROM SLAB IS ASSURED.	
CONCRETE	
A. CONCRETE SHALL BE SUPPLIED AND CONSTRUCTED IN ACCORDANCE WITH ACI-310 LATEST EDITION AND SHALL HAVE A MINIMUM 20 DAY COMPRESSIVE STRENGTH AS FOLLOWS:	
FOOTINGS: 3000 PSI SLABS-ON-GROUND 3000 PSI	
B. CONCRETE AGGREGATES SHALL BE IN ACCORDANCE WITH ASTM C33-17 EDITION. GRAVEL AND SAND SHALL BE USED WHERE SITE NECESSITATES CONCRETE TO BE PUMPED.	
C. WATER SHALL NOT BE ADDED TO CONCRETE AT THE JOBSITE UNLESS APPROVED BY THE ENGINEER. IF ADDITION OF WATER IS NEEDED, CONTRACTOR SHALL SPECIFY REQUIRED SLUMP ON JOB ORDER. CONCRETE PLANT TO INCREASE WORKABILITY BY ADDING WATER, ADDITIONAL CEMENT, ADDITIONAL CEMENT, OR OTHER APPROVED ADMIXTURES.	
D. CONCRETE SHALL NOT BE PLACED AT TEMPERATURES BELOW 40 DEGREES FARENHEIT, OR IN OTHER WAYS OR IN OTHER ADVERSE WEATHER CONDITIONS.	
E. A 6 MIL POLYETHYLENE VAPOR BARRIER SHALL BE PLACED UNDER ALL SLABS. IT SHALL BE TAPERED.	
F. CURE ALL SLABS WITH A CHEMICAL CURING COMPOUND OR KEEP MOIST 7 DAYS AFTER PLACEMENT.	
G. PLACEMENT OF CONCRETE NOT LESS THAN 24 HOURS AND NO MORE THAN 6 DAYS AFTER PLACEMENT OF CONCRETE.	
REINFORCING STEEL	
A. REINFORCING STEEL SHALL BE ASTM A615 GRADE 60 WITH DEFORMATIONS PER ASTM A305 AND SHALL BE DETAILED AND INSTALLED PER ACI-318 LATEST EDITION.	
B. WELDED WIRE FABRIC SHALL BE 6x6W2.5W2.9 WWF (6 GAUGE) PER ACI-318 LATEST EDITION. THE WELDED WIRE FABRIC SHALL BE SUPPORTED AT 18 INCHES EACH WAY ON WWF CHAIRS.	
C. MINIMUM REINFORCING STEEL AND WWF COVERAGE SHALL BE AS FOLLOWS:	
DRILLED FOOTINGS 2 1/2" SIDES, 6" BOTTOM SLABS-ON-GROUND 2 1/2" FROM EARTH GRADE BEAMS 3" BOTTOM, 2" TOP & SIDES	
D. WHERE FIELD SPLICES IN THE CONTINUOUS REINFORCING OCCUR, ENSURE THAT LAPPED AT LEAST 30 TIMES THE BAR DIAMETER. WWF LAPS SHALL BE 10 INCHES MINIMUM.	
E. PROVIDE CORNER BARS IN THE OUTSIDE FACE OF EXTERIOR CONCRETE BEAMS AND REINFORCING STEEL FROM THE INTERSECTING EXTERIOR AND EXTERIOR BEAMS.	
F. AT ALL RE-ENTRANT CORNERS, PLACE 2 #4 x 5'-0" IN THE SLAB.	
G. EXISTING FILL SHALL BE REPLACED IN ACCORDANCE WITH THE SOILS REPORT.	
H. IF EXISTENT TEMPERATURES WILL REACH ABOVE 60F, THE ENTIRE SLAB SURFACE SHALL BE ADDITIONALLY CURED BY KEEPING IT WET FOR A MINIMUM OF 72 HOURS, COMMENCING THE MORNING AFTER CONCRETE PLACEMENT.	



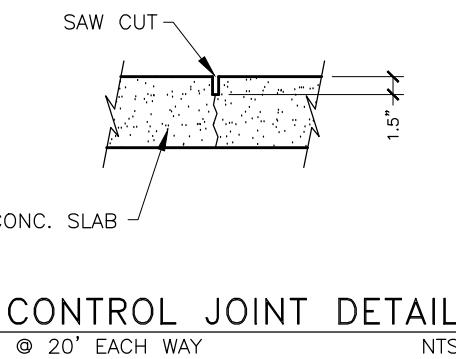
SECTION A
N.T.S.



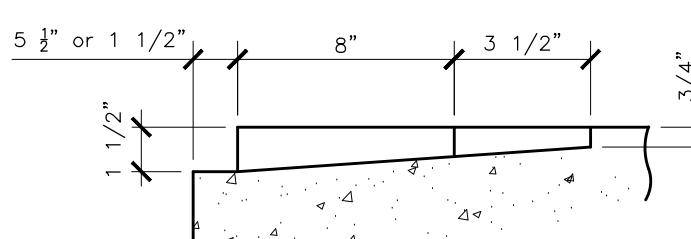
1 FOOT BLOCK DETAIL
N.T.S.



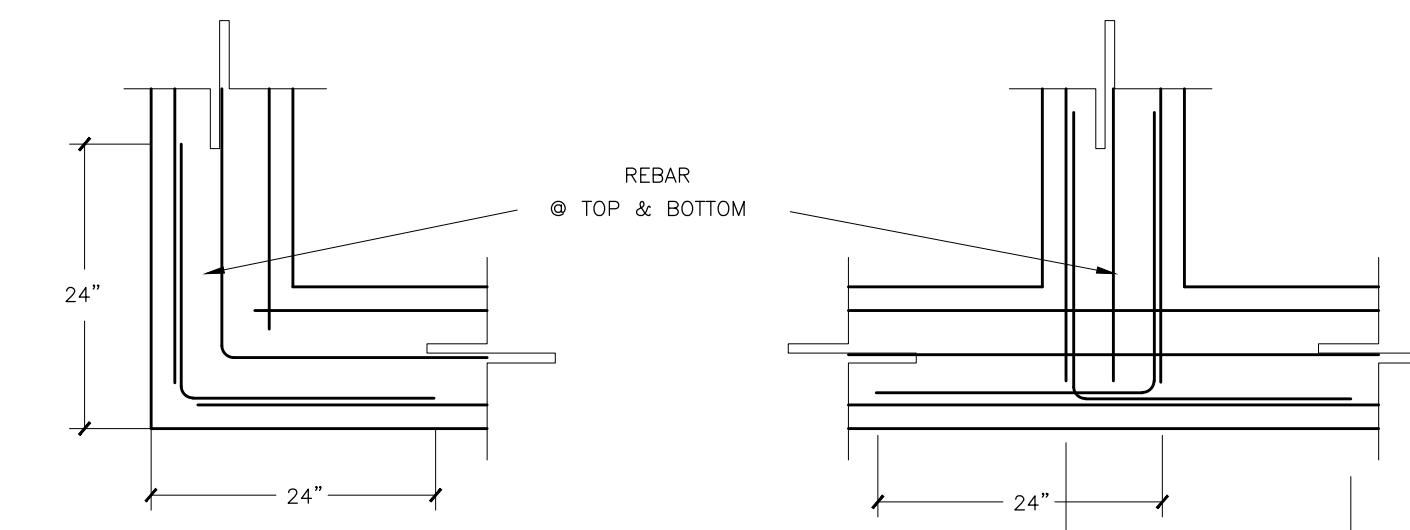
2 FOOT BLOCK DETAIL
N.T.S.



3 CONTROL JOINT DETAIL
N.T.S.



4 GARAGE DOORS SECTION
N.T.S.



TYPICAL BAR PLACING DETAILS
@ CORNER & INTERSECTION
N.T.S.

DESIGN LOADS & CODES	
ROOF :	
DEAD LOAD = 5 PSF	LIVE LOAD = 20 PSF
WINDLOAD :	110 MPH, 3 SEC. GUSTS EXP. "C"

COMPACTED SELECT FILL NOTE:	
THE COMPACTED SELECT FILL SHOULD BE ACCORDING TO SOIL REPORT RECOMMENDATIONS	
POSITIVE DRAINAGE GRADE NOTE:	
THE FOUNDATION SHOULD HAVE POSITIVE DRAINAGE ACCORDING TO THE SOIL REPORT.	

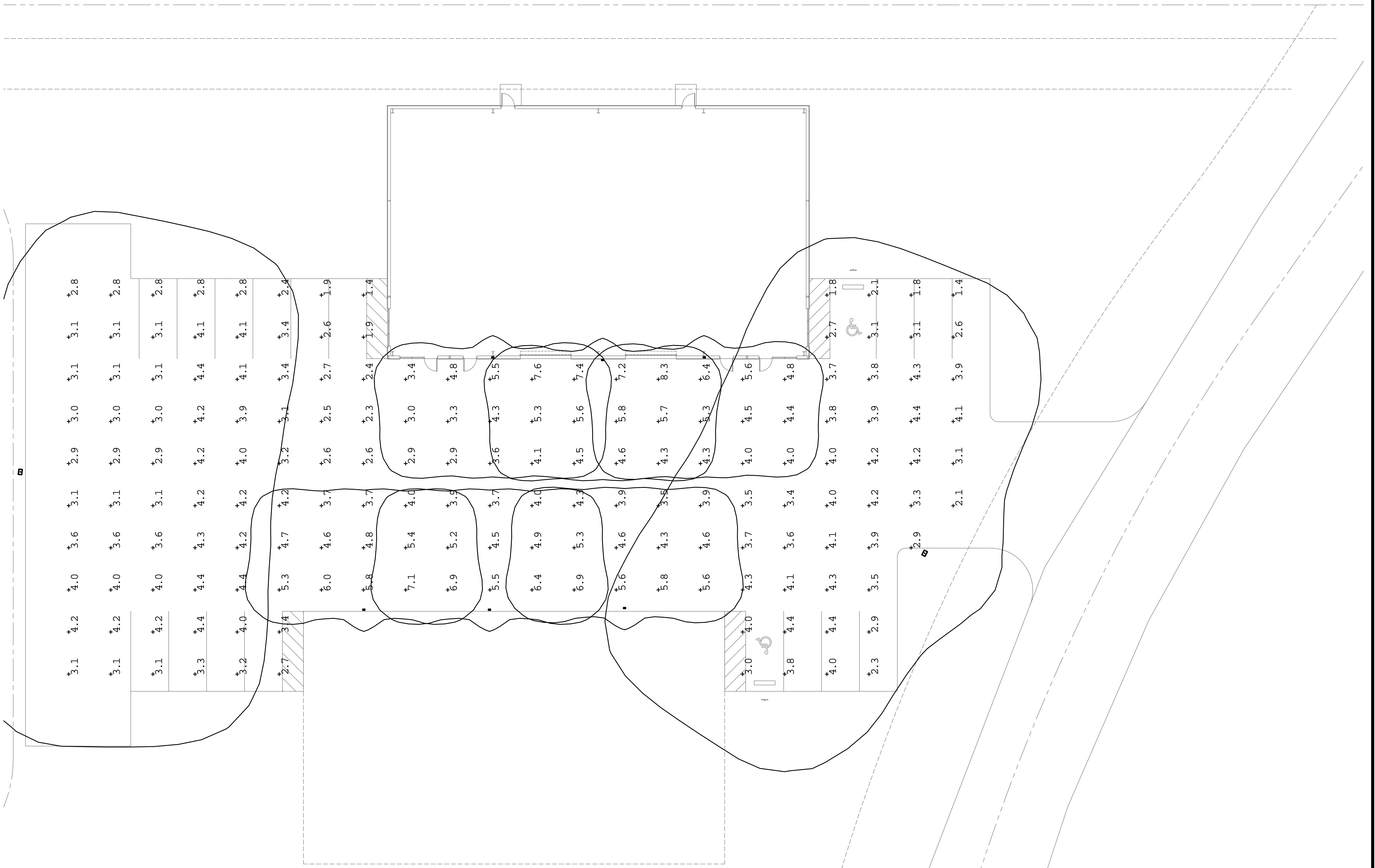
GEOTECHNICAL EVALUATION NOTE:	
THIS FOUNDATION IS DESIGN IN ACCORDANCE WITH THE FOLLOWING GEOTECHNICAL INVESTIGATION:	
SOIL REPORT NO.: RT21-172	
BY: RAM TESTING & DRILLING, LLC	
DATED: MARCH 4, 2021	

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DESIGN BY:	JLT
SCALE:	3/16" = 1'-0"
ABC PROJ. NO.:	ABC21-43
FLOODPLAIN ZONE:	
FEMA MAP PANEL:	
KEY MAP:	
PROPOSED METAL BUILDING AT LOT 14, HIGH MEADOW INDUSTRIAL LANE MAGNOLIA, TX 77355 MONTGOMERY COUNTY, TEXAS	
DATE:	AUGUST 2, 2021
OWNER:	JOSEPH LUIS TREVINO 96-485 1000 E. 1000 S. MAGNOLIA, TX 77355
LEGAL DESC:	
TITLE:	FOUNDATION DETAILS
REVISION:	S-02



8-4-2021
F-10510



**www.breakthroughengineeringdesigns.com
832-413-5390 phone
832-200-1559 fax**

BREAK THROUGH ENGINEERING DESIGNS

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BREAKTHROUGH ENGINEERING, LLC - FIRM F-11984
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TO THE RESPONSIBLE ENGINEER IS AN OFFENSE
UNDER THE TEXAS ENGINEERING PRACTICE ACT.
SONYA@BTMEP.COM 832.413.5390 X101

A circular seal for a professional engineer. The outer ring contains the text "STATE OF TEXAS" at the top and "PROFESSIONAL ENGINEER" at the bottom, separated by a horizontal line. The inner circle contains a five-pointed star in the center. Below the star, the name "SONYA J. BUTTS" is written. At the bottom of the inner circle, the license number "101008" is displayed. A date "07/10/01" is also present at the bottom.

ET TITLE:

PHOTOMETRICS SITE PLAN

ET NO:

GENERAL NOTES

A) REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF LIGHTING FIXTURES. VERIFY FIXTURE TYPE AND CEILING COMPATIBILITY PRIOR TO ORDERING FIXTURES.

B) WHERE LIGHT SWITCHES ARE SHOWN ADJACENT TO ONE ANOTHER, THEY SHALL BE GANGED UNDER A COMMON FACEPLATE.

C) FURNISH AND INSTALL SECURITY CLIPS ON ALL FOUR
SIDE OF 2'X4', 2'X2' AND 1'X4' RECESSED FIXTURES. SEE
GENERAL LIGHTING NOTE (LIGHTING FIXTURE SCHEDULE).

D) EXIT LIGHTS CONNECTED TO EMERGENCY GENERATOR POWER: CONNECT ALL EXIT LIGHTS TO UN-SWITCHED POWER, AHEAD OF LIGHT SWITCHES. EXIT LIGHTS ARE SWITCHED AT PANEL ONLY. CONNECT EXIT LIGHTS TO EMERGENCY CIRCUIT SLELS-11.

E) EMERGENCY EGRESS LIGHTS:
(1) EMERGENCY POWER PROVIDED BY GENERATOR:
FLUORESCENT & NON-FLUORESCENT FIXTURES:
CONNECT ALL EMERGENCY EGRESS LIGHTS TO
UN-SWITCHED GENERATOR POWER UNLESS INDICATED
OTHERWISE ON PLANS. FIXTURES SWITCHED AT PANEL
ONLY. CONNECT EGRESS LIGHTS TO CIRCUIT HLS-1.

(a) NON-FLUORESCENT FIXTURE: CONNECT ALL
EMERGENCY EGRESS LIGHTS TO UN-SWITCHED NORMAL
POWER UNLESS OTHERWISE INDICATED ON PLANS.

FIXTURES SWITCHED AT PANEL ONLY.

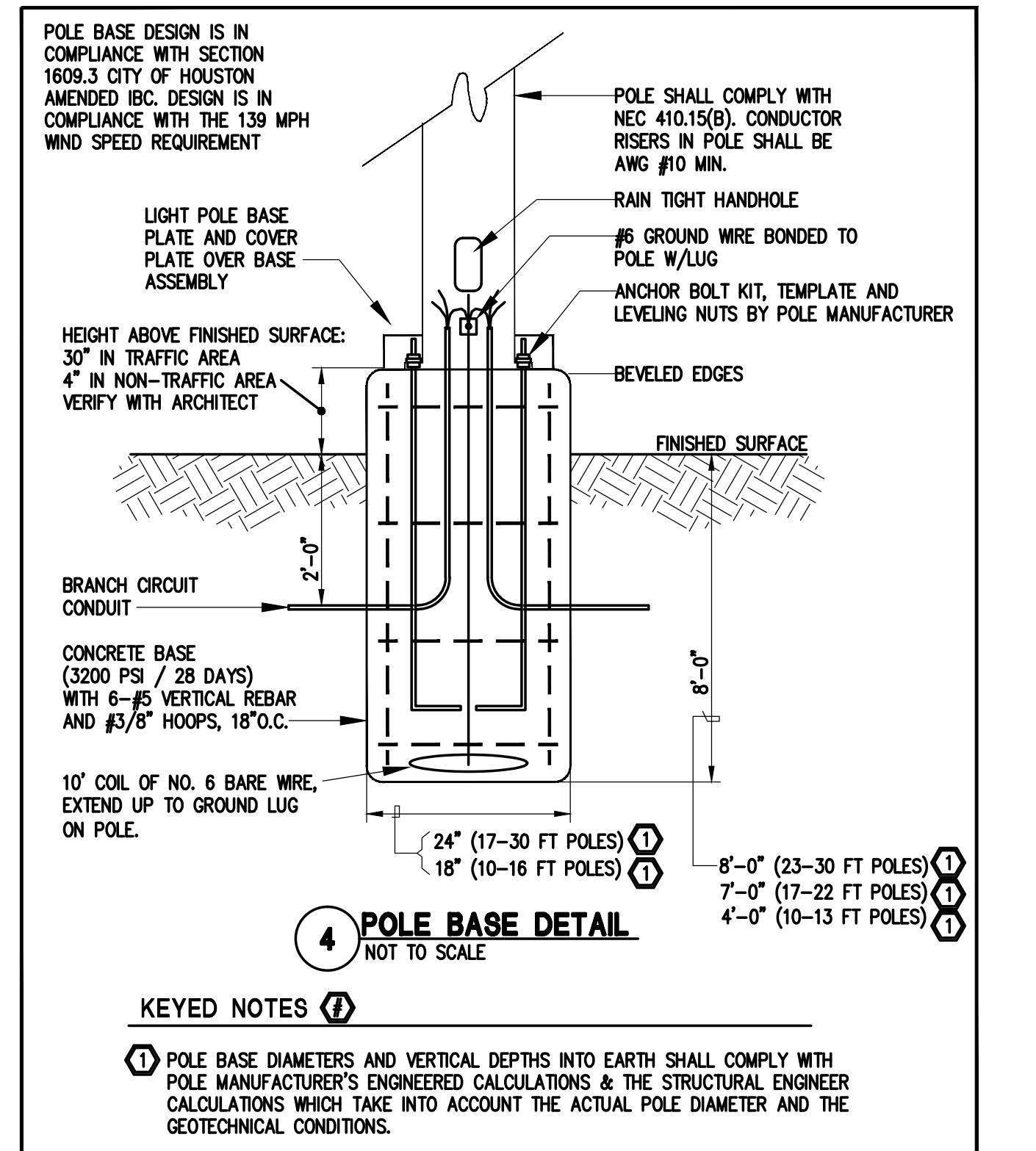
LEGENDS

- DUPLEX RECEPTACLE
- QUAD RECEPTACLE
- FLOOR MOUNTED RECEPTACLE
- JUNCTION BOX
- ▲ COMBINATION DATA/PHONE OUTLET
- SINGLE POLE SWITCH
- THREE WAY SWITCH
- MOTOR RATED SWITCH
- OCCUPANCY SENSOR SWITCH - SEE OCCUPANCY SENSOR DETAIL

KEYED NOTES

- ① COORDINATE MOUNTING ELEVATION WITH ARCHITECT.
- ② TC: HOMERUN TO PANEL VIA DIGITAL TIMECLOCK,TC. PROVIDE COMMERCIAL GRADE DIGITAL TIMECLOCK, INTERMATIC ET8215CR OR EQUAL. TIMECLOCK SHALL HAVE STEEL NEMA 3R ENCLOSURE, 7-DAY ASTRONOMIC ELECTRONIC TYPE TIME SWITCH TO CONTROL TWO LIGHTING CIRCUITS. MOUNT TIMECLOCK NEXT TO SOURCE PANEL. LABEL TIMECLOCK FOR CANOPY LIGHTING APPROPRIATELY AND INDICATE ASSOCIATED CIRCUITS.
- ③ TELEPHONE CABINET. INSTALL CABINET AND CONDUITS PER AT&T REQUIREMENTS.
- ④ TC: HOMERUN TO PANEL VIA DIGITAL TIMECLOCK,TC. PROVIDE COMMERCIAL GRADE DIGITAL TIMECLOCK, INTERMATIC ET8215CR OR EQUAL. TIMECLOCK SHALL HAVE STEEL NEMA 3R ENCLOSURE, 7-DAY ASTRONOMIC ELECTRONIC TYPE TIME SWITCH TO CONTROL TWO LIGHTING CIRCUITS. MOUNT TIMECLOCK NEXT TO SOURCE PANEL. LABEL TIMECLOCK FOR PARKING LOT LIGHTING APPROPRIATELY AND INDICATE ASSOCIATED CIRCUITS.
- ⑤ PROVIDE (1) 2" EMPTY CONDUIT WITH PULL STRING FOR FUTURE POWER SERVICE. ROUTE AT BAR JOIST LEVEL. CONTRACTOR TO COORDINATE TERMINATION OF CONDUIT WITH OWNER PRIOR TO INSTALLATION, AND CAP AND TAG EACH END.
- ⑥ PROVIDE (1) 2" EMPTY CONDUIT WITH PULL STRING FOR FUTURE TELEPHONE SERVICE. ROUTE AT BAR JOIST LEVEL. CONTRACTOR TO COORDINATE TERMINATION OF CONDUIT WITH OWNER PRIOR TO INSTALLATION, AND CAP AND TAG EACH END.
- ⑦ OUTDOOR EMERGENCY LIGHTING IS NOT REQUIRED PER THE 2015 IBC 1006.3(3) AND (5) BECAUSE THE LEASE SPACES DO NOT REQUIRE 2 EXITS, RATHER THEY HAVE 2 EXITS FOR CONVENIENCE. TWO OR MORE EXITS ARE REQUIRED IF (IBC 2015 SECTION 1015.1):
 - a) OCCUPANCY IS GREATER THAN 49 PEOPLE, OR
 - b) THE COMMON PATH OF EGRESS TRAVEL EXCEEDS 75 FEET, OR
 - c) SPECIAL MACHINERY ROOMS ARE IN THE SPACE. EACH LEASE SPACE DOES NOT SATISFY ANY OF THESE CONDITIONS THEREFORE NO OUTSIDE EMERGENCY LIGHTING IS REQUIRED.
- ⑧ FOR IRRIGATION CONTROLLER. FIELD COORDINATE EXACT LOCATION OF IRRIGATION CONTROLLER AND EXTEND POWER AS REQUIRED.

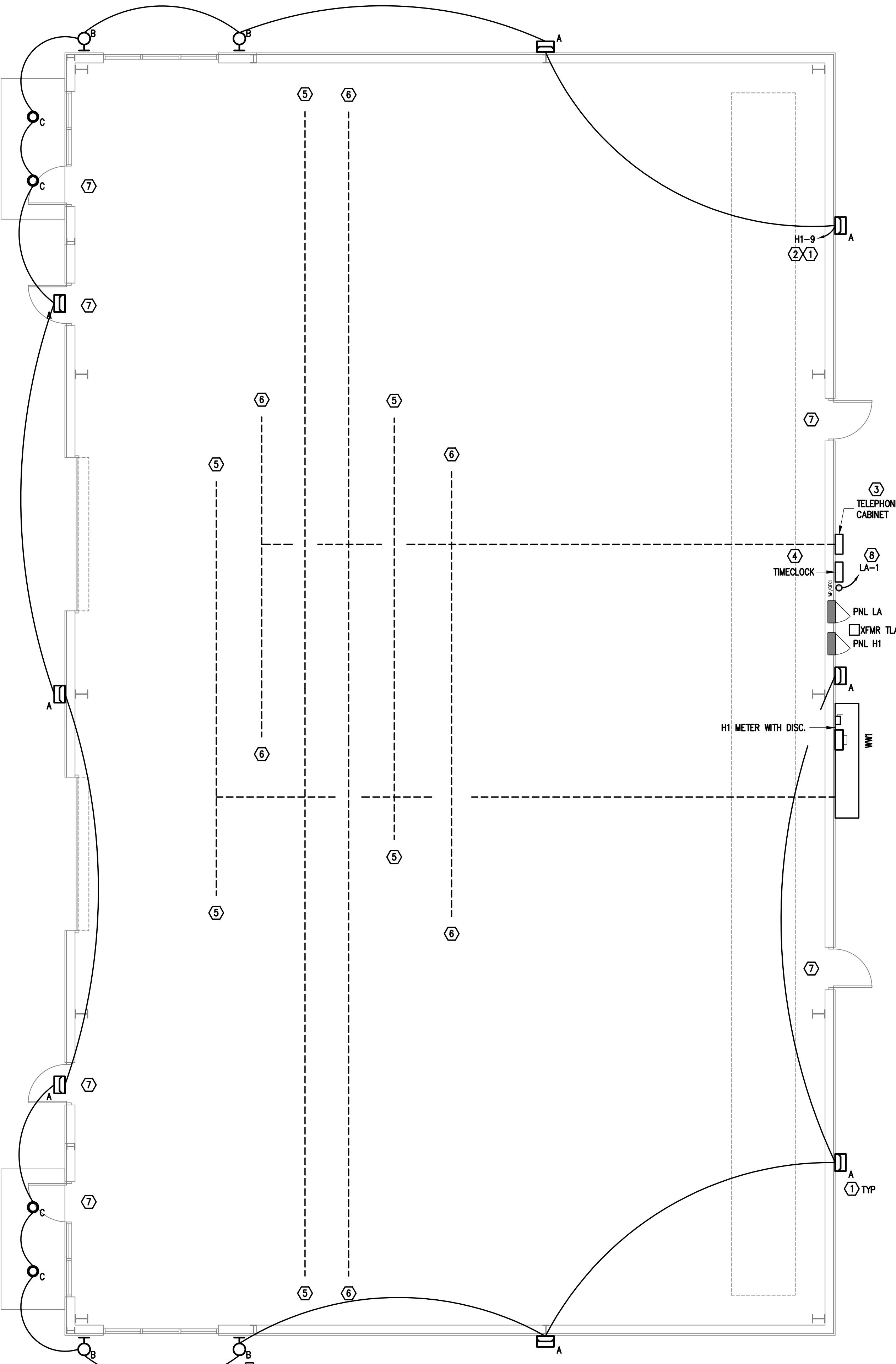
POLE BASE DESIGN IS IN
COMPLIANCE WITH SECTION
1609.3 CITY OF HOUSTON
AMENDED IBC. DESIGN IS IN
COMPLIANCE WITH THE 139 MPH



LIGHTING FIXTURE SCHEDULE

LIGHTING FIXTURE SPECIFICATIONS					
Type	Descriptions	Mounting	Lamp (Qty., Watt and Type)	Volts	Remarks
	LED WALL PACK LIGHT	SURFACE	45W LED	277V	1,2
	6" LED WALL SCONCE LIGHT	SURFACE	23W LED	277V	1,2
	6" LED RECESSED LIGHT	LAY IN	23W LED	277V	1,2

1. PROVIDE ALL NECESSARY ACCESSORIES AS REQUIRED FOR A COMPLETE AND OPERATING SYSTEM.
2. SELECTION TO BE APPROVED BY ARCHITECT AND OWNER BEFORE PURCHASING.



1 ELECTRICAL PLAN
SCALE: 3/16" = 1'-0"

**www.breakthroughengineeringdesigns.com
832-413-5390 phone
832-200-1559 fax**

THE SEAL APPEARING ON THIS DOCUMENT WAS
AUTHORIZED BY SONYA J. BUTTS - P.E. 101008
BREAKTHROUGH ENGINEERING, LLC - FIRM F-11984
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SEALED DOCUMENT WITHOUT PROPER NOTIFICATION
TO THE RESPONSIBLE ENGINEER IS AN OFFENSE
UNDER THE TEXAS ENGINEERING PRACTICE ACT

27/10/2011

ELECTRICAL PLAN

SHE

E1.2

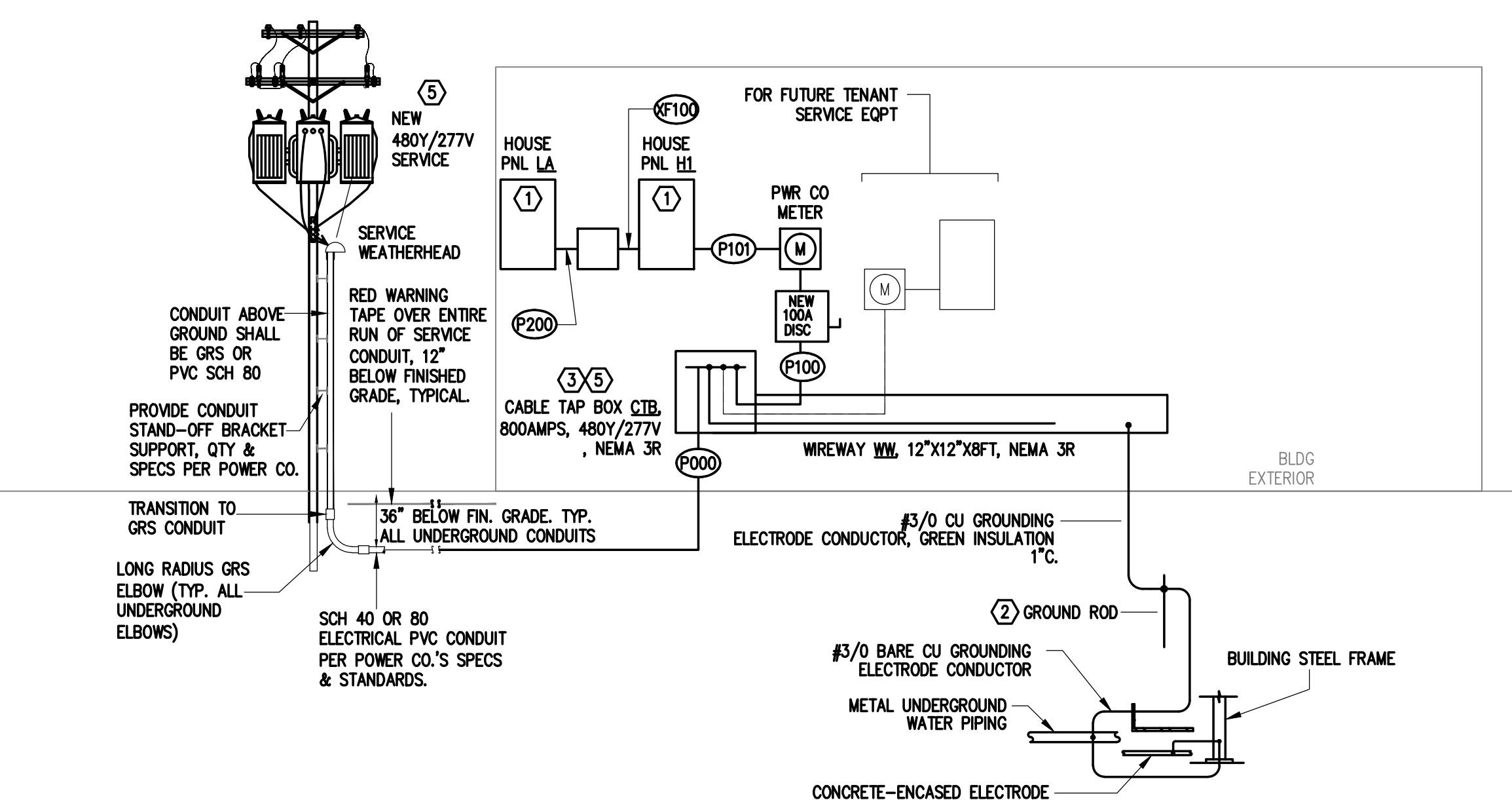
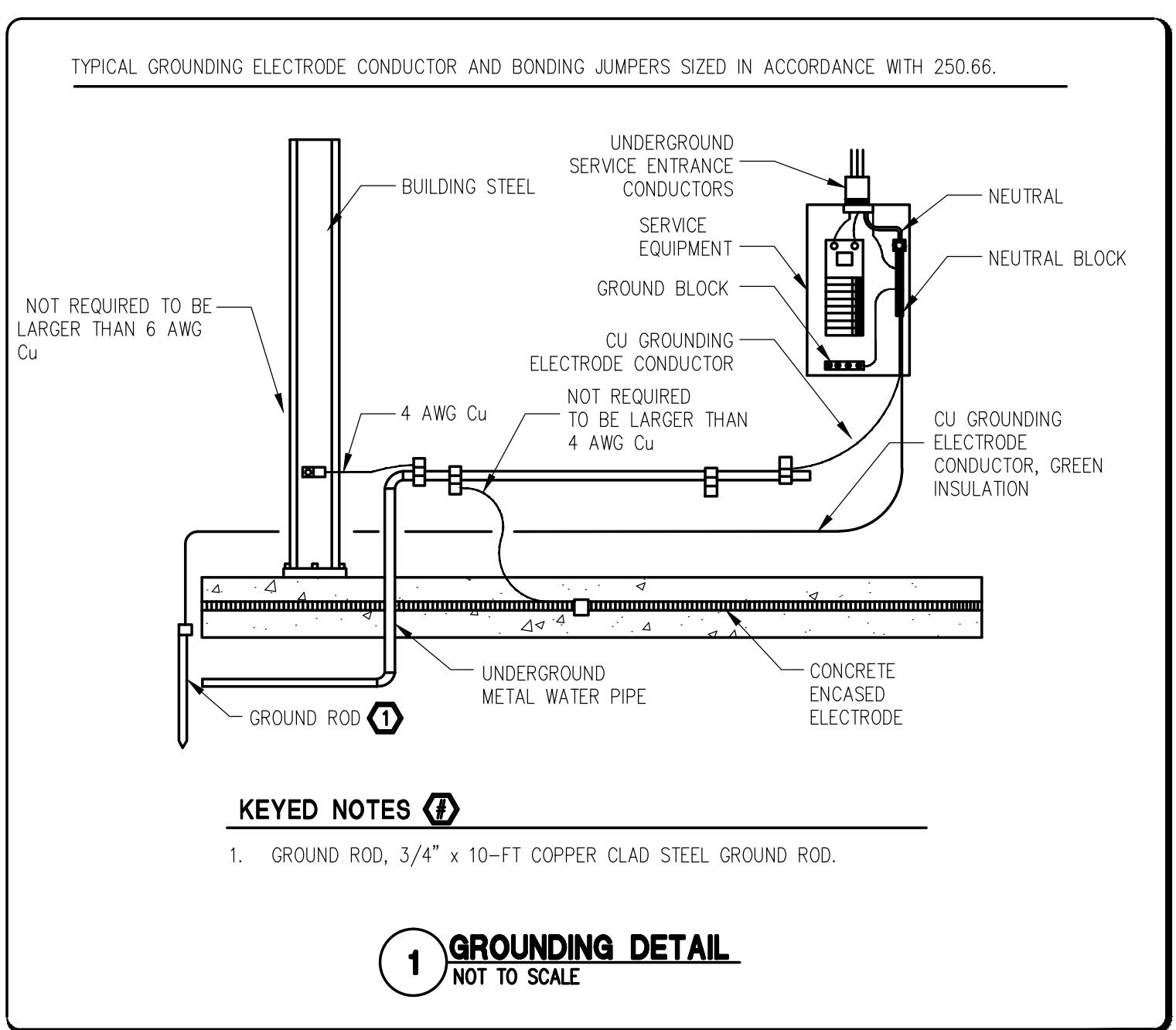
ELECTRICAL LOAD ANALYSIS HIGH MEADOW SHELL						
SERVICE VOLTAGE:		480Y/277V, 3 PHASE, 4 WIRE				
OCCUPANCY:		STORES				
	CONN. LOAD KVA	DIV. %	CALCULATED LOAD KVA	CALCULATED LOAD AMP	COMMENTS	
1 LIGHTS (select larger of (a) or (b))				—		
(a) CONNECTED LOADS				—		
(b) 6,000 SF x 3 VA/SF	18.0	125%	22.5	27.1	code loads larger than connected loads	
2 RECEPTACLES (Qty 1@180VA each=.2kva)		0.2	0.2	0.2		
3 COOLING LOADS - HVAC				—		
4 HEATING LOADS - HVAC (non-coincident w/cooling)				—		
5 HEATING LOADS - HVAC (coincident w/cooling)				—		
6 MOTOR				—		
7 MISC. CONTINUOUS LOADS				—		
8 KITCHEN LOADS				—		
9 OUTSIDE LIGHTING	1.0	125%	1.3	1.5		
10 NON-COINCIDENT LOADS				—	—	
11 TRANSFORMER SPARE CAPACITY	8.8		8.8	10.6		
25% largest motor				—		
TOTAL LOADS	30.8 kva		53.6 kva	64.4 A		
PROPOSED SERVICE CAPACITY	665 kva		800 A			
*Provide service feeder from Power Co. : 2 runs of 4#600 KCM, 4" conduit (RMC) THHN/THWN (Equivalent aluminum feeders acceptable)						
Service Feeder Capacity	698 KVA		840 AMP			
Provide bussed C.T. can, P.T. box & meter per CenterPoint's service standards						
Spare Capacity Available	612 kva		736 A		Percent Spare Capacity Available = 92%	
Grounding Electrode Conductor (NEC article 250.66)	#3/0					
** Provide ground wire where required by local Pwr Co						

Short Circuit Point-to-Point Calculations

HIGH MEADOW SHELL

EQPT	DIST. FROM UPSTREAM EQPT (FT)	CALCULATED SHORT CCT CURRENT (AMPS)	EQPT A.I.C. RATINGS (AMPS)
WW1	225	3,436	14,000
HA	5	3,406	14,000
LA	5	901	10,000

NOTE 1: DO NOT USE "DIST. FROM UPSTREAM EQPT (FT)" FOR MATERIAL TAKE-OFF.
DISTANCES MAY VARY DEPENDING ON ACTUAL FIELD CONDITIONS.



KEYED NOTES

- CONTRACTOR SHALL PERFORM SHORT CIRCUIT & ARC FLASH HAZARD CALCULATIONS AND PROVIDE PERMANENTLY ATTACHED LABEL ON SERVICE EQUIPMENT AT TIME OF INSTALLATION, INDICATING THE AVAILABLE FAULT CURRENT AND THE DATE OF CALCULATION. LABEL SHALL BE 2" X 3" IN SIZE AND BLUE LETTERING ON CONTRASTING BACKGROUND. THIS LABEL SHALL ALSO INCLUDE THE DATE OF CALCULATION.
IN ADDITION TO THE ABOVE LABEL, PROVIDE A SIMILAR LABEL TO WARN PERSONS OF POTENTIAL ELECTRIC ARC FLASH HAZARDS, IN COMPLIANCE WITH NEC 110.16.
- 3/4" x 10-FT COPPER CLAD STEEL GROUND ROD
- CABLE TAP BOX (CTB) SHALL BE FABRICATED FROM 12 GA. MILD STEEL.
- CTB TO BE POWER COATED #61 LT GRAY.
- CTB COVER TO HAVE TWO LIFTING HANDLES AND PAD LOCKING PROVISIONS.
- BU SUPPORTS TO BE FORMED FROM 1/4"X2" FLAT BAR WITH 600V, 1-3/8" INSULATED STANDOFFS.
- CONTRACTOR TO MAKE FINAL LINE/NEUTRAL TAPS IN THE TAP BOX.
- CTB SHALL BE LOCKABLE AND CAN ACCEPT A UTILITY COMPANY LOCK.
- COVERS SHALL BE FASTENED WITH SCREWS OR BOLTS.
- HINGED COVERS ARE NOT PERMITTED.
- CTB SHALL HAVE MECHANICAL STRENGTH AND MOMENTARY RATING TO WITHSTAND SHORT CIRCUIT CURRENT GIVEN.
- PROVIDE BUS BARS WITH 2 ROWS OF 1/2" HOLE NEMA SPACED FOR CABLE TERMINATION.
- REFER TO WIREWAY "WW" SCHEDULE FOR RATING.
- CONTRACTOR SHALL CONTACT CENTERPOINT AND COORDINATE SERVICE REQUIREMENTS. PROVIDE ALL ACCESSORIES PER CHP'S REQUIREMENTS.

WIREWAY "WW1"										
NORMAL POWER PANEL										
480Y/277V 3Ph 4W, full size neutral, w/copper ground										
HIGH MEADOW SHELL										
12" x 12" x length as req'd.										
WIREWAY "WW1" LOAD ANALYSIS										
CIRCUIT BREAKER (CB) FUSED SWITCH (FS)										
Upstream Feeder Breaker Protecting "WW1": 800Amp										
Circuit Breaker (CB) Fused Switch (FS)										
Status NEW										
Enclosure (NEMA) 1										
A.I.C. (KA) 14 KA										
Mounting: Wall										
CKT. LOAD DESCRIPTIONS										
1 Panel "HA"	—	31.1	37.4	—	FS	100	100	3P	A B C	1 run 4#3, 1 #8 G, 1 1/2" C. 100 Amp
2	—	—	—	—	FS	—	—	—	A B C	
3	—	—	—	—	FS	—	—	—	A B C	
4	—	—	—	—	FS	—	—	—	A B C	
5	—	—	—	—	FS	—	—	—	A B C	
6	—	—	—	—	FS	—	—	—	A B C	
7	—	—	—	—	FS	—	—	—	A B C	
WIREWAY "WW1" LOAD ANALYSIS										
LOAD DESCRIPTION										
OUTSIDE LIGHTING	OL	1.25	1.0			1.3				
TRANSFORMER LOADS	X	1	9.0			9.0				
TOTAL LOAD (KVA)			30.8 KVA			31.1 KVA				
TOTAL LOAD (AMP AVG)			37.1 AMP			37.4 AMP				
PhA=38A, PhB=38A, PhC=36A, Neut=2A										

A New Development for
High Meadow Business Park

REV:	DATE:	DESCRIPTION:
5-12-21		ISSUE FOR PERMIT

www.breakthroughengineeringdesigns.com
832-413-5390 phone
832-200-1559 fax

TEXAS FIRM REGISTRATION #: 11984

**BREAK
THROUGH
ENGINEERING DESIGNS**

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY SONJA J. BUTTS - P.E. 101064
BREAKTHROUGH ENGINEERING DESIGN FIRM F-1064
ALTERATION OF A
SEALED DOCUMENT. THIS PROVISION IS MADE
TO THE CONTRACTOR IF DESIGN IS MADE
UNDER THE TEXAS ENGINEERING PRACTICE ACT.
SONJA J. BUTTS
05/19/21

ELECTRICAL
SCHEDULES

SHEET NO:

E2.0

NORMAL POWER PANEL																						
LOAD DESCRIPTION	TYPE	LOAD KVA	LOAD AMP	WIRE/CONDUIT SIZE (Note 1)	TRIPOLE #	CKT #	PH #	CKT #	TRIPOLE #	WIRE/CONDUIT SIZE (Note 1)	LOAD AMP	LOAD KVA	TYPE	LOAD DESCRIPTION								
														X MCB	New MLO	Panel	Isolated Ground Bus					
Copper Bus Rating 100 AMP		Mains Rating (M.C.B.) 100 AMP		1 run of #4#3, 1 #8 G, 1 1/2°C.		Feeder Ampacity = 100A		SEE PLAN		Location		Shunt-Trip MCB		Surface Mounting								
14 KA A.I.C.		1		Enclosure (NEMA)																		
LOAD DESCRIPTION														LOAD DESCRIPTION								
SITE LIGHTING	OL	0.48	1.73	2#12,1#12G,1/2°C	20 /1	1 A 2	/1															
SIGNAGE	MIS	6.93	25.00	4#10,1#10G,1/2°C (Note 3)	30 /3	3 B 4	/1															
*** 25 FLA 20.8 KVA	MIS	6.93	25.00	#10 35Amp		5 C 6	/1															
*** Disc30A/3P/600V/NF/N3R	MIS	6.93	25.00			7 A 8	/1															
FAÇADE LIGHTING	OL	0.54	1.96	2#12,1#12G,1/2°C	20 /1	9 B 10	/1															
						/1 11 C 12	/1															
						/1 13 A 14	/1															
						/1 15 B 16	/1															
						/1 17 C 18	/1															
						/1 19 A 20	/1															
						/1 21 B 22	/1															
						/1 23 C 24	/1															
						/1 25 A 26	/1															
						/1 27 B 28	/1															
						/1 29 C 30	/1															
						/1 31 A 32	/1															
						/1 33 B 34	/1															
						/1 35 C 36	/1															
						/1 37 A 38	20 /3	3#12,1#8G,3/4°C		10.83 3.00 X	X XMFR TLA											
						/1 39 B 40				10.83 3.00 X	*** 9KVA XMFR 10.8 FLA											
						/1 41 C 42				10.83 3.00 X	*** Primary Disc 30A/3P/600V/NF/N3R											
LOAD "HA" LOAD ANALYSIS																						
LOAD DESCRIPTION	TYPE	DEMAND	LOAD (KVA)	NEC CALCULATION																		
		FACTOR	CONNECTED	CALCULATED	REFERENCE																	
MISC. NON-CONTINUOUS LOADS	MIS	1		20.8	20.8																	
OUTSIDE LIGHTING	OL	1.25		1.0	1.3																	
TRANSFORMER LOADS	X	1		9.0	9.0																	
TOTAL LOAD (KVA)				30.8 KVA	31.1 KVA																	
TOTAL LOAD (AMP AVG)				37.4 AMP	Calc'd Amps: Ph A=38.0Amp Ph B=38.3Amp Ph C=35.8Amp Neut= 1.1 Amp																	

NORMAL POWER PANEL																						
LOAD DESCRIPTION	TYPE	LOAD KVA	LOAD AMP	WIRE/CONDUIT SIZE (Note 1)	TRIPOLE #	CKT #	PH #	CKT #	TRIPOLE #	WIRE/CONDUIT SIZE (Note 1)	LOAD AMP	LOAD KVA	TYPE	LOAD DESCRIPTION								
														X MCB	New MLO	Panel	Isolated Ground Bus					
Copper Bus Rating 60 AMP		Mains Rating (M.C.B.) 30 AMP		1 run of 4#10, 1 #8 G, 1°C.		Feeder Ampacity = 35A		SEE PLAN		Location		Shunt-Trip MCB		Surface Mounting								
10 KA A.I.C.		1		Enclosure (NEMA)																		
LOAD DESCRIPTION														LOAD DESCRIPTION								
1.D.R. IRRIGATION	R	0.18	1.50	2#12,1#12G,1/2°C	20 /1	1 A 2	/1															
SPARE						20 /1	3 B 4	/1														
SPARE						20 /1	5 C 6	/1														
						/1	7 A 8	/1														
						/1	9 B 10	/1														
						/1	11 C 12	/1														
						/1	13 A 14	/1														
						/1	15 B 16	/1														
						/1	17 C 18	/1														
						/1	19 A 20	/1														
						/1	21 B 22	/1														
						/1	23 C 24	/1														
						/1	25 A 26	/1														
						/1	27 B 28	/1														
						/1	29 C 30	/1														
						/1	31 A 32	/1														
						/1	33 B 34	/1														
						/1	35 C 36	/1														
						/1	37 A 38</															

GENERAL MEP NOTES

COORDINATION

EACH CONTRACTOR SHALL COORDINATE ITS CONSTRUCTION OPERATIONS WITH THOSE OF OTHER CONTRACTORS AND ENTITIES TO ENSURE EFFICIENT AND ORDERLY INSTALLATION OF EACH PART OF THE WORK. EACH CONTRACTOR SHALL COORDINATE ITS OPERATIONS WITH 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 WITH OTHER CONTRACTORS TO ENSURE MAXIMUM PERFORMANCE AND ACCESSIBILITY FOR REQUIRED MAINTENANCE, SERVICE, AND REPAIR.
3. MAKE ADEQUATE PROVISIONS TO ACCOMMODATE ITEMS SCHEDULED FOR LATER INSTALLATION.
4. VISIT THE SITE PRIOR TO SUBMITTING A BID TO VERIFY THE EXISTING CONDITIONS AND DESIGN CONSTRAINTS. FAILURE TO MEET THIS REQUIREMENT SHALL NOT BE JUSTIFICATION FOR FAULTY INSTALLATION OR ADDITIONAL COSTS.
5. SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR WORK, AND PAY ALL FEES FOR REQUIRED WORK.
6. COMPLY WITH ALL CURRENT LAWS, BUILDING CODES AND REGULATIONS FEDERAL, STATE AND LOCAL AUTHORITIES HAVING JURISDICTION. IN THE EVENT OF CONFLICT BETWEEN THE CONTRACT DOCUMENTS AND THE LOCAL AUTHORITY HAVING JURISDICTION, THE LATTER SHALL RULE. ANY CHANGES RESULTING SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER OR ARCHITECT/ENGINEER. THE CONTRACTOR SHALL REPORT ANY SUCH MODIFICATIONS TO THE ARCHITECT/ENGINEER AND SECURE HIS APPROVAL BEFORE PROCEEDING. SHOULD THE REQUIREMENTS OF THE CONTRACT DOCUMENTS EXCEED THE REQUIREMENTS OF THE CODES, THE CONTRACT DOCUMENTS SHALL GOVERN, PROVIDED THOSE REQUIREMENTS ARE NOT IN CONFLICT WITH THOSE CODES. ALL ITEMS OF EQUIPMENT AND ALL MATERIALS FOR WHICH APPROVAL STANDARDS HAVE BEEN ESTABLISHED BY UNDERWRITERS' LABORATORIES, INC. (UL), FACTORY MUTUAL (FM), AMERICAN STANDARD CODES, ASME, AGA, AMCA, ASA, ANSI, ASHRAE, AND ARI SHALL BE APPROVED AND SHALL BEAR APPROVAL LABELS.
7. PENETRATIONS OF WALLS AND FLOORS OF FIRE-RATED ASSEMBLIES SHALL COMPLY WITH ASTM, UL, AND THE AUTHORITIES HAVING JURISDICTION.
8. IF THE DRAWINGS AND SPECIFICATIONS ARE IN CONFLICT THE GREATER AMOUNT OF WORK SHALL BE PRICED. BRING THE CONFLICT TO THE ATTENTION OF THE ENGINEER AND REQUEST DIRECTION.
9. DRAWINGS ARE DIAGRAMMATIC AND ARE NOT INTENDED TO SHOW ALL FITTINGS, COMPONENTS AND OFFSETS, ETC. THE CONTRACTOR SHALL PROVIDE ALL FITTINGS, COMPONENTS, OFFSETS OR OTHER FEATURES REQUIRED FOR THE FULL OPERATIONAL CONDITION OF THIS PROJECT.
10. CONFIRM DIMENSIONS AND LOCATIONS IN THE FIELD. DRAWINGS ARE NOT TO BE SCALED AND ARE NOT INTENDED TO SHOW EXACT LOCATIONS BASED ON SCALING DIMENSIONS.
11. GUARANTEE LABOR AND MATERIALS OF ENTIRE INSTALLATION FOR ONE YEAR. WORK BELOW FLOOR OR OVER CORRIDORS SHALL BE PERFORMED AT THE OWNER'S CONVENIENCE AND MAY BE REQUIRED TO BE DONE DURING EVENINGS AND WEEKENDS. DEMOLITION DAMAGE TO EXISTING MATERIALS/EQUIPMENT WILL BE REPAIRED AT NO ADDITIONAL COST TO OWNER. RE-SUPPORT ANY REMAINING PIPING OR DEVICES THAT WERE SUPPORTED BY WALLS BEING REMOVED.
12. ELECTRONIC COPIES OF CAD DRAWINGS OF THE CONTRACT DRAWINGS WILL NOT BE PROVIDED BY THE ENGINEER FOR CONTRACTOR'S USE IN PREPARING SUBMITTALS OR AS-BUILT DRAWINGS

ACOUSTIC TREATMENT

- A. IT IS THE INTENT OF THESE DRAWINGS TO SPECIFY AND FOR THE CONTRACTOR TO INSTALL SYSTEMS THAT ARE QUIET AND FREE OF VIBRATION. EQUIPMENT SHALL BE BALANCED AND VIBRATION ISOLATED TO MEET THE REQUIREMENTS SPECIFIED HEREIN FOR BOTH THE EQUIPMENT ITSELF AND CONDITIONS WITHIN OCCUPIED SPACES. THIS CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND INSTALLING EQUIPMENT THAT IS QUIET IN OPERATION AS COMPARED TO OTHER AVAILABLE EQUIPMENT OF ITS SIZE, CAPACITY, AND TYPE.
- B. EQUIPMENT NOT MEETING THESE REQUIREMENTS SHALL BE CORRECTED BY THE CONTRACTOR TO AN ACCEPTABLE LEVEL BUT WITHIN THE REQUIREMENTS OF THE SPECIFICATIONS AT NO COST TO THE OWNER, ARCHITECT OR ENGINEER.
- C. AIR DISTRIBUTION EQUIPMENT SHALL BE SOUND TESTED AT THE DESIGN OPERATING CONDITIONS AND SHALL NOT EXCEED A MAXIMUM DISCHARGE NC RATING OF 25 OR A RADIATED NC RATING OF 30 AT RATED CFM.
- D. UNLESS NOTED OTHERWISE HEREIN OR ON THE DRAWINGS, THE NOISE LEVEL IN ALL OCCUPIED SPACES SHALL NOT EXCEED THE "LOWEST VALUE IN THE RANGE" OF THE NOISE CRITERIA CURVES PUBLISHED IN THE CURRENT FUNDAMENTALS EDITION OF THE ASHRAE GUIDE AND DATA BOOK. THE NOISE CRITERIA CURVES SHALL BE BASED ON ANSI STANDARD SL.6-1987 OCTAVE BANDS AND AVERAGE PRESSURE LEVEL IN DECIBELS REFERENCED TO 0.002 MICROBAR. SOUND LEVELS IN OCCUPIED SPACES MUST MEET THE DESIGN CRITERIA WITH ALL CONSTRUCTION IN PLACE.
- E. SHOULD A QUESTION ARISE REGARDING THE ACCEPTABLE LEVEL OF NOISE OR VIBRATION IN A PARTICULAR SPACE OR PIECE OF EQUIPMENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING THE SERVICES OF AN APPROVED ACOUSTICAL CONSULTANT TO DETERMINE ACTUAL NOISE/VIBRATION CONDITIONS.

SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. ELECTRONIC COPIES OF CAD DRAWINGS OF THE CONTRACT DRAWINGS WILL NOT BE PROVIDED BY THE ENGINEER FOR CONTRACTOR'S USE IN PREPARING SUBMITTALS OR AS-BUILT DRAWINGS.
- B. COORDINATE PREPARATION AND PROCESSING OF SUBMITTALS WITH PERFORMANCE OF CONSTRUCTION ACTIVITIES. COORDINATE EACH SUBMITTAL WITH FABRICATION, PURCHASING, TESTING, DELIVERY, OTHER SUBMITTALS, AND RELATED ACTIVITIES THAT REQUIRE SEQUENTIAL ACTIVITY. SUBMIT ALL ITEMS REQUIRED FOR EACH SPECIFICATION SECTION CONCURRENTLY.
- C. ALLOW TIME FOR SUBMITTAL REVIEW, INCLUDING TIME FOR RESUBMITTALS, AS FOLLOWS. TIME FOR REVIEW SHALL COMMENCE ON ENGINEER'S RECEIPT OF SUBMITTAL. NO EXTENSION OF THE CONTRACT TIME WILL BE AUTHORIZED BECAUSE OF FAILURE TO TRANSMIT SUBMITTALS ENOUGH IN ADVANCE OF THE WORK TO PERMIT PROCESSING, INCLUDING RESUBMITTALS.
1. INITIAL REVIEW: ALLOW 7 DAYS FOR INITIAL REVIEW OF EACH SUBMITTAL EXCLUSIVE OF TRAVEL TIME. ALLOW ADDITIONAL TIME IF COORDINATION WITH SUBSEQUENT SUBMITTALS IS REQUIRED.
2. RESUBMITTAL REVIEW: ALLOW 7 DAYS FOR REVIEW OF EACH RESUBMITTAL EXCLUSIVE OF TRAVEL TIME.
- D. PLACE A PERMANENT LABEL OR TITLE BLOCK ON EACH PAPER COPY SUBMITTAL ITEM FOR IDENTIFICATION. INDICATE NAME OF FIRM OR ENTITY THAT PREPARED EACH SUBMITTAL ON LABEL OR TITLE BLOCK.
- E. INCLUDE THE FOLLOWING INFORMATION FOR PROCESSING AND RECORDING ACTION TAKEN:
 1. PROJECT NAME.
 2. DATE.
 3. NAME OF ARCHITECT.
 4. NAME OF ENGINEER.
 5. NAME OF CONTRACTOR.
 6. NAME OF SUBCONTRACTOR.
 7. NAME OF SUPPLIER.
 8. NAME OF MANUFACTURER.

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/ENGINEER.

STAMP EACH SUBMITTAL WITH A UNIFORM, APPROVAL STAMP. PROVIDE A STATEMENT CERTIFYING THAT SUBMITTAL HAS BEEN REVIEWED, CHECKED, AND APPROVED FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS AND THE PHYSICAL SPACE LIMITATIONS AT THE SITE.

PROVIDE A STATEMENT CERTIFYING THAT SUBMITTAL HAS BEEN REVIEWED, CHECKED, AND APPROVED FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS AND THE PHYSICAL SPACE LIMITATIONS AT THE SITE.

IF THE GENERAL CONTRACTOR IS DEFERRING THE ABOVE REQUIREMENTS TO THE SUBCONTRACTOR, THEN THE SUBCONTRACTOR MUST ALSO REVIEW, STAMP AND CERTIFY THE SUBMITTAL.

G. ENGINEER'S ACTION:
ENGINEER WILL NOT REVIEW SUBMITTALS THAT DO NOT BEAR CONTRACTOR'S APPROVAL STAMP AND WILL RETURN THEM.
ENGINEER WILL REVIEW EACH SUBMITTAL, NOTE CORRECTIONS OR MODIFICATIONS REQUIRED, AND RETURN IT. ENGINEER WILL PROVIDE SUBMITTAL WITH AN ACTION SHEET TO INDICATE ACTION.

REQUESTS FOR INFORMATION (RFI)

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. ENGINEER WILL RETURN RFIS SUBMITTED TO ENGINEER 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.
3. INCLUDE A PROPOSED SOLUTION AS WELL AS INCLUDE A DETAILED, LEGIBLE DESCRIPTION OF ITEM NEEDING INFORMATION OR INTERPRETATION. INCLUDE SKETCHES, DESCRIPTIONS, MEASUREMENTS, PHOTOS, PRODUCT DATA, SHOP DRAWINGS, COORDINATION DRAWINGS, AND OTHER INFORMATION NECESSARY TO FULLY DESCRIBE ITEMS NEEDING INTERPRETATION.

RECORD DRAWINGS

- A. WITHIN 90 DAYS OF COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER, A COMPLETE SET OF "AS BUILT" DRAWINGS PORTRAYING ACTUAL SITE CONDITIONS OF THE MECHANICAL, ELECTRICAL, PLUMBING AND FIRE PROTECTION WORK. SUBMISSION SHALL CONSIST OF ONE SET OF PAPER SEPIAS AND ONE SET OF CAD FILES IN AUTOCAD 2007 FORMAT. ENGINEER AND ARCHITECT SEALS AND LOGOS SHALL BE REMOVED FROM THE DRAWINGS AND THEY SHALL BE STAMPED "AS-BUILT DRAWINGS".
- B. WITHIN 90 DAYS OF COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER, A COMPLETE SET OF "O&M MANUALS", EQUIPMENT DATA, HVAC AIR AND WATER BALANCING REPORT, AND LIGHTING CONTROL TESTING REPORT FOR COMPLIANCE WITH CURRENT ENERGY CODE. THE CONTRACTOR SHALL PROVIDE A WRITTEN CERTIFICATION THAT ALL NEW MATERIALS AND COMPONENTS DO NOT CONTAIN ASBESTOS OR PCB'S.

REQUIRED SUBMITTALS

- A. PROVIDE FOUR BOUND PRODUCT DATA SUBMITTALS FOR THE NEW EQUIPMENT LISTED BELOW TO THE ARCHITECT/ENGINEER. EACH CONTRACTOR RESPONSIBLE FOR THE WORK SHALL REVIEW AND CERTIFY THE SUBMITTAL DATA TO BE IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS AND THE PHYSICAL SPACE LIMITATIONS.
 1. AIR HANDLING UNITS
 2. FAN COIL UNITS
 3. AIR DISTRIBUTION DEVICES
 4. ELECTRICAL PANELS
 5. ELECTRICAL TRANSFORMERS
 6. LIGHTING FIXTURES
 7. WIRING DEVICES
 8. PLUMBING FIXTURES
 9. AIR AND WATER BALANCE REPORTS
 10. CIRCUIT DIRECTORY CARDS

ELECTRICAL SPECIFICATIONS

ELECTRICAL CONDUCTORS

- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 - 1. ALCAN PRODUCTS CORPORATION; ALCAN CABLE DIVISION.
 - 2. AMERICAN TUGAR CABLE CORP.; A LEVITON COMPANY.
 - 3. GENERAL CABLE CORPORATION.
 - 4. SENATOR WIRE & CABLE COMPANY.
 - 5. SOUTHWIRE COMPANY.
 - 6. COPPER CONDUCTORS: COMPLY WITH NEMA WC 70.
 - 7. CONDUCTOR INSULATION: COMPLY WITH NEMA WC 70 FOR TYPES THW, THHN-THWN, XHHW, UF, USE, AND SO.
 - 8. MULTICONDUCTOR CABLE: COMPLY WITH NEMA WC 70 FOR ARMORED CABLE, TYPE AC, METAL-CLAD CABLE, TYPE MC, TYPE SO, AND TYPE USE WITH GROUND WIRE.
- B. CONDUCTOR MATERIAL APPLICATIONS: COPPER. SOLID FOR NO. 10 AWG AND SMALLER; STRANDED FOR NO. 8 AWG AND LARGER.
- C. CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS
 1. SERVICE ENTRANCE: TYPE THHN-THWN, SINGLE CONDUCTORS IN RACEWAY, TYPE SE OR USE MULTICONDUCTOR CABLE.
 2. EXPOSED FEEDERS: TYPE THHN-THWN, SINGLE CONDUCTORS IN RACEWAY.
 3. FEEDERS CONCEALED IN CEILINGS, WALLS, PARTITIONS, AND CRAWLSPACES: TYPE THHN-THWN, SINGLE CONDUCTORS IN RACEWAY.
 4. FEEDERS CONCEALED IN CONCRETE, BELOW SLABS-ON-GRADE, AND UNDERGROUND: TYPE THHN-THWN, SINGLE CONDUCTORS IN RACEWAY.
 5. FEEDERS INSTALLED BELOW RAISED FLOORING: TYPE THHN-THWN, SINGLE CONDUCTORS IN RACEWAY, ARMORED CABLE, TYPE AC, METAL-CLAD CABLE, TYPE MC.
 6. EXPOSED BRANCH CIRCUITS, INCLUDING IN CRAWLSPACES: TYPE THHN-THWN, SINGLE CONDUCTORS IN RACEWAY, METAL-CLAD CABLE, TYPE MC.
 7. BRANCH CIRCUITS CONCEALED IN CEILINGS, WALLS, AND PARTITIONS: TYPE THHN-THWN, SINGLE CONDUCTORS IN RACEWAY, ARMORED CABLE, TYPE AC, METAL-CLAD CABLE, TYPE MC.
 8. BRANCH CIRCUITS CONCEALED IN CONCRETE, BELOW SLABS-ON-GRADE, AND UNDERGROUND: TYPE THHN-THWN, SINGLE CONDUCTORS IN RACEWAY.
 9. BRANCH CIRCUITS INSTALLED BELOW RAISED FLOORING: TYPE THHN-THWN, SINGLE CONDUCTORS IN RACEWAY OR ARMORED CABLE, TYPE AC, METAL-CLAD CABLE, TYPE MC.
 10. BRANCH CIRCUITS INSTALLED IN PATIENT CARE AREAS: TYPE HCF-MCAP OR AC-HCF WITH ASSEMBLY CERTIFIED AS AN EQUIPMENT GROUNDING CONDUCTOR AND A GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR CONNECTED TO ALL RECEPTACLES, METALLIC BOXES CONTAINING RECEPTACLES, AND ALL METALLIC EQUIPMENT CASINGS.

GROUNDING

- A. INSULATED CONDUCTORS: COPPER WIRE OR CABLE INSULATED FOR 600 V UNLESS OTHERWISE REQUIRED BY APPLICABLE CODE OR AUTHORITIES HAVING JURISDICTION.
- B. BARE COPPER CONDUCTORS:
 1. SOLID CONDUCTORS: ASTM B 3.
 2. STRANDED CONDUCTORS: ASTM B 8.
 3. BONDING CABLE: 28 KCMIL, 14 STRANDS OF NO. 17 AWG CONDUCTOR, 1/4 INCH (6 MM) IN DIAMETER.
 4. BONDING CONDUCTOR: NO. 4 OR NO. 6 AWG, STRANDED CONDUCTOR.
 5. BONDING JUMPER: COPPER TAPE, BRAIDED CONDUCTORS TERMINATED WITH COPPER FERRULES; 1-5/8 INCHES (41 MM) WIDE AND 1/16 INCH (1.6 MM) THICK.
- C. GROUNDING BUS: PREDRILLED RECTANGULAR BARS OF ANNEALED COPPER, 1/4 BY 4 INCHES (6.3 BY 100 MM) IN CROSS SECTION, WITH 9/32-INCH (7.14-MM) HOLES SPACED 1-1/8 INCHES (28 MM) APART. STAND-OFF INSULATORS FOR MOUNTING SHALL COMPLY WITH UL 891 FOR USE IN SWITCHBOARDS, 600 V.

D. CONNECTORS: LISTED AND LABELED BY AN NRTL ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION FOR APPLICATIONS IN WHICH USED AND FOR SPECIFIC TYPES, SIZES, AND COMBINATIONS OF CONDUCTORS AND OTHER ITEMS CONNECTED.

E. BOLTED CONNECTORS FOR CONDUCTORS AND PIPES: COPPER OR COPPER ALLOY, PRESSURE TYPE WITH AT LEAST TWO BOLTS. PIPE CONNECTORS: CLAMP TYPE, SIZED FOR PIPE.

F. WELDED CONNECTORS: EXOTHERMIC-WELDING KITS OF TYPES RECOMMENDED BY KIT MANUFACTURER FOR MATERIALS BEING JOINED AND INSTALLATION CONDITIONS.

G. BUS-BAR CONNECTORS: MECHANICAL TYPE, CAST SILICON BRONZE, SOLDERLESS COMPRESSION-TYPE WIRE TERMINALS, AND LONG-BARREL, TWO-BOLT CONNECTION TO GROUND BUS BAR.

H. CONDUCTORS: INSTALL SOLID CONDUCTOR FOR NO. 8 AWG AND SMALLER, AND STRANDED CONDUCTORS FOR NO. 6 AWG AND LARGER UNLESS OTHERWISE INDICATED.

I. ISOLATED GROUNDING CONDUCTORS: GREEN-COLORED INSULATION WITH CONTINUOUS YELLOW STRIPE. ON FEEDERS WITH ISOLATED GROUND, IDENTIFY GROUNDING CONDUCTOR WHERE VISIBLE TO NORMAL INSPECTION, WITH ALTERNATING BANDS OF GREEN AND YELLOW TAPE, WITH AT LEAST THREE BANDS OF GREEN AND TWO BANDS OF YELLOW.

J. CONDUCTOR TERMINATIONS AND CONNECTIONS: PIPE AND EQUIPMENT GROUNDING CONDUCTOR TERMINATIONS: BOLTED CONNECTORS. UNDERGROUND CONNECTIONS: WELDED CONNECTORS EXCEPT AT TEST WELLS AND AS OTHERWISE INDICATED. CONNECTIONS TO GROUND RODS AT TEST WELLS: BOLTED CONNECTORS. CONNECTIONS TO STRUCTURAL STEEL: WELDED CONNECTORS.

K. EQUIPMENT GROUNDING: INSTALL INSULATED EQUIPMENT GROUNDING CONDUCTORS TO COMPLY WITH THE NEC AND AS INDICATED ON THE DRAWINGS.

ELECTRICAL HANGERS AND SUPPORTS

- A. COMPLY WITH NECA 1 AND NECA 101 FOR APPLICATION OF HANGERS AND SUPPORTS FOR ELECTRICAL EQUIPMENT AND SYSTEMS EXCEPT WHERE REQUIREMENTS IN THIS SECTION ARE STRICTER. MAXIMUM SUPPORT SPACING AND MAXIMUM HANGER ROD SIZE FOR RACEWAYS, SUPPORTS FOR EQUIPMENT, IMC, AND RVC IS AS SCHEDULED IN NECA 1, WHERE ITS TABLES LISTS MAXIMUM SPACINGS LESS THAN STATED IN NFPA 70. MINIMUM ROD SIZE SHALL BE 1-1/4 INCH (6 MM) IN DIAMETER. MULTIPLE RACEWAYS OR CABLES: INSTALL TRAPEZE-TYPE SUPPORTS FABRICATED WITH STEEL SLOTTED OR OTHER SUPPORT SYSTEM, SIZED SO CAPACITY CAN BE INCREASED BY AT LEAST 25 PERCENT IN FUTURE WITHOUT EXCEEDING SPECIFIED DESIGN LOAD LIMITS. SECURE RACEWAYS AND CABLES TO THESE SUPPORTS WITH TWO-BOLT CONDUIT CLAMPS, SPRING-STEEL CLAMPS DESIGNED FOR SUPPORTING SINGLE CONDUITS WITHOUT BOLTS MAY BE USED FOR 1-1/2-INCH (38-MM) AND SMALLER RACEWAYS SERVING BRANCH CIRCUITS AND COMMUNICATION SYSTEMS ABOVE SUSPENDED CEILINGS AND FOR FASTENING RACEWAYS TO TRAPEZE SUPPORTS.
- B. SUPPORT INSTALLATION: COMPLY WITH NECA 1 AND NECA 101 FOR INSTALLATION REQUIREMENTS EXCEPT AS SPECIFIED IN THIS ARTICLE.
- C. RACEWAY SUPPORT METHODS: IN ADDITION TO METHODS DESCRIBED IN NECA 1, EMT, IMC, AND RVC MAY BE SUPPORTED BY OPENINGS THROUGH STRUCTURE MEMBERS, AS PERMITTED IN NFPA 70.
- D. STRENGTH OF SUPPORT ASSEMBLIES: WHERE NOT INDICATED, SELECT SIZES OF COMPONENTS SO STRENGTH WILL BE ADEQUATE TO CARRY PRESENT AND FUTURE STATIC LOADS WITHIN SPECIFIED LOADING LIMITS. MINIMUM STATIC DESIGN LOAD USED FOR STRENGTH DETERMINATION SHALL BE WEIGHT OF SUPPORTED COMPONENTS PLUS 200 LB (90 KG).

E. MOUNTING AND ANCHORING OF SURFACE-MOUNTED EQUIPMENT AND COMPONENTS: ANCHOR AND FASTEN EQUIPMENT ITEMS AND THEIR SUPPORTS TO BUILDING STRUCTURAL ELEMENTS BY THE FOLLOWING METHODS UNLESS OTHERWISE INDICATED BY CODE:

1. TO WOOD: FASTEN WITH LAG SCREWS OR THROUGH BOLTS.
2. TO NEW CONCRETE: BOLT TO CONCRETE INSERTS.
3. TO MASONRY: APPROVED TOGGLE-TYPE BOLTS ON HOLLOW MASONRY UNITS AND EXPANSION ANCHOR FASTENERS ON SOLID MASONRY UNITS.
4. TO EXISTING CONCRETE: EXPANSION ANCHOR FASTENERS.
5. INSTEAD OF EXPANSION ANCHORS, POWDER-ACTUATED DRIVEN THREADED STUDS PROVIDED WITH LOCK WASHERS AND NUTS MAY BE USED IN EXISTING STANDARD-WEIGHT CONCRETE 4 INCHES (100 MM) THICK OR GREATER. DO NOT USE FOR ANCHORAGE TO LIGHTWEIGHT-AGGREGATE CONCRETE OR FOR SLABS LESS THAN 4 INCHES (100 MM) THICK.
6. TO STEEL: WELDED THREADED STUDS COMPLYING WITH AWS D1.1/D1.1M, WITH LOCK WASHERS AND NUTS OR BEAM CLAMPS (MSS TYPE 19, 21, 23, 25, OR 27) COMPLYING WITH MSS SP-69.
7. TO LIGHT STEEL: SHEET METAL SCREWS.
8. DRILL HOLES FOR EXPANSION ANCHORS IN CONCRETE AT LOCATIONS AND TO DEPTHS THAT AVOID REINFORCING BARS.

ELECTRICAL CONDUIT

A. METAL CONDUIT AND TUBING: MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:

1. AFC CABLE SYSTEMS, INC.
2. ALFLEX INC.
3. ALLIED TUBE & CONDUIT; A TYCO INTERNATIONAL LTD. CO.
4. ANAMET ELECTRICAL, INC.; ANACONDA METAL HOSE.
5. ELECTRI-FLEX CO.
6. MAVERICK TUBE CORPORATION.
7. MURRAY GEENEY; A UNIT OF GENERAL SIGNAL.
8. WHEATLAND CABLE COMPANY.
9. RIGID STEEL CONDUIT: ANSI C80.1.
10. ALUMINUM RIGID CONDUIT: ANSI C80.5.
11. PVC-COATED RIGID STEEL CONDUIT: PVC-COATED RIGID STEEL CONDUIT.
12. PVC COATINGS: PVC COATINGS.
13. COATING THICKNESS: 0.040 INCH (1 MM), MINIMUM.
14. EMT: ANSI C80.3.
15. FMC: ZINC-COATED STEEL.
16. LFMC: FLEXIBLE STEEL CONDUIT WITH PVC JACKET.
17. FITTINGS FOR CONDUIT (INCLUDING ALL TYPES AND FLEXIBLE AND LIQUIDTIGHT), EMT, AND CABLE: NEMA FB 1; LISTED FOR TYPE AND SIZE RACEWAY WITH WHICH USED, AND FOR APPLICATION AND ENVIRONMENT IN WHICH INSTALLED.
18. FITTINGS FOR EMT: STEEL SET-SCREW OR COMPRESSION TYPE. DIE-CAST IS NOT ACCEPTABLE.
19. COATING FOR FITTINGS FOR PVC-COATED CONDUIT: MINIMUM THICKNESS, 0.040 INCH (1 MM), WITH OVERLAPPING SLEEVES PROTECTING THREADED JOINTS.
20. JOINT COMPOUNDS FOR RIGID STEEL CONDUIT OR IMC: LISTED FOR USE IN CABLE CONNECTOR ASSEMBLIES, AND COMPOUNDED FOR USE TO LUBRICATE AND PROTECT THREADED RACEWAY JOINTS FROM CORROSION AND ENHANCE THEIR CONDUCTIVITY.
21. SURFACE METAL RACEWAYS: GALVANIZED STEEL WITH SNAP-ON COVERS. MANUFACTURER'S STANDARD ENAMEL FINISH IN COLOR SELECTED BY ARCHITECT. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 1. THOMAS & BETTS CORPORATION.
 2. WALKER SYSTEMS, INC.; WIREMOLD COMPANY (THE).
 3. WIREMOLD COMPANY (THE); ELECTRICAL SALES DIVISION.
22. BOXES, ENCLOSURES, AND CABINETS: MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 1. COOPER CROUSE-HINDS; DIV. OF COOPER INDUSTRIES, INC.
 2. EG/APPLETON ELECTRIC.
 3. HOMAC.
 4. HUBBELL INCORPORATED; KILLARK ELECTRIC MANUFACTURING CO. DIVISION.
 5. O-2/GEDEX; A UNIT OF GENERAL SIGNAL.
 6. ROBROY INDUSTRIES, INC.; ENCLOSURE DIVISION.
 7. THOMAS & BETTS CORPORATION.
 8. WALKER SYSTEMS, INC.; WIREMOLD COMPANY (THE).
 9. WIREMOLD COMPANY (THE).
 10. SHEET METAL OUTLET AND DEVICE BOXES: NEMA OS 1.
 11. CAST-METAL OUTLET AND DEVICE BOXES: NEMA FB 1. FERROUS ALLOY, TYPE FD.

- Q. METAL FLOOR BOXES: CAST METAL, FULL

FINISHED AREAS WHERE COORDINATED WITH ARCHITECT.

TRANSFORMERS

A. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
ACME ELECTRIC CORPORATION; POWER DISTRIBUTION PRODUCTS DIVISION.
EATON ELECTRICAL INC.; CUTLER-HAMMER PRODUCTS.
GENERAL ELECTRIC COMPANY.
SIEMENS ENERGY & AUTOMATION, INC.
SOLA/HEV-DUTY.
SQUARE D; SCHNEIDER ELECTRIC.

B. GENERAL TRANSFORMER REQUIREMENTS
DESCRIPTION: FACTORY-ASSEMBLED AND -TESTED, AIR-COOLED UNITS FOR 60-HZ SERVICE.
GRAIN-ORIENTED, NON-AGING SILICON STEEL.
CONTINUOUS WINDINGS WITHOUT SPLICES EXCEPT FOR TAPS.
INTERNAL COIL CONNECTIONS: BRAZED OR PRESSURE TYPE.
COIL MATERIAL: COPPER.

C. COMPLY WITH NEMA ST 20, AND LIST AND LABEL AS COMPLYING WITH UL 1561. ONE LEG PER PHASE.

D. ENCLOSURE: VENTILATED, NEMA 250, TYPE 2. CORE AND COIL SHALL BE ENCAPSULATED WITHIN RESIN COMPOUND, SEALING OUT MOISTURE AND AIR.

E. ENCLOSURE: VENTILATED, NEMA 250, TYPE 3R. CORE AND COIL SHALL BE ENCAPSULATED WITHIN RESIN COMPOUND, SEALING OUT MOISTURE AND AIR.

F. TRANSFORMER ENCLOSURE FINISH: COMPLY WITH NEMA 250. FINISH COLOR: GRAY.

G. TAPS FOR TRANSFORMERS SMALLER THAN 7.5 KVA: ONE 5 PERCENT TAP ABOVE NORMAL FULL CAPACITY.

H. TAPS FOR TRANSFORMERS 7.5 TO 24 KVA: ONE 5 PERCENT TAP ABOVE AND ONE 5 PERCENT TAP BELOW NORMAL FULL CAPACITY.

I. TAPS FOR TRANSFORMERS 25 KVA AND LARGER: TWO 2.5 PERCENT TAPS ABOVE AND TWO 2.5 PERCENT TAPS BELOW NORMAL FULL CAPACITY.

J. INSULATION CLASS: 220 DEG C. UL-COMPONENT-RECOGNIZED INSULATION SYSTEM WITH A MAXIMUM OF 115 DEG C RISE ABOVE 40 DEG C AMBIENT TEMPERATURE.

K. ENERGY EFFICIENCY FOR TRANSFORMERS RATED 15 KVA AND LARGER: COMPLYING WITH DOE-2016 10 CFR PART 431.

L. K-FACTOR RATING: TRANSFORMERS INDICATED TO BE K-FACTOR RATED SHALL COMPLY WITH UL 1561 REQUIREMENTS FOR NON-SINUSOIDAL LOAD CURRENT-HANDLING CAPABILITY TO THE DEGREE DEFINED BY DESIGNATED K-FACTOR. UNIT SHALL NOT OVERHEAT WHEN CARRYING FULL-LOAD CURRENT WITH HARMONIC DISTORTION CORRESPONDING TO DESIGNATED K-FACTOR. INDICATE VALUE OF K-FACTOR ON TRANSFORMER NAMEPLATE.

M. ELECTROSTATIC SHIELDING: EACH WINDING SHALL HAVE AN INDEPENDENT, SINGLE, FULL-WINDING COPPER ELECTROSTATIC SHIELD ARRANGED TO MINIMIZE INTERWINDING CAPACITANCE, ARRANGED COAXIAL TO THE PRIMARY WINDING, AND HAVING LOW COUPLING BETWEEN INPUT AND OUTPUT TERMINALS. INCLUDE SPECIAL TERMINAL FOR GROUNDING THE SHIELD. SHIELD EFFECTIVENESS: CAPACITANCE BETWEEN PRIMARY AND SECONDARY WINDINGS: NOT TO EXCEED 33 PICOFARADS OVER A FREQUENCY RANGE OF 20 Hz TO 1 kHz. COMMON-MODE NOISE ATTENUATION: MINIMUM OF MINUS 120 dB AT 0.5 TO 1 kHz; MINIMUM OF MINUS 65 dB AT 1.5 TO 10 kHz. NORMAL-MODE NOISE ATTENUATION: MINIMUM OF MINUS 50 dB AT 1.5 TO 10 kHz.

N. FUNGUS PROOFING: PERMANENT FUNGICIDAL TREATMENT FOR COIL AND CORE.

O. LUG RATING: ALL LUG CONNECTIONS SHALL BE RATED FOR CONNECTION OF 75 DEG C INSULATION CONDUCTORS.

PANELBOARDS

A. ENCLOSURES: FLUSH- AND SURFACE-MOUNTED CABINETS, RATED FOR ENVIRONMENTAL CONDITIONS AT INSTALLED LOCATION. INDOOR DRY AND CLEAN LOCATIONS: NEMA 250, TYPE 1. OUTDOOR LOCATIONS: NEMA 250, TYPE 3R. WET OR DAMP INDOOR LOCATIONS: NEMA 250, TYPE 4X STAINLESS STEEL.

B. FRONT: SECURED TO BOX WITH CONCEALED TRIM CLAMPS, FOR SURFACE-MOUNTED FRONTS, MATCH BOX DIMENSIONS; FOR FLUSH-MOUNTED FRONTS, OVERLAP BOX.

C. HINGED FRONT COVER: ENTIRE FRONT TRIM HINGED TO BOX AND WITH STANDARD DOOR WITHIN HINGED TRIM COVER.

D. FINISHES: PANELS AND TRIM: GALVANIZED STEEL, FACTORY FINISHED IMMEDIATELY AFTER CLEANING AND PRETREATING WITH MANUFACTURER'S STANDARD TWO-COAT, BAKED-ON FINISH CONSISTING OF PRIME COAT AND THERMOSETTING TOPCOAT.

E. BACK BOXES: GALVANIZED STEEL.

F. FUNGUS PROOFING: PERMANENT FUNGICIDAL TREATMENT FOR OVERCURRENT PROTECTIVE DEVICES AND OTHER COMPONENTS.

G. DIRECTORY CARD: INSIDE PANELBOARD DOOR, MOUNTED IN TRANSPARENT CARD HOLDER.

H. INCOMING MAINS LOCATION: TOP AND BOTTOM.

I. PHASE, NEUTRAL AND GROUND BUSES:
MATERIAL: TIN-PLATED ALUMINUM OR HARD-DRAWN COPPER, 98 PERCENT CONDUCTIVITY.
EQUIPMENT GROUND BUS: ADEQUATE FOR FEEDER AND BRANCH-CIRCUIT EQUIPMENT GROUNDING CONDUCTORS; BONDED TO BOX.

J. CONDUCTOR CONNECTORS: SUITABLE FOR USE WITH CONDUCTOR MATERIAL 95 PERCENT CONDUCTIVITY, MAIN AND NEUTRAL LUGS: COMPRESSION-TYPE GROUND LUGS AND BUS-COUPLED TERMINATORS; COMPRESSION-TYPE FEED-THROUGH LUGS: COMPRESSION-TYPE, SUITABLE FOR USE WITH CONDUCTOR MATERIAL. LOCATE AT OPPOSITE END OF BUS FROM INCOMING LUGS OR MAIN DEVICE. RATED FOR CONNECTION OF 75 DEG C INSULATED CONDUCTORS.

K. PANELBOARD SHORT-CIRCUIT CURRENT RATING: FULLY RATED TO INTERRUPT SYMMETRICAL SHORT-CIRCUIT CURRENT AVAILABLE AT TERMINALS.

L. LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS
MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
EATON ELECTRICAL INC.; CUTLER-HAMMER BUSINESS UNIT.
GENERAL ELECTRIC COMPANY; GE CONSUMER & INDUSTRIAL
SIEMENS ENERGY & AUTOMATION, INC.
SQUARE D; A BRAND OF SCHNEIDER ELECTRIC.

PANELBOARDS: NEMA PB 1, LIGHTING AND APPLIANCE BRANCH-CIRCUIT TYPE.
MAINS: CIRCUIT BREAKER OR LUGS ONLY.
BRANCH OVERCURRENT PROTECTIVE DEVICES: BOLT-ON CIRCUIT BREAKERS, REPLACEABLE WITHOUT DISTURBING ADJACENT UNITS.
DOORS: CONCEALED HINGES; SECURED WITH FLUSH LATCH WITH TUMBLER LOCK; KEYED ALIKE.

LIGHTING FIXTURES

A. GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS,
1. RECESSED FIXTURES: COMPLY WITH NEMA LE 4 FOR CEILING COMPATIBILITY FOR RECESSED FIXTURES.
2. INCANDESCENT FIXTURES: COMPLY WITH UL 1598. WHERE LER IS SPECIFIED, TEST ACCORDING TO NEMA LE 5A.

3. FLUORESCENT FIXTURES: COMPLY WITH UL 1598. WHERE LER IS SPECIFIED, TEST ACCORDING TO NEMA LE 5 AND NEMA LE 5A AS APPLICABLE.

4. LED FIXTURES:
4.1. LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.
4.2. EACH LUMINAIRE TYPE SHALL BE BIDDEN WITHIN A THREE-STEP MACADAM ELLIPE TO ENSURE COLOR CONSISTENCY AMONG LUMINAIRES.

METAL PARTS: FREE OF BURRS AND SHARP CORNERS AND EDGES. SHEET METAL COMPONENTS: STEEL UNLESS OTHERWISE INDICATED. FORM AND SUPPORT TO PREVENT WARPING AND SAGGING. DOORS, FRAMES, AND OTHER INTERNAL ACCESS: SMOOTH OPERATING, FREE OF LIGHT LEAKAGE UNDER OPERATING CONDITIONS, AND DESIGNED TO PERMIT REPAIRING WITHOUT USE OF TOOLS. DESIGNED TO PREVENT

DOORS, FRAMES, LENSES, DIFFUSERS, AND OTHER COMPONENTS FROM FALLING ACCIDENTALLY DURING RELAMPING AND WHEN SECURED IN OPERATING POSITION.

B. DIFFUSERS AND GLOBES:
1. ACRYLIC LIGHTING DIFFUSERS: 100 PERCENT VIRGIN ACRYLIC PLASTIC, HIGH RESISTANCE TO YELLOWING AND OTHER CHANGES DUE TO AGING, EXPOSURE TO HEAT, AND UV RADIATION.
2. LENS THICKNESS: AT LEAST 0.125 INCH (3.175 MM) MINIMUM UNLESS OTHERWISE INDICATED.
3. UV STABILIZED.
4. GLASS: ANNEALED CRYSTAL GLASS UNLESS OTHERWISE INDICATED.

C. FACTORY-APPLIED LABELS: COMPLY WITH UL 1598. INCLUDE RECOMMENDED LAMPS AND BALLASTS. LABELS SHALL BE LOCATED WHERE THEY WILL BE READILY VISIBLE TO SERVICE PERSONNEL, BUT NOT SEEN FROM NORMAL VIEWING ANGLES WHEN LAMPS ARE IN PLACE. LABEL SHALL INCLUDE THE FOLLOWING LAMP AND BALLAST CHARACTERISTICS:
1. "USE ONLY" AND INCLUDE SPECIFIC LAMP TYPE.
2. LAMP DIAMETER CODE (T-4, T-5, T-8, T-12, ETC.), TUBE CONFIGURATION (TWIN, QUAD, TRIPLE, ETC.), BASE TYPE, AND NOMINAL WATTAGE FOR FLUORESCENT AND COMPACT FLUORESCENT LUMINAIRES.
3. LAMP TYPE, WATTAGE, BULB TYPE (ED17, BD56, ETC.) AND COATING (CLEAR OR COATED) FOR HID LUMINAIRES.
4. START TYPE (PREHEAT, RAPID START, INSTANT START, ETC.) FOR FLUORESCENT AND COMPACT FLUORESCENT LUMINAIRES.
5. ANSI BALLAST TYPE (M98, M57, ETC.) FOR HID LUMINAIRES.
6. CCT AND CRI FOR ALL LUMINAIRES.

D. ELECTROMAGNETIC-INTERFERENCE FILTERS: FACTORY INSTALLED TO SUPPRESS CONDUCTED ELECTROMAGNETIC INTERFERENCE AS REQUIRED BY MIL-STD-461. FABRICATE LIGHTING FIXTURES WITH ONE FILTER ON EACH BALLAST INDICATED TO REQUIRE A FILTER.

BALLASTS

A. BALLASTS FOR LINEAR FLUORESCENT LAMPS, GENERAL REQUIREMENTS FOR ELECTRONIC BALLASTS:
1. COMPLY WITH UL 935 AND WITH ANSI C82.11.
2. DESIGNED FOR TYPE AND QUANTITY OF LAMPS SERVED.
3. BALLASTS SHALL BE DESIGNED FOR FULL LIGHT OUTPUT UNLESS ANOTHER BF, DIMMER, OR BI-LEVEL CONTROL IS INDICATED.
4. SOUND RATING: CLASS A.
5. TOTAL HARMONIC DISTORTION RATING: LESS THAN 10 PERCENT.
6. TRANSIENT VOLTAGE PROTECTION: IEC C62.41.1 AND IEEE C62.41.2, CATEGORY A OR BETTER.
7. OPERATING FREQUENCY: 42 KHZ OR HIGHER.
8. LAMP CURRENT CREST FACTOR: 1.7 OR LESS.
9. BF: 0.98 OR HIGHER.
10. POWER FACTOR: 0.95 OR HIGHER.
11. PARALLEL LAMP CIRCUITS: MULTIPLE LAMP BALLASTS SHALL COMPLY WITH ANSI C82.11 AND SHALL BE CONNECTED TO MAINTAIN FULL LIGHT OUTPUT ON SURVIVING LAMPS IF ONE OR MORE LAMPS FAIL.

B. LUMINAIRES CONTROLLED BY OCCUPANCY SENSORS SHALL HAVE PROGRAMMED-START BALLASTS.

C. ELECTRONIC PROGRAMMED-START BALLASTS FOR T8 AND T5 AND T5HO LAMPS: COMPLY WITH ANSI C82.11 AND THE FOLLOWING:
1. LAMP END-OF-LIFE DETECTION AND SHUTDOWN CIRCUIT FOR T5 DIAMETER LAMPS.
2. AUTOMATIC LAMP STARTING AFTER LAMP REPLACEMENT.

D. ELECTROMAGNETIC BALLASTS: COMPLY WITH ANSI C82.11, ENERGY SAVING, HIGH-POWER FACTOR, CLASS P, AND HAVING AUTOMATIC-RESET THERMAL PROTECTION.

E. BALLAST MANUFACTURER CERTIFICATION: INDICATED BY LABEL.
F. SINGLE BALLASTS FOR MULTIPLE LIGHTING FIXTURES: FACTORY WIRED WITH BALLAST ARRANGEMENTS AND BUNDLED EXTENSION WIRING TO SUIT FINAL INSTALLATION CONDITIONS, WITHOUT REMOVING OR REWIRING IN THE FIELD.

G. BALLASTS FOR COMPACT FLUORESCENT LAMPS.

H. DESCRIPTION: ELECTRONIC PROGRAMMED RAPID-START TYPE, COMPLYING WITH UL 935 AND WITH ANSI C 82.11, DESIGNED FOR TYPE AND QUANTITY OF LAMPS INDICATED. BALLAST SHALL BE DESIGNED FOR FULL LIGHT OUTPUT UNLESS DIMMER OR BI-LEVEL CONTROL IS INDICATED:
1. LAMP END-OF-LIFE DETECTION AND SHUTDOWN CIRCUIT.
2. AUTOMATIC LAMP STARTING AFTER LAMP REPLACEMENT.
3. SOUND RATING: CLASS A.
4. TOTAL HARMONIC DISTORTION RATING: LESS THAN 20 PERCENT.
5. TRANSIENT VOLTAGE PROTECTION: IEC C62.41.1 AND IEEE C62.41.2, CATEGORY A OR BETTER.
6. OPERATING FREQUENCY: 20 KHZ OR HIGHER.
7. LAMP CURRENT CREST FACTOR: 1.7 OR LESS.
8. BF: 0.95 OR HIGHER UNLESS OTHERWISE INDICATED.
9. POWER FACTOR: 0.95 OR HIGHER.
10. INTERFERENCE: COMPLY WITH 47 CFR 18, CH. 1, SUBPART C, FOR LIMITATIONS ON ELECTROMAGNETIC AND RADIO-FREQUENCY INTERFERENCE FOR NONCONSUMER EQUIPMENT.

FLUORESCENT LAMPS

A. T8 RAPID-START LAMPS, RATED 32 W MAXIMUM, NOMINAL LENGTH OF 48 INCHES (1220 MM), 2800 INITIAL LUMENS (MINIMUM), CRI 85 (MINIMUM), COLOR TEMPERATURE 3000 K, AND AVERAGE RATED LIFE 20,000 HOURS UNLESS OTHERWISE INDICATED.

B. T8 RAPID-START LAMPS, RATED 17 W MAXIMUM, NOMINAL LENGTH OF 24 INCHES (610 MM), 1300 INITIAL LUMENS (MINIMUM), CRI 85 (MINIMUM), COLOR TEMPERATURE 3000 K, AND AVERAGE RATED LIFE OF 20,000 HOURS UNLESS OTHERWISE INDICATED.

C. T5 RAPID-START LAMPS, RATED 28 W MAXIMUM, NOMINAL LENGTH OF 45.2 INCHES (1150 MM), 2900 INITIAL LUMENS (MINIMUM), CRI 85 (MINIMUM), COLOR TEMPERATURE 3000 K, AND AVERAGE RATED LIFE OF 20,000 HOURS UNLESS OTHERWISE INDICATED.

D. T5HO RAPID-START, HIGH-OUTPUT LAMPS, RATED 54 W MAXIMUM, NOMINAL LENGTH OF 45.2 INCHES (1150 MM), 5000 INITIAL LUMENS (MINIMUM), CRI 85 (MINIMUM), COLOR TEMPERATURE 4100 K, AND AVERAGE RATED LIFE OF 20,000 HOURS UNLESS OTHERWISE INDICATED.

E. COMPACT FLUORESCENT LAMPS: 4-PIN, CRI 80 (MINIMUM), COLOR TEMPERATURE 3000 K, AVERAGE RATED LIFE OF 10,000 HOURS AT THREE HOURS OPERATION PER START, AND SUITABLE FOR USE WITH DIMMING BALLASTS UNLESS OTHERWISE INDICATED.
1. 13 W: T4, DOUBLE OR TRIPLE TUBE, RATED 900 INITIAL LUMENS (MINIMUM).
2. 18 W: T4, DOUBLE OR TRIPLE TUBE, RATED 1200 INITIAL LUMENS (MINIMUM).
3. 26 W: T4, DOUBLE OR TRIPLE TUBE, RATED 1800 INITIAL LUMENS (MINIMUM).
4. 32 W: T4, TRIPLE TUBE, RATED 2400 INITIAL LUMENS (MINIMUM).
5. 42 W: T4, TRIPLE TUBE, RATED 3200 INITIAL LUMENS (MINIMUM).
6. 57 W: T4, TRIPLE TUBE, RATED 4300 INITIAL LUMENS (MINIMUM).
7. 70 W: T4, TRIPLE TUBE, RATED 5200 INITIAL LUMENS (MINIMUM).

LED LAMPS

A. MINIMUM LUMENS PER SCHEDULED FIXTURE.
B. MINIMUM ALLOWABLE EFFICACY OF 85 LM/W.
C. CRI OF MINIMUM 80. CCT PER SCHEDULED FIXTURE.
D. RATED LAMP LIFE OF 50,000 HOURS TO L70.
E. DIMMABLE FROM 100 PERCENT TO 1 PERCENT OF MAXIMUM LIGHT OUTPUT.
F. INTERNAL DRIVER.
G. USER-REPLACEABLE LAMPS:
1. BULB SHAPE COMPLYING WITH ANSI C78.79.
2. LAMP BASE COMPLYING WITH ANSI C81.61 OR IEC 60061-1.

WIRING DEVICES

A. MANUFACTURERS:
1. COOPER WIRING DEVICES;
2. HUBBELL INCORPORATED; WIRING DEVICE-KELLUMS
3. LEVITON MFG. COMPANY INC.
4. PASS & SEYMORE/LEGRAND; WIRING DEVICES & ACCESSORIES

B. ALL WIRING DEVICES TO BE WHITE OR COLOR AS SELECTED BY ARCHITECT.

C. STRAIGHT BLADE RECEPTACLES: CONVENIENCE RECEPTACLES 125 V, 20 A; COMPLY WITH NEMA WD 1, NEMA WD 6 CONFIGURATION 5-20R, AND UL 498. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING:
1. LEVITON; 16362-1GW.
2. ANY EQUAL BY ABOVE LISTED MANUFACTURERS.

D. ISOLATED-GROUND, DUPLEX CONVENIENCE RECEPTACLES, 125 V, 20 A; COMPLY WITH NEMA WD 1, NEMA WD 6 CONFIGURATION 5-20R, AND UL 498. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING:
3. LEVITON; 16362-1GW.

E. GFCI RECEPTACLES
GENERAL DESCRIPTION: STRAIGHT BLADE, FEED-THROUGH TYPE, COMPLY WITH NEMA WD 1, NEMA WD 6, AND UL 498, CLASS A, AND INCLUDE INDICATOR LIGHT THAT IS LIGHTED WHEN DEVICE IS TRIPPED. DUPLEX GFCI CONVENIENCE RECEPTACLES: 125 V, 20 A; PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING:
1. LEVITON; 76990-W.
2. ANY EQUAL BY ABOVE LISTED MANUFACTURERS.

F. SNAP SWITCHES, COMPLY WITH NEMA WD 1 AND UL 20. SWITCHES, 120/277 V, 20 A; PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING:
1. LEVITON; 5621-2W (SINGLE POLE), 5623-2 (THREE WAY).

2. ANY EQUAL BY ABOVE LISTED MANUFACTURERS.

G. WALL-BOX DIMMERS, DIMMER SWITCHES: MODULAR, FULL-WAVE, SOLID-STATE UNITS WITH INTEGRAL QUIET ON-OFF SWITCHES, WITH AUDIBLE FREQUENCY AND EMI/RFI SUPPRESSION FILTERS. CONTROL: CONTINUOUSLY ADJUSTABLE SLIDER; WITH SINGLE-POLE OR THREE-WAY SWITCHING. COMPLY WITH UL 1472.
1. INCANDESCENT LAMP DIMMERS: 120 V; CONTROL SHALL FOLLOW SQUARE-LAW DIMMING CURVE. ON-OFF SWITCH POSITIONS SHALL BYPASS DIMMER MODULE. 2000 W; DIMMERS SHALL REQUIRE NO DERATING WHEN GANGED WITH OTHER DEVICES.

2. FLUORESCENT LAMP DIMMER SWITCHES: MODULAR; COMPATIBLE WITH DIMMER BALLASTS; TRIM POTENTIOMETER TO ADJUST LOW-END DIMMING; DIMMER-BALLAST COMBINATION CAPABLE OF CONSISTENT DIMMING WITH LOW END NOT GREATER THAN 20 PERCENT OF FULL BRIGHTNESS.
3. ACCEPTABLE MANUFACTURERS: LUTRON, LEVITON.

H. VACANCY/OCCUPANCY SENSORS, WALL-SWITCH SENSORS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING:

1. LUTRON; MS-B102 (PROGRAMMED FOR VACANCY OR OCCUPANCY OPERATION AS SHOWN).
2. ANY EQUAL BY NOVITAS, WATTSTOPPER, LEVITON OR SENSOR SWITCH.
DESCRIPTION: DUAL TECHNOLOGY TYPE, 120/277 V, ADJUSTABLE TIME DELAY UP TO 20 MINUTES, 180-DEGREE FIELD OF VIEW, WITH A MINIMUM COVERAGE AREA OF 900 SQ. FT. (81 SQ. M). MANUAL-ON/AUTO-OFF OR AUTO-ON TO 50%/AUTO-OFF.

I. WALL PLATES, SINGLE AND COMBINATION TYPES TO MATCH CORRESPONDING WIRING DEVICES. PLATE-SECURING SCREWS: METAL WITH HEAD COLOR TO MATCH PLATE FINISH.
1. MATERIAL FOR FINISHED SPACES: SMOOTH, HIGH-IMPACT THERMOPLASTIC 0.035 INCH (1 MM) THICK.
2. MATERIAL FOR UNFINISHED SPACES: SMOOTH, HIGH-IMPACT THERMOPLASTIC.
3. MATERIAL FOR DAMP LOCATIONS: THERMOPLASTIC WITH SPRING-LOADED LIFT COVER, AND LISTED AND LABELED FOR USE IN "WET LOCATIONS".
4. WET-LOCATION WEATHERPROOF COVER PLATES: NEMA 250, COMPLYING WITH TYPE 3C WEATHER-RESISTANT, THERMOPLASTIC WITH LOCKABLE COVER.

LIGHTING SYSTEM FUNCTIONAL TESTING

A. ALL REQUIREMENTS SHALL BE PERFORMED PER THE CURRENTLY ADOPTED ENERGY CONSERVATION CODE IN THE AUTHORITY HAVING JURISDICTION. THE FOLLOWING IS NOT A COMPLETE LISTING.

B. OCCUPANT SENSOR CONTROLS, WHERE OCCUPANT SENSOR CONTROLS ARE PROVIDED, THE FOLLOWING PROCEDURES SHALL BE PERFORMED:
1. CERTIFY THAT THE OCCUPANT SENSOR HAS BEEN LOCATED AND AIMED IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.
2. FOR PROJECTS WITH SEVEN OR FEWER OCCUPANT SENSORS, EACH SENSOR SHALL BE TESTED.
3. FOR PROJECTS WITH MORE THAN SEVEN OCCUPANT SENSORS, TESTING SHALL BE DONE FOR EACH UNIQUE COMBINATION OF SENSOR TYPE AND SPACE GEOMETRY, WHERE MULTIPLES OF EACH UNIQUE COMBINATION OF SENSOR TYPE AND SPACE GEOMETRY ARE PROVIDED, NOT LESS THAN 10 PERCENT, BUT IN NO CASE LESS THAN ONE, OF EACH COMBINATION SHALL BE TESTED UNLESS THE CODE OFFICIAL OR DESIGN PROFESSIONAL REQUIRES A HIGHER PERCENTAGE TO BE TESTED. WHERE 30 PERCENT OR MORE OF THE TESTED CONTROLS FAIL, ALL REMAINING IDENTICAL COMBINATIONS SHALL BE TESTED. FOR OCCUPANT SENSOR CONTROLS TO BE TESTED, VERIFY THE FOLLOWING:

3.1. WHERE OCCUPANT SENSOR CONTROLS INCLUDE STATUS INDICATORS, VERIFY CORRECT OPERATION.
3.2. THE CONTROLLED LIGHTS TURN OFF OR DOWN TO THE PERMITTED LEVEL WITHIN THE REQUIRED TIME.
3.3. FOR AUTO-ON OCCUPANT SENSOR CONTROLS, THE LIGHTS TURN ON TO THE PERMITTED LEVEL WHEN AN OCCUPANT ENTERS THE SPACE.
3.4. FOR MANUAL-ON OCCUPANT SENSOR CONTROLS, THE LIGHTS TURN ON ONLY WHEN MANUALLY ACTIVATED.
3.5. THE LIGHTS ARE NOT INCORRECTLY TURNED ON BY MOVEMENT IN ADJACENT AREAS OR BY HVAC OPERATION.

C. TIME-SWITCH CONTROLS, WHERE TIME-SWITCH CONTROLS ARE PROVIDED, THE FOLLOWING PROCEDURES SHALL BE PERFORMED:

1. CONFIRM THAT THE TIME-SWITCH CONTROL IS PROGRAMMED WITH ACCURATE WEEKDAY, WEEKEND, AND HOLIDAY SCHEDULES.
2. PROVIDE DOCUMENTATION TO THE OWNER OF TIMESWITCH CONTROLS PROGRAMMING INCLUDING WEEKDAY, WEEKEND, HOLIDAY SCHEDULES, AND SET-UP AND PREFERENCE PROGRAM SETTINGS.
3. VERIFY THE CORRECT TIME AND DATE IN THE TIME SWITCH.
4. VERIFY THAT ANY BATTERY BACK-UP IS INSTALLED AND ENERGIZED.
5. VERIFY THAT THE OVERRIDE TIME LIMIT IS SET TO NOT MORE THAN 2 HOURS.
6. SIMULATE OCCUPIED CONDITION, VERIFY AND DOCUMENT THE FOLLOWING:
6.1. ALL LIGHTS CAN BE TURNED ON AND OFF BY THEIR RESPECTIVE AREA CONTROL SWITCHES.
6.2. THE SWITCH ONLY OPERATES LIGHTING IN THE ENCLOSED SPACE IN WHICH THE SWITCH IS LOCATED.
7. SIMULATE UNOCCUPIED CONDITION, VERIFY AND DOCUMENT THE FOLLOWING:
7.1. NONEXEMPT LIGHTING TURNS OFF.
7.2. MANUAL OVERRIDE SWITCH ALLOWS ONLY THE LIGHTS IN THE ENCLOSED SPACE WHERE THE OVERRIDE SWITCH IS LOCATED TO TURN ON OR REMAIN ON UNTIL THE NEXT SCHEDULED SHUTOFF OCCURS.
8. ADDITIONAL TESTING AS SPECIFIED BY THE REGISTERED DESIGN PROFESSIONAL.

D. DAYLIGHT RESPONSIVE CONTROLS, WHERE DAYLIGHT RESPONSIVE CONTROLS ARE PROVIDED, THE FOLLOWING SHALL BE VERIFIED:
1. CONTROL DEVICES HAVE BEEN PROPERLY LOCATED, FIELD CALIBRATED AND SET FOR ACCURATE SETPOINTS AND THRESHOLD LIGHT LEVELS.
2. DAYLIGHT CONTROLLED LIGHTING LOADS ADJUST TO LIGHT LEVEL SET POINTS IN RESPONSE TO AVAILABLE DAYLIGHT.

3. THE LOCATIONS OF CALIBRATION ADJUSTMENT EQUIPMENT ARE READILY ACCESSIBLE ONLY TO AUTHORIZED PERSONNEL.

GENERAL MEP NOTES

COORDINATION

EACH CONTRACTOR SHALL COORDINATE ITS CONSTRUCTION OPERATIONS WITH THOSE OF OTHER CONTRACTORS AND ENTITIES TO ENSURE EFFICIENT AND ORDERLY INSTALLATION OF EACH PART OF THE WORK. EACH CONTRACTOR SHALL COORDINATE ITS OPERATIONS WITH 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 WITH OTHER CONTRACTORS TO ENSURE MAXIMUM PERFORMANCE AND ACCESSIBILITY FOR REQUIRED MAINTENANCE, SERVICE, AND REPAIR.

3. MAKE ADEQUATE PROVISIONS TO ACCOMMODATE ITEMS SCHEDULED FOR LATER INSTALLATION.

4. VISIT THE SITE PRIOR TO SUBMITTING A BID TO VERIFY THE EXISTING CONDITIONS AND DESIGN CONSTRAINTS. FAILURE TO MEET THIS REQUIREMENT SHALL NOT BE JUSTIFICATION FOR FAULTY INSTALLATION OR ADDITIONAL COSTS.

5. SECURE ALL PERMITS AND INSPECTIONS REQUIRED FOR WORK, AND PAY ALL FEES FOR REQUIRED WORK.

6. COMPLY WITH ALL CURRENT LAWS, BUILDING CODES AND REGULATIONS FEDERAL, STATE AND LOCAL AUTHORITIES HAVING JURISDICTION. IN THE EVENT OF CONFLICT BETWEEN THE CONTRACT DOCUMENTS AND THE LOCAL AUTHORITY HAVING JURISDICTION, THE LATTER SHALL RULE. ANY CHANGES RESULTING SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER. ARCHITECTS, THE CONTRACTOR SHALL RECONFIRM SUCH MODIFICATIONS TO THE CONTRACTOR/OWNER AND SECURE APPROVAL PRIOR TO PROCEEDING. SHOULD THE REQUIREMENTS OF THE CONTRACT DOCUMENTS EXCEED THE REQUIREMENTS OF THE CODES, THE CONTRACT DOCUMENTS SHALL GOVERN, PROVIDED THOSE REQUIREMENTS ARE NOT IN CONFLICT WITH THOSE CODES. ALL ITEMS OF EQUIPMENT AND ALL MATERIALS FOR WHICH APPROVAL STANDARDS HAVE BEEN ESTABLISHED BY UNDERWRITERS LABORATORIES, INC. (UL), FACTORY MUTUAL (FM), AMERICAN STANDARDS CODES, ASME, AGA, ANCA, ASA, ANSI, ASHRAE, AND ASHRAE SHALL BE APPROVED AND SHALL BEAR APPROVAL LABELS.

7. PENETRATIONS OF WALLS AND FLOORS OF FIRE-RATED ASSEMBLIES SHALL COMPLY WITH ASTM, UL, AND THE AUTHORITIES HAVING JURISDICTION.

8. SEAL ALL PENETRATIONS THRU WALLS, ROOF, FLOORS, AND EXTERIOR WALLS. PENETRATIONS OF EXTERIOR WALLS AND ROOFS SHALL BE SEALED WITH WATER-PROOF SEALANTS.

9. IF THE DRAWINGS AND SPECIFICATIONS ARE IN CONFLICT THE GREATER AMOUNT OF WORK SHALL BE PRICED, BRING THE CONFLICT TO THE ATTENTION OF THE ENGINEER AND REQUEST DIRECTION.

10. DRAWINGS ARE DIAGRAMMATIC AND ARE NOT INTENDED TO SHOW ALL FITTINGS, COMPONENTS AND OFFSETS, ETC. THE CONTRACTOR SHALL PROVIDE ALL FITTINGS, COMPONENTS, OFFSETS OR OTHER FEATURES REQUIRED FOR THE FULL OPERATIONAL CONDITION OF THIS PROJECT.

11. CONFIRM DIMENSIONS AND LOCATIONS IN THE FIELD. DRAWINGS ARE NOT TO BE SCALED AND ARE NOT INTENDED TO SHOW EXACT LOCATIONS BASED ON SCALING DIMENSIONS.

12. GUARANTEE LABOR AND MATERIALS OF ENTIRE INSTALLATION FOR ONE YEAR. WORK BELOW FLOOR OR OVER CORRIDORS SHALL BE PERFORMED AT THE OWNER'S CONVENIENCE AND MAY BE REQUIRED TO BE DONE DURING EVENINGS AND WEEKENDS. DEMOLITION DAMAGE TO EXISTING MATERIALS EQUIPMENT WILL BE REPAIRED AT NO ADDITIONAL COST TO OWNER. RE-SUPPORT ANY REMAINING PIPING OR DEVICES THAT WERE SUPPORTED BY WALLS BEING REMOVED.

13. ELECTRONIC COPIES OF CAD DRAWINGS OF THE CONTRACT DRAWINGS WILL NOT BE PROVIDED BY THE ENGINEER FOR CONTRACTOR'S USE IN PREPARING SUBMITTALS OR AS-BUILT DRAWINGS

ACOUSTIC TREATMENT

IT IS THE INTENT OF THESE DRAWINGS TO SPECIFY AND FOR THE CONTRACTOR TO INSTALL SYSTEMS THAT ARE QUIET AND FREE OF VIBRATION. EQUIPMENT SHALL BE BALANCED AND VIBRATION ISOLATED TO MEET THE REQUIREMENTS SPECIFIED HEREIN FOR BOTH THE EQUIPMENT ITSELF AND CONDITIONS WITHIN OCCUPIED SPACES. THIS CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND INSTALLING EQUIPMENT THAT IS QUIET IN OPERATION AS COMPARED TO OTHER AVAILABLE EQUIPMENT OF ITS SIZE, CAPACITY, AND TYPE.

B. EQUIPMENT NOT MEETING THESE REQUIREMENTS SHALL BE CORRECTED BY THE CONTRACTOR TO AN ACCEPTABLE LEVEL BUT WITHIN THE REQUIREMENTS OF THE SPECIFICATIONS AT NO COST TO THE OWNER, ARCHITECT OR ENGINEER.

C. AIR DISTRIBUTION EQUIPMENT SHALL BE SOUND TESTED AT THE DESIGN OPERATING CONDITIONS AND SHALL NOT EXCEED A MAXIMUM DISCHARGE NC RATING OF 25 OR A RADIATED NC RATING OF 30 AT RATED CFM.

D. UNLESS NOTED OTHERWISE, HEREIN OR ON THE DRAWINGS, THE NOISE LEVEL IN ALL OCCUPIED SPACES SHALL NOT EXCEED THE LOWEST LEVEL IN THE RANGE OF THE NOISE CRITERIA CURVES PUBLISHED IN THE CURRENT FUNDAMENTALS EDITION OF THE ASHRAE GUIDE AND DATA BOOK. THE NOISE CRITERIA CURVES SHALL BE BASED ON ANSI STANDARD S1.6-1987 OCTAVE BANDS AND A SOUND PRESSURE LEVEL IN DECIBELS REFERENCED TO 0.002 MICROBAR. SOUND LEVELS IN OCCUPIED SPACES MUST MEET THE DESIGN CRITERIA WITH ALL CONSTRUCTION IN PLACE.

E. SHOULD A QUESTION ARISE REGARDING THE ACCEPTABLE LEVEL OF NOISE OR VIBRATION IN A PARTICULAR SPACE OR PIECE OF EQUIPMENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING THE SERVICES OF AN APPROVED ACOUSTICAL CONSULTANT TO DETERMINE ACTUAL NOISE/VIBRATION CONDITIONS.

SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. ELECTRONIC COPIES OF CAD DRAWINGS OF THE CONTRACT DRAWINGS WILL NOT BE PROVIDED BY THE ENGINEER FOR CONTRACTOR'S USE IN PREPARING SUBMITTALS OR AS-BUILT DRAWINGS.

B. COORDINATE PREPARATION AND PROCESSING OF SUBMITTALS WITH PERFORMANCE OF CONSTRUCTION ACTIVITIES. RELATED ACTIVITIES THAT REQUIRE SEQUENTIAL ACTIVITY. SUBMIT ALL ITEMS REQUIRED FOR EACH SPECIFICATION SECTION CONCURRENTLY.

C. ALLOW TIME FOR SUBMITTAL REVIEW, INCLUDING TIME FOR RESUBMITTALS, AS FOLLOWS. TIME FOR REVIEW WILL BE ALLOWED FOR EACH SUBMITTAL. EXCEPT FOR SUBMITTAL, NO EXTENSION OF THE CONTRACT TIME WILL BE AUTHORIZED BECAUSE OF FAILURE TO TRANSMIT SUBMITTALS ENOUGH IN ADVANCE OF THE WORK TO PERMIT PROCESSING, INCLUDING RESUBMITTALS.

1. INITIAL REVIEW: ALLOW 7 DAYS FOR INITIAL REVIEW OF EACH SUBMITTAL EXCLUSIVE OF TRAVEL TIME. ALLOW ADDITIONAL TIME IF COORDINATION WITH SUBSEQUENT SUBMITTALS IS REQUIRED.

2. RESUBMITTAL REVIEW: ALLOW 7 DAYS FOR REVIEW OF EACH RESUBMITTAL EXCLUSIVE OF TRAVEL TIME.

D. PLACE A PERMANENT LABEL OR TITLE BLOCK ON EACH PAPER COPY SUBMITTAL ITEM FOR IDENTIFICATION. INDICATE NAME OF FIRM OR ENTITY THAT PREPARED EACH SUBMITTAL ON LABEL OR TITLE BLOCK.

E. INCLUDE THE FOLLOWING INFORMATION FOR PROCESSING AND RECORDING ACTION TAKEN:

1. PROJECT NAME.

2. DATE.

3. NAME OF ARCHITECT.

4. NAME OF ENGINEER.

5. NAME OF CONTRACTOR.

6. NAME OF SUBCONTRACTOR.

7. NAME OF SUPPLIER.

8. NAME OF MANUFACTURER.

F. CONTRACTOR'S REVIEW: 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 A CHECK MARK IN THE CORNER OF THE DRAWING.

G. SUBCONTRACTOR'S REVIEW: SUBMIT WITH A UNIFORM APPROVAL STAMP. PROVIDE A STATEMENT CERTIFYING THAT SUBMITTAL HAS BEEN REVIEWED, CHECKED, AND APPROVED FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS AND THE PHYSICAL SPACE LIMITATIONS AT THE SITE.

IF THE GENERAL CONTRACTOR IS DEFERRING THE ABOVE REQUIREMENTS TO THE SUBCONTRACTOR, THEN THE SUBCONTRACTOR MUST ALSO REVIEW, STAMP, AND CERTIFY THE SUBMITTAL.

G. ENGINEER'S ACTION: ENGINEER WILL NOT REVIEW SUBMITTALS THAT DO NOT BEAR CONTRACTOR'S APPROVAL STAMP AND WILL RETURN THEM.

ENGINEER WILL REVIEW EACH SUBMITTAL, NOTE CORRECTIONS OR MODIFICATIONS REQUIRED, AND RETURN.

H. IT. ENGINEER WILL PROVIDE SUBMITTAL WITH AN ACTION SHEET TO INDICATE ACTION.

REQUESTS FOR INFORMATION (RFI)

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. ENGINEER WILL RETURN RFIS SUBMITTED TO ENGINEER 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.

3. INCLUDE A PROPOSED SOLUTION AS WELL AS INCLUDE A DETAILED, LEGIBLE DESCRIPTION OF ITEM NEEDING INFORMATION OR INTERPRETATION. INCLUDE SKETCHES, DESCRIPTIONS, MEASUREMENTS, PHOTOS, PRODUCT DATA SHEET DRAWINGS, COORDINATION DRAWINGS, AND OTHER INFORMATION NECESSARY TO FULLY DESCRIBE ITEMS NEEDING INTERPRETATION.

4. RECORD DRAWINGS

A. WITHIN 90 DAYS OF COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER, A COMPLETE SET OF "AS BUILT" DRAWINGS PORTRAYING ACTUAL SITE CONDITIONS OF THE MECHANICAL, PLUMBING, AND FIRE PROTECTION WORK. SUBMISSION SHALL CONSIST OF ONE SET OF PAPER SEPARAS AND ONE SET OF CAD FILES IN AUTOCAD 2007 FORMAT. ENGINEER AND ARCHITECT DESKS AND LOGOS SHALL BE REMOVED FROM THE DRAWINGS AND THEY SHALL BE STAMPED "AS-BUILT DRAWINGS".

B. WITHIN 90 DAYS OF COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER, A COMPLETE SET OF "BIM" MANIFESTS, EQUIPMENT DATA, HVAC AIR AND WATER BALANCING REPORT, AND ENERGY CONTROL TESTING REPORT FOR COMPLIANCE WITH CURRENT ENERGY CODE. THE CONTRACTOR SHALL PROVIDE A

REQUIRED SUBMITTALS

A. PROVIDE FOUR BOUND PRODUCT DATA SUBMITTALS FOR THE NEW EQUIPMENT LISTED BELOW TO THE ARCHITECT/ENGINEER. EACH CONTRACTOR RESPONSIBLE FOR THE WORK SHALL REVIEW AND CERTIFY THE SUBMITTAL DATA TO BE IN FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS AND THE PHYSICAL SPACE

1. AIR HANDLING UNITS
2. TOP-UP UNITS
3. FAN COIL UNITS
4. AIR-CONDITIONING DEVICES
5. ELECTRICAL PANELS
6. ELECTRICAL TRANSFORMERS
7. LIGHTING FIXTURES
8. MIRING DEVICES
9. PLUMBING FIXTURES
10. AIR AND WATER BALANCE REPORTS
11. CIRCUIT DIRECTORY CARDS

MECHANICAL AND SERVICE WATER HEATING COMMISSIONING

A. ALL REQUIREMENTS SHALL BE PERFORMED PER THE CURRENTLY ADOPTED ENERGY CONSERVATION CODE IN THE AUTHORITY HAVING JURISDICTION. THE FOLLOWING IS NOT A COMPLETE LISTING.

B. SYSTEMS ADJUSTING AND BALANCING: HVAC SYSTEMS SHALL BE BALANCED IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING STANDARDS. AIR AND WATER FLOW RATES SHALL BE MEASURED AND ADJUSTED TO DESIRED FLOW RATES WITHIN TOLERANCES PROVIDED IN THE PRODUCT SPECIFICATIONS. TEST AND BALANCE REQUIREMENTS SHALL INCLUDE AIR SYSTEM AND HYDROIC SYSTEM BALANCING. THE FOLLOWING SYSTEMS ARE EXEMPT:

1. MECHANICAL SYSTEMS AND SERVICE WATER HEATER SYSTEMS IN BUILDINGS WHERE THE TOTAL MECHANICAL EQUIPMENT IS LESS THAN 400,000 BTUH COOLING CAPACITY AND 600,000 BTUH COMBINED SERVICE
2. SYSTEMS THAT SERVE INDIVIDUAL DWELLING UNITS AND SLEEPING UNITS.

C. AIR SYSTEMS BALANCING: EACH SUPPLY AIR OUTLET AND ZONE TERMINAL DEVICE SHALL BE EQUIPPED WITH MAKE-UP AIR BALANCING. DIFFUSER DAMPERS USED FOR AIR SYSTEM BALANCING ARE PROVIDED ON CONSTANT VOLUME FANS AND VARIABLE VOLUME FANS WITH MOTORS 10HP AND LARGER. AIR SYSTEMS SHALL BE BALANCED IN A MANNER TO FIRST MINIMIZE THROTTLING LOSSES THEN, FOR FANS WITH SYSTEM POWER OF GREATER THAN 1 HP, FAN SPEED SHALL BE ADJUSTED TO MEET DESIGN FLOW CONDITIONS. EXCEPTIONS: FANS WITH MOTORS OF 1 HP OR LESS ARE NOTE REQUIRED TO BE PROVIDED WITH A MEANS FOR AIR BALANCING.

D. DOMESTIC WATER VALVES

A. DRAWINGS SHALL SHOW TYPES TO BE USED. WHERE SPECIFIC VALVE TYPES ARE NOT INDICATED, THE FOLLOWING REQUIREMENTS APPLY:

1. SHUT-OFF DUTY: USE BALL VALVES FOR PIPING NPS 2 (DN 50) AND SMALLER. USE GATE VALVES WITH FLANGED ENDS FOR PIPING NPS 2-1/2 (DN 65) AND LARGER.
2. THROTTLING DUTY: USE BALL VALVES FOR PIPING NPS 2 (DN 50) AND SMALLER. USE BALL VALVES WITH FLANGED ENDS FOR PIPING NPS 2-1/2 (DN 65) AND LARGER.
3. HOT-WATER CIRCULATION PIPING, BALANCING DUTY: CALIBRATED BALANCING VALVES.
4. DRAIN DUTY: HOSE-END DRAIN VALVES.
5. USE CHECK VALVES TO MAINTAIN CORRECT DIRECTION OF DOMESTIC WATER FLOW TO AND FROM EQUIPMENT.
6. IRON GROOVED-END VALVES MAY BE USED WITH GROOVED-END PIPING

E. DIELECTRIC FITTINGS

GENERAL REQUIREMENTS: ASSEMBLY OF COPPER ALLOY AND FERROUS MATERIALS WITH SEPARATING NONCONDUCTIVE INSULATING MATERIAL. INCLUDE END CONNECTIONS COMPATIBLE WITH PIPES TO BE JOINED.

F. DYNAMIC PERFORMANCE TESTING: FUNCTIONAL PERFORMANCE TESTING SHALL BE CONDUCTED.

1. EQUIPMENT, EQUIPMENT FUNCTIONAL PERFORMANCE TESTING SHALL DEMONSTRATE THE INSTALLATION AND OPERATION OF COMPONENTS, SYSTEMS, AND SYSTEM-TO-SYSTEM INTERFACING RELATIONSHIPS IN ACCORDANCE WITH APPROVED PLANS. TESTS SHALL DETERMINE THAT OPERATION, FUNCTION, AND SERVICEABILITY FOR EACH EQUIPMENT, COMPONENT, AND SYSTEM IS CONFORMING TO THE CONTRACT DOCUMENTS. ALL TESTS AND SEQUENCE OF OPERATION, INCLUDING FULL-LOAD, PART-LOAD AND THE FOLLOWING EMERGENCY CONDITIONS:
- a. ALL MODES AS DESCRIBED IN THE SEQUENCE OF OPERATION.
- b. REDUNDANT AUTOMATIC BACK-UP MODE.
- c. PERFORMANCE OF ALARMS.
- d. MODE OF OPERATION UPON A LOSS OF POWER AND RESTORATION OF POWER.

e. EXCEPT: UNITARY OR PACKAGED HVAC EQUIPMENT THAT DO NOT REQUIRE SUPPLY AIR ECONOMIZERS.

F. CONTROLS, HVAC AND SERVICE WATER-HEATING CONTROL SYSTEMS SHALL BE TESTED TO DOCUMENT THAT CONTROLS, DEVICES, COMPONENTS, EQUIPMENT AND SYSTEMS ARE CALIBRATED AND ADJUSTED AND OPERATE IN ACCORDANCE WITH APPROVED PLANS AND SPECIFICATIONS. SEQUENCES OF OPERATION SHALL BE FUNCTIONAL TESTED DOCUMENT THEY OPERATE IN ACCORDANCE WITH APPROVED PLANS AND SPECIFICATIONS.

G. ECONOMIZERS: AIR ECONOMIZERS SHALL UNDERGO A FUNCTIONAL TEST TO DETERMINE THAT THEY OPERATE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

PLUMBING-SPECIFICATIONS

GENERAL NOTES - PLUMBING

1. DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF PIPING SYSTEMS. INDICATED LOCATIONS AND ARRANGEMENTS ARE USED TO SIZE PIPE AND CALCULATE FRICTION LOSS, DETERMINING THE SIZE AND LENGTH OF PIPING AS INDICATED UNLESS DEVIATION TO LAYOUT IS APPROVED OR COORDINATION DRAWINGS.

2. INSTALL COPPER TUBING UNDER BUILDING SLAB ACCORDING TO COA'S "COPPER HANDBOOK."

3. INSTALL SHUT-OFF PIPE IMMEDIATELY UPSTREAM OF EACH DIELECTRIC FITTING.

4. INSTALL DOMESTIC WATER PIPING WITH 0.125 SLOPE DOWNSHIFT TOWARD DRAIN AND PLUMB.

5. INSTALL PIPING CONCEALED WHERE NOT PROTECTED FROM PHYSICAL CONTACT BY BUILDING OCCUPANTS UNLESS OTHERWISE SPECIFIED IN DRAWINGS, PLANS, AND SPECIFICATIONS.

6. INSTALL PIPING INDICATED TO BE EXPOSED AND PLUMB IN EQUIPMENT ROOMS AND SERVICE AREAS AT RIGHT ANGLES OR PARALLEL TO BUILDING WALLS. DIAGONAL PLUMBING IS PROHIBITED UNLESS SPECIFICALLY INDICATED OTHERWISE.

7. PLUMB ABOVE ACCESSIBLE CEILINGS TO ALLOW SUFFICIENT SPACE FOR CEILING PANEL REMOVAL, AND COORDINATE WITH OTHER SERVICES OCCUPYING THAT SPACE.

8. INSTALL PIPING ADJACENT TO EQUIPMENT AND SPECIALTIES TO ALLOW SERVICE AND MAINTENANCE.

9. INSTALL PIPING TO PERMIT VALVE SERVING.

10. INSTALL NIPPLES, UNIONS, SPECIAL FITTINGS, AND VALVES WITH PRESSURE RATINGS THE SAME AS OR HIGHER THAN THE PRESSURE RATINGS OF THE PIPING.

11. INSTALL PIPING FREE OF SAGS AND DEFLECTIONS.

12. INSTALL FITTINGS FOR CHANGES IN DIRECTION AND BRANCH CONNECTIONS.

13. INSTALL UNION IN COPPER TUBING AT JUNCTION TO EACH PIECE OF EQUIPMENT, MACHINE, AND SPECIALTY.

14. INSTALL SLEEVES FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.

15. INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.

16. INSTALL SHUT-OFF VALVE CLOSE TO WATER MAIN ON EACH BRANCH AND RISER SERVING PLUMBING FIXTURES OR EQUIPMENT, OR EACH WATER SUPPLY TO EQUIPMENT, AND ON EACH WATER SUPPLY TO PLUMBING FIXTURES THAT DO NOT HAVE SUPPLY STOPs. USE BALL VALVES FOR PIPING NPS 2 (DN 50) AND SMALLER. USE GATE VALVES FOR PIPING NPS 2-1/2 (DN 65) AND LARGER.

17. ALLOW TIME FOR INSPECTION AND APPROVAL OF INSULATION.

18. INSTALL PIPING TO ALLOW APPLICATION OF INSULATION.

19. MAKE CHANGES IN DIRECTION FOR SOIL AND WASTE DRANDAGE AND VENT PIPING USING APPROPRIATE BRANCHES, BENDS, AND LONG-SWEEP BENDS. SANITARY TEES AND SHORT-SWEEP 1/4 BENDS MAY BE USED ON VERTICAL STACKS. F-CHANGE IN DIRECTION OF FLOW IS FROM HORIZONTAL TO VERTICAL. USE LONG-TURN, DOUBLE-Y-BRANCH, AND 1/8-DEGREE BENDS IF NO FIXTURES ARE INSTALLED BACK TO BACK ON THE SIDE WITH THE LONG TURN. STRAIGHT TEES, ELBOWS, AND 90-Degree Bends ARE USED ON VENT LINES. DO NOT CHANGE DIRECTION OF FLOW MORE THAN 90 DEGREES. USE PROPER SIZE OF STANDARD ISOLATORS AND REDUCERS IF PIPES OF DIFFERENT SIZES ARE CONNECTED. REDUCING SIZE OF DRAINAGE PIPING IN DIRECTION OF FLOW IS PROHIBITED.

20. LAY BURIED BUILDING DRAINAGE PIPING BEGINNING AT LOW POINT OF EACH SYSTEM. INSTALL TRUE TO GRADES AND ALIGNMENT INDICATED, WITH UNBROKEN CONTINUITY OF INLET. PLACE HUB ENDS OF PIPING UPSTREAM. INSTALL REQUIRED GASKETS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS FOR USE OF LUBRICANTS, CEMENTS, AND OTHER INSTALLATION REQUIREMENTS. MAINTAIN SWAB IN PIPING AND PULL PAST EACH JOINT AS COMPLETED.

21. INSTALL SOIL AND WASTE DRAINAGE AND VENT PIPING AT THE FOLLOWING MIN