

ELECTRICAL SPECIFICATIONS

GENERAL:

1. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING BID TO BE FAMILIARIZED WITH THE PROJECT AND ALL ASPECTS OF THE WORK TO BE PERFORMED.
2. ALL WORK SHALL CONFORM TO AND COMPLY WITH APPLICABLE BUILDING CODES: REFER TO ARCHITECTURAL COVER SHEET FOR A LIST OF CODES BEING USED ON THIS PROJECT. NOTE: CONTRACTOR SHALL ALSO VERIFY WITH LOCAL AUTHORITY HAVING JURISDICTION AND LOCAL FIRE MARSHAL FOR ANY REQUIREMENTS NOT LISTED IN REQUIRED CODES AND REFERENCES.
3. INSTALL ALL WORK IN A NEAT AND WORKMANLIKE MANNER.
4. GUARANTEE THE WORK FOR A PERIOD OF ONE YEAR.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PAYING FOR ALL PERMITS INCLUDING ARRANGING ALL INSPECTIONS REQUIRED FOR THE WORK TO BE UNDERTAKEN AND ACCEPTED.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH UTILITY COMPANIES FOR ALL FINAL SERVICE CONNECTION REQUIREMENTS. THE CONTRACTOR SHALL INCLUDE IN CONTRACT PRICE ANY FEES REQUIRED BY UTILITY COMPANIES FOR SERVICE CONNECTIONS.
7. CUT ALL SURFACES AS REQUIRED FOR THE INSTALLATION AND PATCH TO MATCH EXISTING CONDITIONS AND FINISH.
8. ALL MATERIALS AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE TESTED AND LISTED BY UNDERWRITERS LABORATORIES (UL).
9. ALL MATERIALS AND EQUIPMENT SHALL BE INSTALLED PER NEMA STANDARDS, APPLICABLE ANSI STANDARDS AND IEEE STANDARDS.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL CONNECTIONS TO ALL EQUIPMENT REQUIRING POWER.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING SHOP DRAWINGS, PRODUCT DATA AND WIRING DIAGRAMS AS REQUIRED BY EACH SECTION. PRODUCT DATA SHALL BE MARKED TO IDENTIFY THE EXACT MODEL NUMBER AND OPTIONS THAT ARE TO BE PROVIDED. SHOP DRAWINGS SHALL BE SUBMITTED ELECTRONICALLY TO THE ARCHITECT FOR ENGINEER'S APPROVAL. ONCE THE ENGINEER RECEIVES THE SUBMITTAL, THE REVIEW PROCESS WILL REQUIRE FIVE (5) BUSINESS DAYS.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING OPERATION AND MAINTENANCE (O&M) MANUALS. THESE MANUALS SHALL BE A VINYL THREE RING BINDER WHICH IS TO BE LABELED WITH THE OWNER'S PROJECT NAME AND NUMBER ON THE BINDER. THE O&M MANUALS SHALL INCLUDE PRODUCT DATA CUT SHEETS, MAINTENANCE REQUIREMENTS, PROGRAMMING INSTRUCTIONS AND WARRANTIES OF ALL EQUIPMENT.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL CLEANING OF EQUIPMENT INSTALLED.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEMOLITION OF EXISTING ELECTRICAL EQUIPMENT TO BE REMOVED. ALL MATERIALS SHALL BE REMOVED FROM SITE AND DISPOSED OF PROPERLY BY CONTRACTOR.
16. ALL PENETRATIONS THROUGH FIRE WALLS SHALL BE PROPERLY FIRE SEALED TO CONFORM WITH UL SYSTEM NUMBERS AS LISTED IN VOLUME 2 OF THE UL FIRE RESISTANCE DIRECTORY FOR EACH DIFFERENT INTENDED PROJECT APPLICATION, SUCH AS CABLE TRAY PENETRATION AND CONDUIT PENETRATIONS.
17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ACCESS DOORS AND FRAMES AT LOCATIONS OF EQUIPMENT REQUIRING ACCESS WHICH IS CONCEALED IN WALLS OR CEILINGS.

RACEWAY AND BOXES:

1. UNLESS NOTED OTHERWISE, USE EMT CONDUIT WITH STEEL COMPRESSION FITTINGS.
2. THE MINIMUM SIZE OF CONDUIT SHALL BE 3/4".
3. ALL RACEWAY SHALL BE CONCEALED UNLESS OTHERWISE NOTED.
4. UNLESS NOTED OTHERWISE USE RIGID GALVANIZED STEEL CONDUIT UP TO 10' A.F.F. OUTDOORS. USE GALVANIZED IMC OVER 10'. PROVIDE EXPANSION COUPLINGS AS REQUIRED.
5. USE PVC SCHEDULE 40 CONDUIT UNDERGROUND.
6. FLEXIBLE METAL CONDUIT SHALL BE USED FOR THE FINAL CONNECTIONS TO ROTATING MACHINERY, VIBRATING EQUIPMENT AND LIGHTING FIXTURES. 3/8" SIZE IS ALLOWED FOR CONNECTIONS TO LIGHTING FIXTURES. USE LIQUIDTIGHT FOR OUTDOOR USE OR FOR CONNECTIONS TO MOTORS OR EQUIPMENT IN AREAS WHERE THE RUPTURE OF A PIPE COULD SPRAY OR LEAK ON THE CONDUIT, SUCH AS IN MECHANICAL ROOMS.
7. PROVIDE PULL AND JUNCTION BOXES AS REQUIRED.
8. ALL OUTLET BOXES SHALL BE 4" SQUARE OR 4-11/16" SQUARE, GALVANIZED METAL. INSTALL TRUE AND PLUMB WITH THE BUILDING FINISH. INSTALL SECURELY AND INDEPENDENT OF RACEWAY. PROVIDE SINGLE OR MULTIGANG RINGS AS REQUIRED. LIGHTING FIXTURE BOXES MAY BE 4" OCTAGONAL.
9. INSTALL ALL RACEWAYS PARALLEL AND PERPENDICULAR TO THE BUILDING WALLS, FLOOR AND CEILING.
10. ALL BOXES FOR RECEPTACLES, TELEPHONE AND DATA OUTLETS SHALL BE MINIMUM 2-1/8" DEEP. ALL BOXES FOR SWITCHES, LOCAL LIGHT CONTROL, AND RECESSED LIGHT FIXTURES TO BE MINIMUM 1-1/2" DEEP.
11. PROVIDE BLANK COVERS ON ALL BOXES THAT ARE NOT TO RECEIVE A DEVICE.
12. ALL RACEWAY SHALL BE INDEPENDENTLY SUPPORTED FROM THE STRUCTURE USING APPROVED CLAMPS, RODS, FITTINGS, ETC. DO NOT SUPPORT FROM HUNG CEILING WIRES OR THE WORK OF OTHER TRADES. SUPPORT AT INTERVALS AS REQUIRED BY NEC.
13. UNDERGROUND CONDUIT WALL PENETRATIONS SHALL BE SEALED WITH "WS" STEEL SLEEVE AND AND RUBBER LINKS WHICH WILL CREATE A WATERTIGHT SEAL. SLEEVES AND SEALS SHALL BE PSI-THUNDERLINE "LINK-SEAL" MODEL C.
14. USE STEEL SURFACE RACEWAY (2 SECTIONS) ONE SECTION FOR POWER AND ONE FOR LOW VOLTAGE IN AREAS WHERE CONDUITS MAY NOT BE ROUTED CONCEALED DUE TO EXISTING WALL/CEILING CONSTRUCTION. ALL USE OF SURFACE RACEWAYS MUST BE APPROVED BY OWNER/ARCHITECT PRIOR TO INSTALLATION. SURFACE RACEWAYS SHALL BE EQUAL TO WIREMOLD. ALL SURFACE RACEWAYS PRODUCT DATA CUT SHEETS MUST BE SUBMITTED FOR APPROVAL TO ARCHITECT/ENGINEER.

LUMINAIRES:

1. PROVIDE MANUFACTURERS PRODUCT DATA CUT SHEET SUBMITTALS FOR ENGINEERS AND ARCHITECTS APPROVAL FOR ALL LUMINAIRES.
2. LUMINAIRES TYPES ARE AS SCHEDULED OR NOTED. REFER TO LIGHT FIXTURE SCHEDULE AND LEGENDS ON ELECTRICAL AND ARCHITECTURAL DRAWINGS.
3. PROVIDE LUMINAIRES WITH THE NECESSARY FRAMES, FLANGES, FITTINGS, ETC., AS REQUIRED FOR INSTALLATION IN OR ON THE CEILING OR SURFACE IN OR ON WHICH THEY ARE TO BE INSTALLED AND TO ELIMINATE LIGHT LEAKAGE. CATALOG NUMBERS DO NOT NECESSARILY REFLECT THE TYPE OF CEILING IN WHICH A FIXTURE IS TO BE INSTALLED.
4. COORDINATE FINAL LOCATIONS OF LUMINAIRES IN THE FIELD WITH ARCHITECTURAL REFLECTED CEILING PLANS.

WIRE AND CABLE:

1. ALL WIRE AND CABLE SHALL HAVE COPPER CONDUCTORS.
2. USE NEC TYPE THHN/THWN OR XHHW INSULATION.
3. USE MINIMUM #12 AWG SIZE. #14 AWG MAY BE USED FOR CONTROL WIRING. FOR OTHER SYSTEMS, USE WIRING AS NOTED ON THE DRAWINGS AND AS RECOMMENDED BY THE SYSTEM MANUFACTURER.

WIRING DEVICES:

1. ALL RECEPTACLES SHALL BE SAME MANUFACTURER. ALL RECEPTACLES SHALL BE COMMERCIAL GRADE 20A, 125 VOLTS, DUPLEX, WHITE COLOR. ACCEPTABLE MANUFACTURERS ARE HUBBELL, COOPER, PASS & SEYMOUR, OR LEVITON. INSTALL RECEPTACLES WITH THE LONG DIMENSION VERTICAL AND WITH THE GROUND SLOT ON TOP. FLUSH MOUNT IN OUTLET BOX AT 18" AFF UNLESS OTHERWISE NOTED.
2. SPECIAL PURPOSE RECEPTACLES SHALL BE AS NOTED ON THE DRAWINGS.
3. ALL SWITCHES SHALL BE SAME MANUFACTURER. ALL SWITCHES SHALL BE 20A, 120V, QUIET OPERATING TYPE, WHITE COLOR. ACCEPTABLE MANUFACTURERS ARE HUBBELL, PASS & SEYMOUR, OR LEVITON. INSTALL SWITCHES VERTICALLY WITH "ON" IN THE UP POSITION. FLUSH MOUNT IN OUTLET BOX AT 48" AFF UNLESS OTHERWISE NOTED.
4. TELEPHONE AND DATA OUTLET BOXES SHALL BE 4-11/16" SQUARE OUTLET BOX WITH A SINGLE GANG VERTICAL RING AND A 1" CONDUIT CONCEALED IN WALL AND STUBBED UP TO NEAREST CABLE TRAY OR ABOVE ACCESSIBLE CEILING. FLUSH MOUNT IN OUTLET BOX AT 18" AFF UNLESS OTHERWISE NOTED. OWNER WILL PROVIDE WIRING, PLATES AND JACKS.
5. PLATES SHALL BE FLEXIBLE THERMOPLASTIC, NON-BREAKABLE, SAME COLOR AS THE DEVICE. FOR SURFACE BOXES, USED RAISED METAL WITH THE SAME DIMENSIONS AS THE BOX. PLATES IN BREAKROOM, KITCHEN, AND TOILET ROOM SHALL BE STAINLESS STEEL.

GROUNDING:

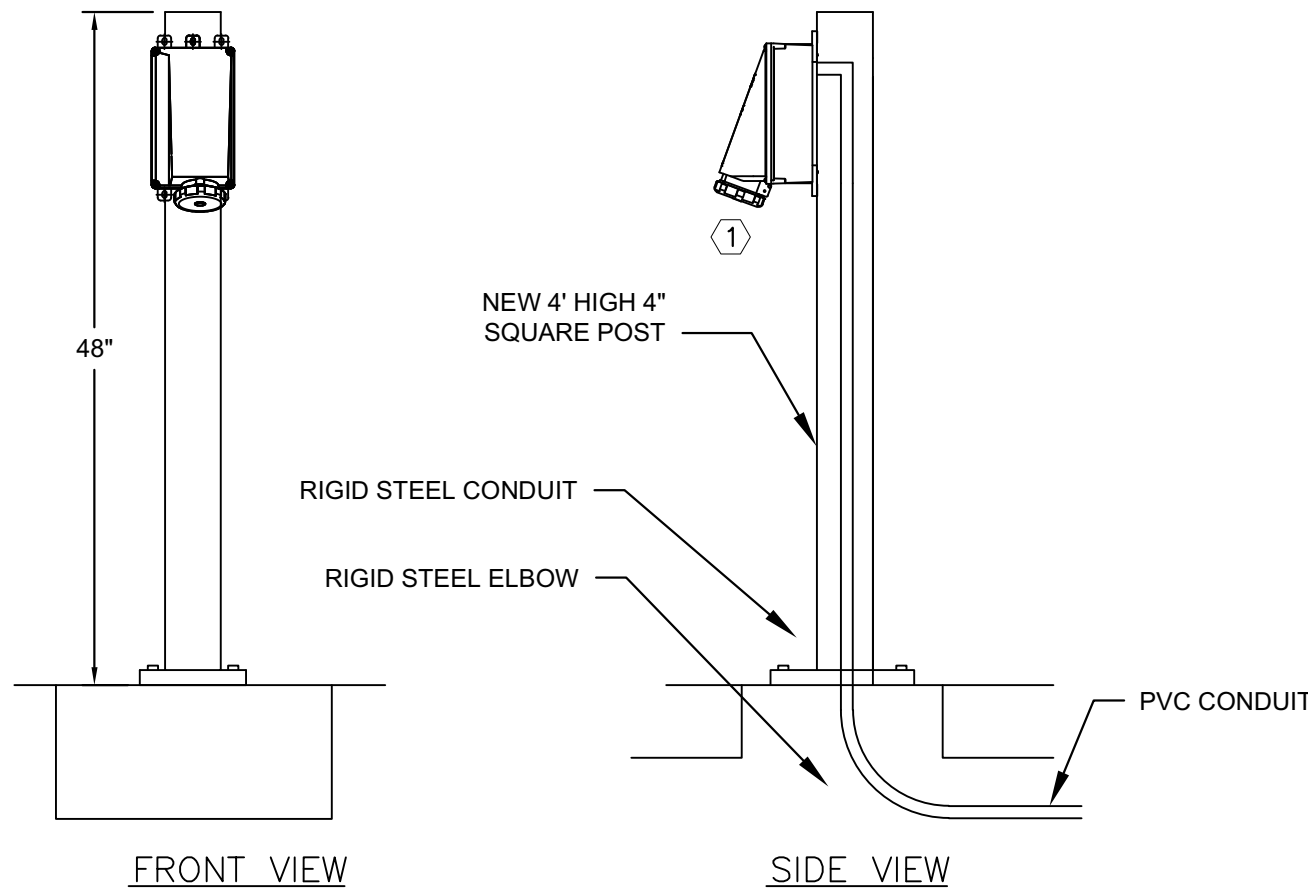
1. INSTALL THE ELECTRICAL SYSTEM CONTINUOUSLY FROM BOX TO BOX AND FROM OUTLET TO OUTLET AND TO CABINETS TO FORM A CONTINUOUS PATH TO GROUND.
2. INSTALL A GREEN-INSULATED EQUIPMENT GROUND WIRE, AT A MINIMUM SIZE OF #12 AWG OR LARGER IF REQUIRED BY NEC TABLE 250.95. ROUTE GROUND WIRE WITH CIRCUIT CONDUCTORS TO ALL RECEPTACLES, EQUIPMENT, MOTORS, LIGHTING FIXTURES, ETC. BOND TO THE EQUIPMENT AND TO THE GROUND BUS OR LUG AT THE SOURCE END.
3. SERVICE AND/OR TRANSFORMER GROUNDING. PROVIDE GROUNDING OF THE NEUTRAL CONDUCTOR FOR SERVICES AND SEPARATELY DERIVED SYSTEMS SUCH AS TRANSFORMERS USING A GROUND WIRE (S) SIZED IN ACCORDANCE WITH NEC TABLE 250-66. FOR SERVICE GROUNDING, PROVIDE CONNECTION TO WATER PIPE AND BUILDING STEEL. IN THE ABSENCE OF STEEL, IN LIEU THEREOF USE A 3/4" ROUND X 10"-0" LONG COPPERCLAD GROUND ROD DRIVEN INTO UNDISTURBED EARTH.

DISCONNECTS AND STARTERS:

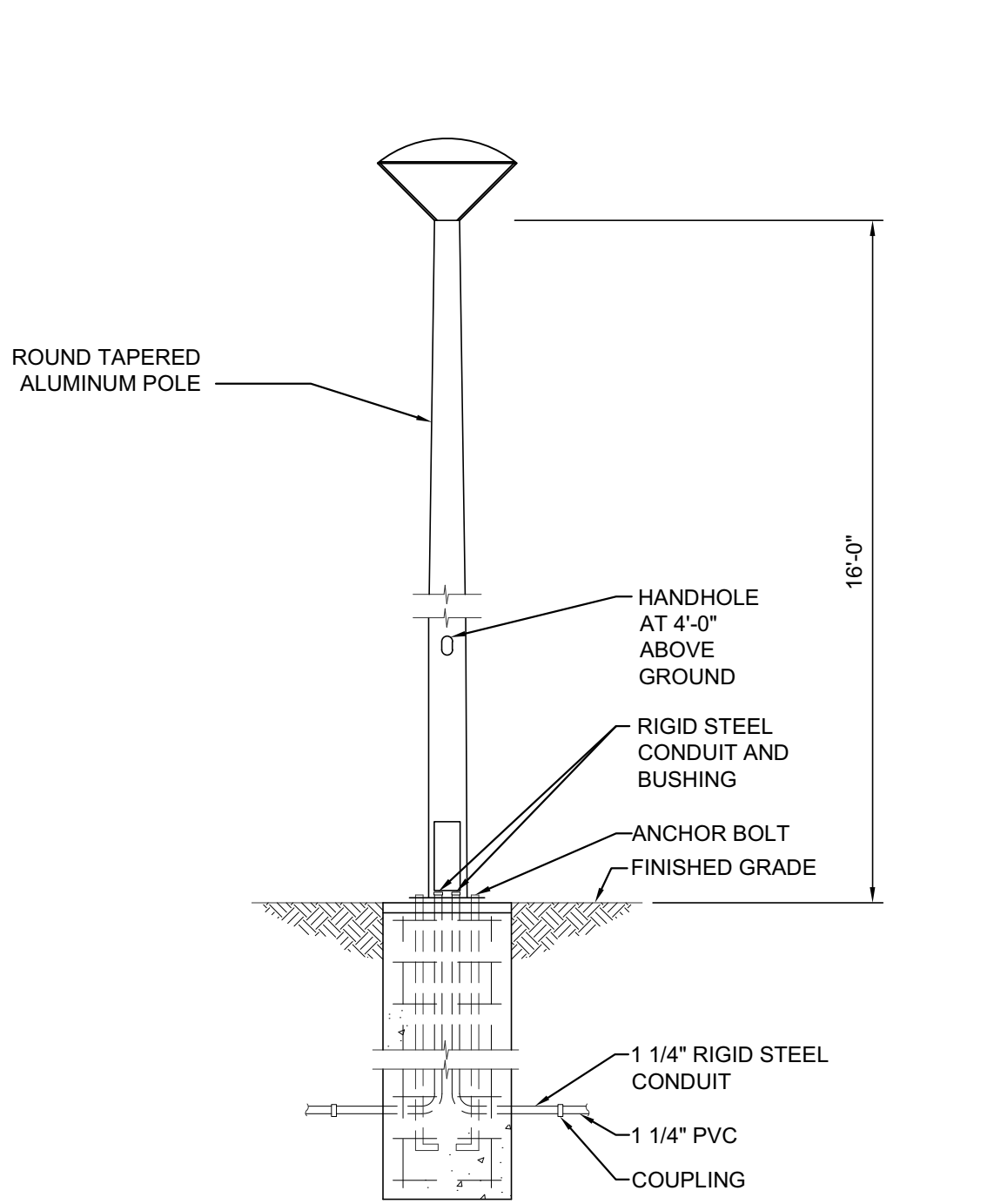
1. PROVIDE MANUFACTURERS PRODUCT DATA CUT SHEET SUBMITTALS FOR ENGINEERS APPROVAL FOR ALL DISCONNECT SWITCHES AND STARTERS.
2. USE HEAVY-DUTY, HORSEPOWER RATED DISCONNECTS, FUSIBLE OR NON-FUSIBLE AS NOTED ON PLANS.
3. ALL STARTERS AND DISCONNECTS LOCATED IN INTERIOR LOCATIONS SHALL BE NEMA 1 AND ALL EXTERIOR UNITS SHALL BE NEMA 3R UNLESS OTHERWISE NOTED.
4. USE 3 POLE FULL VOLTAGE NON-REVERSING MAGNETIC STARTERS WITH A NON-FUSED DISCONNECT SWITCH FOR ALL MOTORS 1/2 HP AND ABOVE. EQUIP WITH CLASS 10 OVERCURRENT PROTECTION, UNDER VOLTAGE, PHASE LOSS AND REVERSAL PROTECTION. EQUIP EACH STARTER WITH AN H-O-A SELECTOR SWITCH, A RED RUN PILOT LIGHT AND AUXILIARY CONTACTS FOR INTERLOCKING AND CONTROL FUNCTIONS AS NEEDED. COORDINATE WITH THE MECHANICAL CONTRACTOR. PROVIDE ENCLOSURE WITH RESET BUTTON, PILOT LIGHT AND SELECTOR SWITCH IN COVER.
5. USE MANUAL MOTOR STARTERS WITH THERMAL OVERLOAD PROTECTION FOR MOTORS LESS THAN 1/2 HP. PROVIDE RED RUN PILOT LIGHT IN COVER.
6. MOTORS 1/2 HP AND ABOVE SHALL BE THREE PHASE. MOTORS BELOW 1/2 HP SHALL BE SINGLE PHASE, 120 VOLTS.
7. PROVIDE A NAMEPLATE WITH 1/2" ENGRAVED WHITE LETTERS ON A BLACK FIELD ON ALL MOTOR STARTERS AND ALL DISCONNECTS WITH THE DESIGNATION OF THE LOAD SERVED (EQUIPMENT IDENTIFICATION).
8. ALL LUGS SHALL BE RATED FOR 75 DEGREE WIRE.
9. EXTERNAL CONTROL WIRING, EXCEPT FOR FIRE ALARM SYSTEM CONNECTIONS, SHALL BE BY MECHANICAL CONTRACTOR.

PANELBOARDS:

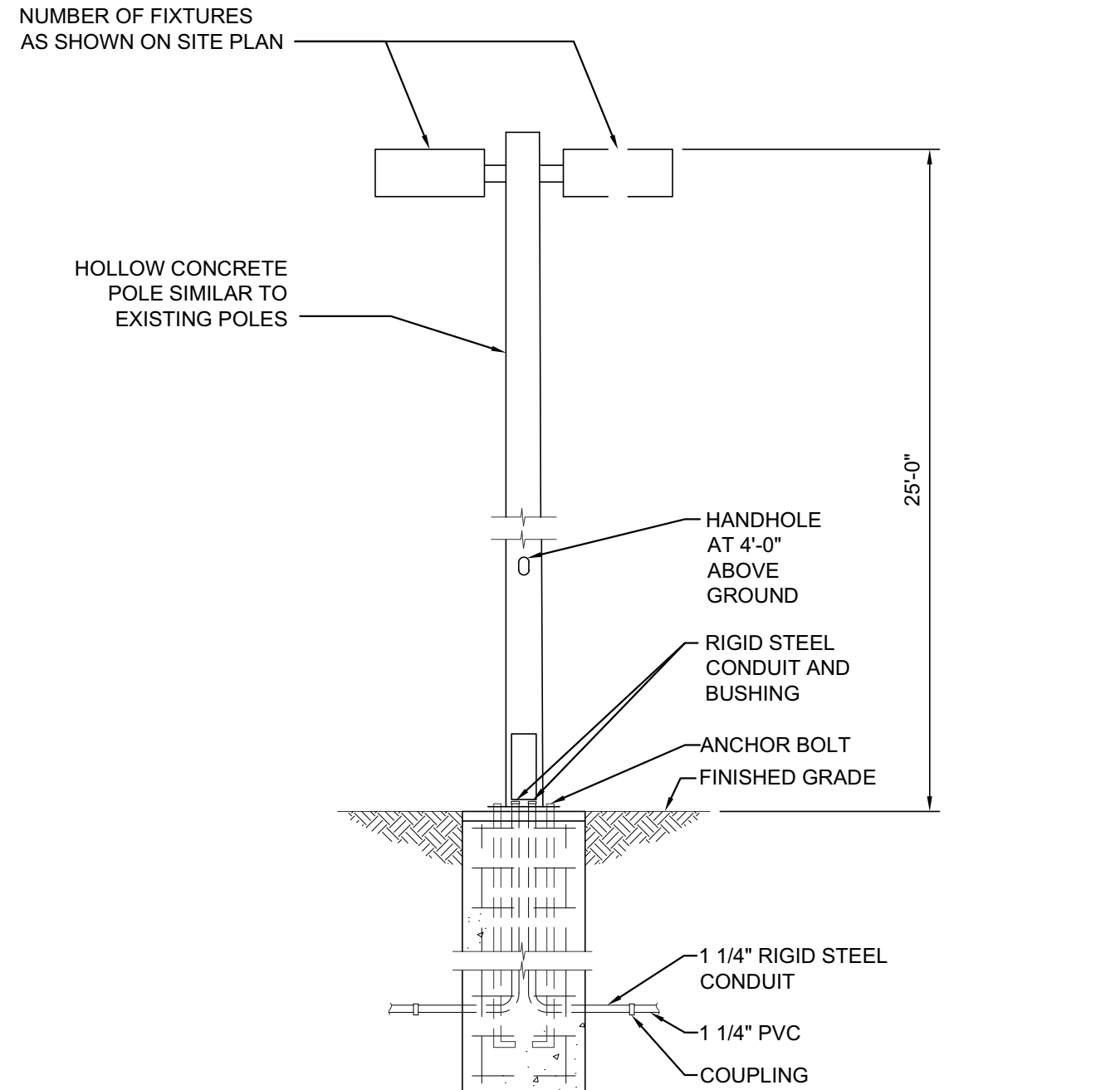
1. PROVIDE MANUFACTURERS PRODUCT DATA CUT SHEET SUBMITTALS FOR ENGINEERS AND ARCHITECTS APPROVAL FOR ALL NEW PANELBOARDS.
2. INTERIOR PANELBOARDS SHALL BE NEMA1 RATED AND EXTERIOR PANELBOARDS SHALL BE NEMA-3R RATED U.O.N.
3. PROVIDE PANELBOARDS WITH HINGED FRONT COVER AND DIRECTORY CARD HOLDER.
4. PROVIDE NEW PRINTED PANEL SCHEDULE FOR ANY NEW OR MODIFIED PANELBOARD.
5. INCOMING MAINS LOCATION, TOP OR BOTTOM, SHALL BE DETERMINED BY CONTRACTOR BASED ON FIELD CONDITIONS.
6. ALL PANELBOARDS SHALL HAVE 100% RATED NEUTRAL BUS U.O.N.
7. ALL PANELBOARDS SHALL HAVE A PRINTED EQUIPMENT LABEL.
8. INSTALL PANELBOARDS WITH CLEARANCES BASED ON NEC REQUIREMENTS.
9. MOUNT PANELBOARD CABINET PLUMB AND RIGID WITHOUT DISTORTION OF BOX. MOUNT RECESSED PANELBOARDS WITH FRONTS UNIFORMLY FLUSH WITH WALL FINISH AND MATING WITH BACK BOX.
10. MOUNT TOP OF TRIM AT 90" ABOVE FINISHED FLOOR U.O.N.
11. INSTALL FILLER PLATES IN UNUSED SPACES.
12. PROVIDE EQUIPMENT FROM ONE OF THE FOLLOWING MANUFACTURERS:
 - 12.1. EATON
 - 12.2. SIEMENS
 - 12.3. SQUARE D
 - 12.4. GENERAL ELECTRIC



1 OUTDOOR EVENT RECEPTACLE MOUNTING DETAIL
E5.00 SCALE: N.T.S.



2 TYPE 1 POLE - FOR FIXTURE TYPE B1
E5.00 SCALE: N.T.S.



2 TYPE 2 POLE - FOR FIXTURE TYPE A/A1
E1.20 SCALE: N.T.S.