

ELECTRICAL SYSTEM SPECIFICATIONS

1. GENERAL CONDITIONS

THE GENERAL PROVISIONS OF THE CONTRACT, INCLUDING THE CONDITIONS OF THE CONTRACT (GENERAL, SUPPLEMENTARY AND OTHER CONDITIONS) AND DIVISION 1 – GENERAL REQUIREMENTS AS APPROPRIATE, APPLY TO THE WORK SPECIFIED IN THIS SECTION.

2. SCOPE OF WORK

THE WORK INCLUDED UNDER THIS SECTION CONSISTS OF FURNISHING ALL MATERIALS, EQUIPMENT, AND LABOR AND THE PERFORMING OF ALL FUNCTIONS, EXCEPT AS OTHERWISE SPECIFIED HEREIN OR SHOWN ON THE DRAWINGS TO BE PERFORMED BY OTHERS, FOR THE INSTALLATION AND PLACING INTO OPERATION OF A COMPLETE ELECTRICAL SYSTEM AS SPECIFIED AND SHOWN ON THE DRAWINGS.

3. GENERAL DESCRIPTION

3.1 THE WORK IN GENERAL SHALL CONSIST OF, BUT IS NOT NECESSARILY LIMITED TO THE FOLLOWING.

3.1.1 FURNISHING AND INSTALLING ALL FIXTURES WITH LAMPS AS INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN UNLESS NOTED.

3.1.2 FURNISHING AND INSTALLING ALL ELECTRICAL WORK, PANELS, SERVICE, CONDUIT, WIRING, ETC., FOR ALL OUTLETS AND EQUIPMENT.

3.1.3 FURNISHING AND INSTALLING ALL TELEPHONE AND DATA OUTLETS, CONDUITS WITH PULL STRINGS AND TELEPHONE MOUNTING BOARDS INCLUDING CONDUIT FROM TELEPHONE MOUNTING BOARD TO THE BUILDING ENTRANCE AS INDICATED ON THE PLAN.

3.1.6 FURNISHING AND INSTALLING ALL MOTOR STARTERS AND CONTROL COMPONENTS, NOT SPECIFICALLY SPECIFIED TO BE FURNISHED IN ACCORDANCE WITH OTHER SECTIONS OF THE SPECIFICATIONS.

3.1.7 FURNISHING AND INSTALLING ALL POWER AND WIRING EXCEPT THAT WHICH IS PRE-WIRED IN FACTORY ASSEMBLED EQUIPMENT.

3.1.8 INSTALLING ALL LINE VOLTAGE, MECHANICAL CONTROL WIRING AND ASSOCIATED CONTROLS WHICH ARE FURNISHED BY THE MECHANICAL CONTRACTOR (LOW VOLTAGE CONTROL WIRING AND CONTROLS SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR).

3.1.9 PAINTING WORK AS DESCRIBED UNDER OTHER SECTIONS OF THESE SPECIFICATIONS. CLEAN AND PREPARE ALL SURFACES READY FOR PAINTING.

3.1.10 PROVIDE TEMPORARY CONSTRUCTION POWER AS OUTLINED BELOW. THIS SERVICE SHALL BE MAINTAINED THROUGHOUT THE ENTIRE JOB AS THE WORK PROGRESSES. PROVIDE OUTLETS AT CONVENIENT POINTS AND IN SUFFICIENT NUMBERS SO THAT NO EXTENSION CORD OVER 50 FEET IN LENGTH IS REQUIRED TO REACH ANY WORK POINT. MAINTAIN GENERAL LIGHTING IN CORRIDORS, STAIRS, BASEMENT AND OTHER AREAS NOT RECEIVING SUFFICIENT DAYLIGHT REQUIRED FOR SAFETY. REMOVE TEMPORARY WORK AS RAPIDLY AS REQUIRED FOR OR ALLOWED BY INSTALLATION OF PERMANENT WORK.

3.1.11 CERTAIN ITEMS OF WORK BY OTHER TRADES WILL BE NECESSARY FOR THE COMPLETION OF WORK UNDER THIS DIVISION. COOPERATE WITH OTHER TRADES AND ARRANGE FOR THESE ITEMS TO BE PERFORMED IN ORDERLY COURSE.

3.1.12 THIS CONTRACTOR SHALL REVIEW THE MECHANICAL CONTROL REQUIREMENTS AS SPECIFIED AND SHOWN ON THE DRAWINGS AND SHALL FURNISH AND INSTALL ALL NECESSARY CONDUIT, WIRING, BOXES, PROTECTIVE DEVICES, SWITCHES, ETC., FOR THE COMPLETION AND PROPER OPERATION OF THE SYSTEM.

3.1.13 REVIEW ALL DRAWINGS AND ALL SPECIFICATIONS FOR EACH SECTION OF WORK. UNLESS SPECIFICALLY NOTED OTHERWISE, HEREIN OR ELSEWHERE, FURNISH AND INSTALL ITEMS OF ANY ELECTRICAL NATURE REQUIRED FOR COMPLETION OF WORK FOR OTHER TRADES, WHETHER OR NOT SAME IS SHOWN OR NOTED IN THIS OR OTHER SECTIONS.

4. REGULATIONS AND CODES

THE CONTRACTOR MUST COMPLY WITH ALL STATE, MUNICIPAL AND FEDERAL SAFETY LAWS, CONSTRUCTION CODES, ORDINANCES AND REGULATIONS RELATING TO BUILDING AND PUBLIC HEALTH AND SAFETY. IN ADDITION, COMPLY WITH RULES AND REGULATIONS OF THE STATE FIRE PROTECTION CODE. FIRE PROTECTION MATERIAL MUST BEAR THE FIRE UNDERWRITERS LABORATORIES LABEL.

5. GENERAL REQUIREMENTS

5.1 THE CONTRACTOR SHALL EXAMINE THE PREMISES AND SATISFY HIMSELF OF EXISTING CONDITIONS UNDER WHICH HE WILL BE OBLIGATED TO OPERATE IN PERFORMING HIS PART OF THE WORK OR THAT WILL IN ANY MANNER AFFECT THE WORK UNDER THE CONTRACT. THE CONTRACTOR SHALL COOPERATE WITH OTHER TRADES SO THAT THE INSTALLATION OF ALL EQUIPMENT MAY BE PROPERLY COORDINATED.

5.2 ALL EQUIPMENT FURNISHED SHALL FIT THE SPACE AVAILABLE, WITH CONNECTION, ETC., IN THE REQUIRED LOCATIONS AND WITH ADEQUATE SPACE FOR OPERATING AND SERVICING. THE DRAWINGS ARE GENERALLY DIAGRAMMATIC AND INDICATE THE MANNER AND METHOD OF THE INSTALLATION, WHILE THE SPECIFICATIONS AND FIXTURE LIST DENOTE THE TYPE AND QUALITY OF MATERIAL AND WORKMANSHIP TO BE USED. WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS AND THE SPECIFICATIONS, THE CONTRACTOR SHALL PROMPTLY NOTIFY THE ARCHITECT/ENGINEER WHOSE DECISION SHALL BE FINAL. NO ALTERATION WILL BE MADE SUBSEQUENTLY IN THIS CONNECTION IN BEHALF OF THE CONTRACTOR AFTER AWARD OF THE CONTRACT.

GROUND FAULT RATING:

480 VOLT

DEVICE	RATING
SAFETY SWITCHES	100,000 (WITH RK-1 FUSES)
SERVICE BREAKERS	65,000 AMPS
DIST. BREAKERS TO PANELS	35,000 AMPS
BRANCH BREAKERS TO DEVICES	22,000 AMPS

208 VOLT

DEVICE	RATING
SAFETY SWITCHES	100,000 (WITH RK-1 FUSES)
SERVICE BREAKERS	42,000 AMPS
DIST. BREAKERS TO PANELS	22,000 AMPS
BRANCH BREAKERS TO DEVICES	10,000 AMPS

NOTE:
THE BUILDING ELECTRICAL GROUND SYSTEM SHALL INCLUDE A DOMESTIC COLD WATER SERVICE BOND, A STRUCTURAL STEEL BOND, A CONCRETE ENCASED ELECTRODE FOUNDATION - 4"x20" MIN., AND A GROUNDING ELECTRODE PLANT IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE REQUIREMENTS.

6. EQUIPMENT AND MATERIAL

6.1 ALL MATERIALS FURNISHED UNDER THIS CONTRACT SHALL BE NEW (EXCEPT AS NOTED), FREE FROM DEFECTS OF ANY CHARACTER, SHALL CONFORM WITH THE STANDARDS OF THE UNDERWRITERS LABORATORIES, INC. (U.L.) (OR OTHER NATIONALLY RECOGNIZED LABORATORY), IN EVERY CASE WHERE SUCH A STANDARD HAS BEEN ESTABLISHED AND SHALL BE SO LABELED. IT IS THE INTENTION OF THESE SPECIFICATIONS TO INDICATE A STANDARD OF QUALITY FOR ALL MATERIALS INCORPORATED IN THIS WORK, AND WHERE MATERIALS ARE NOT SPECIFIED HEREIN AND ARE REQUIRED TO COMPLETE THE ELECTRICAL INSTALLATION, THESE MATERIALS SHALL BE OF FIRST QUALITY FOR USE INTENDED. MANUFACTURERS OF SIMILAR QUALITY PRODUCTS WILL BE CONSIDERED UNLESS THE SPECIFICATIONS OR DRAWINGS INDICATE OTHERWISE.

6.2 MATERIALS SHALL BE SUITABLE FOR INTENDED USE AND LOCATION. UNLESS OTHERWISE SHOWN USE NEMA-1 FOR INTERIOR AREAS AND NEMA-3R FOR EXTERIOR AREAS.

6.3 THE ARCHITECT/ENGINEER DECISION AS TO EQUAL IN GRADE AND QUALITY SHALL RULE AND BE FINAL FOR ALL ELECTRICAL MATERIALS INCORPORATED IN THIS WORK. WHERE TWO OR MORE SIMILAR TYPE ITEMS ARE FURNISHED, ALL SHALL BE OF THE SAME MANUFACTURER (E.G., ALL DISCONNECT SWITCHES SHALL BE OF THE SAME MANUFACTURER) UNLESS OTHERWISE NOTED HEREIN OR SHOWN ON THE DRAWINGS. ALL MATERIAL AND INSTALLATION METHODS USED SHALL BE IN ACCORDANCE WITH THE LATEST AND APPROVED ELECTRICAL AND MECHANICAL ENGINEERING PRACTICES.

7. SERVICE ENTRANCE EQUIPMENT

7.1 SERVICE ENTRANCE EQUIPMENT SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE MUNICIPAL GOVERNING BODY AND SERVING UTILITY. SHOP DRAWINGS SHALL BE SUBMITTED TO THE SERVING UTILITY FOR WRITTEN APPROVAL BEFORE ORDERING EQUIPMENT.

7.2 LABEL EQUIPMENT AND EACH INDIVIDUAL OVERCURRENT DEVICE WITH MILLED PHENOLIC LABELS.

8. PANELBOARDS

8.1 EACH PANEL SHALL BE PROVIDED WITH DOOR LOCK AND TWO KEYS, ALL KEYED ALIKE. EACH PANEL SHALL BE PROVIDED WITH TYPEWRITTEN SHEET INSTALLED ON DOOR IDENTIFYING THE USE OF EACH BRANCH CIRCUIT. PANELS SHALL HAVE BUSSING AS INDICATED ON THE DRAWINGS.

8.2 LABEL EQUIPMENT WITH MILLED PHENOLIC LABELS.

8.3 APPROVED MANUFACTURERS ARE: SQUARE D, CHALLENGER, WESTINGHOUSE, SIEMENS/ITE, GENERAL ELECTRIC, RYCO, PCI

8.4 FLUSH MOUNTED PANELS SHALL BE FURRED OUT AS NECESSARY BY CONTRACTOR.

9. STARTERS

9.1 ALL MOTOR STARTERS SHALL BE FURNISHED UNDER THIS SECTION OF THE SPECIFICATIONS UNLESS AN INTEGRAL PART OF EQUIPMENT OR NOTED AS FURNISHED WITH EQUIPMENT SPECIFIED UNDER OTHER SECTIONS OF THESE SPECIFICATIONS.

9.2 SEPARATELY MOUNTED MOTOR STARTERS SHALL BE ACROSS--THE--LINE COMBINATION MAGNETIC WITH 120V COILS, FUSED DISCONNECT CONTACTORS, ADDITIONAL AUXILIARY CONTACT FOR INTERLOCKING OF CONTROLS. PROVIDE PUSHBUTTON OR SELECTOR SWITCH IN COVER. SWITCHBOARD MOUNTED STARTERS SHALL BE MAGNETIC WITH 120V COILS AND ADDITIONAL AUXILIARY CONTACTS AS REQUIRED FOR INTERLOCKING OF CONTROLS. STARTERS SHALL HAVE AN INTEGRAL CONTROL CIRCUIT TRANSFORMER OR SEPARATE 120V CONTROL WITH CONTROL CIRCUIT DISCONNECT SWITCH IN COVER.

9.3 MANUAL STARTERS SHALL BE HORSEPOWER, VOLTAGE AND PHASE RATED WITH OVERLOAD PROTECTION AND GREEN "ON" PILOT LIGHT. SURFACE MOUNTED UNLESS NOTED OTHERWISE.

9.4 ALL STARTERS SHALL HAVE OVERLOAD PROTECTION IN ALL PHASE LINES. FURNISH AND INSTALL THE PROPER SIZE OVERLOAD HEATER ELEMENTS DETERMINED FROM FULL LOAD NAMEPLATE READINGS ON MOTORS AND COMPENSATION FOR AMBIENT TEMPERATURE IN ALL STARTERS WHETHER THEY BE FURNISHED UNDER THIS SECTION OR OTHER SECTIONS.

9.5 LABEL PER 7.2.

9.6 APPROVED MANUFACTURERS ARE: SQUARE D

WIRING AND CONDUIT GENERAL NOTES:

ON 20A 120V CIRCUITS, WIRING AND CONDUIT SIZE SHALL BE ENLARGED IF ROUTING OF LINES CAUSES WIRE LENGTH TO BE GREATER THAN THE FOLLOWING:

LENGTH ONE WAY	MINIMUM WIRE SIZE	MINIMUM CONDUIT SIZE
75	12	1/2"
100	10	1/2"
150	8	1"
200	6	1"
300	4	1-1/4"
450		

CONDUIT AND WIRE SIZES SPECIFIED IN 120/208 VOLT PANEL SCHEDULES ARE ONLY ACCURATE WHERE THE TOTAL WIRE LENGTH IN ROUTING IS 75 FEET OR LESS.

ON 20A-277V CIRCUITS, WIRING AND CONDUIT SIZE SHALL BE ENLARGED IF ROUTING OF LINES CAUSES WIRE LENGTH TO BE GREATER THAN THE FOLLOWING:

LENGTH ONE WAY	MINIMUM WIRE SIZE	MINIMUM CONDUIT SIZE
150	12	3/4"
270	10	3/4"
430	8	1"
700	6	1"
1000	4	1-1/4"

CONDUIT AND WIRE SIZES SPECIFIED IN 277/480 VOLT PANEL SCHEDULES ARE ONLY ACCURATE WHERE THE TOTAL WIRE LENGTH IN ROUTING IS 150 FEET OR LESS.

ON ALL CIRCUITS, WIRING AND CONDUIT SIZES SHALL BE ENLARGED IF ROUTING OF LINES CAUSES WIRE LENGTH TO BE EXCESSIVE. WIRING AND CONDUIT SIZES

11. CONDUIT

11.1 METALLIC CONDUITS SHALL BE HOT DIPPED GALVANIZED EQUAL TO CLIFFTON.

11.2 ELECTRIC METALLIC TUBING (EMT) IS PERMITTED FOR EXPOSED WORK ABOVE 6'-0" A.F.F. OR CONCEALED WORK ONLY. EMT IS NOT PERMITTED IN THE FOLLOWING: (1) IN OR UNDER CONCRETE, (2) IN EARTH, (3) IN GROUTED WALLS, (4) EXTERIOR OF BUILDING. INSTALL BOND WIRE PER F.C.C. OR M.A.G. AMENDMENTS.

11.3 RIGID PVC CONDUIT IS PERMITTED ONLY UNDERGROUND OR AS NOTED ON DRAWINGS. PROVIDE RIGID STEEL ELBOWS AND RISERS (NO MINIMUM SIZE).

11.4 RIGID GALVANIZED OR SHERADIZED STEEL SHALL BE USED FOR ALL EXPOSED CONDUIT BELOW 6'-0" A.F.F. OR AS NOTED ON DRAWINGS. WHERE USED IN OR UNDER CONCRETE OR IN EARTH, SHALL BE CODE APPROVED PVC COATED OR HALF LAP WRAPPED WITH POLYKEN #900 TAPE OR EQUAL.

11.5 INSTALL EXPOSED RACEWAYS PARALLEL AND PERPENDICULAR TO NEARBY SURFACES OR STRUCTURAL MEMBERS AND FOLLOW THE SURFACE CONTOURS AS MUCH AS PRACTICAL.

11.6 RUN EXPOSED, PARALLEL, OR BANKED RACEWAYS TOGETHER. MAKE BENDS IN PARALLEL OR BANKED RUNS FROM THE SAME CENTER LINE SO THAT THE BENDS ARE PARALLEL. FACTORY ELBOWS MAY BE USED IN BANKED RUNS ONLY WHERE THEY CAN BE INSTALLED PARALLEL. THIS REQUIRES THAT THERE BE A CHANGE IN THE PLANE OF THE RUN SUCH AS FROM WALL TO CEILING AND THAT THE RACEWAYS BE OF THE SAME SIZE. IN OTHER CASES PROVIDE FIELD BENDS FOR PARALLEL RACEWAYS.

12. WIRE

12.1 SOFT DRAWN ANNEALED COPPER (UNLESS OTHERWISE NOTED ON PLANS) HAVING CONDUCTIVITY OF NOT LESS THAN 98% OF THAT OF PURE COPPER, UNIFORM IN CROSS SECTION, FREE FROM FLAWS, SCALES, AND OTHER IMPERFECTIONS. ALL WIRE LARGER THAN #10 SHALL BE STRANDED.

12.2 INSULATION: TYPE THHN/THWN, OR XHHW FOR ALL BRANCH CIRCUIT AND FEEDER WIRING.

12.3 SIZES: NO WIRE SMALLER THAN #12 UNLESS OTHERWISE NOTED ON DRAWINGS.

13. MISCELLANEOUS MATERIALS:

13.1 SAFETY SWITCHES: HEAVY DUTY, FUSED REJECTION TYPE, MINIMUM 200,000 A.I.C. RATED. "NF" INDICATES NOT FUSED.

13.1.1 LABEL PER SECTION 16000.22

13.1.2 APPROVED MANUFACTURERS ARE: SQUARE D, CHALLENGER, WESTINGHOUSE, GENERAL ELECTRIC OR SAME MANUFACTURERS AS DISTRIBUTION EQUIPMENT.

13.2 FUSES: "BUSSMAN" OR "GOULD SHAWMUT" MFG. NO SUBSTITUTIONS UNLESS BY PRIOR WRITTEN APPROVAL FROM ENGINEER, OR AS NOTED ON DRAWINGS.

13.3 CONDUIT STRAP: HEAVY GAUGE STEEL SNAP--ON TYPE.

13.4 ELECTRICAL METALLIC TUBING FITTINGS: EQUAL TO T&B COMPRESSION TYPE. CONNECTORS SHALL HAVE INSULATED BUSHINGS.

13.5 RIGID CONDUIT LOCKNUTS AND BUSHINGS: EQUAL TO T&B.

13.6 FLEXIBLE CONDUIT AND FITTINGS: EQUAL TO CALIFORNIA CONDUIT AND CABLE COMPANY, INC.

13.7 LIQUID TIGHT CONDUIT AND FITTINGS FOR ALL EXTERIOR AND EQUIPMENT CONNECTIONS.

13.8 OUTLET BOXES, PLASTER RINGS, PULL, AND JUNCTION BOXES, ETC., EQUAL TO RACO. ZINC COATED OR CADMIUM PLATED SHEET STEEL FOR INDOOR LOCATIONS, CAST ALUMINUM FOR OUTDOOR LOCATIONS.

13.8.1 FOR ALL LIGHT FIXTURES: OCTAGON OR 4" SQUARE BOXES.

13.8.2 FOR SWITCHES AND RECEPTACLES: 4" OR 4-11/16" SQUARE BOXES.

13.8.3 JUNCTION AND PULL BOXES: 4" SQUARE MINIMUM SIZE. PROVIDE WITH SCREWFASTENED COVERS LOCATED IN ACCESSIBLE LOCATIONS.

13.9 CONDULETS: EQUAL TO CROUSE--HINDS.

13.10 WIRE AND CABLE: EQUAL TO GENERAL CABLE AND/OR SIMPLEX.

13.11 DEVICES: "HUBBELL", "BRYANT", OR APPROVED EQUAL. RECEPTACLES: DUPLEX--20 AMP #5362-I, ISOLATED GROUND -- 20 AMP #IG-5362, GFCI -- 20 AMP #GF-5362-I, SWITCHES: 20 AMP #1221-I SINGLE POLE, 1222-I DOUBLE POLE, 1223-I THREE WAY, 1224-I FOUR WAY.

13.12 DEVICE PLATES: "HUBBELL" OR EQUAL. IVORY NYLON IN INTERIOR AREAS OR AS NOTED ON DRAWINGS. ZINC DIE CAST FLIP UP MOUNTED HORIZONTALLY FOR EXTERIOR OR WEATHERPROOF LOCATIONS.

13.13 LIGHTING FIXTURES: EQUAL TO AS SHOWN ON FIXTURE SCHEDULE OR DESCRIBED ON DRAWINGS, COMPLETE WITH LAMPS IN ORIGINAL CARTONS AND ALL CANOPIES, STEMS, HANGERS AND ACCESSORIES INCLUDING ALL STRUCTURAL MEMBERS REQUIRED FOR PROPER MOUNTING. ALL FIXTURE BALLASTS SHALL BE ELECTRONIC ENERGY SAVING TYPE. SUBMIT SHOP DRAWINGS TO ARCHITECT/ENGINEER FOR APPROVAL BY THE SAME. BALLASTS SHALL BE C.E.C. APPROVED. BALLAST LOSS SHALL NOT EXCEED 10 PERCENT OF TOTAL FIXTURE WATTAGE.

13.14 LAMPS: G.E. OR EQUAL AND SHALL BE FOR THE MAXIMUM RATED WATTAGE OF FIXTURE UNLESS OTHERWISE SHOWN ON DRAWINGS. FLUOR. LAMPS & BALLASTS SHALL BE SOLID STATE ELECTRONIC. TYPE.

23. GROUNDING

23.1 GROUND EACH TRANSFORMER PER NEC.

23.2 AT EACH BUILDING SERVICE ENTRANCE, PROVIDE DISCONNECT SWITCH AND ONE 3/4"x10" GROUND ROD BONDED TO SERVICE WITH CONDUCTOR PER N.E.C. ALSO BOND PER N.E.C. TO FOUNDATION REBAR, BUILDING STEEL AND WATER SERVICE.

14. SLEEVES, INSERTS, OPENINGS

14.1 CONTRACTOR SHALL LAYOUT AND INSTALL HIS WORK IN ADVANCE OF POURING CONCRETE FLOORS OR WALLS. PROVIDE ALL SLEEVES AND/OR OPENINGS THROUGH FLOORS OR WALLS REQUIRED FOR ELECTRICAL CONDUITS OR DUCTS.

14.2 SLEEVES SHALL BE OF RIGID CONDUIT OR GALVANIZED SHEET STEEL RIGIDLY SUPPORTED AND SUITABLY PACKED TO PREVENT ENTRANCE OF WET CONCRETE.

15. EXCAVATION/CUTTING/FITTING/REPAIRING/FINISHING

15.1 THE CONTRACTOR SHALL INCLUDE IN HIS BID ALL EXCAVATION, COMPACTION, FILL, BACKFILL, CUTTING, FITTING, REPAIRING AND FINISHING OF ALL WORK NECESSARY FOR THE INSTALLATION OF ALL EQUIPMENT UNDER THIS SPECIFICATION BUT NO CUTTING OF THE WORK OF OTHER CONTRACTORS SHALL BE DONE WITHOUT THE CONSENT OF THE GENERAL CONTRACTOR.

15.2 EARTHWORK SHALL BE DONE IN ACCORDANCE WITH LATEST INDUSTRY STANDARDS.

16. CLEANUP OF PREMISES

CONTRACTOR SHALL AT ALL TIMES KEEP THE PREMISES CLEAR OF WASTE MATERIALS AND DEBRIS CAUSED BY HIS EMPLOYEES AND OPERATION. EQUIPMENT NOT REQUIRED IN THE WORK SHALL BE REMOVED PRIOR TO THE TERMINATION OF THE CONTRACT.

17. TESTS AND INSPECTIONS

17.1 CONTRACTOR SHALL TEST WIRING AND DEVICES AS SECTIONS ARE COMPLETED AND SHALL CORRECT ALL DEFECTS IMMEDIATELY AT HIS OWN EXPENSE, INCLUDING ANY DAMAGE TO WALLS, CEILINGS, FLOOR OR OTHER PORTIONS OF THE BUILDING WHICH MAY RESULT FROM REPLACING DEFECTIVE EQUIPMENT.

17.2 FURNISH ALL METERS, CABLE, CONNECTIONS AND APPARATUS NECESSARY FOR MAKING TESTS.

17.3 TEST SYSTEM FOR SHORTS AND GROUNDS. FAULTY WIRING SHALL BE REMOVED AND REPLACED. ANY DEVICE, APPARATUS OR FIXTURE INSTALLED SHOWING SUBSTANDARD PERFORMANCE SHALL BE REMOVED AND REPLACED AS DIRECTED BY THE ARCHITECT/ENGINEER.

17.4 MEGGER ALL SYSTEMS NEUTRALS TO INSURE THE NEUTRAL IS NOT GROUNDED WITHIN THE SYSTEM.

17.5 ALL EQUIPMENT RATED AT 1,000 AMPS OR MORE, OR 480 VOLTS SHALL BE TESTED FOR INSULATION BREAKDOWN PRIOR TO ITS BEING ENERGIZED. SUCH EQUIPMENT SHALL WITHSTAND FOR A PERIOD OF ONE MINUTE WITHOUT BREAKDOWN, THE APPLICATION OF A 60 HZ ALTERNATING POTENTIAL OF 1,000V PLUS TWICE THE RATED VOLTAGE OF THE DEVICE.

17.6 AFTER THE ELECTRICAL WIRING SYSTEM INSTALLATION IS COMPLETED AND AT SUCH TIME AS THE ARCHITECT/ENGINEER OR HIS AUTHORIZED REPRESENTATIVE MAY DIRECT, THE CONTRACTOR SHALL CONDUCT AN OPERATING TEST FOR APPROVAL. EQUIPMENT SHALL BE DEMONSTRATED TO OPERATE IN ACCORDANCE WITH REQUIREMENTS OF SPECIFICATIONS. TEST SHALL BE PERFORMED IN PRESENCE OF ARCHITECT/ENGINEER OR HIS REPRESENTATIVE.

18. SHOP DRAWINGS

18.1 ALL DATA SHALL BE SUBMITTED AT ONE TIME, BOUND AND INDEXED IN AN ORDERLY MANNER. PRIOR TO STARTING THE WORK, SUBMIT TO THE ARCHITECT/ENGINEER FOR APPROVAL, SIX (6) SETS OF SHOP DRAWINGS OF SERVICE (S.E.S.), PANELS DISTRIBUTION SECTIONS, LIGHT FIXTURES, MOTOR CONTROL CENTERS, FIRE ALARM SYSTEM, DIMMERS, SOUND SYSTEM, EMERGENCY GENERATOR, DEVICES, TRANSFORMERS, LABELS AS REQUIRED BY 16000.22, AND ALL OTHER EQUIPMENT TO BE FABRICATED.

18.2 PROCURE SHOP DRAWINGS, WIRING DIAGRAMS, ETC., FROM OTHER TRADES INVOLVED WHERE SUCH DRAWINGS MAY FACILITATE AND EXPEDITE THE WORK. AIR CONDITIONING AND MECHANICAL EQUIPMENT SHALL BE WIRED COMPLETE AS PER MANUFACTURER'S WIRING DIAGRAMS FURNISHED BY THE AIR CONDITIONING AND MECHANICAL CONTRACTORS.

19. DRAWINGS OF RECORD (AS-BUILT)

AS--BUILT DRAWINGS SHALL BE SUBMITTED IN ACCORDANCE WITH AND IF REQUIRED BY DIVISION 1 -- GENERAL REQUIREMENTS.

20. GUARANTEE

THE CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND EQUIPMENT TO BE FREE FROM DEFECT OF MATERIAL AND WORKMANSHIP AND SHALL REPLACE OR REPAIR WITHOUT COST TO THE OWNER ALL DEFECTIVE MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE.

21. INSTRUCTIONS

21.1 CONTRACTOR SHALL INSTRUCT THE OWNER IN THE PROPER OPERATING AND MAINTENANCE OF THE EQUIPMENT.

21.2 CONTRACTOR SHALL PROVIDE TWO (2) SETS OF OPERATING AND MAINTENANCE MANUALS FOR EACH PIECE OF EQUIPMENT PROVIDED BY THIS DISCIPLINE. ONLY WHEN SUCH MANUALS ARE AVAILABLE FROM THE MANUFACTURER.

21.2.1 ALL MANUALS TO BE BOUND IN A 3--RING BINDER AND TABULATED IN AN ORDERLY MANNER.

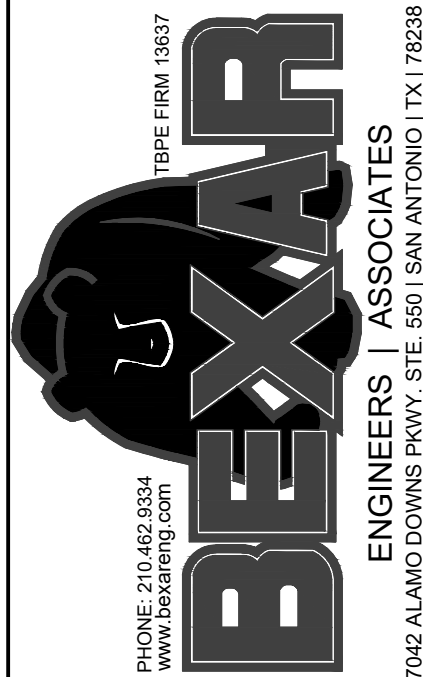
22. LABELING

22.1 LABELS SHALL BE ENGRAVED, BLACK ON WHITE MELAMINE PLASTIC LAMINATE, 1/16" MINIMUM THICKNESS FOR SIGNS UP TO 20 SQUARE INCHES OR 8 INCHES LONG; 1/8" THICK FOR LARGER SIZES. ENGRAVED LEGEND SHALL BE IN WHITE LETTERS ON BLACK FACE WITH MINIMUM 3/16" HIGH LETTERS. LABELS SHALL BE PUNCHED AND FASTENED TO EQUIPMENT WITH ALUMINUM RIVETS OR SELF TAPPING STAINLESS STEEL SCREWS OR NUMBER 10/32 STAINLESS STEEL MACHINE SCREWS WITH NUTS, FLAT AND LOCK WASHERS.

22.2 LABEL EQUIPMENT WITH NAME, AMPERAGE, VOLTAGE, PHASE, AND WIRES (E.G. PANEL 1A, 120/208V, 3 PHASE, 4W). SUBMIT LIST OF ALL LABELS WITH WORDING FOR REVIEW AS PER 16000.18.

22.3 EQUIPMENT TO BE LABELED SHALL INCLUDE SERVICE (S.E.S.) AND ALL OVERCURRENT DEVICES, DISTRIBUTION SECTIONS AND ALL OVERCURRENT DEVICES, MOTOR CONTROL CENTERS (M.C.C.) AND ALL OVERCURRENT DEVICES, FUSIBLE PANELBOARDS AND FUSE OVERCURRENT DEVICES, PANELS, STARTERS AND TRANSFORMERS. LABEL OTHER EQUIPMENT AS NOTED ON PLANS.

REVISIONS--
NO. DATE DESCRIPTION



GENERAL ELECTRICAL NOTES

NACOGDOCHES SHELL BUILDING
NEW CONSTRUCTION
15709 NACOGDOCHES ROAD
SAN ANTONIO, TEXAS 78247

DESIGN	RLI
DRAWN	-
CHECKED	DA
DATE	-
JOB NO.	2201046
SHEET	
E-0	
1 OF 1	

PLUMBING SYSTEM SPECIFICATIONS

1. GENERAL

1.1 THE GENERAL PROVISIONS OF THE CONTRACT, INCLUDING THE CONDITIONS OF THE CONTRACT (GENERAL, SUPPLEMENTARY, AND OTHER CONDITIONS) AND DIVISION 1 – GENERAL REQUIREMENTS AS APPROPRIATE, APPLY TO THE WORK SPECIFIED IN THIS SECTION.

2. SCOPE OF WORK

2.1 THE WORK INCLUDED UNDER THIS SECTION CONSISTS OF FURNISHING ALL MATERIALS, EQUIPMENT, LABOR, AND THE PERFORMING OF ALL FUNCTIONS EXCEPT AS OTHERWISE SPECIFIED HEREIN OR SHOWN ON THE DRAWINGS TO BE PERFORMED BY OTHERS FOR THE INSTALLATION AND PLACING INTO OPERATION A COMPLETE PLUMBING AND PIPING SYSTEM AS SPECIFIED AND SHOWN ON THE DRAWINGS.

3. GENERAL DESCRIPTION

3.1 THE WORK IN GENERAL SHALL CONSIST OF, BUT IS NOT NECESSARILY LIMITED TO THE FOLLOWING:

3.2 COMPLETE SANITARY PLUMBING SYSTEM FROM HE PLUMBING FIXTURES OR EQUIPMENT AS INDICATED ON THE DRAWINGS TO PUBLIC SANITARY SEWER OR PRIVATE DISPOSAL SYSTEM, INCLUDING TAP, AND MANHOLES IF NECESSARY.

3.3 INSTALLATION OF ALL WATER AND GAS PIPING AND EQUIPMENT CONNECTIONS INCLUDING WATER SERVICE LINES AND METER IF REQUIRED.

3.4 FURNISH AND INSTALL ALL PLUMBING FIXTURES AS SHOWN ON THE DRAWINGS.

3.5 BEFORE STARTING WORK, EACH SUBCONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF THE EQUIPMENT LISTED TO THE ARCHITECT FOR APPROVAL. FIVE COMPLETE SETS OF SHOP DRAWINGS SHALL BE SUBMITTED.

IN CHECKING SHOP DRAWINGS, THE ARCHITECT AND ENGINEER WILL MAKE EVERY EFFORT TO DETECT ERRORS AND OMISSIONS, BUT NEITHER THE FAILURE OF THE ARCHITECT OR ENGINEER TO DETECT ERRORS OR OMISSIONS NOR THE APPROVAL OF SHOP DRAWINGS SHALL RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO COMPLY WITH THE PLANS AND SPECIFICATIONS.

3.6 WORK EXCLUDED: NOTED ON DRAWINGS.

4. REGULATIONS AND CODES

4.1 THE CONTRACTOR MUST COMPLY WITH ALL STATE, MUNICIPAL, AND FEDERAL SAFETY LAWS, CONSTRUCTION CODES, ORDINANCES AND REGULATIONS RELATING TO BUILDING AND PUBLIC HEALTH SAFETY.

5. GENERAL REQUIREMENTS

5.1 THE CONTRACTOR SHALL EXAMINE THE PREMISES PRIOR TO THE COMMENCEMENT OF ANY WORK AND SATISFY HIMSELF OF EXISTING CONDITIONS UNDER WHICH HE WILL BE OBLIGATED TO OPERATE IN PERFORMING HIS PART OF THE WORK OR THAT WILL IN ANY MANNER AFFECT THE WORK UNDER THE CONTRACT. THE CONTRACTOR SHALL COOPERATE WITH THE OTHER TRADES SO THAT THE INSTALLATION OF ALL EQUIPMENT MAY BE PROPERLY COORDINATED.

5.2 ALL EQUIPMENT FURNISHED SHALL FIT THE SPACE AVAILABLE, WITH CONNECTION, ETC., IN THE REQUIRED LOCATIONS AND WITH ADEQUATE SPACE FOR OPERATING AND SERVICING. THE DRAWINGS ARE GENERALLY DIAGRAMMATIC AND INDICATE THE MANNER AND METHOD OF THE INSTALLATION, WHILE THE SPECIFICATIONS AND FIXTURE LIST DENOTE THE TYPE AND QUALITY OF MATERIAL AND WORKMANSHIP TO BE USED. WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS AND THE SPECIFICATIONS, THE CONTRACTOR SHALL PROMPTLY NOTIFY THE ARCHITECT WHOSE DECISION SHALL BE FINAL. NO ALLOWANCE WILL BE MADE SUBSEQUENTLY IN THIS CONNECTION IN BEHALF OF THE CONTRACTOR AFTER AWARD OF THE CONTRACT.

6. EQUIPMENT AND MATERIAL

6.1 SUBSTITUTION OF EQUIPMENT BRANDS, OTHER THAN AS NOTED ON THE DRAWINGS, IS TO BE ON AN APPROVED EQUAL BASIS.

6.2 THE PLUMBING CONTRACTOR SHALL PROVIDE ALL NECESSARY TAILPIECES, P- TRAPS, TRAP ARMS, WALL HANGERS, CARRIERS, SHUTOFF VALVES, ANGLE VALVES, ETC., REQUIRED FOR THE INSTALLATION OF A CODE APPROVED PLUMBING SYSTEM.

7. PIPING

7.1 BUILDING DRAIN

7.1.1 NO-HUB CAST IRON CONFORMING TO CISPI NO. 301.

7.1.2 GALVANIZED STEEL PIPE CONFORMING TO ASTM A-120

7.1.3 SCH. 40 PVC.

7.2 BUILDING SEWER

7.2.1 SCH. 40 PVC.

7.3 FITTINGS

7.3.1 NO-HUB CAST IRON DRAINAGE PATTERN FITTINGS CONFORMING TO CISPI NO. 301

7.3.2 THREAD CAST IRON FITTINGS SHALL CONFORM TO ANSI-B16.4.

7.3.3 THREADED MALLEABLE IRON FITTINGS CONFORMING TO ANSI-B16.3.

7.3.4 SOLVENT WELD SCH. 40 PVC FITTINGS.

7.3.6 NO-HUB COUPLINGS:

7.3.6.1 (DOUBLE BAND STAINLESS STEEL COUPLINGS WITH NEOPRENE LINER CONFORMING TO CISPI NO. 301 SPECIFICATIONS. FOR ABOVE GROUND USE ONLY.) (TYPE 304 STAINLESS STEEL COUPLING EQUAL TO "HUSKEY" OR "CLAMP-ALL" FOR BELOW GRADE.)

7.3.7 PITCH 3" AND SMALLER PIPE AT 1/4" PER FOOT, 4" AND LARGER @ 1/8" PER 1 FT. WHERE APPROVED BY LOCAL JURISDICTION.

7.3.8 TEMPORARILY CLOSE ENDS OF PIPE WITH WOOD BLOCKS AT END OF EACH WORKING DAY.

7.4 DOMESTIC WATER

7.4.1 TYPE "L" HARD DRAWN COPPER, CONFORMING TO ASTM B-88 TO BE USED FOR ALL PIPE SET ABOVE CONCRETE.

7.4.2 TYPE "K" SOFT DRAWN COPPER, CONFORMING TO ASTM B-88 TO BE USED FOR ALL PIPE SET UNDER CONCRETE.

7.5 FITTINGS

7.5.1 PROVIDE WROUGHT COPPER TYPE FITTINGS CONFORMING TO ANSI B16.22 FOR ALL CONNECTIONS TO COPPER PIPING.

7.5.2 PROVIDE PVC FITTINGS CONFORMING TO ASTM D2466 WITH SOLVENT CEMENT CONFORMING TO ASTM D2564 AND PRIMER CONFORMING TO ASTM F656.

7.6 SOLDER

7.6.1 PIPES 1/2" THROUGH 2": USE LEAD FREE SOLDER WITH SUITABLE FLUX.

7.6.2 PIPES 2 1/2" AND LARGER: USE AIRCOSIL 45, OR EQUAL SILVER BRAZING ALLOY OF MELTING POINT AND PHYSICAL PROPERTIES. USE AIRCOSIL FLUX OR EQUAL, SUITABLE TO BRAZING ALLOY.

7.7 INSTALLATION

7.7.1 PITCH PIPING TO DRAIN AND PROVIDE ALL NECESSARY DRAIN VALVES. BURY A MINIMUM OF 24" BELOW GRADE OR NATURAL FROST LINE. PROVIDE DI-ELECTRIC UNIONS AT ALL MATERIAL CHANGES IN SYSTEM.

7.7.2 COPPER PIPE INSTALLED BELOW CONCRETE FLOORS SHALL BE WITHOUT JOINTS AND WRAPPED WITH 20 MILS OF POLYETHYLENE TAPE WITH A MINIMUM OF 50% OVERLAP.

7.8 PIPE HANGERS AND SUPPORTS

7.8.1 ADEQUATELY SUPPORT PIPING AGAINST SAGGING, POCKETING, SWAYING, AND DISPLACEMENT. ALL PIPING AND EQUIPMENT SHALL BE SUPPORTED BY STRUCTURAL MEMBERS ADEQUATELY ABLE TO BEAR THEIR WEIGHT. PROPERLY SPACE AND APPLY HANGERS IN ACCORDANCE WITH THE FOLLOWING:

7.8.2 SPACING

7.8.2.1 STEEL PIPE:

3/4" AND SMALLER	5' ON CENTER
1" AND 1 1/4"	6' ON CENTER
1 1/2" TO 2 1/2"	10' ON CENTER
3" AND LARGER	12' ON CENTER

7.8.2.2 COPPER PIPE:

3/4" AND SMALLER	5' ON CENTER
1" TO 1 1/2"	6' ON CENTER
2" AND LARGER	10' ON CENTER

7.8.2.3 CAST IRON:

5' ON CENTER AND ALL BRANCHES IN EXCESS OF 30" LONG.

7.8.3 ALL PIPING SHALL BE INSTALLED WITH ADEQUATE PROVISION FOR EXPANSION AND CONTRACTING USING SWING JOINTS, PIPE CLAMPS, ANCHORS, AND EXPANSION JOINTS. FITTINGS SHALL BE SO SPACED THAT THEY WILL NOT INTERFERE WITH SLIDING OF PIPE ON SUPPORTS.

7.9 Provide shock arrestors for each group of fixtures per mfg. req. minimum 1 pt size.

8. CONDENSATE PIPING

8.1 REFER TO PLANS FOR LAYOUT AND ROUTING. OFFSET PIPING AS REQUIRED TO AVOID CONFLICT WITH DUCTWORK, OTHER PIPING SYSTEMS, OR STRUCTURE. USE CODE APPROVED TYPE "M" COPPER. PROVIDE TRAP AND VENT AT MECHANICAL EQUIPMENT, SLOPE TO LOCATION SHOWN ON PLANS.

8.2 CONDENSATE PIPING SHALL BE INSULATED WHEN RUNNING INSIDE AN UNCONDITIONED SPACE. INSULATION SHALL BE EQUAL TO 1/2" ARMAFLEX.

9. CLEANOUTS

9.1 CLEANOUTS SHALL BE SAME SIZE AS PIPE UNLESS OTHERWISE INDICATED ON THE DRAWINGS. CLEANOUTS SHALL BE INSTALLED IN SOIL AND WASTE LINES AT EVERY CHANGE OF DIRECTION AND AT EVERY 100 FEET OF RUN WHETHER SHOWN ON THE DRAWINGS OR NOT. CLEANOUTS SHALL BE ACCESSIBLE IN ALL CASES. WHEN LOCATED IN A FINISHED WALL OR FLOOR, SET CLEANOUT FLUSH WITH SURROUNDING SURFACE.

10. VENTS

10.1 VENTS SHALL EXTEND NOT LESS THAN 10 INCHES THROUGH THE ROOF. THEY SHALL BE GATHERED TOGETHER WHERE POSSIBLE INTO ONE VENT OF EQUIPMENT AREA. VENTS SHALL BE OF SAME MATERIAL AS BUILDING DRAIN. ALL VENTS THROUGH ROOF SHALL BE LOCATED A MINIMUM OF 10 FEET FROM ANY OUTSIDE AIR INTAKE. VENTS SHALL BE FLASHED AS INDICATED BELOW.

11. MISCELLANEOUS

11.1 SUPPLY FLASHINGS FOR ALL PIPES WHICH PASS THROUGH THE ROOF. FLASHINGS SHALL BE INSTALLED WITH ROOFING. VENTS SHALL BE FLASHED WITH THE CORRECT SIZE STANDARD GALVANIZED SHEET METAL OR LEAD ROOF FLASHING. SLEEVES SHALL BE 24 GAUGE GALVANIZED STEEL WHERE PIPES PASS THROUGH MASONRY AND FOOTINGS. WHEREVER PIPES PASS THROUGH WALLS, FLOORS, OR CEILINGS, ESCUTCHEON PLATES EQUAL TO CADWELL NO. 3A, CAST BRASS SPLIT RINGS WITH SET SCREWS SHALL BE USED. USE POLISHED CHROME IN FINISHED ROOMS, POLISHED BRASS IN ALL OTHERS. ALL CLEANOUTS IN FINISHED WALLS ARE TO HAVE CHROME COVERS.

GLOBE VALVES EQUAL TO	MILWAUKEE 502 OR 554
GATE VALVES EQUAL TO	MILWAUKEE 1140 OR 1145
BALANCING VALVES EQUAL TO	MILWAUKEE BB-1
CHECK VALVE VERTICAL EQUAL TO	MILWAUKEE 558
CHECK VALVE HORIZONTAL EQUAL TO	MILWAUKEE 553
TEMP RELIEF VALE EQUAL TO	CRANE NHLX5
ANGLE STOPS EQUAL TO	CRANE 96107W
SUPPLY TUBING EQUAL TO	CRANE

11.2 CONTRACTOR SHALL LAYOUT AND INSTALL HIS WORK IN ADVANCE OF POURING CONCRETE FLOORS OR WALLS. PROVIDE SLEEVES FOR ALL PLUMBING PIPES PASSING THROUGH CONCRETE FLOOR SLABS, MASONRY, TILES, AND GYPSUM WALLS. SLEEVES SHALL NOT SUPPORT PIPE AND SHALL BE CONSTRUCTED OF 24 GAUGE GALVANIZED STEEL.

11.3 ALL SMITH, ZURN, JOSAM, AND WADE SHALL BE ON AN EQUAL BASIS AND EQUAL TO THE SERIES SPECIFIED ON THE DRAWINGS.

11.4 REFER TO PLUMBING DRAWINGS FOR FIXTURE SPECIFICATIONS.

12. APPROVED MANUFACTURES LIST

12.1.1 FIXTURES:
AM. STD., ELJER, KOHLER, CRANE, ELKAY, HALSEY TAYLOR

12.1.2 SUPPLIES (NON BRASS):
DELTA, ELKAY, CRANE

12.1.3 SUPPLIES (BRASS):
CHICAGO, T&S, ROYAL BRASS, AM. STD., ELJER

12.2 EQUIPMENT:

12.2.1 WATER HEATERS RESIDENTIAL:
A.O. SMITH, RHEEM, LOCHINVAR, RUUD

13. CONNECTIONS TO EQUIPMENT

13.1 CONTRACTOR SHALL MAKE ALL PLUMBING AND PIPING CONNECTIONS TO EQUIPMENT SPECIFIED TO BE FURNISHED BY OWNER OR UNDER OTHER SECTIONS OF THESE SPECIFICATIONS. PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FINAL CONNECTIONS TO AIR CONDITIONING AND HEATING EQUIPMENT. PROVIDE SUFFICIENT APPROVED AIR CHAMBERS OR EXPANSION LOOPS TO PREVENT WATER HAMMER. AFTER COMPLETION OF WORK, ALL EXPOSED FIXTURES, EQUIPMENT, AND PIPING SHALL BE THOROUGHLY CLEANED.

14. ACCESSIBILITY

14.1 UNIONS, VALVES, TRAPS, CONTROLS, ETC., WHICH ARE LOCATED IN NON ACCESSIBLE LOCATIONS SHALL BE PROVIDED WITH APPROVED ACCESS DOORS (FITTED IN A FRAMED HOLE).

15. EXCAVATION AND BACKFILL

15.1 THE CONTRACTOR SHALL DO ALL EXCAVATION AND BACKFILLING NECESSARY FOR INSTALLATION OF WATER AND SOIL PIPE. BACKFILL TO ORIGINAL GRADE TO 95% OF ASTM-D-698 MAX. DENSITY. REMOVE EXCESS DIRT AS DIRECTED. NO WORK SHALL BE COVERED UNTIL PROPERLY TESTED.

16. TESTS

16.1 WATER PIPING: HYDROSTATIC TEST AT 160 PSI; MAXIMUM ALLOWABLE PRESSURE DROP OF 1.5 PSI IN FOUR HOURS AT CONSTANT TEMPERATURE.

16.2 BUILDING SEWER AND DRAIN: 10 FEET STATIC HEAD OR HIGHEST VENT, (WHICHEVER IS GREATER). HEAD MUST BE MAINTAINED AT A CONSTANT LEVEL FOR TWO HOURS AT CONSTANT TEMPERATURE.

16.3 NATURAL GAS PIPING: EACH SEGMENT OF A SERVICE LINE (OTHER THAN PLASTIC) INTENDED TO BE OPERATED AT A PRESSURE OF 5" W.C. SHALL BE GIVEN A LEAKAGE TEST AT A PRESSURE OF NOT LESS THAN 50 P.S.I.G. FOR A PERIOD OF NOT LESS THAN 8 HOURS.

16.4 FAILURE OF TESTS: ANY PIPING SYSTEM WHICH HAS FAILED ITS REQUIRED TEST SHALL HAVE ALL LEAKS REPAIRED AND/OR PIPES REPLACED UNTIL SAID PIPING SYSTEM PASSES ITS REQUIRED TEST. NO PIPING SYSTEM SHALL BE PUT INTO OPERATION UNTIL IT HAS PASSED ALL TESTING PROCEDURES.

17. POTABLE WATER SYSTEM STERILIZATION

17.1 STERILIZE THE ENTIRE WATER DISTRIBUTION SYSTEM THOROUGHLY WITH A SOLUTION CONTAINING NOT LESS THAN 50 PARTS PER MILLION OF AVAILABLE CHLORINE. FOR THE CHLORINATING MATERIAL USE SODIUM HYPOCHLORITE SOLUTION CONFORMING TO FEDERAL SPECIFICATION 0-8-441, GRADE D. ALLOW THE STERILIZATION SOLUTION TO REMAIN IN THE SYSTEM FOR A PERIOD OF 8 HOURS, DURING WHICH TIME ALL VALVES AND FAUCETS SHALL BE OPENED AND CLOSED SEVERAL TIMES. AFTER STERILIZATION, FLUSH THE SOLUTION FROM THE SYSTEM WITH CLEAN WATER UNTIL THE RESIDUAL CHLORINE CONTENT IS NOT GREATER THAN 0.2 PARTS PER MILLION. PROVIDE ARCHITECT WITH CERTIFICATION OF TEST RESULTS.

18. GUARANTEE

18.1 THE CONTRACTOR SHALL GUARANTEE ALL MATERIAL AND EQUIPMENT TO BE FREE FROM DEFECT OF MATERIAL AND WORKMANSHIP AND SHALL REPLACE OR REPAIR, WITHOUT COST TO THE OWNER, ALL DEFECTIVE MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE.

GENERAL NOTES

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THESE PLANS, SPECIFICATIONS, AND LATEST INDUSTRY ACCEPTED PRACTICES.

PLUMBING CONTRACTOR SHALL FURNISH ALL EQUIPMENT, MATERIAL, LABOR, ETC., WHETHER SHOWN ON THESE PLANS OR NOT, NECESSARY TO PROVIDE A COMPLETE, WORKABLE, CODE-APPROVED PLUMBING SYSTEM.

ALL LAVATORIES AND SINKS SHALL COME COMPLETE WITH NECESSARY TRIM, P TRAPS, TAILPIECE CONNECTIONS, SHUTOFF VALVES, AND REQUIRED CARRIERS. PROVIDE NECESSARY CARRIERS FOR ALL WATER CLOSETS, URINALS, AND ALL OTHER PLUMBING EQUIPMENT WHICH REQUIRES THEM.

ALL HOT WATER LINES SHALL BE INSULATED WITH 1/2" ARMAFLEX OR EQUAL.

PLUMBING CONTRACTOR TO COORDINATE ALL LINES AND VENTS WITH RELIEF VENTS AND MECHANICAL EQUIPMENT.

BUILDING SEWER CLEANOUTS SHALL BE INSTALLED AT INTERVALS NOT TO EXCEED ONE HUNDRED FEET (100') IN STRAIGHT RUNS.

PLUMBING CONTRACTOR SHALL VERIFY, PRIOR TO TRENCHING, THAT THE DESIGNED SLOPE OF THE SEWER SHALL WORK UNDER ACTUAL FIELD CONDITIONS. IF THE DESIGNED SLOPE WILL NOT WORK, THE PLUMBING CONTRACTOR SHALL CONTACT DIVERSIFIED METRO DESIGN GROUP AT (602) 235-9399 IMMEDIATELY.

PROVIDE ACCESS PANELS FOR ALL WATER HAMMER ARRESTORS AND/OR TRAP PRIMERS.

PLUMBING CONTRACTOR TO CAP ALL UNUSED HOLES IN LAVATORIES AND SINKS.

FLASH ALL PIPE PENETRATIONS THROUGH THE ROOF IN A WATER TIGHT MANNER.

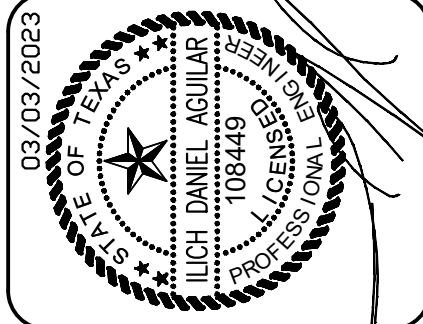
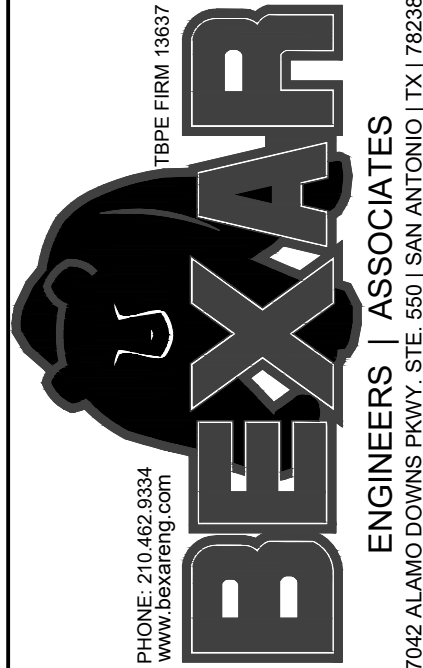
THE CONTRACTOR SHALL VERIFY ALL UTILITIES LOCATION, SIZES AND CONNECTION REQUIREMENTS PRIOR TO BID AND COMMENCEMENT OF ANY WORK.

CONDENSATE PIPING

CONDENSATE PIPING: REFER TO PLANS FOR LAYOUT AND ROUTING. OFFSET PIPING AS REQUIRED TO AVOID CONFLICT WITH DUCTWORK, OTHER PIPING SYSTEMS, OR STRUCTURE. USE CODE APPROVED TYPE "M" COPPER. PROVIDE TRAP AND VENT AT MECHANICAL EQUIPMENT, SLOPE TO LOCATION SHOWN ON PLANS.

CONDENSATE PIPING SHALL BE INSULATED WHEN RUNNING INSIDE AN UNCONDITIONED SPACE. INSULATION SHALL BE EQUAL TO 1/2" ARMAFLEX.

REVISIONS:
NO. DATE DESCRIPTION



GENERAL PLUMBING NOTES

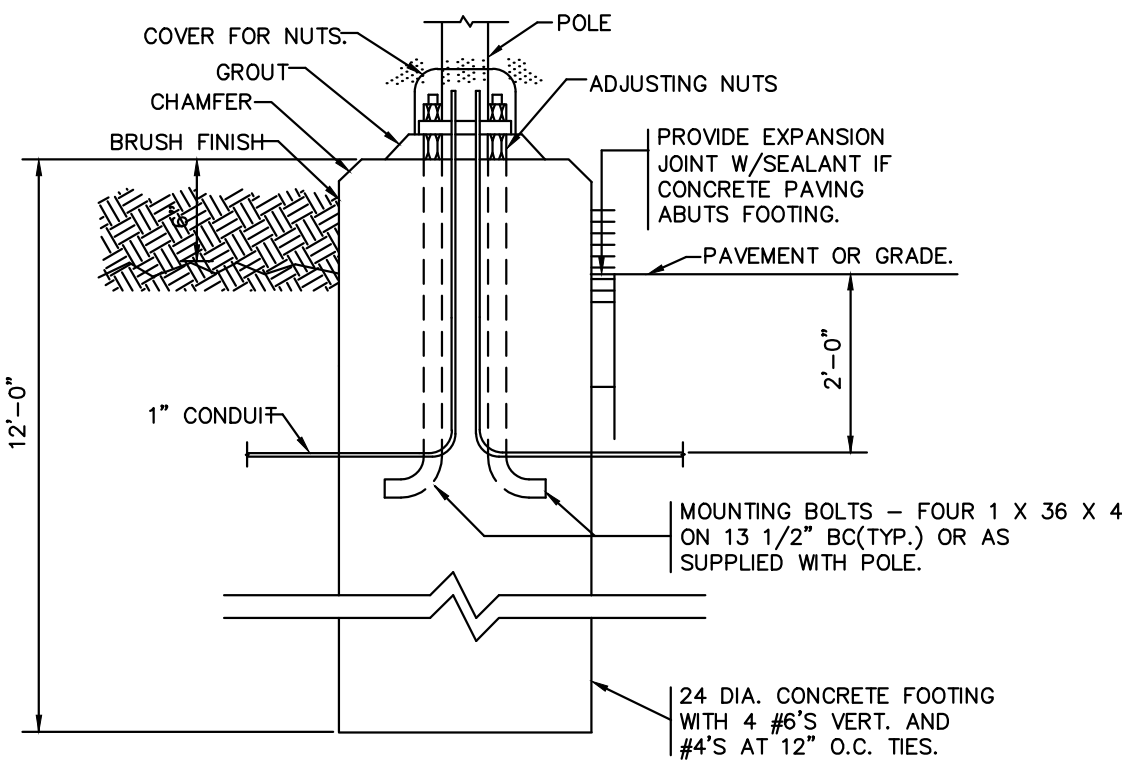
NACOGDOCHES SHELL BUIDLING
NEW CONSTRUCTION
15709 NACOGDOCHES ROAD
SAN ANTONIO, TEXAS 78247

DESIGN	RLI
DRAWN	-
CHECKED	DA
DATE	-
JOB NO.	2201046
SHEET	
P-0	
1 OF 1	

Date: Mar 03, 2023, 3:45pm User ID: rjpei
File: U:\2201046-15709 Nacogdoches\Map\230220-NSB-MEP1.dwg

SITE LIGHTING FIXTURE SCHEDULE												
MARK	MANUFACTURER	MODEL	FIXTURE TYPE	LLF	ARR.	LUM.	WATTS	TYPE	BALLAST	MOUNTING	REMARKS	QUANTITY
S1	LITHONIA	RSX1 P1 30K R3 MVDLT 3PA DDBXD SSP18-4, 0-11-BR2-DM10-BC	20' POLE LIGHT	-	-		51	LED	-	POLE		16
A	KEYSTONE	KT-WPLED40-M2-840-VD1M	WALL PACK	-	-		40	LED	-	SURFACE	W/ BATTERY BACKUP	12

NOTES: (1) ALL LAMPS SHALL BE CONSISTENT WITH NATIONAL ENERGY POLICY PER DEADLINES IN EFFECT AT TIME OF CONSTRUCTION.
(2) PROVIDE UNSWITCHED HOT LEGS TO EXIT AND EMERGENCY FIXTURES FROM NEAREST FIXTURE IN SAME SPACE.
(3) ALL FIXTURE HEIGHTS TO BE VERIFIED WITH OWNER.

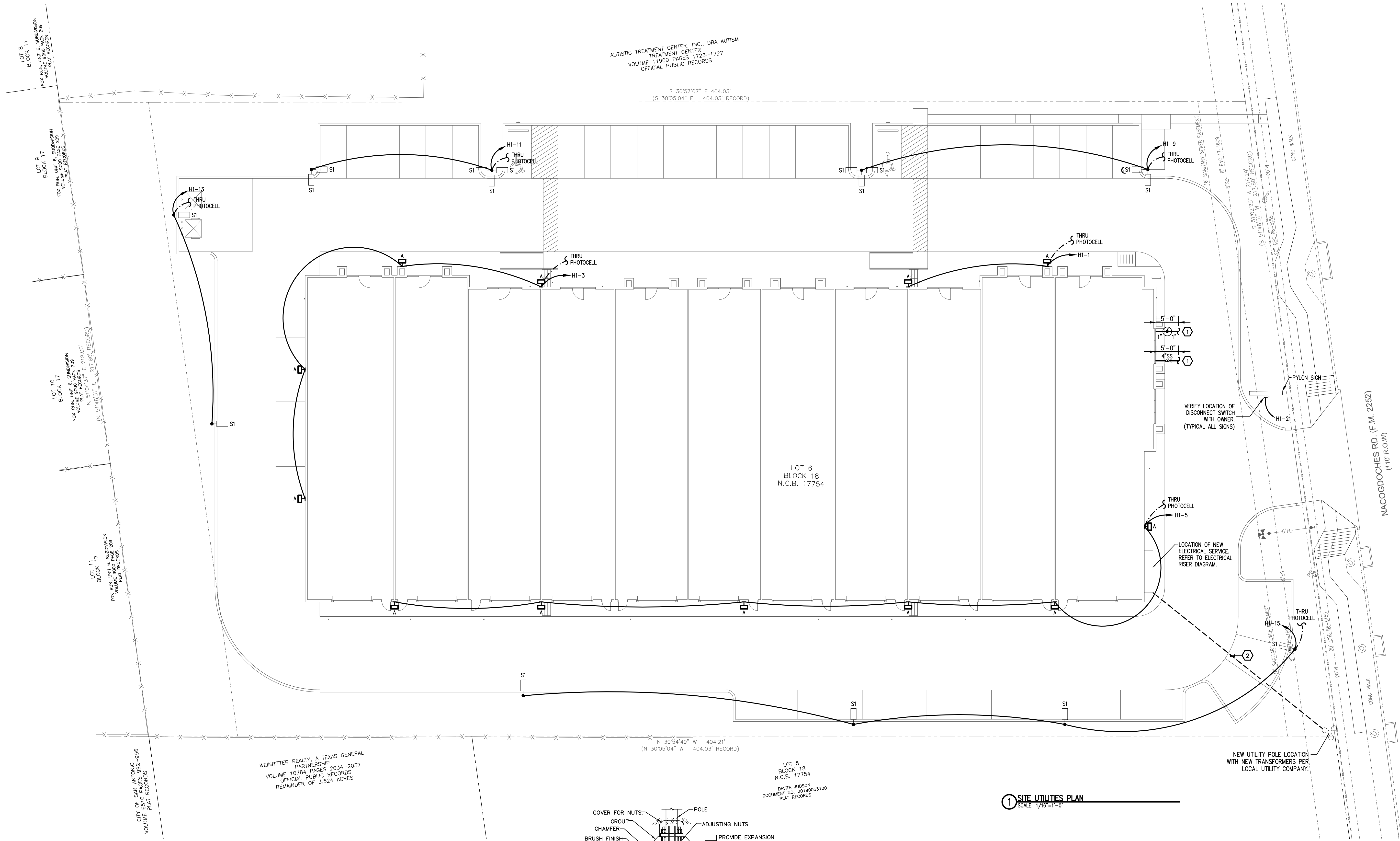


1 SITE UTILITIES PLAN

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

KEYED NOTES:

- (1) REFER TO CIVIL PLANS FOR CONTINUATION.
(2) NEW UNDERGROUND ELECTRICAL SERVICE BY CPS ENERGY.
COORDINATE WITH CPS ENERGY.

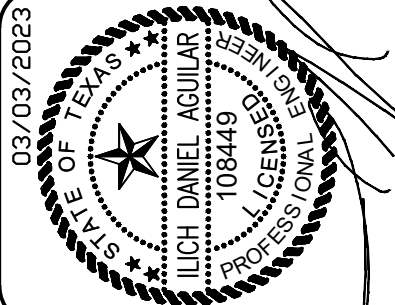


OVERALL MEP SITE PLAN

NACOGDOCHES SHELL BUILDING
NEW CONSTRUCTION
15709 NACOGDOCHES ROAD
SAN ANTONIO, TEXAS 78247

DESIGN RL
DRAWN SL
CHECKED DA
DATE -
JOB NO. 2201046
SHEET

MEP-1
1 OF 1



REVISIONS:
NO. DATE DESCRIPTION

Date: Mar 03, 2023, 3:19pm User ID: rjpei
File: U:\2201046-15709 NACOGDOCHES\Map\230220-NSB-MEP.dwg

ELECTRICAL SPECIFICATIONS

- Electrical work includes lighting fixtures, connections to new equipment and to Owner furnished equipment, electrical connection to heating, ventilating, and air conditioning equipment, switches, convenience outlets, wiring and conduit, emergency systems, empty conduit systems, and all other labor, supplies, materials, and hardware required to provide a complete and finished installation. The electrical contractor shall provide temporary electrical service to the project during construction.
- Service to the project shall be by means of an existing 120/208 volt, three phase, four-wire service.
- The contractor shall coordinate the location of all outlets with the Owner.
- All power wiring systems shall be installed in conduit. Conduit shall be run concealed where possible; the owner shall be consulted prior to installation of any conduit that will be exposed to public view at the completion of the project. Low voltage systems, such as thermostat wiring, may be installed without conduit if plenum- grade conductor is utilized. Conduit types are as follows:
 - Conduit 2-1/2" and larger --- Intermediate Metal Conduit
 - Conduit 2" and smaller --- Electrical Metallic TubingConnections to motors and equipment --- Flexible Metal Conduit (Greenfield) Flexible Metal Conduit may be used within walls as permitted by City Code.
 - Electrical Nonmetallic Tubing (NMT) may be used in applications where permitted by Code and by the City.
- Conduit and fittings must conform to ASA standards, and conduit size shall conform to National Electrical Code requirements for numbers of conductors.
- All wire and cable shall be copper wire conforming to Article 310 of the National Electrical Code for 600 volt wire. Minimum power wire size shall be #12. All conductors #8 AWG and larger shall be stranded. Insulation shall be THW or THHN. Wire size shall be increased to compensate for voltage drop as distance increases; voltage drop shall not exceed five percent.
- All splices shall be made in accessible junction boxes or outlet boxes sized in accordance with NEC requirements for the number and size of conductors. Splices shall be made with "Scotchlok" or equal connectors sized for the conductors served.
- Lighting fixtures, motors, safety switches, panelboards, and outlets shall be grounded using a green wire grounding system. All metallic conduit shall be bonded to the ground.
- Power panels used for branch circuit lighting and power loads shall be load center construction with thermal and magnetic type circuit breakers in the ratings scheduled. Panels shall be provided with concealed hinges and trim. All circuits shall be identified by means of typewritten index cards mounted on the interior of the doors. Circuit designations shall include room numbers. Panels shall be General Electric or equal.
- Switches and receptacles shall be as follows:
 - Single-pole switches: Leviton 1243-W
 - Three-way switches: Leviton 1244-W
 - Convenience outlets: Leviton 5014-SP
 - Ground-fault interrupters: Leviton 012-8598-00W
 - Heavy-duty outlets shall be as noted on the drawings or as required for the appliance being connected.All switches and outlets shall be provided with Sierra plastic smooth pattern plates. Provide appropriate plates for coaxial cable and telephone outlets. Switches shall be mounted to conform to ADA requirements.
- Lighting fixtures as scheduled shall be furnished and installed by the contractor. All fluorescent fixtures shall be provided with Class "P" type CBM ballasts having an "A" sound rating.
- The electrical contractor shall make all final connections to all items of equipment requiring power. For equipment connected by cord-and-plug, furnish and install properly sized cords, plugs, and caps.
- After all equipment is installed, test the entire system to verify that each circuit is free of short circuits or points of excessive resistance.

HEATING, VENTILATING, AND AIR CONDITIONING SPECIFICATIONS:

- Heating, ventilating, and air conditioning work includes packaged terminal air conditioning systems, gas furnaces with coils and condensing units, ventilating systems, ductwork and air device systems, insulation, and all labor, supplies, materials, and hardware required for a complete and finished system.
- Ductwork: Supply and return ductwork shall be constructed from galvanized steel in accordance with ASHRAE and SMACNA standards. Ducts and duct fittings for toilet exhaust systems shall be round or rectangular metal duct. The duct system shall include turning vanes, splitters, dampers, and control devices as required for balancing and effective operation. Duct dimensions shown are interior measurements. Supply and return duct shall be insulated with 1-1/2" fiberglass batt material with fiberglass reinforced aluminum foil backing. Insulation shall be adhered with adhesive and joints shall be sealed with vapor barrier mastic. Provide flexible connections at duct connections to units.
- Supply air devices shall be equipped with opposed-blade damper air volume controls and square-to-round adapters as required.
- Thermostats shall be electric low voltage combination heating and cooling type with automatic changeover. Thermostats shall be equipped with an "off-fan-auto" switch and a separate "cool-off-auto-heat" switch along with a thermometer that indicates the temperature of the control station and a means for setting the desired temperature.
- Testing and balancing: All systems shall be tested at the completion of the project to verify that systems are functioning properly and that controls are calibrated. Duct systems shall be balanced to produce the air quantities shown. For the ducted air supply systems, the contractor shall measure the air supply at each outlet using a flow hood and provide a report for the Owner.

PLUMBING SPECIFICATIONS:

- Plumbing work consists of soil, waste, and vent piping; hot and cold water supply piping; water heaters and accessories; plumbing fixtures, trim, and accessories; swimming pool accessories; and all labor, supplies, materials, and hardware required for a complete and finished installation. The plumbing contractor shall provide final connections to all fixtures and items of equipment and shall coordinate such connections with the general contractor and other subcontractors. The plumbing contractor shall provide temporary water and sewer services as required during construction.
- All work shall be performed in accordance with the requirements of the City of San Antonio, Texas.
- The water services, sewer service, and gas service shall be provided as shown on the Drawings and as directed by the Owner. All utility taps shall be coordinated with the utilities providing the service, and all connection fees shall be included in the Contract.
- Piping and drainage system materials:
 - Hot and cold water piping within building: Type "L" copper with lead-free solder joints and dielectric fittings at connections to dissimilar metals.
 - Cold water piping more than five feet from building footprint: Schedule 40 PVC with solvent welded fittings.
 - Soil, waste, and vent piping: Schedule 40 PVC with solvent welded fittings.
 - Valves for hot and cold water piping: Jenkins 650-A (above 2"), Jenkins 902T ball valves or Jenkins 1222 check valves.
 - Provide access doors for all valves or equipment concealed by walls or solid ceilings.
 - Provide Zurn "Shoktrols" or equal in sizes and quantities necessary to prevent water hammer.
 - Hose bibbs on the building exterior shall be ZURN Z-1320 or equal.
 - Provide control valves as shown on the drawings for isolation of portions of the work.
 - Insulate all hot water piping in chases or in walls with 1/2" thick closed cell foam insulation rated at 25 or less for flame spread and 50 or less for smoke development according to ASTM E-84.
 - Sterilize the entire plumbing installation upon completion with a concentrated chlorine solution. Flush the system thoroughly following sterilization.
 - Test all soil, waste, and vent lines to a head of six feet for 24 hours. Test all water piping to 150 psi for eight hours. Test all gas piping to 25 psi for eight hours. All tests shall at least conform to City Code requirements.
 - Where flue vents are included in the plumbing subcontract, such vents shall be double-walled metal Class "B" systems assembled from standard manufactured fittings in accordance with City Code. The vent systems shall include Briedert or equal caps above the roof.

SYMBOLS SCHEDULE

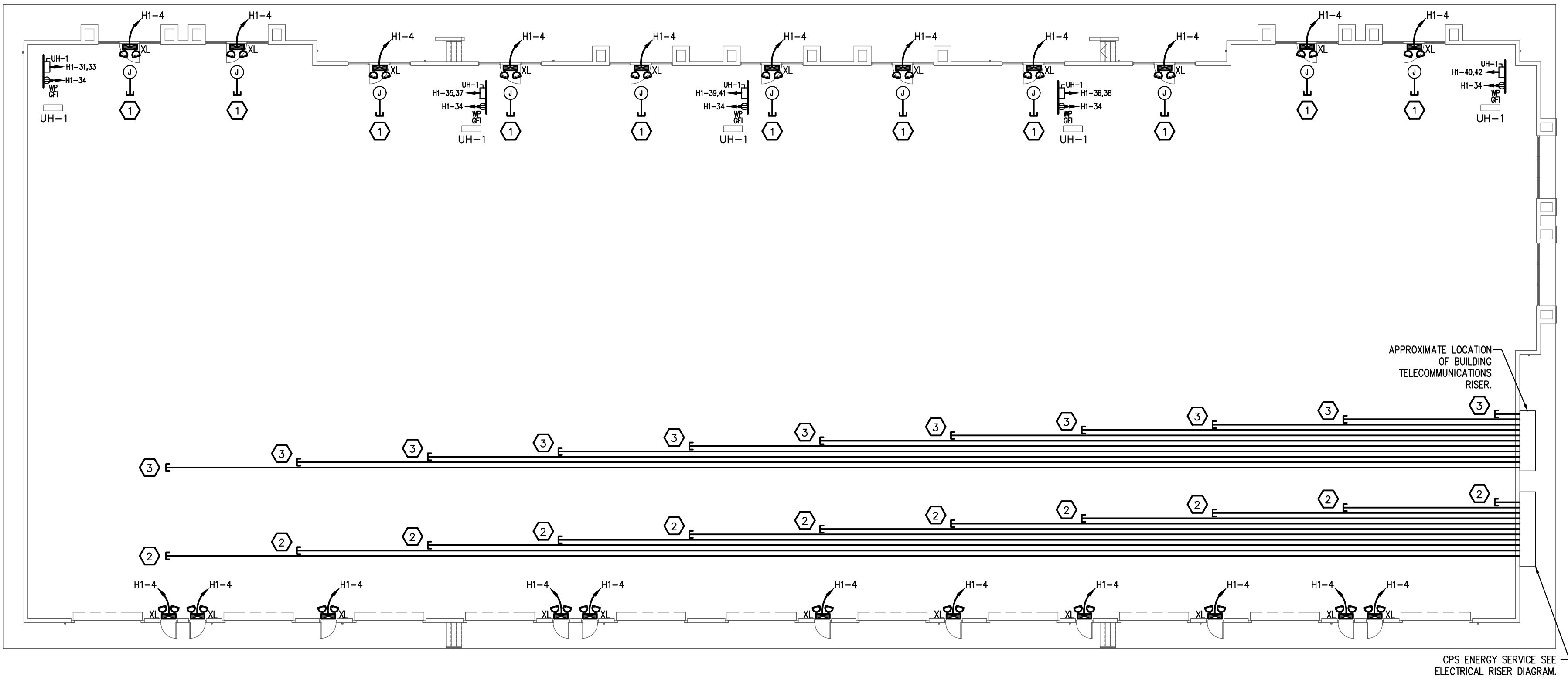
SYMBOL	DESCRIPTION
	FLUORESCENT LIGHTING FIXTURE, TO REMAIN.
	FLUORESCENT LIGHTING FIXTURE, TO BE RELOCATED.
	FLUORESCENT LIGHTING FIXTURE, RECESSED, RELOCATED OR NEW
	PENDANT LIGHT
	WALL MOUNTED COMPACT FLUORESCENT FIXTURE
	EXIT SIGN
	EMERGENCY LIGHT WITH SELF-CONTAINED BATTERY.
	TELEPHONE OUTLET.
	SINGLE POLE SWITCH, 20A, MTD AT 48" A.F.F. UNLESS NOTED.
	OCCUPANCY SENSOR W/ MANUAL CONTROL, 20A, MTD AT 48" A.F.F. UNLESS NOTED.
	3-WAY SWITCH, 20A, MTD AT 48" A.F.F. UNLESS NOTED.
	DUPLEX RECEPTACLE, 20 AMP, 125 VOLT, 2 POLE, 3 WIRE, GROUNDING TYPE.
	DUPLEX RECEPTACLE, 20 AMP, GROUNDING TYPE WEATHER PROOF.
	DUPLEX RECEPTACLE, 20 AMP GROUNDING TYPE, MOUNTED AT 18" A.F.F. BOTTOM HALF SWITCHED.
	QUADPLEX RECEPTACLE, 20 AMP, 125 VOLT, 2 POLE, 3WIRE, GROUNDING TYPE.
	20 AMP, 250 VOLT 10 GROUNDED RECEPTACLE.
	PANELBOARD, SEE SCHEDULES.
	SAFETY SWITCH NON-FUSED, WP INDICATES NEMA 3R.
	EXHAUST FAN.
	MOTOR OUTLET.

PLUMBING SYMBOLS

MARK	DESCRIPTION
	WASTE PIPE
	VENT PIPE
	COLD WATER PIPE
	HOT WATER PIPE
	GAS PIPE
	FLOOR DRAIN
	HUB DRAIN
	CLEANOUT
	GATE VALVE
	GLOBE VALVE
	RISE OR DROP IN PIPING
	HOSE BIBB
	FIRE SPRINKLER HEAD, STANDARD
	FIRE SPRINKLER HEAD, SPECIAL
	FIRE SPRINKLER PIPING

KEYED NOTES:

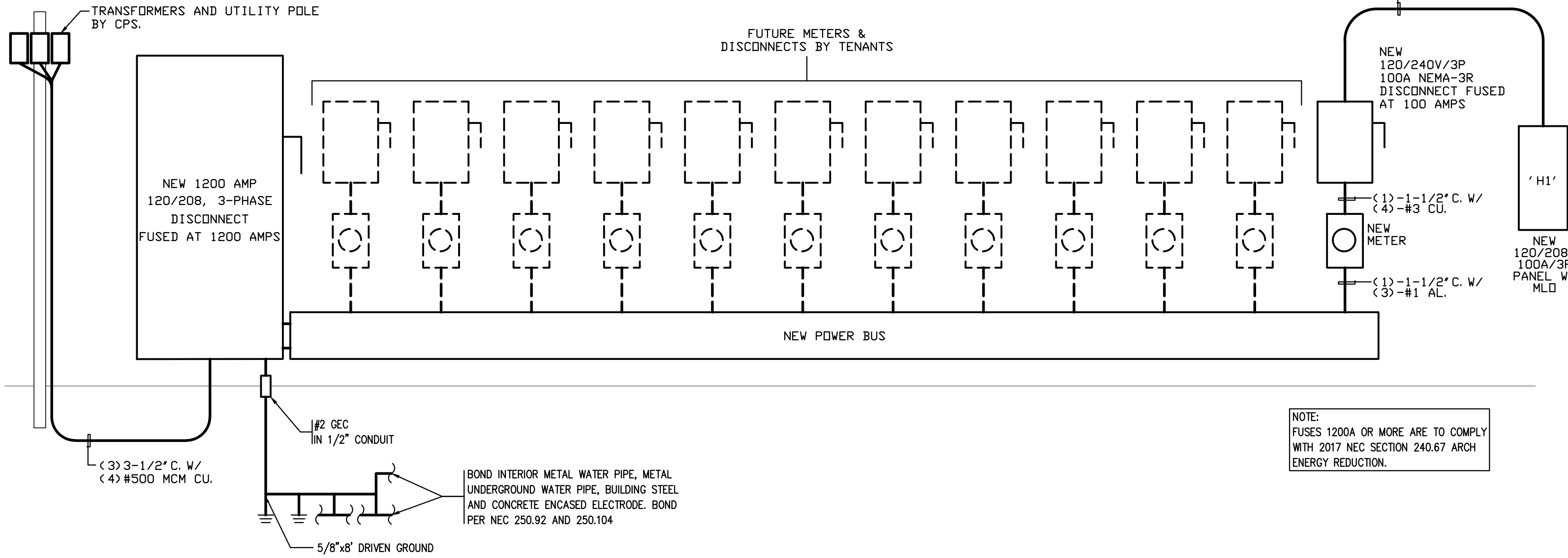
- PROVIDE FLUSH MOUNTED JUNCTION BOX FOR FUTURE TENANT SIGNAGE. STUB 1" CONDUIT INTO LEASE SPACE W. PULL CORD. CAP AND LABEL CONDUIT.
- TYPICAL: PROVIDE 2" CONDUIT W/ PULL CORD FOR FUTURE POWER WIRING BY TENANT. CAP AND LABEL CONDUIT.
- TYPICAL: PROVIDE 2" CONDUIT W/ PULL CORD FOR FUTURE CABLE TELEVISION & TELEPHONE WIRING BY TENANT. CAP AND LABEL CONDUIT.
- PROVIDE KENDORF RACK FOR ALL ROOF EQUIPMENT PROVIDE WP GR RECEPTACLE ON RACK FOR MAINTENANCE.
- REFER TO CIVIL PLANS FOR CONTINUATION.



LIGHTING FIXTURE SCHEDULE									
MARK	MANUFACTURER	MODEL	FIXTURE TYPE	NO.	WATTS	TYPE	BALLAST	MOUNTING	REMARKS
XL	G.C. PROVIDED *	*	EMERGENCY/EXIT LIGHT	-	-	ELEC.	-	SURFACE	22 W/ BATTERY BACK-UP

NOTES:
(1) ALL LAMPS SHALL BE CONSISTENT WITH NATIONAL ENERGY POLICY PER DEADLINES IN EFFECT AT TIME ON CONSTRUCTION.
(2) PROVIDE UNSWITCHED HOT LEGS TO EXIT AND EMERGENCY FIXTURES FROM NEAREST FIXTURE IN SAME SPACE.
(3) ALL FIXTURE HEIGHTS TO BE VERIFIED WITH ARCHITECT.
(*) ALL FIXTURE TO BE "GE" OR EQUAL.

PANELBOARD SCHEDULE									
PANEL: H1		VOLTS: 120/208 PHASE: 3 AMPS: 100 ENCLOSURE: NEMA-3R		WIRE: 4 MAIN: 100 MCB IER: 10000		MOUNTED: SURFACE FEED: TOP CIRCUITS: 42		WIRE SIZE: SEE GROUND: RISER INSULATION: DIAGRAM CONDUIT:	
CCT	DESCRIPTION	BREAKER		RUN		CONNECTED KVA PER PHASE			CCT
		VOLT	A	P	G	A PHASE	B PHASE	C PHASE	
1	OUTSIDE LIGHTING	120	20	1	12	1/2"	0.1	0.5	2
3	OUTSIDE LIGHTING	120	20	1	12	1/2"	0.2	1.0	4
5	OUTSIDE LIGHTING	120	20	1	12	1/2"		0.3	6
7									8
9	POLE LIGHTS	120	20	1	12	1/2"	0.3		10
11	POLE LIGHTS	120	20	1	12	1/2"		0.3	12
13	POLE LIGHTS	120	20	1	12	1/2"	0.2		14
15	POLE LIGHTS	120	20	1	12	1/2"	0.3		16
17									18
19									20
21									22
23									24
25									26
27									28
29									30
31	UH-1	208	20	2	12	1/2"	1.3	1.3	32
33	*						1.3	1.0	34
35	UH-1	208	20	2	12	1/2"	1.3	1.3	36
37	*						1.3	1.3	38
39	UH-1	208	20	2	12	1/2"	1.3	1.3	40
41	*						1.3	1.3	42
G: WIRE GAUGE BASED ON THW. COPPER C: CONDUIT SIZE *: SEE "RISER DIAGRAM" IER: INTEGRATED EQUIPMENT RATING		A: 6.0		B: 6.7		C: 5.8		TOTAL: 18.5 KVA (51.3 AMPS)	



1 ELECTRICAL RISER DIAGRAM
NOT TO SCALE

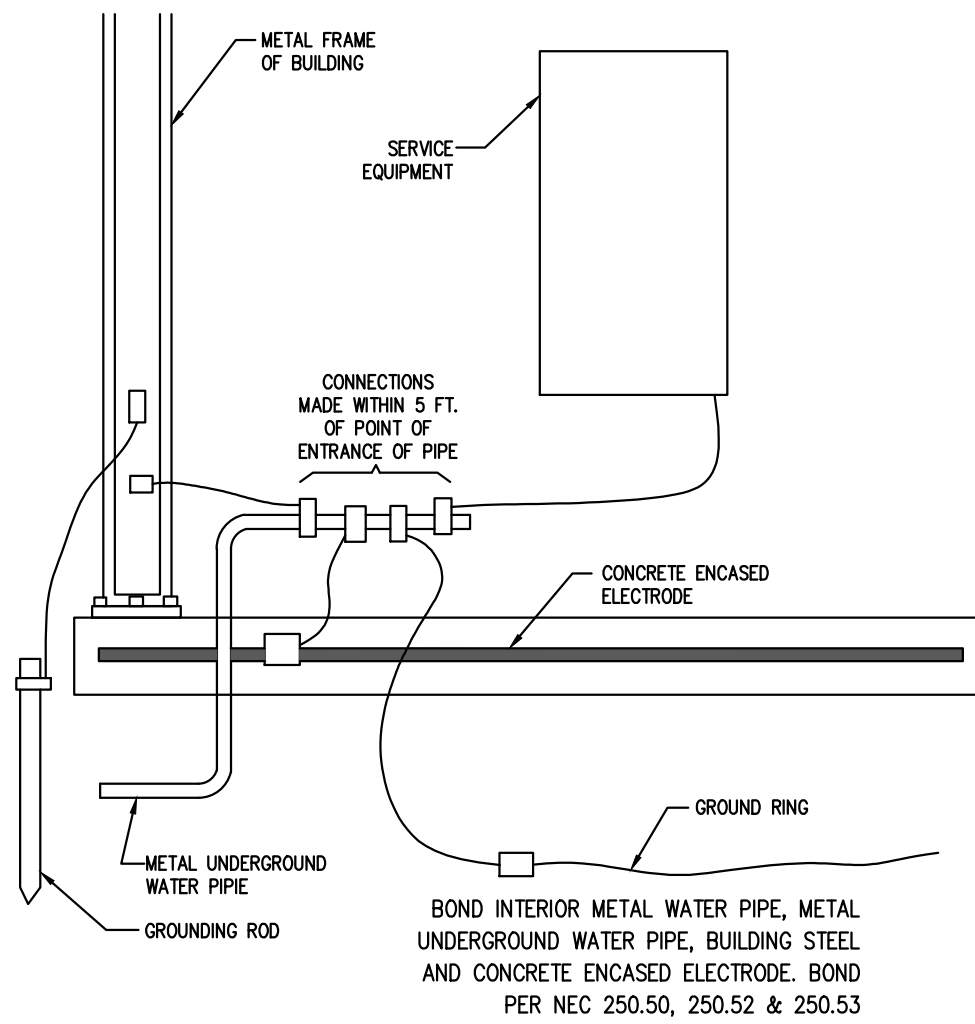
PLUMBING FIXTURE SCHEDULE									
MARK	FIXTURE	MANUF.	MODEL	DESCRIPTION	FI TT I NGS MANUF. MODEL	CONNECTI ONS WASTE VENT			REMARKS
P-1	WALL HYDRANT	G.C. PROVIDED *	*	WALL HYDRANT W/ WALL BOX	-	-	-	3/4"	
NOTES: (1) APPLY FULL BEAD OF CAULK AROUND ALL FIXTURES AT POINTS OF CONTACT WITH WALLS OR FLOORS. (2) LTR-5422-10. (3) 2-8609-12-89. (4) MOUNT HYDRANT FLUSH WITH FINISHED GRADE. (5) PROVIDE SAMPLES OF TRIM AND FITTINGS FOR APPROVAL OF OWNER PRIOR TO ORDERING OR BIDDING. (*) ALL FIXTURES TO BE KOHLER OR EQUAL.					PLUMBING TRIM AND ACCESSORIES: 1. TOILET SEAT OPEN FRONT NO COVER. 2. KOHLER K-7637 STOP AND SUPPLY. 3. KOHLER K-7605 STOPS AND SUPPLIES. 4. CP STRAINER, TYPE B, AND Z-1022. 5. KOHLER P-TRAP, K-8999 OR 9000 AS REQUIRED. 6. AMERICAN STANDARD 7723.018 OFFSET DRAIN. 7. SM TH #700 CARRIER. 8. ELKAY LK-36. 9. PROVIDE WATER TEMPERING VALVES PER IPC 2012.				

*ALL FIXTURE FLOW RATES TO COMPLY WITH CITY OF SAN ANTONIO MAX FLOW RATE TABLE 604.4

ELECTRICAL LOAD ANALYSIS					
DESCRIPTION	AREA OR NUMBER	LOAD	% DEMAND FACTOR	SUBTOTAL	LOAD VA
LIGHTING 3.5 W/SF	30,698	107,443	100		107,443
GENERAL POWER 2.0 W/SF	30,698	61,396	100		61,396
OUTDOOR LIGHTING		1,700	125		2,125
HVAC SUITES @ 15,000 W	11	165,000	125		206,250
VENT @ 200 W	11	2,200	125		2,750
HEATER @ 2,500 W	5	12,500	125		15,625
1,097.9 AMPS AT 208V 3 PHASE				TOTAL	395,589

UNIT HEATER SCHEDULE						
MARK	CFM	HEAT KW	VOLT/ PHASE	MIN CKT AMPS	WEIGHT <LBS.>	MODEL #
UH-1	80	3.3	208/1	16<20	27	TRANE
						UHEC-032A0C0

PLUMBING LOAD ANALYSIS					
FIXTURE	QUANTITY	D. F. U.	S. F. U.	TOTAL	
TOILET	0	6	5	0	0
LAVATORY	0	2	2	0	0
SINK	0	2	2	0	0
MDP SINK	0	2	2	0	0
WALL HYDRANT	0	2	4	0	0
FLOOR DRAIN	0	1	1	0	0
FLOOR SINK	0	1	1	0	0
SEWER REQUIREMENT <1/4" PER FOOT SLOPE> - 4" MINIMUM				0	9
WATER DEMAND 2" METER, 2" SUPPLY, 44 GPM					



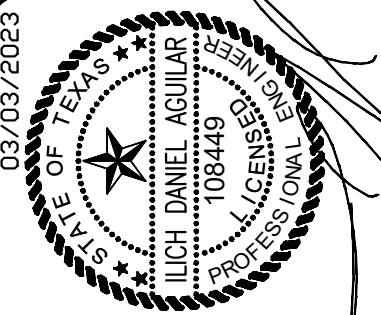
2 GROUNDING SYSTEM DETAIL
NOT TO SCALE

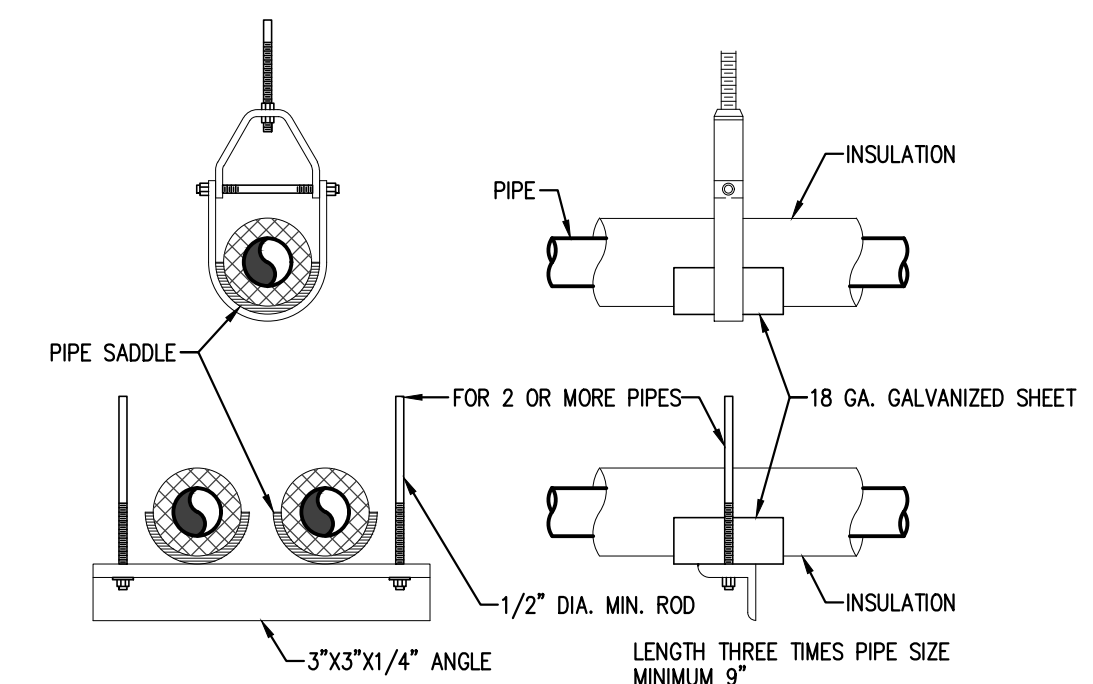
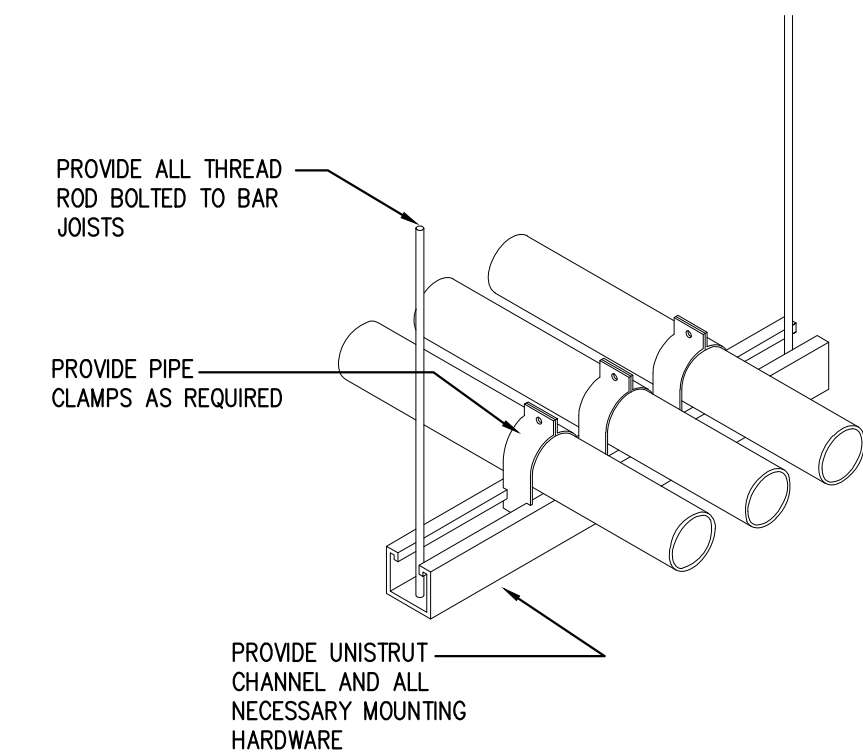
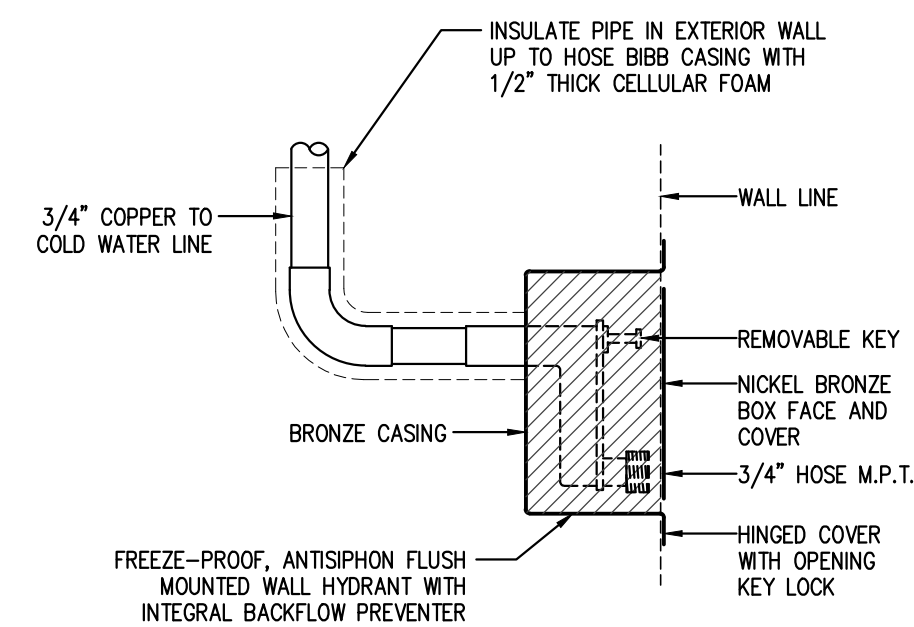
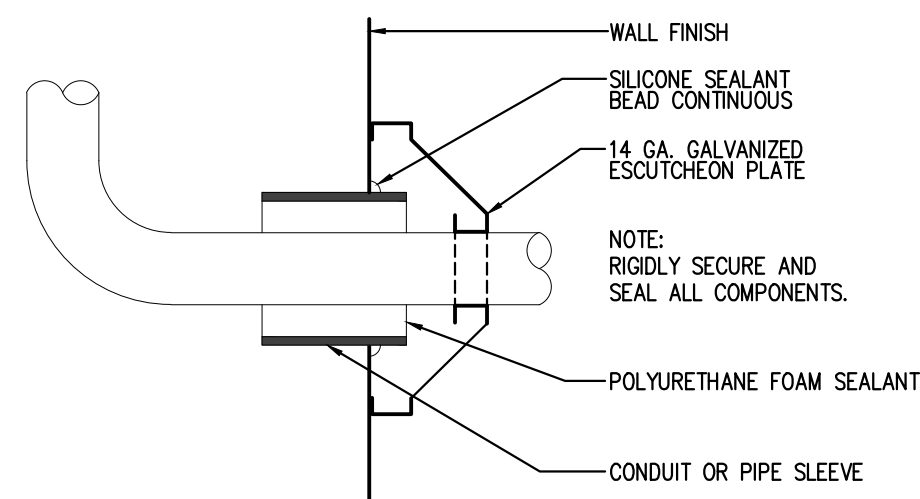
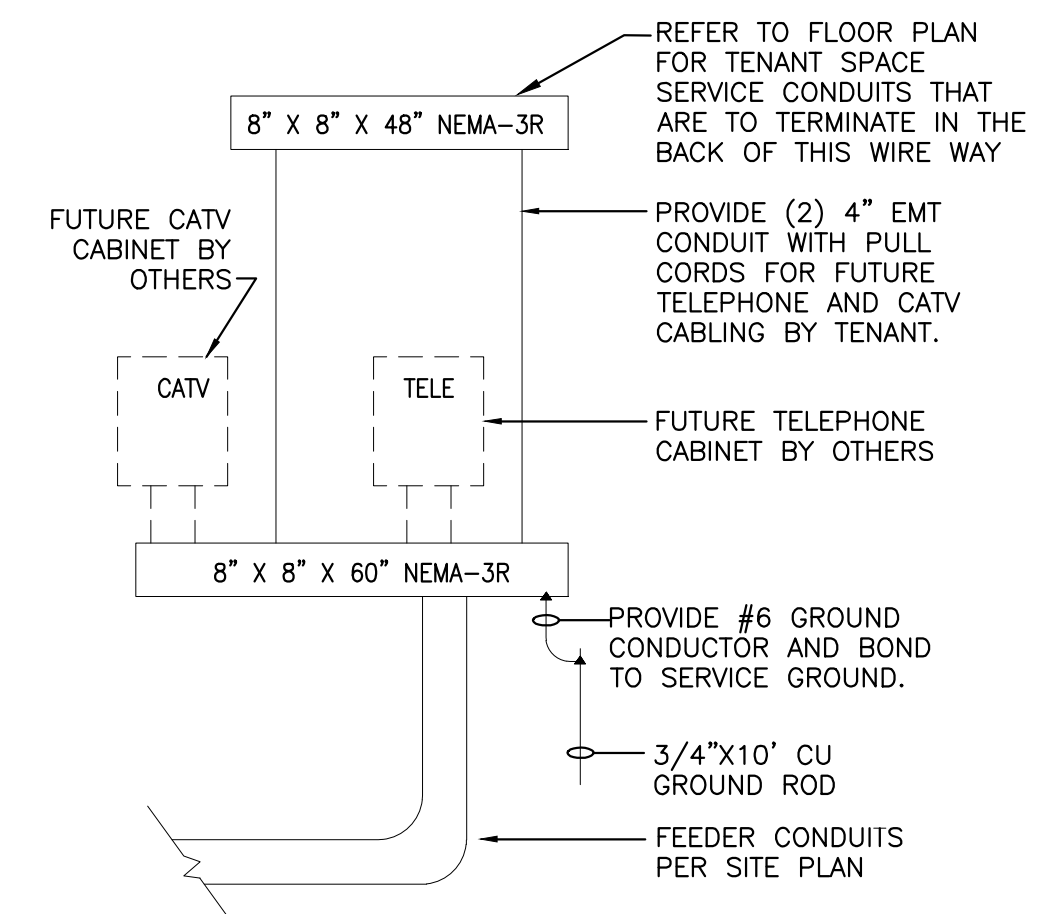
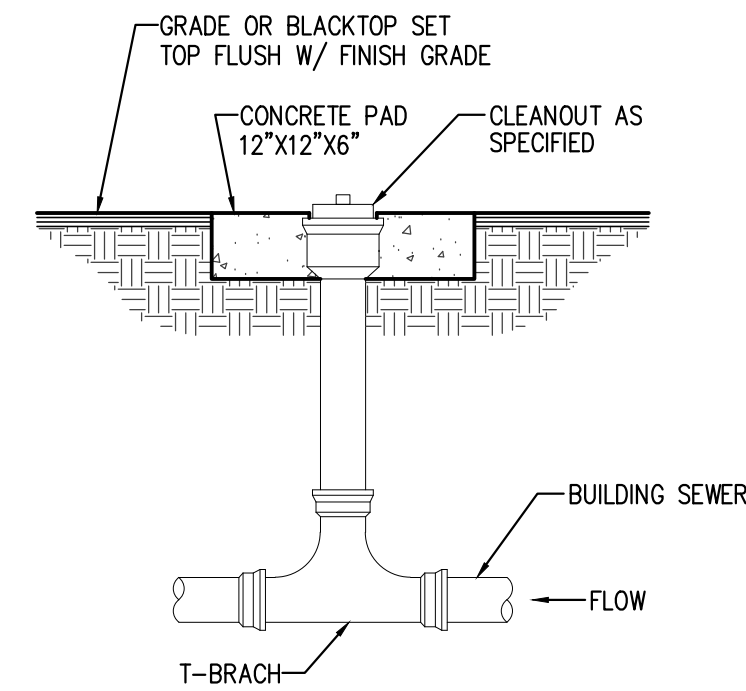
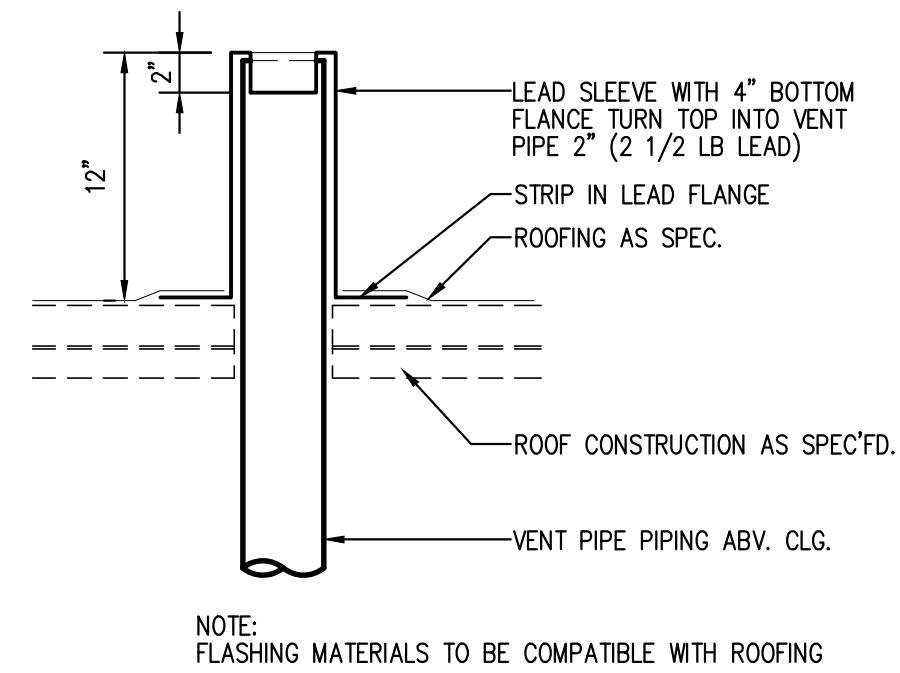
DETAILS & SCHEDULES

NACOGDOCHES SHELL BUILDING
NEW CONSTRUCTION
15709 NACOGDOCHES ROAD
SAN ANTONIO, TEXAS 78247

DESIGN RLL
DRAWN SL
CHECKED DA
DATE -
JOB NO. 2201046

SHEET
EP-2
2 OF 3

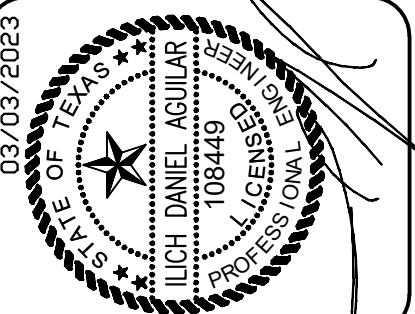
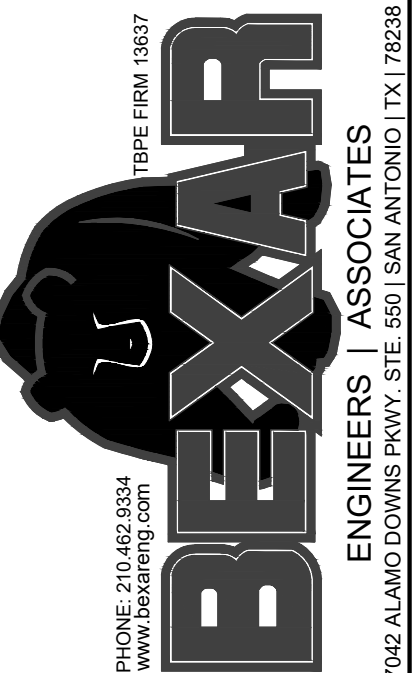




NOTE:

1. INSULATION ABOVE SADDLES SHALL BE FOAM GLASS OF SAME THICKNESS AS PIPE INSULATION AND A COMPRESSIVE STRENGTH ON NOT LESS THAN 3,300 PSI.
2. HANGER RODS SHALL BE OF THE SIZE REQUIRED, BUT NOT SMALLER THAN 1.2" DIAMETER.
3. HANGERS ARE ALSO TYPICAL FOR UNINSULATED PIPING WITHOUT INSULATION AND SADDLES.

REVISIONS:	DESCRIPTION
NO.	DATE



DETAILS

NACOGDOCHES SHELL BUILDING
NEW CONSTRUCTION
15709 NACOGDOCHES ROAD
SAN ANTONIO, TEXAS 78247

DESIGN RLI
DRAWN SL
CHECKED DA
DATE -
JOB NO. 2201046

SHEET
EP-3
3 OF 3