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Acronyms and Abbreviations

Term	Definition
ANSI	American National Standard Institute
ASCE	American Society of Civil Engineers
ASTM	ASTM International
AWG	American Wire Gauge
CFR	Code of Federal Regulations
CT	current transformer
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ICEA	Insulated Cable Engineers Association
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
kV	kiloVolt
kVA	kiloVolt-Ampere, total power in a system
kW	kiloWatts
LLDPE	linear low-density polyethylene
MCB	Main circuit breaker
MCM	M represents 1,000, C represents circular, and M represents mil that is 1/1000 of an inch
MVA	megavolt ampere
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NESC	National Electrical Safety Code
NETA	InterNational Electrical Testing Association
NFPA	National Fire Protection Association
OGPe	Permits Management Office
OSHA	Occupational Safety and Health Administration
psi	pound-force per square inch

Term	Definition
PVC	polyvinyl chloride
RUS	Rural Utilities Service
SCH	schedule
TRXLPE	tree-retardant crosslinked polyethylene
UBC	Uniform Building Code
UG	underground
VT	voltage transformer
XLPE	crosslinked polyethylene

PART I: GENERAL APPLICATION

1. Overview

1.1 Purpose

The purpose of this manual is to provide guidance to engineering, operation, and construction parties responsible for LUMA underground projects to improve resilience and modernize the Puerto Rico underground electrical distribution system. These standards will be effective as of the date of publication of this manual for all new designs received for endorsement from that date on. The distribution systems' designs shall comply with the provisions of the Regulation of Infrastructure in Public Space. LUMA and its contractors will faithfully observe these standards. Special written approval will be obtained from LUMA for exceptions to the standards in this manual.

The current Public Policy for the Construction of Electrical Systems, approved on June 7, 2012, establishes the criteria to be used in the design and construction of electrical systems in harmony with the *Reglamento Conjunto para la Evaluación y Expedición de Permisos Relacionados al Desarrollo, Uso de Terrenos y Operación de Negocios* (Joint Regulation) in force, the Regulation of Ordination of the Infrastructure in Public Space (Puerto Rico Planning Board Regulation No. 22) in force, and Acts No 139 of August 9, 2002, and No. 47 of June 26, 1987, both as amended.

1.2 Safety

The standards in this manual shall be in accordance with LUMA Safety Rules, the National Electrical Code (NEC), the National Electrical Safety Code (NESC), and the latest version of the Puerto Rico Codes as amended by the Permits Management Office (OGPe, by its spanish acronysm). Safety will take priority over all other requirements. If any specification or standard is considered inadequate or incorrect from a safety point of view, it shall be brought to the attention of LUMA's Engineering team for clarification or correction in the application of the specification or standard.

1.3 Standards Application

In general, the application of these standards will be as follows:

1. In LUMA's service areas where underground electrical distribution is required according to the guidelines of the Puerto Rico Planning Board and the current LUMA's policy for construction of electrical systems.

2. In all projects where the distribution system is going to be constructed underground and will be transferred to LUMA for its operation and maintenance.

3. In those projects where it is safer, least cost, more advantageous, or more aesthetically pleasing to use this type of construction.

2. Applicable Regulations

2.1 Industry Codes, Standards and Reference Documents

The following is a list of applicable standards and guidelines to be used in the implementation of the design criteria for the underground electrical distribution system.

- National Electrical Code (NEC)
- National Electrical Safety Code (NESC)
- Puerto Rico Codes (PR Codes)
- LUMA's construction standards and materials specifications

2.1.1 Organizations with Applicable Codes and Standards

The electrical infrastructure in Puerto Rico shall comply with all applicable laws, regulations and referenced codes. A summary of the organizations whose industry codes and standards can be used are as follows (the following list shall not be construed as all-inclusive):

- American Concrete Institute (ACI)
- American National Standards Institute (ANSI)
- American Society of Civil Engineers (ASCE)
- ASTM International (ASTM)
- Institute of Electrical and Electronics Engineers (IEEE)
- Insulated Cable Engineers Association (ICEA)
- InterNational Electrical Testing Association (NETA)
- International Electrotechnical Commission (IEC)
- National Electrical Manufacturers Association (NEMA)
- National Fire Protection Association (NFPA)
- Occupational Safety and Health Administration (OSHA)
- Puerto Rico Energy Bureau (PREB)
- Puerto Rico Electric Power Authority (PREPA)
- Puerto Rico Permits Management Office (OGPe)
- Puerto Rico Planning Board (JP)
- Regulations per the Commonwealth of PR
- Rural Utilities Service (RUS)

The construction standards shall also take into consideration industry best practices and the unique environmental conditions on the island.

PART II: UNDERGROUND SYSTEM REQUIREMENTS

3. General

The underground electrical distribution system consists of:

1. Primary feeders
2. Branch feeders
3. Lateral circuits
4. Primary service laterals
5. Manholes and pull boxes for primary system
6. Secondary circuits
7. Secondary service laterals
8. Sectionalizing devices
9. Transformers, their equipment, and protection devices
10. Transclosures and vault-type substations
11. Secondary pedestals
12. Pull boxes for secondary system
13. Grounding and bonding
14. Labeling

In common neutral systems, neutral cable must be a continuous metallic path from the substation to the customer or user of the electrical service. The neutral of the transformer in the substation must be solidly grounded or use an impedance to limit the short circuit current (this case must be coordinated with LUMA). The neutral must be grounded at various points along the feeder path. The neutral cable generally carries a portion of the system's unbalance current. The rest of the current flows to the ground through the system's ground connections, so the current that flows in the neutral cable, compared to what flows to the ground, can vary proportionally to the resistivity of the ground (and the system's connections to the ground) along the feeder, which highlights the importance of building and maintaining a good ground system in our distribution network.

For all underground distribution system owned or to be transferred to LUMA, the current capacity (ampacity) of the neutral cable shall be up to 100% of the ampacity of the energized ungrounded cables. This criterion turns out to be suitable for all feeders. It allows LUMA to maintain sufficient capacity to help activate protection systems by overcurrent in the event of faults in the system.

4. Primary Distribution Circuits

4.1 Primary Feeders

4.1.1 System

Primary feeders (backbone or mainline) will be installed between substations, through sectionalizing devices. A primary feeder will be a three-phase, three-wire, multi-grounded system. Depending on the connection point assigned by LUMA, the voltage level will be 4.16, 7.20, 8.32, or 13.20 kV, or any other voltage required by LUMA. Newly installed cables will be jacketed concentric neutral type. Cables will have a minimum insulation value of 15 kV, regardless of the system supply voltage. The cables will be installed in ducts as approved by LUMA according to its purpose.

Primary feeders will be designed and built with provisions for interconnection with other feeders in-loop for protection. The designer will coordinate with LUMA the arrangement to be used in each particular project.

LUMA establishes that underground primary feeders operate in a loop. This is essential to maintain the continuity of the electrical service in the event of a fault in any of the sections of the circuit. The loop shall leave the point that supplies power to it, that can be a pole, switching unit, gas insulated switch, or transformer, and it shall close at a different point.

Electric lines will not be allowed underground between lots, behind lots, crossing lots, or at inaccessible places that may cause problems for system's maintenance. Refer to standard no. URD-24 for more details of primary and secondary line's locations.

4.1.2 Cables

4.1.2.1 Type

For underground systems that will become part of LUMA's distribution system, the cable shall be jacketed concentric neutral type, in accordance with the latest industry standards and LUMA's specifications. Use of tape shielded cable or aluminum conductors will not be accepted for new constructions. **Tape shielded cable will be used for maintenance only.** Primary underground service laterals must also meet this requirement.

The insulation of the cables will be tree retardant cross-linked polyethylene (TRXLPE) for 15 kV. Other insulation must be approved by LUMA for its use in distribution systems to be transferred or interconnected with those of LUMA.

The cables will comply with the latest revision of the applicable ICEA standards and LUMA's specification. Cables shall comply with at least the following requirements:

1. Insulation will be cross-linked polyethylene with a retardant of arborescence (TRXLPE) with 220 thousandths of thickness (133% insulation level).

2. Cables will have a copper concentric neutral corresponding to ⅓ of the conductor capacity.

3. All cables will have the following marks printed on the outer jacket:

    a. Identification of the manufacturer
    b. Type of insulation TRXLPE
    c. Cable gauge
    d. Cable material
    e. Nominal voltage
    f. Year of manufacture
    g. Insulation thickness
    h. Cover material (jacket)
    i. Compliance standard

In addition to the ICEA standards requirements listed above, the following requirements must be incorporated into all distribution designs:

1. All cables to be used in the underground system at voltages of 0–600 volts will be insulated with cross-linked polyethylene (XLPE) with high heat resistance and water resistance (XHHW-2) for 90°C.

2. At medium voltages of 15 kV, tree retardant cross-linked polyethylene (TRXLPE) with 133% insulation level is acceptable. In secondary circuits, the cables will be individual, all insulated (phases and neutral). In underground connections, the cables will be insulated individually.

4.1.2.2 Size

The designer will coordinate with LUMA the gauge of the jacketed concentric neutral cable to be used for developments in accordance with the requirements of the master plans. The primary cable gauge must be equal to or greater than 500 MCM in copper.

To comply with the neutral 100% current capacity of the energized cables requirement using jacketed concentric neutral cables:

1. In three-phase three-wire circuits, the current capacity of the neutral will be one third (⅓) of the energized cable.

2. In single-phase circuits, an additional neutral wire of the same gauge as the energized cables shall be installed.

Table 4-1 summarizes the cable size for three-phase primary feeders, three-phase branches, and three-phase and single-phase lateral circuits.

Table 4-1. Cable Gauge

Description		Phase Gauge	Neutral Gauge
Primary Feeder	Three-Phase	750 MCM CU - 15 kV	Concentric strands
		500 MCM CU - 15 kV	
Branch Feeder		4/0 AWG CU - 15 kV	
Lateral Circuit	Three-phase or connections for primary services	2/0 AWG CU - 15 kV	
		#2 AWG CU - 15 kV	
	Single-phase	2/0 AWG CU - 15 kV	2/0 AWG CU - 600 V
		#2 AWG CU - 15 kV	#2 AWG CU - 600 V
Primary Service Lateral	Three-phase	#2 AWG CU - 15 kV Min.	Concentric strands
	Single-phase	#2 AWG CU - 15 kV Min.	#2 AWG CU - 600 V

MCM = kcmil; CU = copper (Cu)

4.1.2.3 Splices and Terminations

Insulation made of silicone rubber offers better performance and is more beneficial when making installations, repairs, or operations in the electrical system. The specified voltage for which insulation is required in equipment is 15 kV for all applications in electrical distribution lines. All material shall comply with LUMA's specifications.

All cables will be installed with approved prefabricated terminations (stress cone type, either interior or exterior, as the case may be, or elbow type) and splices. Silicone rubber terminations and splices with a minimum insulation value of 15 kV will be used throughout the entire distribution system. All splices and terminations shall be installed as per manufacturer's instructions and LUMA's standards.

Splices shall be covered with an arc and fireproofing tape, installed from 6" before to 6" after the splice, with a minimum overlap of half the width of the tape.

4.1.2.4 Testing

LUMA requires testing of new underground cables and their accessories in private projects that will be connected to the electrical system. This requirement responds to LUMA's interest in maintaining the safety and reliability of the electrical system and ensuring due protection of the public interest. These tests can be made by both, LUMA and private companies.

LUMA will accept reports of tests performed in private projects on underground cables and their accessories, provided that the following provisions are met:

A. Tests on insulated cables for 15 kV onwards and their accessories:

1. The project owner or his representative is responsible for hiring and paying the company that performs the tests, as well as for the safety of the personnel and public in the test area.

2. The company that performs the cable tests must be a different entity than the contractor that performs the installation of the underground cables and their accessories. This company cannot be the contractor or its employees and must function completely independent of them.

3. The company conducting the tests must be on the list of companies approved by LUMA to perform these works. The company that wants to be on this approval list must present evidence to the Distribution Standards and Materials unit that it complies with the following:

    a. Dedicate mostly to testing and maintenance of electrical equipment and components of power systems.

    b. Incorporation in the U.S. Department of State.

    c. Have as part of your staff or under contract a licensed and collegiate electrical engineer who prepares and delivers all the test and study reports with his signature and professional stamp.

    d. Two years or more of cable testing experience. This experience can be from the company or the licensed engineer who certifies tests and studies.

    e. Have an established office with a physical address in Puerto Rico.

    f. Affiliation to the InterNational Electrical Testing Association (NETA).

    g. Documentation of the equipment used by the company and the detailed test procedure, which must comply with the NETA's ATS (Acceptance Testing Specifications) and MTS (Maintenance Testing Specifications) standards latest version.

    LUMA will evaluate the documents submitted and notify, in writing, the approval or reasons for not approving the company. LUMA reserves the right to reevaluate approved companies.

4. Tests are performed on installed cables with their terminations and splices.

5. Test reports for TRXLPE jacketed concentric neutral (JCN) high voltage cables with 133% insulation must include general information on the cable (gauge, voltage, type, manufacturer, year of manufacture, length, location, etc.), in addition to the results of the following tests:

   a. Visual inspection including, but not limited to, the condition of the cable jacket, ducts, and insulation.

   b. Identification check of the cable ends to verify that they correspond to the same phase.

   c. Verification of the fit of the connectors on the terminals.

   d. Continuity test.

   e. Contact resistance test to the connectors on the terminals.

   f. High voltage test performed according to the criteria described in the following table:

Table 4-2. High Voltage Test Criteria

Nominal Voltage (kV)	Test Voltage (kVDC)	Test Time (minutes)
15	64	5

The test voltage must be applied in increments of 20 percent of the test voltage per minute until the required voltage is reached. Once the test voltage is reached, it must be maintained for 5 minutes.

6. The test report shall include equipment calibration certificate according to NETA requirements.

7. Test reports must include the name and signature of the technician who performed them, as well as the signature and professional stamp of a licensed and collegiate electrical engineer in Puerto Rico. Test results shall be displayed both tabulated and graphically.

B. Tests to cables with insulation for 600 V in private projects:

1. The project owner or his representative is responsible for hiring and paying the company that performs the tests, as well as the safety of the personnel and public in the test area.

2. These tests can be performed and signed by the project's inspection engineer, a contracted master electrician, or contractor personnel, who must be licensed and collegiate electrical engineers or licensed and collegiate master electricians in Puerto Rico.

3. The test reports for 600 V insulated cables must include general information about the cable (gauge, voltage, type, manufacturer, year of manufacture, length, location, etc.), in addition to the results of the following tests:

a. Visual inspection including, but not limited to, the condition of the cable jacket, ducts, and insulation.

b. Insulation resistance test (Megger) performed at 1 kV DC.

c. Identification check of the cable ends to verify that they correspond to the pedestals or lots to be served.

4. Once the different tests have been performed, it is the responsibility of the project contractor to verify the adjustment of the connection of the secondary terminals in the transformers, pedestals, and meter sockets.

5. In those cases where there is only one secondary service lateral, LUMA will accept as an exception, 600 V insulation tests results (Megger) included in the electrical certification.

In development projects, it is the responsibility of the private inspection engineers to document in their partial or final inspection reports compliance with the requirement to perform these tests.

LUMA always reserves the right to retest the underground cables and their accessories or to require the testing company to perform them again in the presence of an authorized LUMA official.

4.1.3 Construction

1. Cables shall be installed in ducts approved by LUMA buried to a minimum of 48" deep. If this depth cannot be met, contractor shall request LUMA's authorization for a less deep installation. LUMA can require an identification nameplate to be installed as warning of this condition. Refer to assembly ASSY-2506 for the nameplate details.

2. Ducts will be laid in the trench on a layer of sand or soil free of rocks or other objects that could damage or deform them. Material taken from the excavation could be accepted as long as the terrain complies with such requirements.

3. The designer should consider the reduction in ampacity of the conductors resulting from the geometry and depth of the duct trench to use the one that provides the highest possible efficiency.

4. A hazard warning tape will be installed 12" below the final ground surface. It will be a at least 6" wide red underground cable identification hazard warning tape, permanently printed with the message **"CAUTION BURIED ELECTRIC LINE BELOW"** continuously repeated, according to LUMA's material specification. Refer to standards no. URD-6, URD-7, URD-9, and URD-24 for installation details.

5. At all crossings of streets, highways, roads, or any other location where another public or private service company has pipes, the ducts will be encased in concrete according to the standards and guides established in this manual. In this way, the ducts are protected from the possibility of breakage due to excavation or traffic of heavy vehicles. For conduits installed in driveways, concrete encasement will not be necessary because vehicular traffic is low and is limited to light vehicles.

6. All ducts installed from manhole to manhole of any underground primary main feeder or three-phase branch feeder shall be protected with a concrete encasement with a minimum of 3”.

7. After conduits have been installed, it is necessary to check the internal condition of each duct. They shall be cleaned, and any debris removed. A mandrel shall be pulled to perform this process.

8. A mandrel should be pulled back with a #8 galvanized steel pulling wire or pulling rope/tape (9/16") left in place for continuous runs to assist cable installation.

9. The ducts and fittings will meet the following specifications:

    a. They will be polyvinyl chloride (PVC) schedule 40.

    b. At 5’ intervals, the ducts will have the following marks:

        i. Size

        ii. Type and grade

        iii. Industry standard

        iv. Manufacturer’s name

    c. They will be built according to the latest version of standards NEMA TC-2, TC-3 and UL-651 as applicable.

    d. The key to conserving the life of a cable is to perform an installation that does not allow excessive pulling and sidewall pressure stresses. It is necessary that the design allow the cable to be installed without applying excessive stress to it. Designers shall be responsible to calculate the stress limits for underground cables using manufacturer’s data. These calculations must be submitted to LUMA with the design plans to be endorsed.

10. Risers approved by LUMA shall be PVC SCH-80. These will be protected at the base of the pole according to standards no. URD-4 or URD-4-A.

4.1.3.1 Directional Drilling

1. All electrical construction design using directional drilling must include in its general notes that it is the responsibility of the contractor to comply with the requirements of the current NESC.

2. The material of the ducts to be installed by directional drilling will be high-density polyethylene (HDPE) SDR-11 in red.

3. For distribution lines to be transferred to LUMA, the ducts to be used will be 2” to 6” in diameter, and the maximum recommended depth will be 15’.

4. The joint between HDPE ducts must be done by electrofusion or butt fusion methods to ensure that there will be no damage to the cable during the wiring process.

5. The transition from HDPE pipes to PVC ducts must be made with joints designed for this use, similar to the joints for PVC ducts.

6. The ends of each section of directional drilling, whether in manholes, switching units, or others, must be labeled with a nameplate indicating "PELIGRO / ALTO VOLTAJE / PERFORACIÓN DIRECCIONAL / DESDE ___ HASTA___ / LUMA / TEL. 1-844-888-5862". Refer to assembly no. ASSY-2506 for the nameplate details.

7. The contractor must submit a report with as-built drawings with the final route and depth of the ducts after installation. The contractor must indicate the number of drillings made and the number of ducts installed per section with their respective sizes.

4.1.4 System Protection

The underground primary feeders will be protected at the connection points to overhead lines and at the normally open position points, with metal oxide lightning arresters approved for the corresponding system voltage (see Table 4-3)

Table 4-3. Guidelines for Electrical Protection

System Voltage (kV)	DCV[1]-rms (kV)	MCOV[2]-rms (kV)
2.4 / 4.16	3	2.55
4.16 / 7.2	6	5.10
4.80 / 8.32	6	5.10
7.62 / 13.2	10	8.40

1. DCV = Duty-Cycle Voltage (Application Voltage)
2. MCOV = Maximum Continuous Operating Voltage

To reduce the time to locate faults, fault current indicators (fault detectors) approved by LUMA will be used on outgoing cables exits of vacuum switches, switching units, automatic sectionalizing devices and pad-mounted transformers. Refer to LUMA's standards for specific protection guidelines.

4.2 Branch Feeders

4.2.1 System

Branch feeders will be installed between sectionalizing devices, and between pole risers and sectionalizing devices. A branch feeder will be a three-phase, three-wire, multi-grounded system. Depending on the connection point assigned by LUMA, the voltage level will be 4.16, 7.20, 8.32, or 13.20 kV, or any other voltage required by LUMA. Newly installed cables will be jacketed concentric neutral type. Cables will have a minimum insulation value of 15 kV, regardless of the system supply voltage. The cables will be

installed in ducts approved by LUMA according to its purpose. Refer to LUMA's standards for connection details.

Branch feeders will be designed and built with provisions to operate in loop for backup or for interconnection with other branch feeders of the same main feeder. The designer will coordinate with LUMA the arrangement to be used in each particular project.

Electric lines will not be allowed underground between lots, behind lots, crossing lots, or at inaccessible places that may cause problems for system's maintenance. Refer to standard no. URD-24 for more details of primary and secondary lines' locations.

4.2.2 Cables

4.2.2.1 Type

Cables will be of the same type and specification as the primary feeders (see section 4.1.2).

4.2.2.2 Size

The minimum gauge for branch circuits will be determined by the requirements of design and those established by ICEA according to the voltage. The cable with largest gauge will be used. The minimum allowable gauge will be 4/0 AWG copper.

In three-phase, three-wire circuits with jacketed concentric neutral cables, the current capacity of the neutral will be one third (⅓) of the energized cable, to comply with the neutral 100% current capacity of the energized cables.

4.2.2.3 Splices and Terminations

Splices and terminations will be of the same type and specifications as the primary feeders (see section 4.1.2.3).

4.2.3 Construction

The construction of branch feeders will be the same as established for primary feeders (see section 4.1.3).

4.2.4 System Protection

Branch circuits will be protected in disconnecting units with power fuses of nominal capacity according to the design and protection coordination requirements. The interrupting capacity will be according to the computations of LUMA's design for a specific application. Fuses will be loadbreak type (SMU-20 or similar), approved by LUMA. Power fuses will be equipped with a device to eliminate or reduce the gas discharge. Cables of these branch feeders will be installed with prefabricated terminations approved by LUMA.

In switching units and three-phase pad-mounted transformers, lightning arresters approved by LUMA shall be installed in places where the cable is connected normally open. Refer to applicable standards for lightning arresters' installation details.

To reduce the time to locate faults, fault current indicators (fault detectors) approved by LUMA will be used on outgoing cables exits of vacuum switches, switching units, automatic sectionalizing devices and pad-mounted transformers. Refer to LUMA's standards for specific protection guidelines.

4.3 Lateral Circuits

4.3.1 System

Lateral circuits will be installed from sectionalizing devices to pad-mounted transformers. A lateral circuit will be a three-phase three-wire, or single-phase two-wires, multi-grounded system. They will be connected from a primary feeder or branch feeder. Depending on the connection point assigned by LUMA, the voltage level will be 4.16, 7.20, 8.32, or 13.20 kV, or any other voltage required by LUMA. Newly installed cables will be jacketed concentric neutral type. Cables will have a minimum insulation value of 15 kV, regardless of the system supply voltage. The cables will be installed in ducts approved by LUMA according to its purpose. Refer to LUMA's standards for connection details.

Lateral circuits will be designed and built with provisions to operate in loop for backup or for interconnection with other lateral circuit of the same feeder. The designer will coordinate with LUMA the arrangement to be used in each particular project.

Electric lines will not be allowed underground between lots, behind lots, crossing lots, or at inaccessible places that may cause problems for system's maintenance. Refer to standard no. URD-24 for more details of primary and secondary line's locations.

The circuit will be normally open at a transformer in the center of the load (see standards no. URD-20, URD-33, and URD-35). For lateral circuits, the nominal capacity of transformers connected in a loop shall not exceed 100 A. For single-phase, each end of the loop will be connected to the same phase of the system.

The maximum allowable imbalance in kVA between the phases is indicated in Table 4-4 for different voltages:

Table 4-4. Lateral Imbalance

Voltage Level (kV)	Max. Imbalance (kVA)
4.16	75
7.20	100
8.32	125
13.2	150

4.3.2 Cables

4.3.2.1 Types

Cables will be of the same type and specification as the primary feeders (see section 4.1.2).

4.3.2.2 Size

For lateral circuits (single-phase and three-phase), the gauge will be calculated conforming to system load, but will never be less than #2 AWG in copper insulated for 15 kV. The neutral cable (additional wire) on single-phase circuits will be the same gauge as the phase cable with 600 V insulation XHHW-2 type. (see Table 4-1)

4.3.2.3 Splices and Terminations

Splices and terminations will be of the same type and specifications as the primary feeders (see section 4.1.2.3).

Cables will either terminate in approved stress cones terminations in live-front switching units (field maintenance only) and at the point of connection with overhead lines. Elbow terminations shall be used in dead front switching units and pad-mounted transformers.

Only prefabricated splices and terminations approved by LUMA will be accepted.

4.3.3 Construction

The construction of lateral circuits will be the same as established for primary feeders (see section 4.1.3).

4.3.4 System Protection

Lateral circuits will be protected with fuses in switching units and with relays in automatic sectionalizing devices. Fuse rating and protection relays settings shall be coordinated according with the loop load and equipment protection. All protective devices shall be approved by LUMA.

In switching units, automatic sectionalizing devices and pad-mounted transformers, lightning arresters approved by LUMA shall be installed in places where the cable is connected normally open. Refer to applicable standards for lightning arresters' installation details. Refer to section 4.1.4 and LUMA's standards for specific protection guidelines.

To reduce the time to locate faults, fault current indicators (fault detectors) approved by LUMA will be used on outgoing cables exits of vacuum switches, switching units, automatic sectionalizing devices and pad-mounted transformers. Refer to LUMA's standards for specific protection guidelines.

4.4 Primary Service Laterals

4.4.1 System

Primary service laterals will be three-phase or single-phase, according to customer's needs. They will be installed in ducts buried 48" deep. They will extend from poles, sectionalizing devices or primary junctions, designated as service points, to the customer's electrical facilities.

Depending on the connection point assigned by LUMA, the voltage level will be 4.16, 7.20, 8.32, or 13.20 kV, or any other voltage required by LUMA. Newly installed cables will be jacketed concentric neutral type. Cables will have a minimum insulation value of 15 kV, regardless of the system supply voltage. The cables will be installed in ducts approved by LUMA according to its purpose.

Primary service laterals will not be transferred to LUMA. The customer is responsible for the maintenance and replacement of all service laterals.

Primary service laterals will not be allowed underground between lots, behind lots, crossing lots, or at inaccessible places that may cause problems for system's maintenance. Refer to standard no. URD-24 for more details of primary and secondary lines' locations.

4.4.2 Cables

4.4.2.1 Types

Cables will be of the same type and specification as cables for primary feeders (see section 4.1.2.1).

4.4.2.2 Size

For primary service lateral (single-phase and three-phase), the gauge will be calculated conforming to system load, but will never be less than #2 AWG in copper insulated for 15 kV. The neutral cable (additional wire) on single-phase circuits will be the same gauge as the energized cable with 600 V insulation XHHW-2 type. (see Table 4-1)

The designer is responsible to determine the size of the cables required for primary service laterals according to the latest version of the NEC.

4.4.2.3 Splices and Terminations

Splices and terminations will be of the same type and specifications as the primary feeders (see section 4.1.2.3).

Cables will terminate in approved stress cones terminations in live-front switching units (field maintenance only) and at the point of connection with overhead lines. Elbow terminations shall be utilized in dead front switching units and pad-mounted transformers.

Only prefabricated splices and terminations approved by LUMA will be accepted.

4.4.3 Construction

1. The construction will be the same as established for primary feeders (see section 4.1.3).

2. The developer will make provisions to serve future lots. These provisions will consist of two 4" diameter ducts capped at both ends and extending 5' within the property line. In addition, the place where the ducts will be installed shall be left identified.

3. The crossing of primary services laterals between below buildings will not be allowed.

4. When the proposed project is in an area defined by the Planning Board's current ruling Regulation of Ordination of the Infrastructure in Public Space (Puerto Rico Planning Board Regulation No. 22) and the electrical distribution is overhead, the primary service lateral will be intercepted within a 7' x 4'-6" x 5' primary pull box (see standard no. URD-30-B) to facilitate system conversion from overhead to underground.

5. Underground primary service laterals are customer's property and responsibility as well as their maintenance and replacement.

6. The diameter of the duct will be according to the guidelines of the current National Electrical Code, but it will never be less than 2".

7. LUMA does not allow the use of its manholes to pass private service lines. This situation means that, when the customers would require maintenance or replacement of their cables, LUMA would have to do the work if their cables are together with LUMA's energized lines.

8. All underground service connections at primary voltage will have their own manholes or pull boxes, and no installations are allowed in LUMA's ones. The service point for underground systems will include the manhole or pull box used for the entry of cables from the service point to the device where the private system is connected to the LUMA's system. In those exceptional cases in which it is demonstrated that the use of a LUMA's manhole or pull box is strictly necessary, it must be referred to the corresponding Distribution Engineering Department for their evaluation and endorsement.

9. LUMA only allows the pass of private services cables through the LUMA's manhole that serves as entrance to the switching unit from which it is connected. For all practical purposes, the switching unit will be considered the electric power service point.

4.4.4 System Protection

Primary service lateral will be protected with fuses in switching units, poles and with relays in automatic sectionalizing devices. Fuse rating and protection relays settings shall be coordinated according to load and upstream system protection. All protective devices shall be coordinated and approved by LUMA.

Metal oxide type lightning arresters shall be provided at the connection point of the underground cables with the overhead lines (see section 4.1.4 for electrical protection guidelines).

To reduce the time to locate faults, fault current indicators (fault detectors) approved by LUMA will be used on outgoing cables at primary junctions. Refer to LUMA's standards for specific protection guidelines.

4.5 Manholes and Pull Boxes for Primary System

4.5.1 General

In electrical underground distribution systems, manholes and pull boxes are used when its necessary for installation of cables and equipment. These uses must be taken into consideration when designing underground electrical distribution systems. Refer to standards no. URD-30-B, URD-31, URD-33, and URD-34-D for construction and installation details.

In electrical underground distribution systems, a 12' x 9' x 8' manhole (standard no. URD-34-D) is used when it is necessary to install a sectionalizing device or when growth or development of an area is expected. These uses must be taken into consideration when designing underground electrical distribution systems.

Standard no. URD-11-D shows the installation of a 900 A and 600 A four-way sectionalizing device inside a 12' x 9' x 8' manhole. LUMA establishes that when the installation of a sectionalizing device within the 12' x 9' x 8' manholes is not considered in the first stage of a project, a loop of the primary feeder cable shall be left inside the manhole. The loop of cable must have a minimum length equal to the inside perimeter of the manhole. This ensures that sufficient cable is available for future installation of a sectionalizing device.

Installation of a 10' x 7' x 8' manhole (standard no. URD-31) is required in front of any switching unit to facilitate the wiring of all cables entering and leaving the unit, whether they are transferred to LUMA or not.

4.5.2 Requirements

Additional LUMA's requirements for manholes and pull boxes are listed below:

1. When manholes are to be installed in the planting area, a 6" thick wire mesh reinforced concrete slab must be installed, extending 12" around the manhole cover. Standard no. URD-31 shows the concrete protection that is required when installing manholes.

2. The equipment and hardware inside the manholes will be in stainless steel. In addition, synthetic polymer material accessories approved by LUMA will be accepted.

4.5.3 Stress pulling tension

The key to conserving the life of a cable is to perform an installation that does not allow excessive pulling and sidewall pressure stresses. It is necessary that the design allows to install the cable without applying excessive stress to it. Length of cable runs is limited by the maximum pulling tension specified by the manufacturer. Designers shall be responsible to calculate the stress limits for underground cables using

manufacturer's data. These calculations must be submitted to LUMA with the design plans to be endorsed.

The methods allowed for cable installation are pulling eye or basket grip. The method to be used and the location to pull and feed each duct shall be indicated. In no case it will be allowed to exceed a maximum cable run of 1000'. LUMA recommends using shorter distances, whenever possible or deemed necessary, to foresee future derivations of the system.

4.6 Pole Risers

1. Risers are used for transitions between the distribution overhead and underground electrical systems. Refer to standards no. URD-2, URD-3, URD-3-A, URD-3-B, and URD-54, for installation details and materials. For primary and secondary riser installation related to transformers and other equipment, refer to the Overhead Electrical Distribution System Manual.

2. All riser to be transferred to LUMA or installed on LUMA poles shall use PVC SCH-80 ducts for the primary and secondary distribution electrical system. Fiberglass and rigid galvanized steel ducts, with mechanical characteristics equal to or greater than those of PVC SCH-80, can be used for the construction of risers in private poles that will not be transferred to LUMA for their operation and maintenance. For riser mechanical protection and support, refer to standards no. URD-4, URD-4-A, and assembly no. ASSY-2501.

3. Pole risers' spare ducts installation must comply with the following requirements:

    a. In electrical systems where all poles require a concrete base, two spare 6" diameter ducts shall be installed in at least one utility pole of every five. For the rest of the pole bases, two spare 4" diameter ducts shall be installed.

    b. Two spare 6" diameter ducts will be installed in concrete bases when it is understood that such location may be used to serve loads in the future, such as at street intersections and avenues or in places that are connection points for new projects

    c. In distribution systems within residential projects where future expansions or additional stages are not proposed, two spare 4" diameter ducts may be specified for the bases that are required to be built by design.

    d. In electrical systems where concrete pole bases are occasionally required, two spare 6" diameter ducts will be installed for each of these bases.

    e. No spare duct will be installed where doble conductor riser (standard no. URD-3-B) is required.

    f. All risers' ducts will be installed on the side of the pole opposed to vehicular traffic, so that the likelihood of being struck by a vehicle is reduced.

4. Any variation to the established requirements for pole risers must be coordinated with the corresponding LUMA's Distribution Engineering Department.

5. Secondary Circuits

5.1 System

The secondary system, in general, will be single-phase, 120 / 240 V, three-wires, underground at 36" depth in approved ducts. In secondary circuits, the minimum diameter of the duct will be 2". In circuits for street lighting, a duct with minimum diameter of ¾" will be used for cable gauge less than or equal to #10 AWG, and 2" if the cable gauge is not larger than 4/0 AWG. For cables of gauge larger than 4/0 AWG, the designer shall specify ducts appropriate to the cable gauge that meets NEC and LUMA's requirements.

It will extend from transformers to secondary pedestals, between pedestals, and from pedestals to metering banks. Parallel runs will not be allowed, nor more than three pedestals in series, to control voltage drop.

5.2 Secondary Cables

5.2.1 Types

LUMA requires that all underground secondary distribution lines owned or to be transferred to LUMA, and secondary underground service laterals shall be copper insulated with cross-linked polyethylene (XLPE), 600 V, 90°C minimum, waterproof, according to the latest applicable norms and requirements of ICEA and LUMA. Neutral will consist of a stranded copper cable with the same insulation and gauge as energized cables. Neutral cable will be effectively grounded on pedestals, pull boxes, and transformers. Cables will be marked as indicated in section 4.1.2.1.

Insulation type that meets these requirements and is allowed for underground secondary distribution lines and secondary service laterals is XHHW-2. Cables with other insulation type must be approved by LUMA for use in distribution systems to be transferred or interconnected with those of LUMA. These cables must be installed in ducts.

In private substations for residential projects, LUMA approves the use of aluminum cables with a #2 AWG or larger gauge for secondary cables from the transformers to the meter bank (see Figure 5-1). It is required to use copper cables from the meter to the indoor installation. LUMA prohibits the use of aluminum cables in interior installations of residences and in substations located less than 1 mile from a saltwater body.

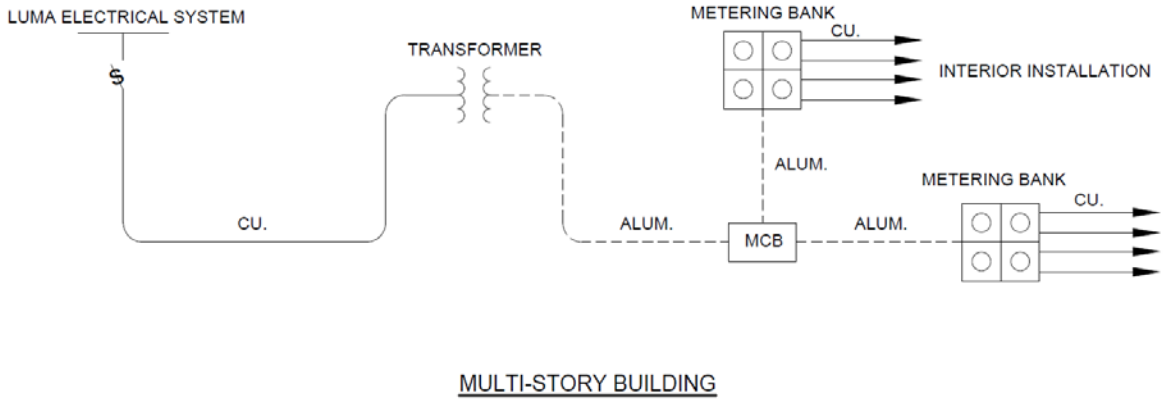

Figure 5-1. Use of aluminum cables in residential electrical systems

In private substations for commercial and industrial projects, LUMA approves the use of #2 AWG or larger gauge aluminum cables for secondary cables from the transformers to the indoor installation (see Figure 5-2). The use of aluminum cables is not allowed in substations located less than 1 mile from a saltwater body.

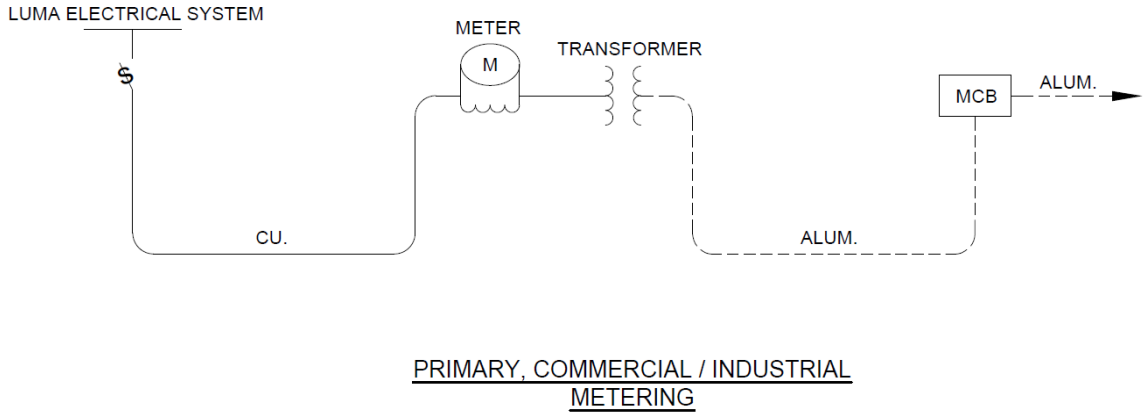

Figure 5-2. Use of aluminum cables in commercial and industrial electrical systems

For connection of aluminum cables, terminals and connectors specified or identified for aluminum cables must be used.

5.2.2 Size

The size of the cables will be according to the design and minimum NEC and LUMA's requirements. Aluminum cables will not be allowed. For systems to be transferred to LUMA, the minimum gauge for secondary lines will be 1/0 AWG in copper, and the maximum gauge will be 500 MCM in copper.

5.2.3 Voltage Regulation

Design voltage regulation will not exceed 3% at the furthest point of the service. To determine voltage drop, refer to articles 210.19, and 215.2 of the NEC, 2017 edition. These calculations must be submitted to LUMA with the design plans to be endorsed.

5.3 Construction

1. Cables shall be installed in ducts approved by LUMA buried to a minimum of 36" deep.

2. Ducts will be laid in the trench on a layer of sand or soil free of rocks or other objects that could damage or deform them. Material taken from the excavation could be accepted as long as the terrain complies with such requirements.

3. A hazard warning tape will be installed 12" below the final ground surface. It will be a at least 6" wide red underground cable identification hazard warning tape, permanently printed with the message **"CAUTION BURIED ELECTRIC LINE BELOW"** continuously repeated, according to LUMA's material specification. Refer to standards no. URD-7, URD-8, URD-9, and URD-24 for installation details.

4. At all crossings of streets, highways, roads, or any other location where another public or private service company has pipes, the ducts will be encased in concrete according to the standards and guides established in this manual. In this way, the ducts are protected from the possibility of breakage due to excavation or traffic of heavy vehicles. For conduits installed in driveways, concrete encasement will not be necessary because vehicular traffic is low and is limited to light vehicles.

5. The ducts and fittings will meet the following specifications:

    a. They will be polyvinyl chloride (PVC) schedule 40.

    b. At 5' intervals, the ducts will have the following marks:

        i. Size

        ii. Type and grade

        iii. Industry standard

        iv. Manufacturer name

    c. They will be built according to the latest version of standards NEMA TC-2, TC-3 and UL-651 as applicable.

6. Risers approved by LUMA shall be PVC SCH-80. These will be protected at the base of the pole according to standards no. URD-4 or URD-4-A.

6. Secondary Service Laterals

6.1 System

Secondary service laterals will be three-phase or single-phase, according to customer's needs. They will be installed in ducts buried 36" deep. They will extend from transformers, pull boxes or pedestals to metering banks or meter sockets. The cables will be installed in ducts approved by LUMA according to its purpose. For secondary service laterals, the minimum diameter of the duct will be 2".

Secondary service laterals will not be transferred to LUMA. The customer is responsible for the maintenance and replacement of all service laterals. Secondary service laterals will not be allowed underground between lots, behind lots, crossing lots, or at inaccessible places that may cause problems for system's maintenance. Refer to standard no. URD-24 for more details of secondary line's locations.

6.2 Cables

Cables for the service lateral, including the neutral, will be copper, insulated with cross-linked polyethylene (XLPE) with high-heat resistance and water resistance (XHHW-2) for 90 °C, installed in ducts. The neutral of the system will be of the same gauge of energized cables. The gauge of the cables will be according to the design but not less than #2 AWG in copper.

Only one cable shall be connected per connector port for secondary service connections. No more than 18 cables shall be connected to a transformer and no more than 24 cables in a secondary pedestal.

6.3 Construction

1. Cables for the secondary service laterals shall be installed from the pedestal, pull box or transformer to the metering bank or meter socket following the shortest path without crossing other lots.

2. The service cable may not cross the front of more than two lots, and their length shall not exceed 150'.

3. The secondary electrical distribution system will be installed under the sidewalk. Where it is not feasible, it should be installed under the street (see standard no. URD-24).

4. Metering banks in commercial areas or multi-family buildings will require a spare duct.

5. In double multi-family residences, a service lateral will be required for each dwelling unit.

6. The developers will provide facilities to serve future lots. These facilities will consist of two available 2" diameter ducts, covered at both ends and extending 5' inside the property line. In addition, the place where these ducts were installed shall be left identified with a capped vertical post made of PVC duct.

7. A secondary service lateral will be required for each building that is separated by fireproof walls, according to the NEC.

8. Additional construction requirements will be the same as established for secondary circuits (see section 5.3).

6.3.1 Metering

1. The meter shall be installed on the outside of the building, preferably on the front wall. There shall be no physical barriers that would restrict reading, inspection, and testing of meters. They shall be installed at a maximum height of 7’ and not less than 5’-6” above the floor level from where they are to be read or inspected.

2. At meter banks, the lower level of the meters may be installed at a height less than 5’-6”, but not less than 3’ above the floor level.

3. If the above requirements cannot be met because of any special condition, it must be consulted to LUMA to obtain a written authorization prior to its installation.

4. Refer to standard no. URD-29 for secondary service meter socket installation details.

7. Sectionalizing Devices

7.1 Uses

Sectionalizing devices will be installed in primary feeder and branch feeders across electrical distribution system with the following purposes:

1. Interconnect with other primary feeders
2. Sectionalize to create branch feeders and lateral circuits
3. Tap off three-phase and single-phase primary service laterals to energize customer's facilities

7.2 Specifications

Sectionalizing devices installed by LUMA or to be transferred to LUMA shall be dead front switching units or dead front gas insulated switchgear. This equipment shall comply with the latest LUMA's specifications (documents no. 4350.231 and 4350.279) and standards no. URD-11-B, URD-11-C and URD-11-D.

7.3 Installation

7.3.1 Dead Front Switching Units

1. Switching units will be installed on a precast or cast in place concrete base. Refer to standard no. URD-53 for concrete base details.
2. Elbow connectors shall be used in the 15 kV underground cable for connection at the source and load side of the switching unit.
3. A 10' x 7' x 8' manhole (standard no. URD- 31) shall be installed in front of any switching unit for cables entering and leaving the switching unit if it is to be transferred to LUMA. Location of the switching unit and manhole will be according to the design of the underground system.
4. Fault current indicators shall be installed on the outgoing feeder of the switching unit. The fault current indicator shall have a visible fault indication and shall be hot stick mounting type.
5. The neutral system of main feeders and branch feeders consists of a 300 MCM copper bare conductor connected to a ground rod. For three-phase loads service, all concentric neutral strands from each elbow connector shall be connected to the neutral system. For single-phase loads service, all concentric neutral strands from each elbow connector shall be connected to the grounding system. Refer to standards no. URD-11-B and URD-11-C for neutral and grounding connection details.

7.3.2 Dead Front Gas Insulated Switchgear

1. Dead front gas insulated switchgear is an automatic sectionalizing device with the capability for remote supervisory operation. It can also be operated manually from street level.

2. Switchgear will be installed in a 12' x 9' x 8' direct traffic rated manhole. Refer to standard no. URD-34-D for manhole details.

3. Gas insulated switchgear must have 4 ways. Ways 1 and 4 must have load interrupter switches for source connection. Ways 2 and 3 must have fault interrupter switches for load connection.

4. Source ways could be 900 A or 600 A. Load output ways will be 600 A. Elbow connectors shall be used in the 15 kV underground cable for connection at the source and load side of the switchgear. Use the corresponding current rating for source and load connection. Refer to standard no. URD-11-D for installation details.

5. All concentric neutral strands and equipment grounding conductor must be effectively connected to the neutral bus bar and grounding system using copper bare conductor with double eye terminal connector. It is recommended to leave the concentric neutral strands long enough to make the connection in the neutral bus bar without having to splice additional conductor. If strands need to be spliced with additional conductor, use #2 AWG copper bare conductor with copper compression tap connector. Use 4/0 AWG copper bare conductor for equipment grounding.

6. Fault current indicator sensors shall be installed on the outgoing feeder of the switchgear. Those sensors shall be connected to a wireless interface that transmit the sensor status to a wireless monitor. The fault current indicator shall be hot stick mounting type. Refer to assembly no. ASSY-2502 for installation details.

7. Due to the limited space inside the manhole, it is required the installation of additional manholes adjacent to the manhole containing the underground switchgear. Adjacent manholes must be located before and after switchgear's manhole at a distance not greater than 150'. These adjacent manholes shall comply with the standard no. URD-31. Primary cables inside those manholes must have a full turn with a length greater than the manhole inside perimeter.

7.4 System Protection

7.4.1 Dead Front Switching Units

1. Branch feeders, lateral circuits and primary service laterals will be protected with load-break type power fuses (SMU-20 or similar) approved by LUMA. Refer to standards no. URD-11-B and URD-11-C, and current LUMA's Distribution Equipment and Primary Line Fusing Guideline for details.

2. Switching units in underground systems will have a three-phase gang-operated switch at the input and output of the source side. Load side three-phase circuits always will be protected with load-break type power fuses.

3. Switching units' enclosures shall be effectively grounded through a ⅝" x 8' ground rod. Grounding resistance of the equipment will not exceed 5 ohms.

4. Metal oxide lightning arresters will be provided at the points normally open and normally closed points in the switching units and in the connection of cables with overhead lines.

5. Cabinet must be secured with padlocks.

7.4.2 Dead Front Gas Insulated Switchgear

1. Branch feeders, lateral circuits and primary service laterals will be protected by equipment protective relays.

2. A 4/0 AWG copper bare conductor shall be used for installation of a ground ring on the floor inside the manhole connected to two ⅝" x 8' ground rods. Grounding resistance of the equipment will not exceed 5 ohms.

3. 600 A elbow arresters must be installed in all fault interrupters inputs, and load interrupters outputs. Selection of the elbow arrester rating shall be based on the system voltage.

4. Manhole hatches must be secured with padlocks and screws.

8. Transformers

8.1 General Specifications

8.1.1 Type

Distribution transformers will be non-PCB content oil insulated. They will in 304 stainless steel enclosures dead front type installed on concrete pads (standards no. URD-20 and URD-35) or submersible type (standard no. URD-33). Pad-mounted dead front transformers will be built with the combination of bushing well and bushing insert. Pad-mounted type transformers constructed with integral bushing will not be accepted.

All transformers will be specified in compliance with the applicable industry standards and LUMA's standards. Regulation 10 CFR Part 431 of the DOE (Energy Conservation Program for Commercial and Industrial Equipment: Energy Conservation Standards for Distribution Transformers; Final Rule) establishes energy conservation standards, among which is the efficiency of electrical distribution system transformers. The efficiency of these transformers is measured according to the test procedure established in the regulations. The current efficiency levels established by the DOE for oil-insulated distribution transformers must be complied.

Transformers to be installed in projects whose infrastructure is going to be transferred to LUMA or in private substations with secondary metering must comply with the minimum efficiency established by the DOE without tolerance. In private substation projects with primary metering, a tolerance level as authorized by the DOE will be allowed.

Designers must include in their plans a note to certify that all distribution transformers to be purchased will comply with these parameters. Only distribution transformers that meet the latest DOE efficiency requirements will be allowed to connect to LUMA's electrical system.

8.1.2 Voltage

The transformer primary voltage will be determined by LUMA after performing a field evaluation of the primary feeders available in the area to assign the project's connection point. LUMA reserves the right to request dual voltage transformers for new projects with primary voltage different to 13.2 kV. The secondary voltage, in general, will be 120 / 240 V, three wires, according to LUMA's standards.

Transformers installed or transferred to LUMA shall have four 2.5% taps, two leads over and two under primary voltage. The transformer nameplate must show the taps with their position and corresponding voltage.

For double-winding transformers, taps will be provided as described above, but only in the winding corresponding to the highest primary voltage. The primary windings of these transformers must have the same configuration.

8.1.3 Capacity

Transformers capacity will be according to the design. Designers shall include the future energy consumption of at least one electric vehicle per dwelling unit or property in the project's load calculations.

Pad-mounted type single-phase distribution transformers are required to have a capacity of 50 kVA or 75 kVA in distribution systems to be transferred to LUMA. Three-phase distribution transformers, either pad-mounted or submersible type, are required to have a capacity of 150 kVA or 300 kVA to be transferred to LUMA.

8.1.4 System Protection

1. Pad-mounted and submersible transformers shall have 200 A loadbreak elbow connectors for loop input and output. Refer to assembly no. ASSY-2507 for installation details.

2. They will be protected by bayonet and current limiting fuses of adequate interrupting capacity, approved by LUMA.

3. Elbow arresters shall be used at the normally open point according to standards no. URD-20, URD-33, and URD-35.

8.2 Determination of Load per Residential Unit and Number of Residential Units per Transformer

1. The designer will determine the load in kW of the model residential units in the project according to the current NEC dispositions.

2. Set the number of model residential units to be connected to a single transformer and add loads of the units to be served.

3. The sizes and quantity of the required transformers for the project shall be determined by the designer, in compliance with the current NEC dispositions.

8.3 Installation

8.3.1 Pad-mounted Transformers

1. LUMA requires that all pad-mounted transformers be manufactured with 304 stainless steel. This requirement avoids the possibility of interruptions in service caused by corrosion and decrease maintenance work, resulting in a more economical system in the long term.

2. Installation of pad-mounted transformers in the underground system shall be according to the standards no. URD-20, URD-24 and URD-35.

3. Pad-mounted transformers shall be marked on the outside with the transformer capacity in kVA and asset number according LUMA's requirements.

8.3.1.1 Single-phase or three-phase transformers for radial feed circuits

LUMA allows the use of pad-mounted type single-phase or three-phase distribution dead front transformers in radial feed circuits under the following conditions:

1. Application of these transformers in radial circuits is exclusive to private systems, so the maintenance and replacement of the transformers is the responsibility of the owner or administrator. These transformers will not be transferred to LUMA.

2. Installation of these transformers in radial circuits is allowed for commercial or residential services.

3. Transformers are required to comply with the following technical characteristics:

Table 8-1. Transformers' Technical Characteristics

Characteristics	Transformer (Single-phase)	Transformer (Three-phase)
Primary voltage	2.4, 4.8, 7.62 kV	13.2 kV (see Note)
Secondary voltage	120 / 240 V	208Y / 120V
Maximum capacity	100 kVA	1,000 kVA
Connection	N/A	delta - star

Note: LUMA will evaluate the exception of allowing the connection of three-phase transformers to primary voltages other than 13.2 kV.

4. Transformers must be installed on a concrete pad accessible to vehicles used for their operation and maintenance. The electrical design plans shall illustrate the vehicular access route to the transformer.

5. Overcurrent protection on the primary or high voltage side of the transformer must consist of bayonet and current limiting type fuses, as applicable. Refer to LUMA's document Distribution Equipment and Primary Line Fusing Guideline.

6. Three-phase transformers with a capacity of 300 kVA or less must be provided with a low voltage switch on the secondary side.

7. For transformers with a capacity greater than 300 kVA, their installation is required to be inside a cabinet with a load gang-operated switch for connection to LUMA's electrical system. This cabinet must contain a set of power fuses. Designers must specify in their design plans that any gang-operated disconnecting switch installed in vault-type substations must be inside a cabinet similar to the one illustrated in standard no. URD-42. This cabinet has the function of avoiding any accidental contact with the energized parts of this equipment. For this application, the cabinet must be constructed of 304 stainless steel, 14 gauge.

8.3.1.2 Three-phase transformers for loop feed circuits

1. In LUMA's underground distribution system, only the installation of pad-mounted type three-phase distribution transformers with the following characteristics is accepted:

    a. Loop feed type transformer

    b. Delta - Star connection

    c. 150 kVA or 300 kVA capacity

    d. Primary operating voltage of 13.2 kV

    e. 208Y / 120V secondary operating voltage

2. The design, construction, and installation of these transformers must be in accordance with standard no. URD-35.

3. LUMA allows the installation of these transformers only in the following applications:

    a. Multi-family residential projects in low-rise buildings, which have up to seven floors and may or may not have an elevator

    b. Commercial projects with individual loads less than 50 kVA

4. In commercial projects with individual loads less than 50 kVA, only the installation of 150 kVA transformers is allowed. However, the secondary service lateral for these transformers must be designed for a capacity of 300 kVA.

5. For all applications, transformers must be installed on a concrete pad.

6. LUMA allows up to a maximum of eight transformers installed per loop.

7. The transformers must be installed in a three-phase lateral circuit, from which branches cannot be derived to serve other loads. Cable in these circuits shall be copper with TRXLPE insulation at 15 kV, with a minimum size of #2 AWG.

8. To connect the cables of the three-phase lateral circuit to the high voltage bushings of the transformer, elbow connectors with an interrupting capacity of 200 A shall be used.

9. The overcurrent protection on the primary or high voltage side of the transformer must consist of bayonet and current limiting fuses. Refer to LUMA's document Distribution Equipment and Primary Line Fusing Guideline for additional information.

10. Metal oxide elbow arresters are required to be installed at the input or output bushings on the high voltage side of all transformers in a loop. In addition to these arresters, it is necessary to install metal oxide parking stand arresters at the ends of the cables that remain disconnected in

those transformers that are installed in the normally open point of the loop. See standard no. URD-35 for details of this installation.

11. The overcurrent protection on the secondary or low voltage side of the transformer must consist of a low voltage switch with a capacity of 600 A for the 150 kVA transformer, and 1,200 A for the 300 kVA transformer.

12. For commercial projects, the switch on the low voltage side of the transformer must be of the adjustable-trip circuit breaker type with a coverage of 600 A and 1,200 A.

13. Each switch output terminal on the low voltage side of the transformer must have a maximum of four connection points, which must be suitable for 500 MCM gauge copper wire.

14. For all applications, the cable to be connected to the transformer's low voltage switch output terminals is required to be copper, 500 MCM gauge, and XHHW-2, 600V insulation.

15. Installation of the cables in the transformer low voltage switch output terminals is described below:

    a. **150 kVA transformer:** Two 500 MCM cables must be installed per terminal at the output of the secondary switch of this transformer.

    b. **300 kVA transformer:** Four 500 MCM cables must be installed per terminal at the output of the secondary switch of this transformer.

8.3.1.3 Single-phase transformers for loop feed circuits

1. In LUMA's underground distribution system, only the installation of pad-mounted type three-phase distribution transformers with the following characteristics is accepted:

    a. Loop feed type transformer

    b. 50 kVA or 75 kVA capacity

    c. Primary operating voltage of 13.2 kV

    d. 240 / 120 V secondary operating voltage

2. The design, construction, and installation of these transformers must be in accordance with standard no. URD-20.

3. For all applications, transformers must be installed on a concrete pad.

4. LUMA allows to install transformer up to a maximum of 100 A per loop.

5. The transformers must be installed in a single-phase lateral circuit, from which branches cannot be derived to serve other loads. Cable in these circuits shall be copper with TRXLPE insulation at 15 kV, with a minimum size of #2 AWG.

6. To connect the cables of the single-phase lateral circuit to the high voltage bushings of the transformer, elbow connectors with an interrupting capacity of 200 A shall be used.

7. The overcurrent protection on the primary or high voltage side of the transformer must consist of bayonet and current limiting fuses. Refer to LUMA's document Distribution Equipment and Primary Line Fusing Guideline for additional information.

8. A metal oxide elbow arrester is required to be installed at the transformer in the normally open point of the loop. In addition to this arrester, it is necessary to install a metal oxide parking stand arrester at the end of the cable that remain disconnected in this transformer. See standard no. URD-20 for details on this installation.

9. No more than 18 cables shall be connected to a transformer.

8.3.2 Submersible Transformers

1. LUMA requires that all submersible transformers be manufactured with 304 stainless steel. This requirement avoids the possibility of interruptions in service caused by corrosion and decrease maintenance work, resulting in a more economical system in the long term.

2. Installation of submersible transformers in the underground system shall be according to the standard no. URD-33.

3. Submersible transformers shall be marked on the outside with the transformer capacity in kVA and voltage according to LUMA's requirements.

4. The installation of submersible transformers in 12' x 6' x 8' manholes is allowed for the development and construction of underground distribution systems where there is not enough space to install a pad-mounted transformer or when it is required because of the load type. Refer to standard no. URD-33 for installation details.

5. Only the installation of a submersible transformer, the input and output of the primary distribution system to serve the transformer and the output of the secondary distribution system from the transformer is allowed in these manholes. Installation of additional secondary connectors, other than the ones already installed in the secondary bushing, is not allowed. The secondary connectors to extend the secondary distribution system and serve loads at secondary voltage must be installed in another pull box dedicated to these purposes. Neither additional primary nor secondary distribution lines are allowed to pass through these manholes.

6. The manhole must be installed with the 12' side parallel to the curb. It is assumed that the street has a slope of 2% from the center of the street towards the curb.

7. For slopes equal to or less than 3" in 12' or 1.5" in 6' or a combination of these:

   a. It will be allowed to install the approved manholes according to standard no. URD-33 without modifications.

   b. The manholes will be installed leveled with the final elevation of the terrain.

   c. The transformers installed within the manholes shall be fixed to the ground with stainless steel bolts of at least ½" diameter and 3" of embedment in the floor slab. At least four of these bolts will be used, one at each corner of the transformer.

8. For slopes equal to or less than 12" at 12' or 4" at 6' or a combination of these, there are two alternatives:

   a. Alternative I

      It will be allowed to install the approved manholes according to the standards no. URD-33 with the following modifications:

      i. The manholes will be installed leveled with the final elevation of the terrain.

      ii. The manhole floor will be leveled using a self-leveling concrete product. Manufacturer's recommendations for product application are required to be strictly followed to ensure that it will not crack or lose its adhesion to the floor.

      iii. The primary side of the transformer will always be installed towards the side of the manhole with the greatest clearance between the floor and the cover.

      iv. The manhole floor slab will have no slope other than the one provided for drainage after the product is applied.

   b. Alternative II

      It will be allowed to install the approved manholes according to standard no. URD-33 with the following modifications:

      i. The contractor may install the modified 12' x 6' x 8' manhole on site. This modification will be certified by the manufacturer.

      ii. The manhole will be installed horizontally, without slopes. This installation must be done in such a way as to provide a minimum of 6" clearance between the final level of the road and any of the walls of the manhole.

      iii. The walls of the manhole will be extended according to the manufacturer's instructions. The final surface of the manhole will be leveled with the final elevation of the roadway.

      iv. The manhole floor slab will not have any slopes other than that provided for drainage.

9. For slopes greater than 12” at 12’ or 4” at 6’ or a combination of these:

    a. The contractor will fabricate the manhole on site. The contractor will be responsible to develop and submit the corresponding design plans, calculations and supporting documents required for evaluation and approval of LUMA, prior to start the construction.

    b. The manhole will have the following minimum dimensions at any point inside it: 12' long, 6' wide, and 8' high. Refer to standard no. URD-33 for details.

    c. The finished cover will be leveled with the final elevation of the roadway.

    d. The manhole floor slab will not have any slope other than the one provided for drainage.

8.3.3 Transclosures (Transformers in Enclosure)

A transclosure is a private type electrical substation. The transclosure’s cabinet shall be a self-supporting unit, completely enclosed with metal divisions between each cubicle. Transclosure’s construction shall be according to current NEC and NESC standards. This type of substation must also comply with the following requirements:

1. LUMA requires that pole type transformer tanks, both in private systems and in systems to be transferred to LUMA, installed in vaults, manholes or cabinets (transclosures) are manufactured with 304 steel stainless.

2. In transclosures with primary metering, it is required to have a cubicle dedicated only for the installation of LUMA’s metering equipment. Cubicle dimension shall comply with LUMA’s standard no. URD-48.

3. Transclosure cabinet must be secured with padlocks.

4. Maximum capacity allowed shall be 750 kVA using three single-phase distribution transformer of 250 kVA. 1000 or 1500 kVA substations will be allowed only in special situations with prior approval from LUMA and will remain property of the customers.

5. Transformers shall comply with latest applicable DOE low losses requirements.

6. Secondary lines shall be protected according to current NEC requirements.

7. Lightning arresters shall be selected according to the voltage rating.

8. Transclosure shall provide an oil containment mean according to the NEC and applicable environmental laws and ruling.

9. Transclosure cubicles shall have a second security barrier on both sides where people have access to live parts with a voltage greater than 600 volts are exposed. This second security barrier shall comply with:

   a. It must be made of safety glass, expanded-metal, fiberglass-reinforced thermoset polyester resins. If expanded-metal is used, it must be of the same material used in the cabinet construction, and the security door shall allow visibility to internal components.

   b. The doors to be used must have hinges with an accessory that keeps them open when working in cabinets and a proper closure attachment.

   c. It must have a hazard label that does not interfere with the visibility of the components inside the cabinet.

   d. Minimum clearances shall comply with the current NESC requirements.

8.3.3.1 Metering

1. The metering equipment (CT and VT) require maintenance, so it is necessary that they are accessible to the personnel of LUMA who perform this work. To fulfill this purpose, the construction of the metering cubicle in the transclosures will have the following specifications:

   a. Front: Two independent doors will be installed, one at the top and one at the bottom, with their corresponding locks for padlocks. The meter cover will consist of two removable bolted parts.

   b. Back: A 30” wide door that opens to 90° will be installed. With this dimension, the opened door will assure compliance with the required 30” clearance from the cabinet to the rear wall or fence, if any.

   c. Safety glass window shall be installed exclusively in the metering cubicle. It will not be allowed to be used in other cubicles in the cabinet.

   d. The doors will have an attachment to keep them fixed in the open position.

8.3.4 Vault-type Substations

A vault type substation is a private type of electrical substation. Vaults for transformers can be located inside buildings. Vault-type substations are typically constructed using three single-phase transformers to reduce primary voltage down to secondary voltage for the facility to be served. Vault-type substations shall comply with the NESC, NEC and any other NFPA applicable code.

This type of substation must also comply with the following requirements:

1. A gang-operated disconnecting device that opens and closes all three phases simultaneously from outside the vault by means of a crank handle with provision to install padlocks in both positions.

2. All gang-operated disconnecting switch in a vault-type substation shall be installed inside an enclosure. Refer to standard no. URD-42 for installation details.

3. Transformers shall comply with the latest applicable DOE low losses requirements.

4. Secondary lines shall be protected according to the current NEC requirements.

5. Lightning arresters shall be selected according to the voltage rating.

6. Vault-type substations shall provide an oil containment mean according to the NEC and the applicable environmental laws and ruling.

8.3.4.1 Metering

1. In vault-type substations with primary metering, it is required to have a cubicle dedicated only for the installation of LUMA's metering equipment (CT and VT). Cubicle dimension shall comply with LUMA's standard no. URD-48.

2. Meters and secondary breakers shall be installed outside the vault to facilitate their reading and operation avoiding danger of accidents.

3. Vault cubicles shall have a second security barrier on both sides where people have access to live parts with a voltage greater than 600 volts are exposed. This second security barrier shall comply with:

    a. It must be made of safety glass, expanded-metal, fiberglass-reinforced thermoset polyester resin. If expanded-metal is used, it must be of the same material used in the cabinet construction, and the security door shall allow visibility to internal components.

    b. The doors to be used must have hinges with an accessory that keeps them open when working in cabinets and a proper closure attachment.

    c. It must have a hazard label that does not interfere with the visibility of the components inside the cabinet.

    d. Minimum clearances shall comply with the current NESC requirements.

9. Secondary Pedestals

9.1 General

Secondary pedestals will be used for secondary service lateral and street lighting.

9.2 Requirements

1. Secondary pedestals shall be of the submersible type.

2. No fuses will be required on the pedestals except for street lighting.

3. The connectors on the pedestals will accept cables from #12 AWG up to 500 MCM for copper cables.

4. The neutral cable on the pedestal will be grounded through an ⅝" x 8' ground rod. Grounding resistance of the pedestal will not exceed 5 ohms.

5. The number of cables connected to a pedestal shall not exceed 27, including the taps for street lighting.

6. Secondary pedestals will be installed in the planting strip in front of the lots, as close to the sidewalk as possible. These will be installed according to the guides included in the standards no. URD-26-A, URD-27-A, URD-27-B, and assembly no. ASSY-2504.

7. Installation of pedestals at driveways will not be allowed.

8. Installation of pedestal in the sidewalk area is allowed only in urban areas where there is no planting strip. The pedestal cover shall be installed at the same level as the sidewalk. In such way, it does not represent an obstacle or hazard to pedestrians.

9. All ducts shall have a PVC end bell termination to provide a smooth safe cable entry. The quantity and size of ducts will depend on the underground system design. Refer to standard no. URD-54 for duct selection.

10. After installation of all cables is completed, ducts in use shall be sealed with a nonhardening duct sealing compound and a duct sealing plug shall be installed in each spare duct to prevent water intrusion.

10. Pull Boxes for Secondary System

10.1 General

Pull boxes will be used in the design of secondary feeders and service laterals in urban centers where cables up to 500 MCM in copper will be used. Refer to standard no. URD-30 for installation details.

10.2 Requirements

1. Pull boxes for secondary system shall be of the submersible type.
2. No fuses will be required on the pedestals except for street lighting.
3. The connectors on pedestals will accept cables from #12 AWG up to 500 MCM for copper cables.
4. The neutral cable on the pedestal will be grounded through an ⅝" x 8' ground rod. Grounding resistance of the pedestal will not exceed 5 ohms.
5. Pull boxes for secondary system will be installed in the sidewalk. These will be installed according to the guides included in the standard no. URD-30 and assembly no. ASSY-2504.
6. Installation of pull boxes at driveways will not be allowed.
7. The pull box cover shall be installed at the same level as the sidewalk. In such way, it does not represent an obstacle or hazard to pedestrians.
8. All ducts shall have a PVC end bell termination to provide a smooth safe cable entry. The quantity and size of ducts will depend on the underground system design. Refer to standard no. URD-54 for duct selection.
9. After installation of all cables is completed, ducts in use shall be sealed with a nonhardening duct sealing compound, and a duct sealing plug shall be installed in each spare duct to prevent water intrusion.
10. No more than two pull boxes shall be installed in series.

11.Grounding and Bonding System

11.1 General

The purpose of grounding and bonding is to safeguard employees and the public from injuries that may be caused by electrical potential, and protect all electrical equipment installed in the underground distribution system. Grounding and bonding should not be taken for granted.

The underground electrical system shall be effectively connected to ground in a manner that will limit the voltage imposed by lightning, line surges or unintentional contact with higher voltage lines and that will stabilize the voltage to earth during normal operation. Bonding is also necessary to establish electrical continuity and conductivity between metal parts required to be electrically connected. The Article 250 of the current NEC establish the general requirements for grounding and bonding.

The underground grounding system consist of the following components:

1. Ground rods made of copper-clad steel, with ⅝" diameter and 8' long minimum
2. Ground rods buried at concrete bases for pad-mounted equipment
3. Ground rods buried at manholes, pull boxes and pedestals for equipment as submersible transformers, sectionalizing devices, primary junctions, primary and secondary connectors
4. Electrical copper bare conductor with minimum gauge #2 AWG for grounding and bonding connection
5. A ground ring made of copper bare conductor with minimum gauge of 4/0 AWG installed on the floor inside manholes or pull boxes and attached to ground rods
6. For single-phase systems, 15 kV underground neutral cable effectively connected to ground
7. For three-phase systems, 15 kV underground cable concentric neutral strands effectively connected to ground
8. Copper bare conductor used for bonding riser supports with the concrete pole's grounding conductor

Grounding resistance test for distribution lines will not exceed 5 ohms. If the results are outside the acceptable limits, additional rod extensions shall be installed, with their corresponding couplings for copper ground rod, until the expected results are reached. If it's not possible to install a ⅝" x 8' ground rod, ⅝" x 4' ground rod extensions with their corresponding couplings shall be installed to comply with the minimum length of 8'. The footing resistance is measured by one of the following methods:

a. Clamp-on Resistance Meter
b. Wenner's Three Point Method (Fall of Potential)

Approved compression cross ground grid connector or mechanical connector with hexagonal head bolt shall be used to connect the grounding copper bare conductor to the ground rod.

For pole risers, the grounding conductor for lightning arresters shall be as short as possible. Excessive length of jumpers connected to the feeder and from the arrester to the grounding conductor, as well as too large separation between the arrester and the equipment to be protected, can reduce, or eliminate the effectiveness of the arrester. The grounding conductor of the arrester shall not have sharp bends (equal or close to 90°) because the transient signals in the power system see them as an open circuit and consequently their magnitudes are amplified.

Grounding and bonding shall be installed at the underground electrical distribution system as per LUMA's standards and materials specification.

12. Labeling

12.1 General

Labels are intended to assist in understanding how the equipment is connected and provide reference for proper operation. Informational labels are installed on electrical equipment such as cables, pole risers, sectionalizing devices, transformers, manholes, pull boxes and pedestals. The purpose is to identify equipment type, operational and safety or work-related information. This section does not include instructions related to assign asset and device number identification. Refer to document Asset & Devices Identification for Puerto Rico Distribution System.

A durable engineering grade vinyl label with good adhesive shall be used for labeling. The vinyl label shall have a white background and black lettering to include additional operational identification. The letters and numbers shall be Arial font and 1½" minimum height for equipment labeling, except for cables, pedestals, and interior of transformers, where must be 1". All material shall be approved by LUMA.

12.2 Requirements

12.2.1 Primary system cables

The method used for labeling primary system cables shall be with vinyl, water and weather resistant type. All material shall be approved by LUMA. The primary system cables labels shall include the following information:

1. Phases A, B, C
2. Lot number or customer's name on cable at primary junctions, using the word "TO" as part of the label
3. Feeder number
4. ASSET ID of manholes or DEVICE ID of equipment before and after, using the words "TO" and "FROM" as part of the label

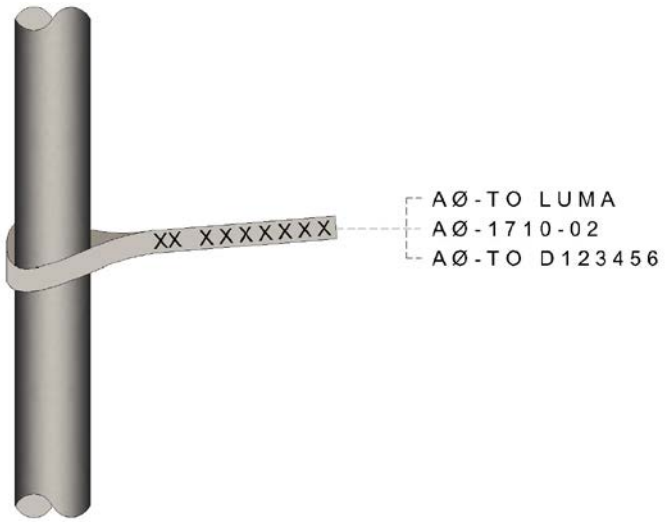

Figure 12-1. Primary system cable labeling example

12.2.2 Pole risers

The method used for labeling ducts shall be with vinyl, water and weather resistant type. All material shall be approved by LUMA. Identify cables phases A, B, C, as detailed in section 12.2.1.

Riser ducts shall be labeled to identify its purpose. Some alternatives could be the feeder number, customer's name, customer's address, company or building's name, manhole number, switching unit number, transformer number, etc. Labels shall be installed on the riser duct at approximately 10' height above finished ground level. The pole riser labels shall include the following information:

1. Feeder number

2. Lot number or customer's name, using the word “TO” as part of the label

3. ASSET ID or DEVICE ID of the equipment to be served (transformer, sectionalizing device, manhole, pull box, etc.), using the word “TO” as part of the label

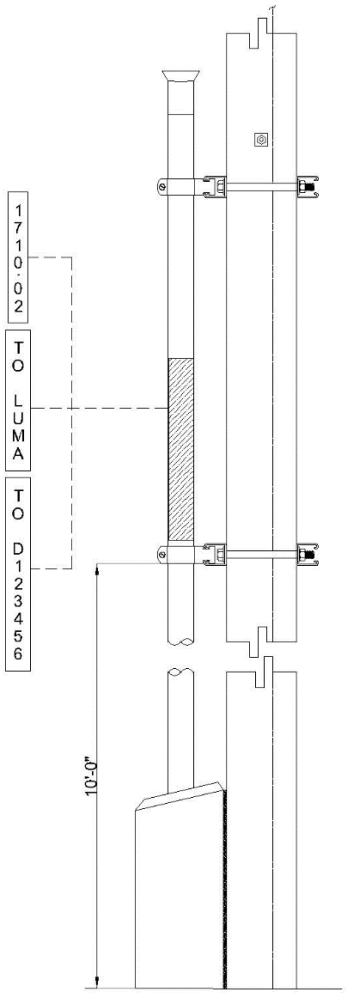

Figure 12-2. Riser labeling example

12.2.3 Sectionalizing devices

The method used for labeling sectionalizing devices shall be with vinyl, water and weather resistant type. All material shall be approved by LUMA. Identify cables phases A, B, C, as detailed in section 12.2.1.

Sectionalizing devices shall be labeled including the entering and leaving sources cables routes, and equipment or loads to be served. The labels for sectionalizing devices enclosures shall include the following information:

1. Phases A, B, C

2. ASSET ID of equipment before and after, using the words “TO” and “FROM” as part of the label

3. Identification of loads to be served (transformers, sectionalizing device, manholes, etc.), using the word “TO” as part of the label

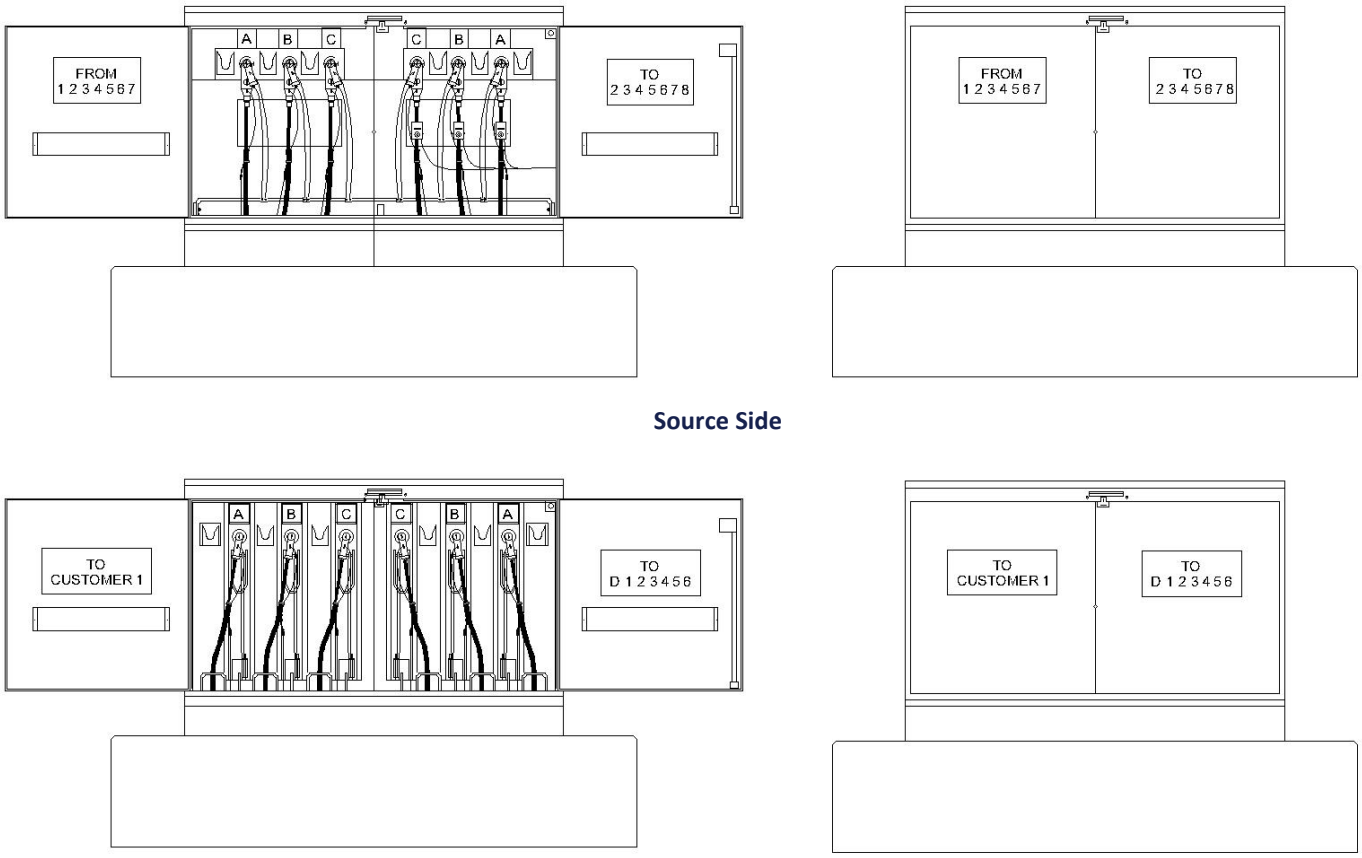

Figure 12-3. Three-phase dead front switching unit labeling example

12.2.4 Transformers

The method used for labeling transformers shall be with vinyl, water and weather resistant type. All material shall be approved by LUMA. Identify cables phases A, B, C, as detailed in section 12.2.1.

All transformers shall be labeled including the entering and leaving sources cables routes and equipment or loads to be served. The transformers labels shall include the following information:

1. Phases A, B, C
2. ASSET ID or DEVICE ID of the equipment before and after, using the words “TO” and “FROM” as part of the label
3. Draw a diagram inside the tank lid of the pad-mounted transformers showing secondary cables route to the pedestal locations
4. Identify all secondary system cables, as detailed in section 12.2.6

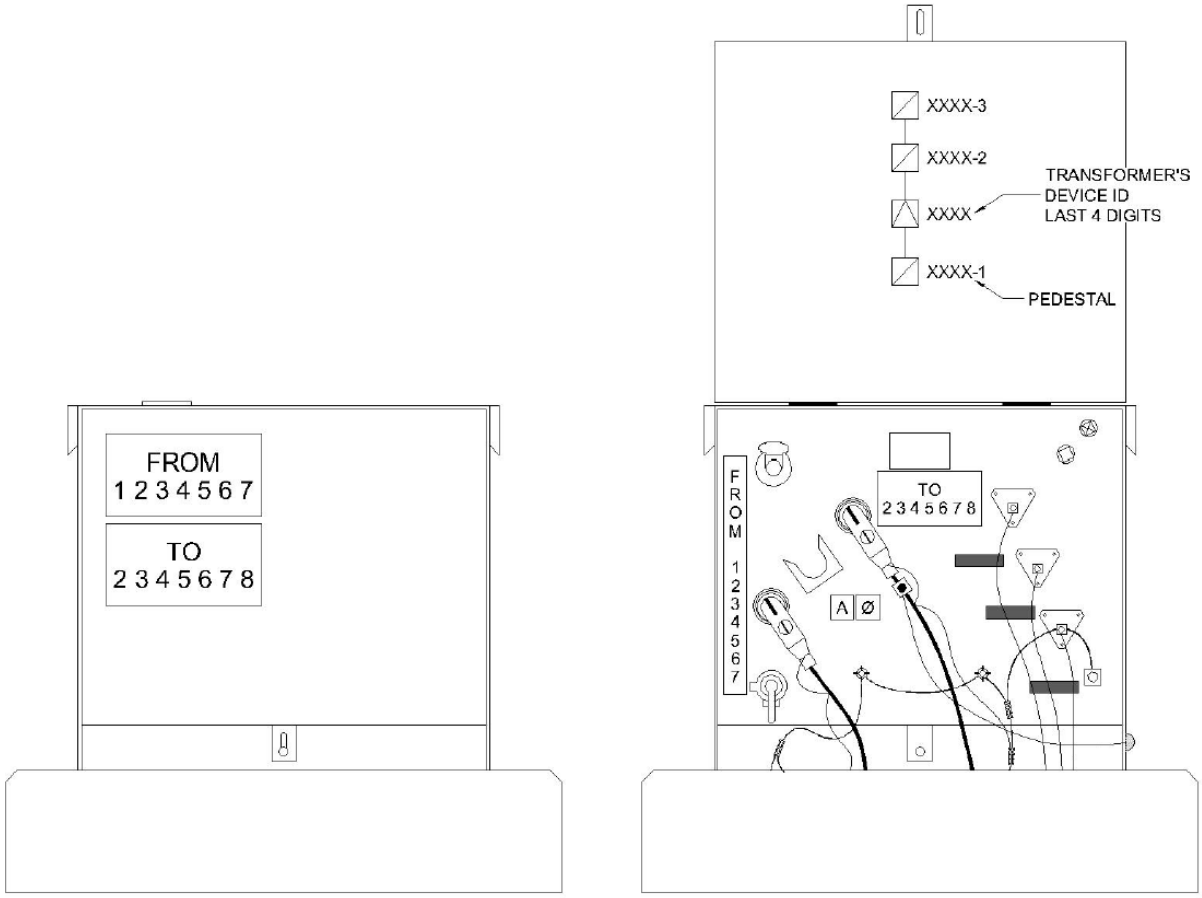

Figure 12-4. Single-phase dead front pad-mounted transformer labeling example

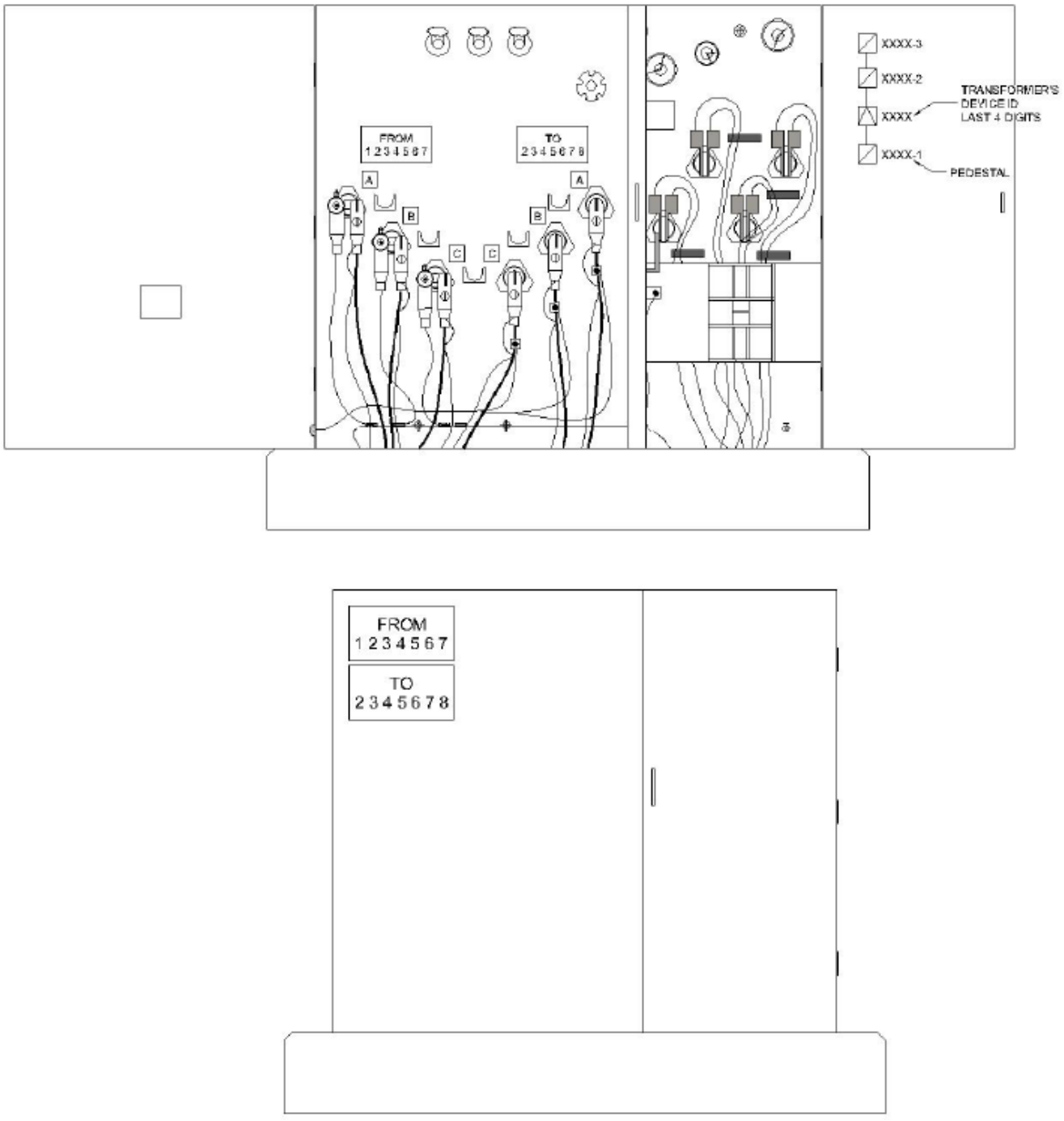

Figure 12-5. Three-phase dead front pad-mounted transformer labeling example

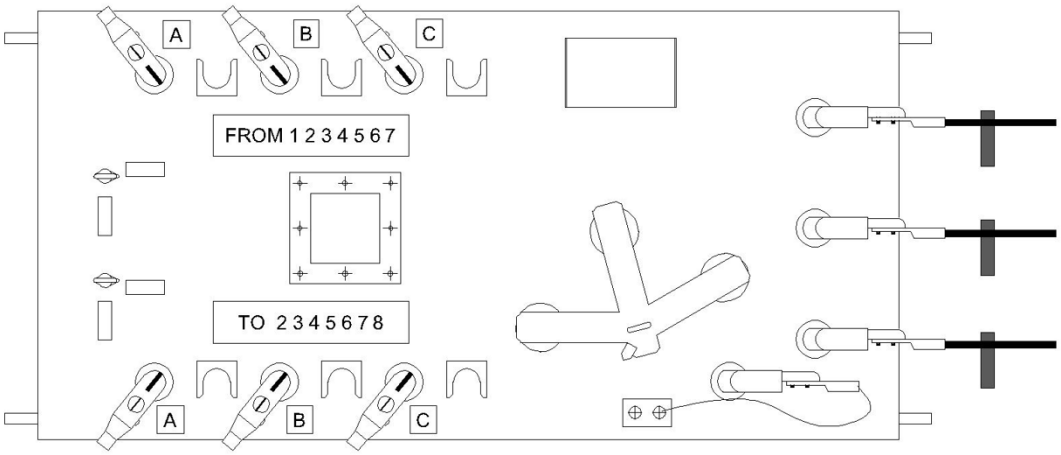

Figure 12-6. Three-phase submersible transformer labeling example

12.2.5 Manholes, pull boxes and pedestals

Manholes, pull boxes and pedestals covers shall be labeled according to the LUMA's document Asset & Devices Identification for Puerto Rico Distribution System. All material shall be approved by LUMA.

Pedestal covers shall also include the last four digits of the DEVICE ID of the transformer that provide service to the pedestal. Beside those four digits, it shall include the number of the pedestal from 1 to 3, as assigned at the one-line diagram shown in the transformer's lid.

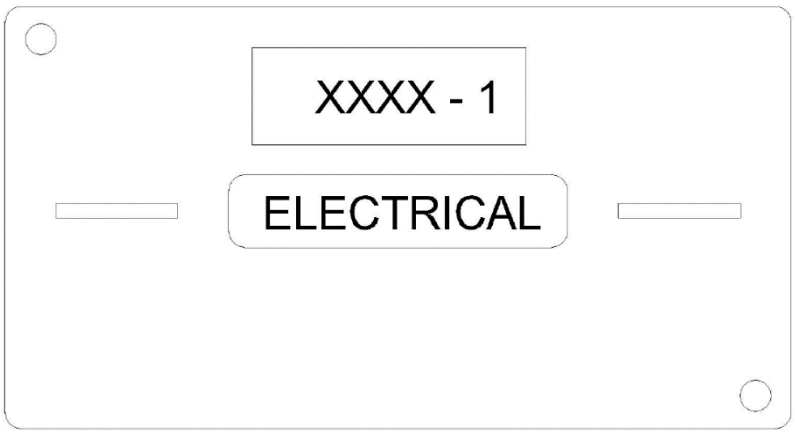

Figure 12-7. Pedestal labeling example

12.2.6 Secondary system cables

The method used for labeling secondary system cables shall be with vinyl, water and weather resistant type. All material shall be approved by LUMA. The secondary system cables labels shall include the following information:

1. DEVICE ID of transformers that supplies service, using the word “FROM” as part of the label

2. ASSET ID of pull boxes or identification number of pedestals before and after, using the words “TO” and “FROM” as part of the label

3. Lot number or customer's name on each secondary service lateral, using the word “TO” as part of the label

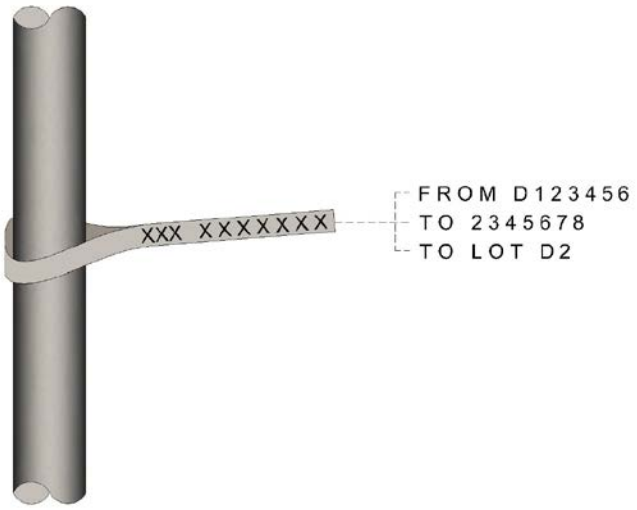

Figure 12-8. Secondary system cable labeling example

PART III: UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM STANDARDS

The standards are developed to maintain safety and reliability of the underground electrical distribution system. The standards herein include the bill of materials and construction details. They shall be followed without deviation for new constructions.

UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM STANDARDS INDEX		
STANDARD NO.	DOCUMENT NO.	TITLE
ASSY-2501	4325.004	RISER SUPPORT ASSEMBLY
ASSY-2502	4325.005	WIRELESS FAULT CURRENT INDICATION SYSTEM ASSEMBLY
ASSY-2503	4325.006	UNDERGROUND NONMETALLIC CABLE RACK ASSEMBLY FOR PRIMARY AND SECONDARY CABLES
ASSY-2504	4325.007	MULTIPLE OUTLET CONNECTOR ASSEMBLY
ASSY-2505	4325.008	PRIMARY JUNCTION ASSEMBLY
ASSY-2506	4325.009	UNDERGROUND CABLE LOCATION WARNING NAMEPLATE
ASSY-2507	4325.010	SEPARABLE INSULATED CONNECTORS AND CABLE TERMINATION ASSEMBLY
ASSY-2508	4325.011	15 KV CABLE SPLICES ASSEMBLY
URD-2	4325.012	UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM SINGLE PHASE AND NEUTRAL WITH FUSE CUTOUT
URD-3	4325.013	UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM THREE PHASE WITH DISCONNECTING SWITCHES
URD-3-A	4325.014	UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM THREE PHASE WITH FUSE CUTOUTS
URD-3-B	4325.015	UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM THREE PHASE WITH DISCONNECTING SWITCHES
URD-4	4325.016	PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER
URD-4-A	4325.017	PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER WITH PRECAST CONCRETE FOUNDATION
URD-6	4325.018	TRENCH DETAIL FOR INSTALLATION OF PRIMARY DISTRIBUTION CIRCUITS
URD-7	4325.019	TRENCH DETAIL FOR INSTALLATION OF PRIMARY AND SECONDARY DISTRIBUTION CIRCUITS
URD-8	4325.020	TRENCH DETAIL FOR INSTALLATION OF SECONDARY DISTRIBUTION CIRCUITS
URD-9	4325.021	TRENCH DETAIL FOR INSTALLATION OF PRIMARY AND SECONDARY DISTRIBUTION CIRCUITS ON ROCKY TERRAIN
URD-11-B	4325.022	THREE PHASE DEAD FRONT SWITCHING UNIT FOR THREE PHASE LOADS
URD-11-C	4325.023	THREE PHASE DEAD FRONT SWITCHING UNIT FOR SINGLE PHASE LOADS

UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM STANDARDS INDEX		
STANDARD NO.	DOCUMENT NO.	TITLE
URD-11-D	4325.024	GAS INSULATED DISTRIBUTION SWITCHGEAR 4 WAYS, WET VAULT MOUNTED STYLE REMOTE SUPERVISORY CAPABLE
URD-20	4325.025	SINGLE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
URD-24	4325.026	LOCATION DETAILS FOR TRANSFORMERS, SERVICE PEDESTALS AND CONDUIT TRENCH
URD-26-A	4325.027	12" X 12" SERVICE PEDESTAL
URD-27-A	4325.028	13" X 24" SERVICE PEDESTAL
URD-27-B	4325.029	24" X 36" SERVICE PEDESTAL
URD-29	4325.030	SECONDARY SERVICE METER SOCKET INSTALLATION
URD-30	4325.031	UNDERGROUND PULL BOX FOR SECONDARY CABLES 7' x 4'-6" x 4'
URD-30-B	4325.032	UNDERGROUND PULL BOX FOR PRIMARY CABLES 7' X 4'-6" X 5'
URD-31-B	4325.033	10' X 7' X 8' MANHOLE WITH DOUBLE DOOR HATCH
URD-33	4325.034	THREE PHASE SUBMERSIBLE TRANSFORMER
URD-34-D	4325.035	12' X 9' X 8' MANHOLE FOR UNDERGROUND DISTRIBUTION SWITCHGEAR WET VAULT MOUNTED STYLE
URD-38	4325.036	THREE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
URD-42	4325.037	GANG OPERATED DISCONNECTING SWITCH INSIDE A VAULT
URD-48	4325.038	DETAIL FOR SUBSTATION METERING EQUIPMENT CABINET
URD-53	4325.039	CONCRETE BASES FOR PAD MOUNTED EQUIPMENT
URD-54	4325.040	DUCT SIZING

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ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	DRAWINGS
0001	THROUGH BOLT Perno pasante	4350.072	54343	002-01483	Φ = ⅜", 8" L - HDG	
			82642	002-82642	Φ = ⅜", 10 " L - HDG	
			54344	002-01525	Φ = ⅜", 12" L - HDG	
			54345	002-01541	Φ = ⅜"", 14" L - HDG	
			54346	002-01566	Φ = ⅜"", 16" L - HDG	
			82411	002-82411	Φ = ¾", 8" L - HDG	
			82641	002-82641	Φ = ¾", 10" L - HDG	
			82412	002-82412	Φ = ¾"", 12" L - HDG	
			59056	002-59056	Φ = ¾", 14" L - HDG	
			82413	002-82413	Φ = ¾", 16" L - HDG	
			82918	002-82918	Φ = ½", 8" L - HDG	
			82919	002-82919	Φ =½", 10" L - HDG	
			82920	002-82920	Φ = ½", 12" L - HDG	
			82921	002-82921	Φ = ½", 14" L - HDG	
			82922	002-82922	Φ = ½", 16" L - HDG	
		4350.073	57697	002-13637	Φ = ⅝"", 8" L - SS AND TDG	
			82643	002-82643	Φ = ⅝", 10" L - SS AND TDG	
			57698	002-13645	Φ = ⅝", 12" L - SS AND TDG	
			57700	002-13660	Φ = ⅝", 14" L - SS AND TDG	
			57701	002-13678	Φ = ⅝", 16" L - SS AND TDG	
			82405	002-82405	Φ = ¾", 8" L - SS AND TDG	
			82644	002-82644	Φ = ¾"", 10" L - SS AND TDG	
			82406	002-82406	Φ = ¾", 12" L - SS AND TDG	
			82407	002-82407	Φ = ¾", 14" L - SS AND TDG	
			82408	002-82408	Φ = ¾", 16" L - SS AND TDG	
			82409	002-82409	Φ = ¾" 18" L - SS AND TDG	
			82410	002-82410	Φ = ¾", 20" L - SS AND TDG	
			82923	002-82923	Φ = ½", 10" L - SS AND TDG	
			82924	002-82924	Φ =½", 16" L - SS AND TDG	
0002	FLAT SQUARE WASHER Arandela cuadrada plana	4350.120	57585	002-06946	2¼"x 2¼" x 3/16" HOLE 11/16" - HDG	
			82656	002-82656	2¼" x 2¼" x 3/16" HOLE 13/16" - HDG	
			57586	002-06961	4" x 4"x ¼" HOLE 11/16" - HDG	
			82657	002-82657	4" x 4"x ¼" HOLE ⅜" - HDG	
		4350.121	57703	002-13702	2¼"x 2¼" x 3/16" HOLE 11/16" - SS OR TDG	
			82660	002-82660	2¼" x 2¼" x 3/16" HOLE 13/16" - SS OR TDG	
			82661	002-82661	4" x 4"x ¼" HOLE 11/16" - SS OR TDG	
			82662	002-82662	4" x 4"x ¼" HOLE ⅜" - SS OR TDG	
	FLAT ROUND WASHER Arandela redonda	4350.111	82932	002-82932	½" - HDG	
		4350.112	82041	002-82041	½" - SS	
	SPLIT LOCK WASHER Arandela de seguridad partida	4350.109	82931	002-82931	½" - HDG	
		4350.110	82930	002-82930	½" - SS	
0006	COMPRESSION SPLICES SINGLE SLEEVE FULL TENSION Conector de compresión de camisilla sencilla para tensión completa	4350.091	82678	002-82678	556.5 ACSR TO 556.5 ACSR, 652.4 AAAC	
			55430	002-04446	BARE COPPER CONDUCTOR #2	
			55892	002-09965	BARE COPPER CONDUCTOR 1/0	
			82676	002-09973	BARE COPPER CONDUCTOR 4/0	
			55838	002-13454	BARE COPPER CONDUCTOR 300 MCM	
0006	COMPRESSION SPLICES TWO SLEEVE FULL TENSION ACSR Conector de compresión de doble camisilla para tensión completa (ACSR)	4350.092	83882	002-08660	#2 (6/1)	
			54260	002-08678	1/0 (6/1)	
			54261	002-08686	3/0 (6/1)	
			83031	002-83031	4/0 (6/1)	
			56679	002-09601	266.8 (26-7)	
			55995	002-11458	336.4 (18-1)	
			57692	002-13587	556.5 (24-7) MCM	
			83032	002-83032	795.0 (26-7)	
0006	COMPRESSION CONNECTORS FIGURE 3 SHAPE - ALUMINUM Conector de compresión tipo Figura 3 (AL)	4350.093	55897	002-10039	#6-#4, #6-#4 STRANDED, #6-#4, #6-#4 ACSR	
			54248	002-08363	#2-2/0, #6-#2 STRANDED, #2-1/0, #6-#2 ACSR	
			54249	002-08371	1/0-2/0, 1/0-2/0 STRANDED, 1/0, 1/0 ACSR	
			54250	002-08389	2/0-3/0, #2 STRANDED, 1/0-2/0, #2-#4 ACSR	
			56676	002-09569	4/0, 1/0-2/0 STRANDED, 3/0-4/0, 1/0-2/0 ACSR	
			83025	002-83025	2/0-3/0, 1/0-2/0 STRANDED, 2/0, #1-2/0 ACSR	
			83026	002-83026	4/0, #4-#2 STRANDED, 3/0-4/0, #4-#2 ACSR	
0006	COMPRESSION CONNECTORS FIGURE 6 SHAPE - ALUMINUM Conector de compresión tipo Figura 6 (AL)	4350.164	54253	002-08439	#6-#2 RUN, #14 SOL.-#8 TAP STRANDED AL/CU #6-#4 RUN, #14 SOL.-#8 TAP ACSR AL/CU	
			83028	002-83028	#1-3/0 RUN, #14 SOL - #8 TAP STRANDED AL/CU #2-3/0 RUN, #14 SOL - #8 ACSR AL/CU	
			83027	002-83027	3/0-4/0 RUN, #6-#3 TAP STRANDED AL/CU 3/0-4/0 RUN, #6-#3 TAP STRANDED AL/CU	
			54251	002-08413	3/0-4/0 RUN, 2/0-4/0 TAP STRANDED AL/CU 3/0-4/0 RUN, 3/0-4/0 TAP ACSR AL/CU	
			55917	002-10658	250-400 MCM RUN, 6 SOL.-2/0 TAP STRANDED AL/CU 266.8 (18/1)- 397.5 (18/1) RUN, #6-1/0 TAP ACSR	
			56704	002-10666	250 - 477 MCM RUN, 2/0-4/0 TAP STRANDED AL/CU 266.8 (18/1) - 397.5 (18/1) RUN, 2/0-4/0 TAP ACSR	

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ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	DRAWINGS
0006	COMPRESSION CONNECTORS FIGURE 6 SHAPE - ALUMINUM Conector de compresión tipo Figura 6 (AL)	4350.164	56705	002-10674	250-400 MCM RUN, 250-400 MCM TAP STRANDED 266.8 (18/1)- 397.5 (18/1) RUN, 266.8 (18/1)- 397.5 (18/1) TAP ACSR	
			56710	002-10799	477-600 MCM RUN, 2/0-400 MCM TAP STRANDED AL/CU 397.5 (18/1)-556.5 (18-1) RUN, #6-1/0 TAP ACSR	
			56585	002-12217	600 - 800 MCM RUN, 2/0-400 MCM TAP STRANDED AL/CU 556.5 (18-1)- 795(26/7) RUN, 2/0-397.5 (18/1) TAP ACSR	
			56586	002-12225	600 - 800 MCM RUN, 397.5-600 MCM TAP STRANDED AL/CU 556.5 (18-1)-795(26/7) RUN, 336.4 (26/7)-556.5 (18/1) TAP ACSR	
			56587	002-12233	600 - 954 MCM RUN, 600 - 954 MCM TAP STRANDED AL/CU 556.5 (18-1)-795(26/7) RUN, 556.5 (18-1)-795(26/7) TAP ACSR	
0006	COMPRESSION JUMPER SLEEVE SPLICES (ACSR & AAAC CONDUCTORS) Conector de compresión para empalme en puentes	4350.165	83034	002-83034	#2 (6/1) (7/1) ACSR	
			83035	002-83035	1/0 (6/1) ACSR	
			54365	002-09429	3/0 (6/1) ACSR	
			83632	002-09460	4/0 (6/1) ACSR	
			83633	002-09886	266.8 (26/7) ACSR	
			55450	002-05450	366.4 (18/1) ACSR	
			54366	002-09478	556.5 (24/7) ACSR, 652.4 (19) AAAC	
			83634	002-09502	795.0 (26/7) ACSR	
0006	COMPRESSION CONNECTORS TAP CONNECTORS - COPPER Conector de compresión tipo C - Cobre	4350.199	58181	002-03893	6 SOL. - 4 STR. RUN, 6 SOL. - 6 STR. TAP	
			55420	002-03919	6 SOL. - 4 STR. RUN, 6 SOL. - 4 STR. TAP	
			56167	002-08793	4 SOL. - 2 STR. RUN, 8 SOL. - 4 STR. TAP	
			54265	002-08785	2 SOL. - 2 STR. RUN, 2 SOL. - 2 STR. TAP	
			54369	002-09544	3/0 SOL. - 4/0 STR. RUN, 3/0 SOL. - 4 STR. TAP	
			83016	002-83016	8 SOL. - 8 STR. RUN, 10 SOL. - 8 STR. TAP	
			83017	002-83017	1/0 STR. - 2/0 STR. RUN, 8 SOL. - 2 STR. TAP	
			83018	002-83018	1/0 STR. - 2/0 SRT. RUN, 1/0 STR. - 2/0 STR. TAP	
			83019	002-83019	3/0 SOL. - 4/0 STR. RUN, 6 SOL. - 2 STR. TAP	
			83020	002-83020	3/0 SOL. - 4/0 STR. RUN, 1/0 STR. - 2/0 STR. TAP	
			83022	002-83022	4/0 - 500 MCM RUN, 4/0 - 500 MCM TAP	
			83023	002-83023	4/0 - 500 MCM, #2 - 250 MCM TAP	
			83024	002-83024	4/0 - 500 MCM, #6 SOL. - #6 STR. TAP	
0006	COMPRESSION CROSS GROUND GRID CONNECTOR Conector de compresión cruzado para sistema de conexión a tierra	4350.170	59063	002-14460	GROUND CROSS GRID CONNECTOR #2 AWG (STR)-250 MCM	
			83499	002-83499	GROUND CROSS GRID CONNECTOR 250 MCM - 500 MCM	
0006	ALUMINUM PRIMARY T-TAP CONNECTOR Conector tipo T-Tap - Aluminio	4350.244	55977	002-11052	556.5 (24/7)	
			83030	002-83030	795 (26/7)	
0006	WEDGE CONNECTOR ALUMINUM TO COPPER Conector de cuña - Aluminio a Cobre	4752.289	77922	002-77922	556.5 ACSR - 750 COPPER	
			83118	002-83118	1192.5 ACSR - 750 COPPER	
0028	ALUMINUM SPACER CONDUCTOR ACSR/GA, 15 KV Conductor espaciador de aluminio 15 kV	4350.063	82619	042-82619	#2 AWG	
			37633	042-00820	3/0 AWG	
			82620	042-82620	4/0 AWG	
			56723	042-00911	336.4 MCM	
			56730	042-00986	556.5 MCM	
			83217	042-83217	795 MCM	
0037	⅝" X 8' GROUND ROD Varilla para conexión a tierra ⅝" X 8'	4350.089	55365	002-02465	⅝" X 8' L	
	⅝" X 4' GROUND ROD Varilla para conexión a tierra ⅝" X 4'		83238	002-83238	⅝" X 4' L	
	THREADED COUPLING FOR COPPER GROUND ROD Unión con rosca para varilla de cobre para conexión a tierra		83223	002-83223	THREADED COUPLING FOR COPPER GROUND ROD	
	THREADED DRIVE HEAD FOR COPPER GROUND ROD Cabezal con rosca para varilla de cobre para conexión a tierra		83224	002-83224	THREADED DRIVE HEAD FOR COPPER GROUND ROD	
	UNTHREADED COUPLING FOR COPPER GROUND ROD Unión sin rosca para varilla de cobre para conexión a tierra		83239	002-83239	UNTHREADED COUPLING FOR COOPER GROUND ROD	

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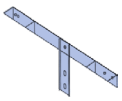
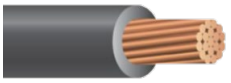
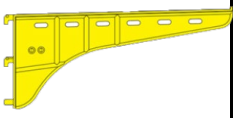
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	DRAWINGS
0037	UNTHREADED DRIVE HEAD FOR COPPER GROUND ROD Cabezal sin rosca para varilla de cobre para conexión a tierra	4350.089	83240	002-83240	UNTHREADED DRIVE HEAD FOR COPPER GROUND ROD	
0066	CONNECTOR FOR ⅝" GROUND ROD Conector para varilla de ⅝" para conexión a tierra	4350.078	57693	002-13595	CONNECTOR FOR ⅝" GROUND ROD	
0077	HIGH VOLTAGE VINYL ELECTRICAL INSULATING THERMOPLASTIC TAPE Cinta adhesiva de vinilo con aislación termoplástica para alto voltaje	4350.130	55005	038-01248	VINYL INSULATING TAPE	
0078	HOT LINE CLAMP Grapa para línea energizada	4350.097	22046 22047	072-00330 072-00348	#3/0 - 636.0 (30/19) ACSR RUN / #6 (6/1) - 266.8 (26/7), CU #4 SOL. - 350 MCM ACSR TAP #6 (6/1) - 397.5 (18/1) ACSR RUN / (6/1) - 3/0 (6/1), CU #6 SOL. -4/0 STR. ACSR TAP	
0080	COPPER BARE CONDUCTOR Conductor de cobre sin cubierta	4350.055	82621 56082 56081 59361	006-82621 006-01534 006-01526 006-01609	#2 AWG 1/0 AWG 4/0 AWG 300 MCM	
0087	15 KV UNDERGROUND CABLE TAPE SHIELDED Cable soterrado 15 kV tipo blindado con cinta	4350.050	56890 56889 56896 56893 56894	006-00783 006-00767 006-01005 006-00866 006-00874	#2 AWG 2/0 AWG 4/0 AWG 500 MCM 750 MCM	
	15 KV UNDERGROUND CABLE JACKETED CONCENTRIC NEUTRAL Cable soterrado 15 kV tipo neutral concéntrico con cubierta	4350.160	82624 82625 82626 82627 82628	006-82624 006-82625 006-82626 006-82627 006-82628	#2 AWG 2/0 AWG 4/0 AWG 500 MCM 750 MCM	
0106	ALUMINUM BARE CONDUCTOR - ACSR Conductor de AL sin cubierta (ASCR)	4350.062	56725 56728 56726 56727 82942	042-00937 042-00960 042-00945 042-00952 042-82942	1/0 AWG - RAVEN 3/0 AWG - PIGEON 266.8 MCM - PARTRIDGE 556.5 MCM - PARAKEET 795 MCM - DRAKE	
	ALUMINUM BARE CONDUCTOR - AAAC Conductor de AL sin cubierta (AAAC)	4350.059	53689 52171	042-01018 042-52171	652.4 MCM - ELGIN 927.2 MCM - GREELEY	
0128	AIR BREAK SWITCH Interruptor (machete)	4350.071	82825 55417	032-82825 032-02785	27.0 KV, 600A DISCONNECT AIR-BREAK 27.0 KV, 900A DISCONNECT AIR-BREAK	
0141	CROSSARM Cruceta	4350.002	27511	008-00680	STAINLESS STEEL - 42"	
		4350.005	59342	008-00714	HOT DIP GALVANIZED - 72"	
		4350.155	82814 82815 82816	008-82814 008-82815 008-82816	FIBERGLASS - 5' FIBERGLASS - 8' FIBERGLASS - 12'	
0144	STIRRUP CONNECTOR Conector de estribo	4350.080	76635 76636	002-14593 002-14601	1/0 @ 4/0 ACSR 336.4 @ 556.5 MCM	
0145	DOUBLE EYE TERMINAL CONNECTOR (ALUMINUM) FOR OVERHEAD SYSTEM (ACSR, AAAC AND CU CONDUCTORS) Terminal de doble ojo aluminio para sistema aéreo (Conductores ASCR, AAAC, y CU)	4350.208	55978 55979 55980 56718 83029	002-11060 002-11086 002-11094 002-10948 002-83029	4/0 (6/1) ACSR, 4/0 STD (19) CU 266.8 (26/7) ACSR, 300 MCM (37) CU 336.4 (18/1) ACSR 556.5 (24/7) ACSR, 652.4 (19) AAAC 795 (26/7) ACSR	
	DOUBLE EYE TERMINAL CONNECTOR FOR UNDERGROUND SYSTEM Terminal de doble ojo para sistema soterrado	4350.132	56696 81460 54678 56912 54677	002-09833 038-81460 038-00786 038-01487 038-00778	#2 AWG 1/0 AWG 4/0 AWG 500 MCM 750 MCM	

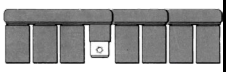
UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST

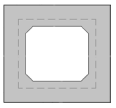
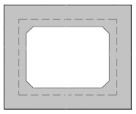
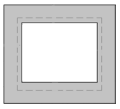
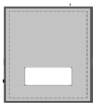
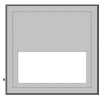
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	DRAWINGS
0181	PRECAST CONCRETE FOUNDATION FOR PRE-STRESSED CONCRETE POLE Base de hormigón prefabricada para poste de hormigón	4350.101	82595	026-82595	PRECAST CONCRETE BASE FOR H-6 TYPE POLES, 40' TO 65', AND H-8 TYPE POLES, 45' TO 65'	
			82596	026-82596	EPOXY COATED REINFORCING STEEL PRECAST CONCRETE BASE FOR H-6 TYPE POLES, 40' TO 65' AND H-8 TYPE POLES, 45' TO 65'	
	PRECAST CONCRETE FOUNDATION FOR GALVANIZED STEEL POLE Base de hormigón prefabricada para poste de acero galvanizado	4350.198	82691	026-82691	PRECAST CONCRETE BASE FOR GALVANIZED STEEL S8 TYPE POLES, 50' TO 70'	
			82692	026-82692	EPOXY COATED REINFORCING STEEL PRECAST CONCRETE BASE FOR GALVANIZED STEEL S8 TYPE POLES, 50' TO 70'	
2001	OUTDOOR CABLE TERMINATION STRESS CONE Terminación para cable exterior	4350.135	55871	038-01461	#2 AWG CU, 15 KV	
			56913	038-01495	1/0 AWG CU, 15 KV	
			55870	038-01453	2/0 AWG CU, 15 KV	
			55868	038-01438	4/0 AWG CU, 15 KV	
			55869	038-01446	500 MCM CU, 15 KV	
			55872	038-01479	750 MCM CU, 15 KV	
2002	CABLE AND STRESS CONE SUPPORT BRACKET Soporte para terminación	4350.136	82668	038-82668	#2 AWG - 1/0 AWG CU, 15KV	
			77377	038-77377	2/0 AWG - 4/0 AWG CU, 15KV	
			77378	038-77378	500 MCM - 750 MCM CU, 15KV	
2003	PIN TERMINAL CONNECTOR Terminal de compresión para cables aislados	4350.044	56690	002-09742	#2 AWG CU, 15 KV	
			82936	002-82936	1/0 AWG CU, 15 KV	
			82937	002-82937	2/0 AWG CU, 15 KV	
			82938	002-82938	3/0 AWG CU, 15 KV	
			82939	002-82939	4/0 AWG CU, 15 KV	
			82940	002-82940	500 MCM CU, 15 KV	
			82941	002-82941	750 MCM CU, 15 KV	
2004	FAULT CURRENT INDICATOR Indicador de falla de corriente	4350.006	56917	038-01545	1Ø - SINGLE PHASE FAULT CURRENT INDICATOR WITH LED REMOTE INDICATION 20FT	
			83874	038-83874	1Ø - SINGLE PHASE FAULT CURRENT INDICATOR WITH INTEGRATED TARGET DISPLAY	
		4350.007	82528	032-82528	FCI - 3A WITHOUT COMMUNICATION AUTOMATIC RESET FAULTED CIRCUIT INDICATORS (FCI) FOR USE ON 60 HRTZ WYE CONNECTED MULTI-GROUNDED IN RANGE OF 4.16 to 13.2 KV (PHASE TO PHASE)	
			82529	032-82529	FCI - 3A WITH COMMUNICATION AUTOMATIC RESET FAULTED CIRCUIT INDICATORS (FCI) FOR USE ON THE 60 HERTZ WYE CONNECTED MILTI-GROUNDED IN RANGE OF 4.16 to 13.2 KV (PHASE TO PHASE)	
2005	STRANDED COPPER CABLE, 600 V, XHHW-2 Cable de cobre trenzado, 600 V, XHHW-2	4350.054	56892	006-00833	#2 AWG CU, 600 V, XHHW-2	
			82622	006-82622	1/0 AWG CU, 600 V, XHHW-2	
			82623	006-82623	2/0 AWG CU, 600 V, XHHW-2	
			82753	006-82753	3/0 AWG CU, 600 V, XHHW-2	
			56891	006-00809	4/0 AWG CU, 600 V, XHHW-2	
			59358	006-01575	500 MCM CU, 600 V, XHHW-2	
2006	1⅝" STRUT CHANNEL Canal de puntal 1⅝"	4350.105	83135	038-83135	1⅝" X 1⅝" 12 GAUGE - HDG	
		4350.106	83136	038-83136	1 ⅝" X 1 ⅝" 12 GAUGE - SS	
2007	STRUT CHANNEL CLAMP Abrazadera de tubo para canal de puntal	4350.115	83137	038-83137	2" - HDG	
			83138	038-83138	3" - HDG	
			83139	038-83139	4" - HDG	
			83140	038-83140	6" - HDG	
			83141	038-83141	8" - HDG	
		4350.116	83142	038-83142	2" - SS	
			83143	038-83143	3" - SS	
			83144	038-83144	4" - SS	
			83145	038-83145	6" - SS	
			83146	038-83146	8" - SS	
2008	½" FULLY THREADED ROD Varilla rosca corrida ½"	4350.107	82933	002-82933	½" DIAMETER X 6' L - HDG	
		4350.108	82929	002-82929	½" DIAMETER X 6' L - SS	

UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST						
ITEM NO.	**GENERAL DESCRIPTION**	**SPECS DOC NO.**	**ASSET SUITE'S CATALOG NO.**	**WAREHOUSE ITEM**	**DETAILS**	**DRAWINGS**
2009	½" HEXAGONAL NUT Tuerca hexagonal ½"	4350.113 4350.114	82928 82038	002-82928 002-82038	½" DIAMETER - HDG ½" DIAMETER - SS	
2010	½" DROP-IN ANCHOR Anclaje de expansión ½"	4350.173	83219	038-83219	½" X 2" DIAMETER - SS	
2011	ELBOW ARRESTER Pararrayos tipo codo	4350.238	54004 54006 53998 83338	004-00358 004-00374 004-00291 004-83338	3 KV, 200 A, ELBOW TYPE 6 KV, 200 A, ELBOW TYPE 10 KV, 200 A, ELBOW TYPE 10 KV, 600 A, T TYPE	
2012	BRONZE MALE SERVICE POST CONNECTOR Conector mecánico macho en bronce para conexión a tierra	4350.118	82925 83411	002-82925 002-83411	½" BRONZE MALE SERVICE POST CONNECTOR #2 AWG TO 1/0 AWG CU - BRZ ⅝" BRONZE MALE SERVICE POST CONNECTOR #1 AWG TO 350 MCM CU - BRZ	
2013	INDOOR CABLE TERMINATION STRESS CONE Terminación para cable interior	4350.182	55867 55866 55864 55018 55017 55016	038-01420 038-01412 038-01396 038-01388 038-01370 038-01362	#2 AWG CU, 15 KV 1/0 AWG CU, 15 KV 2/0 AWG CU, 15 KV 4/0 AWG CU, 15 KV 500 MCM CU, 15 KV 750 MCM CU, 15 KV	
2014	DUCT SEALING COMPOUND Sellador de ductos	4350.190	48058	003-02935	DUCT SEALING COMPOUND	
2015	PADLOCK Candado	4350.191	54786 54787	066-07303 066-07345	1½ " PADLOCK 2½ " PADLOCK SIZE 15	
2016	SMU-20 TYPE FUSE Fusible tipo SMU-20	4350.134	55266 55267 55268 55269 55270 55271 55272 55273 83410	010-07749 010-07756 010-07764 010-07772 010-07780 010-07798 010-07806 010-07814 010-83410	SMU-20 TYPE FUSE, 7E SMU-20 TYPE FUSE, 20E SMU-20 TYPE FUSE, 25E SMU-20 TYPE FUSE, 40E SMU-20 TYPE FUSE, 80E SMU -20 TYPE FUSE, 100E SMU-20 TYPE FUSE, 125E SMU-20 TYPE FUSE, 150E SMU-20 TYPE FUSE, 200E	
2017	WEDGE ANCHOR BOLT Perno con anclaje de expansión	4350.156	83147 83148	038-83147 038-83148	WEDGE EXPANSION ANCHOR BOLT ½" X 4½ " L - SS WEDGE EXPANSION ANCHOR BOLT ⅝" X 4¾" L - SS	
2018	ELASTOMERIC JOINT SEALANT Sellador de juntas elastomérico	4350.157	83149	038-83149	10.1 fl. OZ CARTRIDGE ALUMINUM GRAY OR BLACK	
2019	RIGID GALVANIZED STEEL PIPE Tubo rígido de acero galvanizado	4350.254	83318	038-83318	6" RIGID GALVANIZED STEEL PIPE	
2020	GANG OPERATED SWITCHING UNIT Unidad seccionadora de operación conjunta	4350.161	58498	038-02023	3Ø TWO GANG OPERATED - SS	

UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST						
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	DRAWINGS
2021	SINGLE POLE SWITCHING UNIT Unidad seccionadora monopolar	4350.161	58496	038-02007	SIX 1Ø MANUAL OPERATED - SS	
2022	36" CABLE RACK Estante para cables - 36"	4350.220	56569	002-11839	POLYMER 36" HEAVY DUTY NONMETALLIC CABLE RACK	
2023	14" CABLE SUPPORT ARM Brazo para soporte de cables - 14"	4350.220	56570	002-11862	14" L X 4" W POLYMER UNDERGROUND HEAVY DUTY NONMETALLIC CABLE SUPPORT ARM	
	20" CABLE SUPPORT ARM Brazo para soporte de cables - 20"		55814	002-12597	20" L X 4" W POLYMER UNDERGROUND HEAVY DUTY NONMETALLIC CABLE SUPPORT ARM	
2024	MECHANICAL GROUNDING CONNECTOR Conector mecánico para conexión a tierra	4350.210	83151	038-83151	#6 AWG TO 2/0 AWG CU 1 HOLE UNIVERSAL TERMINAL	
		4350.004	58173	038-03620	SPLIT BOLT RUN AND TAP #2 AWG TO 2/0 AWG	
2025	SELF-DRILLING SCREW Tornillo autoperforante	4350.253	83309	002-83309	SELF-DRILLING ¼" X 1" L HEX HEAD SCREW SIMILAR OR EQUAL TO TEK TYPE	
2026	CABLE TIE Ligadura para cable	4350.211	83155	038-83155	24" L CABLE TIE WEATHER RESISTANT	
2027	SML-20 FUSE UNIT END FITTING Accesorio de extremo para fusible SML-20	4350.214	54490	010-08150	SILENCER AND FITTINGS - LOAD BREAK SIMILAR OR EQUAL TO SML-20 TYPE	
	SME-20 FUSE UNIT END FITTING Accesorio de extremo para fusible SME-20		83385	010-83385	SILENCER AND FITTINGS - LOAD BREAK SIMILAR OR EQUAL TO SME-20 TYPE	
2028	SINGLE HOLE CABLE STRAP FOR COPPER CONDUCTOR Abrazadera de cable con un solo hueco para conductores de cobre	4350.212	83156	038-83156	0.5" OD - COPPER SINGLE HOLE CABLE STRAP	
2029	CONCRETE SCREW ANCHOR HEX WASHER HEAD Tornillo con cabeza arandela hexagonal para anclaje en concreto	4350.213	83157	038-83157	¼" X 1¾" L - CONCRETE SCREW ANCHOR - SS SIMILAR OR EQUAL TO TAPCON TYPE	
2030	TUBULAR MOLE CONNECTOR Conector mole tipo tubular	4350.177	83158	038-83158	#2 AWG TO 500 MCM CU, 600 V MOLE CONNECTOR 8 OUTLETS SIMILAR OR EQUAL TO ZM TYPE	
		4350.177	83225	038-83225	#2 AWG TO 500 MCM CU, 600 V MOLE CONNECTOR 9 OUTLETS SIMILAR OR EQUAL TO ZMT TYPE	
2031	DEAD FRONT SWITCHING UNIT Unidad seccionadora con frente muerto	4350.231	83414	038-83414	15 KV, 3Ø, 600 A SOURCE SIDE, 200 A LOAD SIDE, 4 COMPARTMENTS - SS	

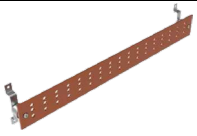
UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST

ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	DRAWINGS
2032	TUBULAR MOLE SOCKET AND NUT Casquillo y tuerca para conector tipo mole tubular	4350.174	83159	038-83159	#2 AWG TO 500 MCM CU, 600 V SIMILAR OR EQUAL TO Z34 NR TYPE	
2033	TUBULAR MOLE COMPRESSION CONE Cono de compresión para conector tipo mole tubular	4350.174	83161 83162 83163 83164 83165 83166 83167	038-83161 038-83162 038-83163 038-83164 038-83165 038-83166 038-83167	#2 AWG CU, 600 V. SIMILAR OR EQUAL TO Z TYPE 1/0 AWG CU, 600 V. SIMILAR OR EQUAL TO Z TYPE 2/0 AWG CU, 600 V. SIMILAR OR EQUAL TO Z TYPE 4/0 AWG CU, 600 V. SIMILAR OR EQUAL TO Z TYPE 250 MCM CU, 600 V. SIMILAR OR EQUAL TO Z TYPE 350 MCM CU, 600 V. SIMILAR OR EQUAL TO Z TYPE 500 MCM CU, 600 V. SIMILAR OR EQUAL TO Z TYPE	
2034	TUBULAR MOLE OUTLET INSULATING SLEEVE Manga aislante de salida de conector tipo mole tubular	4350.174	83168	038-83168	MOLE OUTLET INSULATING SLEEVE SIMILAR OR EQUAL TO Z-C TYPE	
2035	TUBULAR MOLE OUTLET PLUG Sellador de salida para conector tipo mole tubular	4350.174	83169	038-83169	MOLE OUTLET PLUG SIMILAR OR EQUAL TO Z-P TYPE	
2036	BUS BAR MOLE CONNECTOR Conector tipo mole en barra	4350.177	54674 56914	038-00745 038-01511	#12 AWG TO 4/0 AWG CU, 600 V 4 ONE-HOLE OUTLET SIMILAR OR EQUAL TO RDM-28 TYPE #12 AWG TO 4/0 AWG CU, 600 V 8 ONE-HOLE OUTLET SIMILAR OR EQUAL TO RDM-28 TYPE	 
2037	BUS BAR MOLE TAP KIT WITH INSULATING RUBBER SLEEVE Set de manga de goma aislada para conector tipo mole en barra	4350.203	55010 55015 55011 55012 55013 55014 82926	038-01305 038-01354 038-01313 038-01321 038-01339 038-01347 038-82926	#2 AWG TO #1 AWG CU, 600 V RUBBER SLEEVE, MOUNTING HARDWARE 1/0 AWG CU, 600 V RUBBER SLEEVE, MOUNTING HARDWARE 2/0 AWG CU, 600 V RUBBER SLEEVE, MOUNTING HARDWARE 3/0 AWG CU, 600 V RUBBER SLEEVE, MOUNTING HARDWARE 4/0 AWG CU, 600 V RUBBER SLEEVE, MOUNTING HARDWARE 250 MCM CU, 600 V RUBBER SLEEVE, MOUNTING HARDWARE 500 MCM CU, 600 V RUBBER SLEEVE, MOUNTING HARDWARE	
2038	SEALED BUS BAR CONNECTOR Conector sellado tipo barra	4350.232	81471	038-81471	#14 AWG TO 350 MCM CU, 600 V, 6 OUTLETS	
2039	PVC SCH-80 DUCT Tubo PVC SCH-80	4350.236	83314 83315 83316 83317	038-83314 038-83315 038-83316 038-83317	2" - SCH-80 3" - SCH-80 4" - SCH-80 6" - SCH-80	
2040	PVC SCH-40 DUCT Tubo PVC SCH-40	4350.235	83422 83424 59318 83182 59311 56927	038-83422 038-83424 038-01867 038-83182 038-01792 038-01727	¾" - SCH-40 1" - SCH-40 2" - SCH-40 3" - SCH-40 4" - SCH-40 6" - SCH-40	

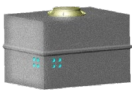
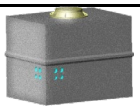
UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST						
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	DRAWINGS
2041	90° PVC ELBOW Codo PVC 90°	4350.235	83425	038-83425	¾" - SCH-40	
			83427	038-83427	1" - SCH-40	
			59319	038-01875	2" - SCH-40	
			82927	038-82927	3" - SCH-40	
			59312	038-01800	4' - SCH-40	
			56928	038-01735	6" - SCH-40	
2042	PVC END CAP Tapa PVC	4350.235	59320	038-01883	2"- SCH-40	
			83194	038-83194	3" - SCH-40	
			59313	038-01818	4" - SCH-40	
			56929	038-01743	6" -SCH-40	
2043	PVC COUPLING Unión PVC	4350.235	83428	038-83428	¾" - SCH-40	
			83429	038-83429	1" - SCH-40	
			58486	038-01909	2" - SCH-40	
			83198	038-83198	3" - SCH-40	
			59315	038-01834	4" - SCH-40	
			56931	038-01762	6" - SCH-40	
2044	PVC FEMALE ADAPTER Adaptador hembra PVC	4350.235	83202	038-83202	2" - SCH-40	
			83203	038-83203	3" - SCH-40	
			83204	038-83204	4" - SCH-40	
			83205	038-83205	6" - SCH-40	
2045	PVC END BELL Terminal tipo campana PVC	4350.235	59321	038-01891	2" - SCH-40	
			83201	038-83201	3" - SCH-40	
			59314	038-01826	4" - SCH-40	
			56930	038-01750	6" - SCH-40	
2046	CONCRETE BASE Base de hormigón	4350.269	46140	026-46140	82" x 88" REINFORCED CONCRETE BASE FOR LIVE FRONT SINGLE POLE SWITCHING UNIT URD-11	
			47208	026-47208	88" x 104" REINFORCED CONCRETE BASE FOR LIVE FRONT GANG OPERATED SWITCHING UNIT URD-11-A	
			51009	026-51009	90¾" X 99" REINFORCED CONCRETE BASE FOR DEAD FRONT SWITCHING UNIT URD-11-B OR URD-11-C	
			44635	026-44635	60" X 52" REINFORCED CONCRETE BASE FOR SINGLE PHASE PAD MOUNTED TRANSFORMER URD-20	
			46566	026-46566	76" X 77" REINFORCED CONCRETE BASE FOR THREE PHASE PAD MOUNTED TRANSFORMER URD-35	
2047	ARC AND FIRE PROOFING TAPE Cinta adhesiva a prueba de arco y fuego	4350.252	55006	038-01255	ARC AND FIRE PROOFING TAPE 3" X 20'	
2048	HEX HEAD BOLT Tornillo con cabeza hexagonal	4350.209	83212	038-83212	½" DIAMETER X 2" L BOLT - SS	
			83218	038-83218	½" DIAMETER X 1 ½" L BOLT - SS	
			83413	038-83413	⅜" DIAMETER X 1" L BOLT - SS	
2049	A-2-4 BACKFILL MATERIAL Material de relleno A-2-4	4350.205	83207	038-83207	A-2-4 MATERIAL AS PER ASTM D3282, LATEST EDITION (CU.MT. OR m^3)	

UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST

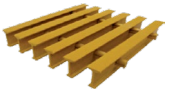
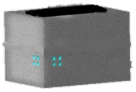
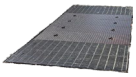
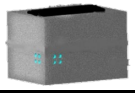
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	DRAWINGS
2050	#67 CRUSHED STONE OR GRAVEL Piedra triturada o gravilla #67	4350.204	83208	038-83208	¾" AND SMALLER CRUSHED STONE (CU. MT. OR m^3)	
2051	NONWOVEN GEOTEXTILE FILTER FABRIC Tela filtrante de geotextil no tejido	4350.206	83209	038-83209	8 OZ / SQ. YD. (SQ. YD. OR yd^2)	
2052	PREFORMED EXPANSION JOINT FILLER Relleno de juntas de expansión preformado	4350.271	46670	038-46670	PREFORMED EXPANSION JOINT FILLER	
2053	STEEL REINFORCEMENT REBAR Varilla de acero de refuerzo	4350.255	52816 52815 52817 52818	002-52816 002-52815 002-52817 002-52818	#3, ⅜" DIAMETER #4, ½" DIAMETER #5, ⅝" DIAMETER #6, ¾" DIAMETER	
2054	WELDED WIRE MESH REINFORCEMENT Refuerzo de malla de alambre soldado	4350.266	53608	002-53608	WWR 4" X 4" (W1.7 / W1.7)	
2055	READY MIX CONCRETE Concreto premezclado	4350.267	44668	038-44668	3000 PSI 4000 PSI	
2056	DUCT SEALING PLUG Tapón sellador de tubo	4350.235	83310 83311 83312 83313	038-83310 038-83311 038-83312 038-83313	2" 3" 4" 6"	
2057	4 WAYS PRIMARY LOADBREAK JUNCTION Caja primaria de empalme de 4 vías para operación con carga	4350.180	05496	038-00638	4 WAYS PRIMARY LOADBREAK JUNCTION 15 KV, 200 A	
2058	6 WAYS PRIMARY JUNCTION Caja primaria de empalme de 6 vías		55171	038-01032	6 WAYS PRIMARY JUNCTION 15 KV, 1EA - 600 A DEADBREAK AND 5EA - 200 A LOADBREAK	
2059	LOADBREAK ELBOW CONNECTOR Conector tipo codo para operación con carga	4350.183	54681 83334 54684	038-00844 038-83334 038-00877	#2 AWG CU, 15 KV, 200 A 2/0 AWG CU, 15 KV, 200 A 4/0 AWG CU, 15 KV, 200 A	
2060	DEADBREAK ELBOW CONNECTOR Conector tipo codo para operación sin carga	4350.184	54683 55164 55165 55166 55167 83335	038-00869 038-00893 038-00901 038-00919 038-00927 038-83335	2/0 AWG CU, 15 KV, 600 A 4/0 AWG CU, 15 KV, 600 A 500 MCM CU, 15 KV, 600 A 750 MCM CU, 15 KV, 600 A 1200 MCM CU, 15 KV, 600 A 750 MCM CU, 15 KV, 900 A	
2061	LOADBREAK BUSHING PLUG INSERT Buje para operación con carga	4350.229	05498	038-00679	15 KV, 200 A	
2062	INSULATED CAP WITH GROUND Tapa de buje aislada con conexión a tierra	4350.230	55172	038-01040	15 KV, 200 A, LOADBREAK	
			56916	038-01537	15 KV, 600 A, DEADBREAK	
2063	13" x 24" SERVICE PEDESTAL Pedestal de servicio 13" x 24"	4350.186	58492	038-01962	13" W X 24" L X 18" D STANDARD OPEN BOTTOM, TIER 22 UNDERGROUND RECTANGULAR ENCLOSURE WITH TIER 15 COVER MADE OF PRECAST POLYMER CONCRETE	

UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST						
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	DRAWINGS
2064	13" x 24" SERVICE PEDESTAL COVER Tapa para pedestal de servicio 13" x 24"	4350.187	58493	038-01976	13" X 24", TIER 15, "ELECTRIC" LOGO, AND TAMPER RESISTANT PENTA-HEAD BOLT, POLYMER CONCRETE TOP COVER FOR UNDERGROUND ENCLOSURE	
2065	24" X 36" SERVICE PEDESTAL Pedestal de servicio 24" X 36"	4350.186	58490	038-01947	24" W X 36" L X 30" D STANDARD OPEN BOTTOM, TIER 22 UNDERGROUND RECTANGULAR ENCLOSURE WITH TIER 15 COVER MADE OF PRECAST POLYMER CONCRETE	
2066	24" X 36" SERVICE PEDESTAL COVER Tapa para pedestal de servicio 24" X 36"	4350.187	58491	038-01954	24" X 36", TIER 15, "ELECTRIC" LOGO, AND TAMPER RESISTANT PENTA-HEAD BOLT, POLYMER CONCRETE TOP COVER FOR UNDERGROUND ENCLOSURE	
2067	12" X 12" SERVICE PEDESTAL Pedestal de servicio 12" X 12"	4350.186	58494	038-01984	12" W X 12" L X 12" D STANDARD OPEN BOTTOM, TIER 15 UNDERGROUND SQUARE ENCLOSURE WITH TIER 15 COVER MADE OF PRECAST POLYMER CONCRETE	
2068	12" X 12" SERVICE PEDESTAL COVER Tapa para pedestal de servicio 12" X 12"	4350.187	58495	038-01992	12⅞" X 12⅞", TIER 15, "ELECTRIC" LOGO, AND TAMPER RESISTANT PENTA-HEAD BOLT, POLYMER CONCRETE TOP COVER FOR UNDERGROUND ENCLOSURE	
2069	HAZARD WARNING TAPE Cinta de advertencia de peligro	4350.268	83464	072-83464	ELECTRICAL HAZARD WARNING TAPE	
2070	DUCT SPACER Espaciador/Separador de ductos	4350.235	58487	038-01917	2" x 3" - BASE	
			83210	038-83210	3" x 3" - BASE	
			59316	038-01842	4" x 3" - BASE	
			59309	038-01776	6" x 3" - BASE	
			58488	038-01925	2" x 3" - INTERMEDIATE	
			83211	038-83211	3" x 3" - INTERMEDIATE	
			59317	038-01859	4" x 3" - INTERMEDIATE	
			59310	038-01784	6" x 3" - INTERMEDIATE	
2071	45° PVC ELBOW Codo PVC 45°	4350.235	83213	038-83213	2" - SCH-40	
			83214	038-83214	3" - SCH-40	
			83215	038-83215	4' - SCH-40	
			83216	038-83216	6" - SCH-40	
2072	LOADBREAK FEED-THRU INSERT Buje doble para operación con carga	4350.100	55170	038-01008	15 KV, 200 A - LOADBREAK	
2073	15 KV UNDERGROUND CABLE SPLICE KIT Set de empalme para cable soterrado 15 kV	4350.222	55174	038-01107	#2 AWG CU, 15 KV - SPLICE KIT	
			55177	038-01149	1/0 AWG CU, 15 KV - SPLICE KIT	
			55180	038-01172	2/0 AWG CU, 15 KV - SPLICE KIT	
			55175	038-01123	4/0 AWG CU, 15 KV - SPLICE KIT	
			55178	038-01156	500 MCM CU, 15 KV - SPLICE KIT	
			55179	038-01164	750 MCM CU, 15 KV - SPLICE KIT	
2074	NEUTRAL BUS BAR Barra para neutral	4350.263	83390	038-83390	NEUTRAL BUS BAR 36" x 4"	

UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST

ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	DRAWINGS
2075	10' X 7' X 8' MANHOLE WITH COVER Registro 10' X 7' X 8' con tapa	4350.272	70153	038-70153	10' X 7' X 8' MANHOLE WITH COVER	
2076	31 9/16" DIAMETER MANHOLE COVER Tapa de 31 9/16" para registro	4350.272	52786	038-52786	31 9/16" DIAMETER MANHOLE COVER	
2077	12' X 9' X 8' MANHOLE WITH COVER Registro 12' X 9' X 8' con tapa	4350.272	52787	038-52787	12' X 9' X 8' MANHOLE WITH COVER	
2078	43 ¾" DIAMETER MANHOLE COVER Tapa de 43 ¾" para registro	4350.272	56919	038-01560	43 ¾" DIAMETER MANHOLE COVER	
2079	7' X 4 ½' X 4' PULL BOX WITH COVER Registro de tiro 7' X 4 ½' X 4' con tapa	4350.273	70155	038-70155	7' X 4 ½' X 4' PULL BOX WITH COVER	
2080	7' X 4 ½' X 5' PULL BOX WITH COVER Registro de tiro 7' X 4 ½' X 5'con tapa	4350.273	70165	038-70165	7' X 4 ½' X 5' PULL BOX WITH COVER	
2081	PARKING BUSHING Buje de estacionamiento	4350.218	55169	0038-00992	15 KV, 200 A - LOADBREAK	
			83336	038-83336	15 KV, 600 A - DEADBREAK	
2082	PARKING STAND ARRESTER Pararrayo estacionario	4350.237	54005	004-00366	3 KV, 200 A	
			54007	004-00382	6 KV, 200 A	
			54002	004-00333	10 KV, 200 A	
2083	DEADBREAK BUSHING INSERT Buje para operación sin carga	4350.229	54675	038-00752	15 KV, 600 A	
2084	LOADBREAK ELBOW TAP PLUG Conector tipo codo para operación con carga	4350.229	79765	072-79765	15 KV, TAP FROM 600 A TO 200 A	
2085	LOADBREAK FEED-THRU PARKING BUSHING Buje de estacionamiento con alimentación horizontal para operación con carga	4350.218	79764	072-79764	15 KV, 200 A, HORIZONTAL	
2086	STRANDED COPPER CABLE, 600 V, THHN Cable de cobre trenzado, 600 V, THHN	4350.056	58516	040-00774	#12 AWG CU, 600 V, THHN, GREEN	
			54271	040-00931	#12 AWG CU, 600 V, THHN, WHITE	
			54270	040-00899	#12 AWG CU, 600 V, THHN, BLACK	
			54269	040-00873	#12 AWG CU, 600 V, THHN, RED	
			54268	040-00857	#12 AWG CU, 600 V, THHN, ORANGE	
			54267	040-00816	#12 AWGCU, 600 V, THHN, BLUE	
			54266	040-00790	#12 AWG CU, 600 V, THHN, YELLOW	
			54273	040-01293	#12 AWG CU, 600 V, THHN, BROWN	
			56897	006-01070	#10 AWG CU, 600 V, THHN, BLACK - SOLID	
			83458	006-83458	#10 AWG CU, 600 V, THHN, GREEN	
			83459	006-83459	#10 AWG CU, 600 V, THHN, WHITE	

UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST						
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	DRAWINGS
2087	SINGLE PHASE PAD MOUNTED TRANSFORMER Transformador monofásico tipo pedestal	4350.013	60376	012-07943	PM, 50 KVA, 4.16/2.4 KV TO 120/240 V, OIL - SS	
			60379	012-08065	PM, 50 KVA, 7.2/4.16 KV TO 120/240 V, OIL - SS	
			60383	012-08180	PM, 50 KVA, 8.32/4.8 KV TO 120/240 V, OIL - SS	
			59083	012-08305	PM, 50 KVA, 13.2/7.62 KV TO 120/240 V, OIL - SS	
			60377	012-07968	PM, 75 KVA, 4.16/2.4 KV TO 120/240 V, OIL - SS	
			60381	012-08081	PM, 75 KVA, 7.2/4.160 KV TO 120/240 V, OIL - SS	
			59079	012-08206	PM, 75 KVA, 8.32/4.8 KV TO 120/240 V, OIL - SS	
			59085	012-08321	PM, 75 KVA, 13.2/7.62 KV TO 120/240 V, OIL - SS	
			60378	012-07984	PM, 100 KVA, 4.16/2.4 KV TO 120/240 V, OIL - SS	
			60382	012-08107	PM, 100 KVA, 7.2/4.160 KV TO 120/240 V, OIL - SS	
			59081	012-08222	PM, 100 KVA, 8.32/4.8 KV TO 120/240 V, OIL - SS	
			59087	012-08347	PM, 100 KVA, 13.2/7.62 KV TO 120/240 V, OIL - SS	
2088	THREE PHASE PAD MOUNTED TRANSFORMER Transformador trifásico tipo pedestal	4350.216	59265	012-09832	3Ø, 150 KVA, 13.2 KV TO 120/208 V, Δ-Y	
			59258	012-09360	3Ø, 300 KVA, 13.2 KV TO 120/208 V, Δ-Y	
2089	THREE PHASE SUBMERSIBLE TRANSFORMER Transformador trifásico sumergible	4350.012	83611	012-83611	3Ø, 150 KVA, 13.2 KV TO 120/240 V, Δ-Δ	
			59239	012-09048	3Ø, 300 KVA, 13.2 KV TO 120/240 V, Δ-Δ	
2090	HEAVY DUTY CONCRETE SCREW ANCHOR Tornillo de anclaje para hormigón	4350.270	83465	002-83465	HEAVY DUTY SCREW ANCHOR ½" x 5" - SS	
2091	BONDING JUMPER FLEXIBLE COPPER BRAID Puente de conexión trenzado flexible de cobre	4350.262	83391	038-83391	24" BONDING JUMPER COPPER BRAID STRAP, 960 A	
2092	DEAD FRONT GAS INSULATED SWITCHGEAR Unidad seccionadora con frente muerto aislada por gas	4350.279	83629	038-83629	900 A UNDERGROUND GAS INSULATED SWITCHGEAR, 3Ø, 15.5 KV, 25 KA, 4 WAYS, REMOTE SUPERVISORY CAPABLE. SOURCE SIDE, (2) 900 A - LOAD SIDE (2) 600 A.	
			83630	038-83630	600 A UNDERGROUND GAS INSULATED SWITCHGEAR, 3Ø, 15.5KV, 12.5 KA, 4 WAYS, REMOTE SUPERVISORY CAPABLE. SOURCE SIDE, (2) 600 A - LOAD SIDE (2) 600 A.	
2093	UNIVERSAL TERMINAL LUG Terminal tipo bloque universal	4350.243	83451	038-83451	2 HOLES, 2 CONDUCTORS LUG UP TO 500 MCM	
			83452	038-83452	2 HOLES, 3 CONDUCTORS LUG UP TO 2/0 AWG	
2094	GRATING CLIP Grapa para rejilla	4350.274	83160	038-83160	GRATING CLIP	

UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST						
ITEM NO.	GENERAL DESCRIPTION	SPECS DOC NO.	ASSET SUITE'S CATALOG NO.	WAREHOUSE ITEM	DETAILS	DRAWINGS
2095	RUBBER SPLICING TAPE Cinta de empalme de goma	4350.276	83609	038-83609	RUBBER SPLICING TAPE	
2096	GRATING PANEL Panel de rejilla de polímero reforzado con fibra	4350.275	83047	038-83047	4' X 20' - FIBER REINFORCED POLYMER OPEN T-BAR PULTRUDED FRP GRATING PANEL	
2097	12' X 6' X 8' MANHOLE WITH COVER Registro 12' X 6' X 8' con tapa	4350.272	52784	038-52784	12' X 6' X 8' MANHOLE WITH COVER	
2098	12'-8 ½" X 5'-1" RECTANGLE MANHOLE COVER Tapa 12'-8 ½" X 5'-1" para registro rectangular	4350.272	52788	038-52788	12' X 5'- 1" RECTANGLE MANHOLE COVER	
2099	FAULT CURRENT INDICATOR WIRELESS INTERFACE DEVICE Dispositivo de integración inalámbrico para indicador de corriente de falla	4350.041	83566	032-83566	FCI WIRELESS INTERFACE DEVICE	
	REMOTE FAULT READER Lector remoto para indicador de corriente de falla		83567	032-83567	HANDHELD FCI READER	
	FAULT CURRENT INDICATOR WITH INTERFACE PROBE Indicador de corriente de falla con cable para interfaz		83565	032-83565	FCI W/PROBE 12'.	
2100	12' X 9' X 8' MANHOLE WITH DUAL LIFT ASSIST HATCHES Registro 12' X 9' X 8' con escotilla doble	4350.282	46718	038-46718	12' X 9' X 8' MANHOLE WITH DUAL LIFT ASSIST DOOR	
2101	DUAL LIFT ASSIST HATCHES Escotilla doble para registro 12' X 9' X 8'	4350.282	52785	038-52785	DUAL LIFT ASSIST HATCHES	

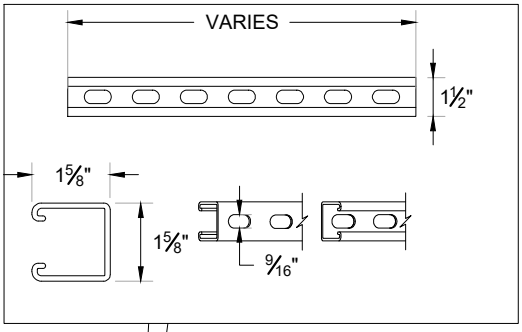
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

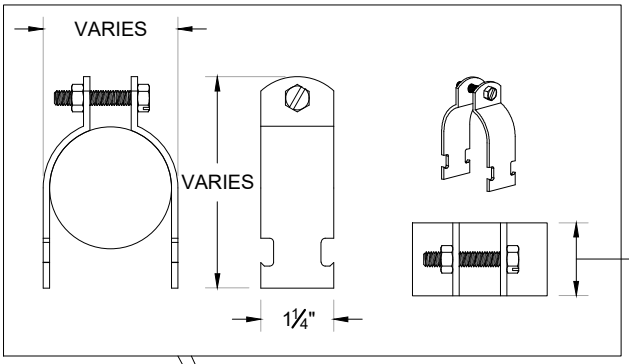
TITLE:

RISER SUPPORT ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

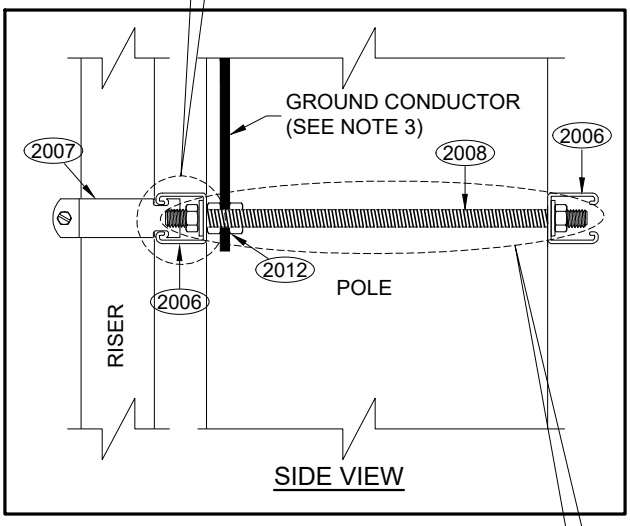
ASSEMBLY NO. ASSY-2501 VERSION 1
DOCUMENT NO. 4325.004
PAGE 1 OF 2 DATE SEPT 19, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412



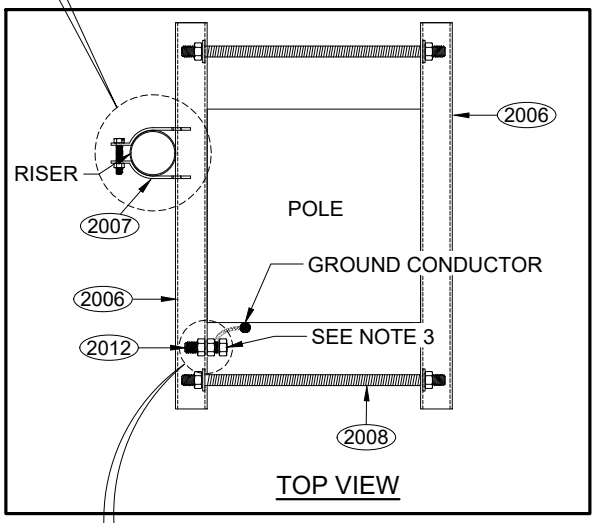
STRUT CHANNEL



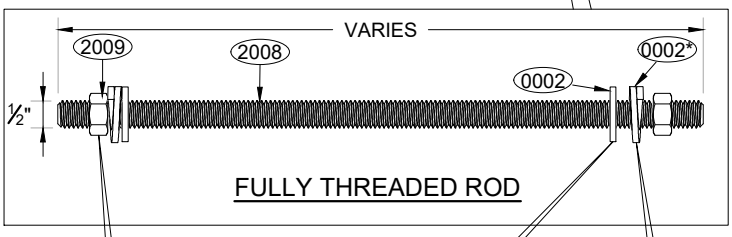
STRUT CHANNEL CLAMP



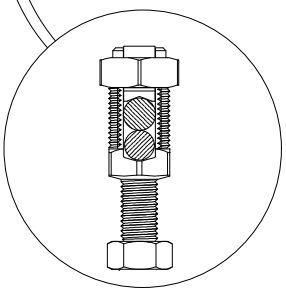
SIDE VIEW



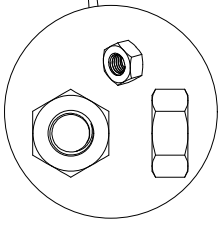
TOP VIEW



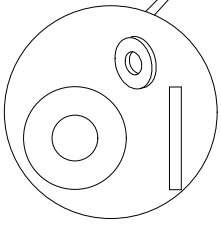
FULLY THREADED ROD



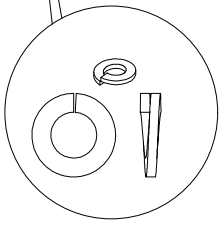
BRONZE MALE SERVICE POST CONNECTOR



HEXAGONAL NUT



FLAT WASHER



SPLIT LOCK WASHER

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

RISER SUPPORT ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV
NOTES AND BILL OF MATERIAL

ASSEMBLY NO. ASSY-2501 VERSION 1
DOCUMENT NO. 4325.004
PAGE 2 OF 2 DATE SEPT 19, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT ROUND WASHER	VARIES	4
0002*	SPLIT LOCK WASHER	VARIES	4
2006	1⅝" STRUT CHANNEL	VARIES	2
2007	STRUT CHANNEL CLAMP	VARIES	1
2008	½" FULLY THREADED ROD	VARIES	2
2009	½" HEXAGONAL NUT	VARIES	4
2012	BRONZE MALE SERVICE POST CONNECTOR	002-82925	1

NOTES:

1. THE FIRST SUPPORT SHALL BE INSTALLED AT A MAXIMUM DISTANCE OF 2' BELOW THE PVC END BELL AT THE RISER. THE SUBSEQUENT SUPPORTS SHALL BE INSTALLED WITH A MAXIMUM SEPARATION OF 5' BETWEEN THEM.
2. THE LOWEST RISER SUPPORT MUST BE INSTALLED AT 10' ABOVE THE GROUND LEVEL.
3. EACH RISER SUPPORT SHALL BE EFFECTIVELY CONNECTED TO THE POLE GROUND CONDUCTOR USING A MALE SERVICE POST CONNECTOR.
4. ALL MATERIAL ASSOCIATED WITH THE RISER SUPPORT SHALL BE STAINLESS STEEL WHEN THE SITE IS LOCATED WITHIN 1 MILE OF A SALTWATER BODY.

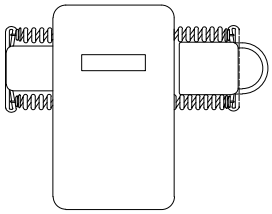
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

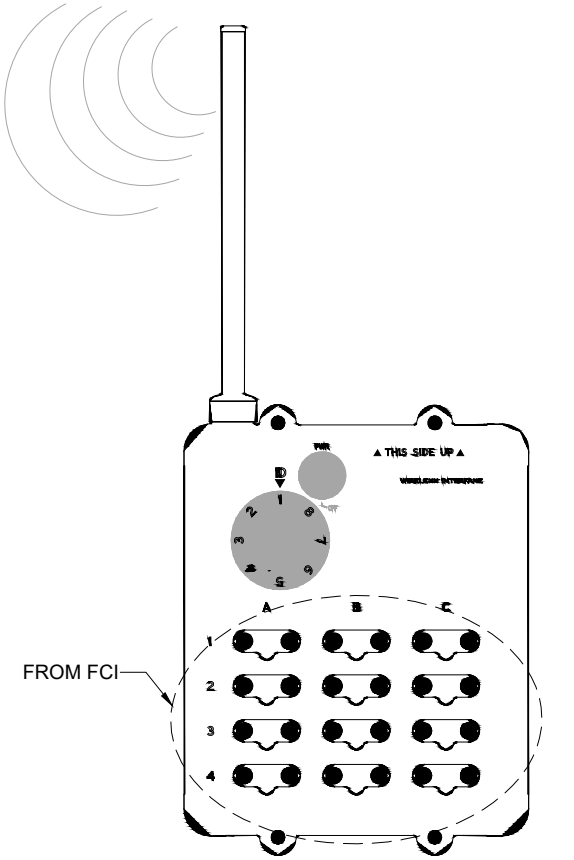
TITLE:

WIRELESS FAULT CURRENT INDICATION SYSTEM ASSEMBLY MAXIMUM VOLTAGE: 13.2 KV

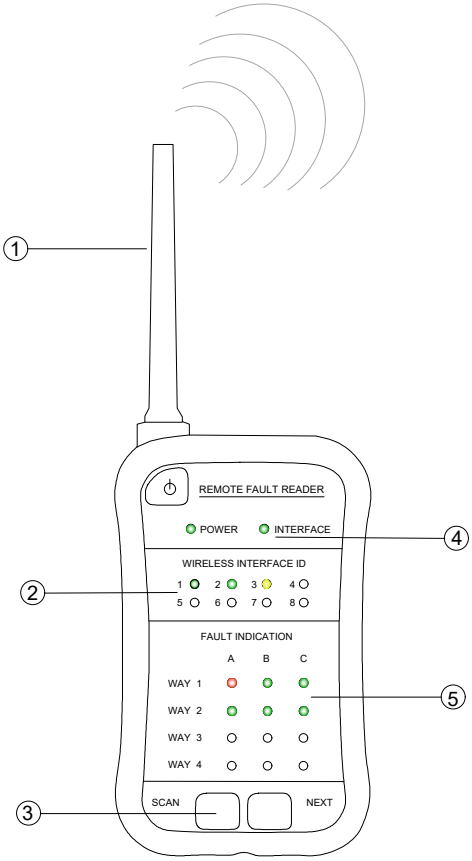
ASSEMBLY NO. ASSY-2502 VERSION 1
DOCUMENT NO. 4325.005
PAGE 1 OF 7 DATE OCT 18, 2022
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000



FAULT CURRENT INDICATOR (FCI)



FCI WIRELESS INTERFACE DEVICE



REMOTE FAULT READER
(SEE NOTES 9 AND 10)

1. FLEXIBLE ANTENNA
2. DISPLAY FOR UP TO EIGHT UNIQUE WIRELESS INTERFACE IDs
3. KEYPAD
4. WIRELESS INTERFACE STATUS MONITOR
5. FAULT INDICATOR PRESENCE AND STATUS

   RED - TRIPPED FAULT INDICATOR
   GREEN - UNTRIPPED FAULT INDICATOR
   OFF - NO FAULT INDICATOR PRESENT

FIGURE 1
WIRELESS FAULT INDICATOR SYSTEM
(SEE NOTE 1)

TITLE:

WIRELESS FAULT CURRENT INDICATION SYSTEM ASSEMBLY MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2502 VERSION 1
DOCUMENT NO. 4325.005
PAGE 2 OF 7 DATE OCT 18, 2022
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DIGITIZED EMILIO CUADRADO LIC. 3000

STEP 1: INSTALL FAULT CURRENT INDICATOR AS PER MANUFACTURER'S INSTRUCTIONS.

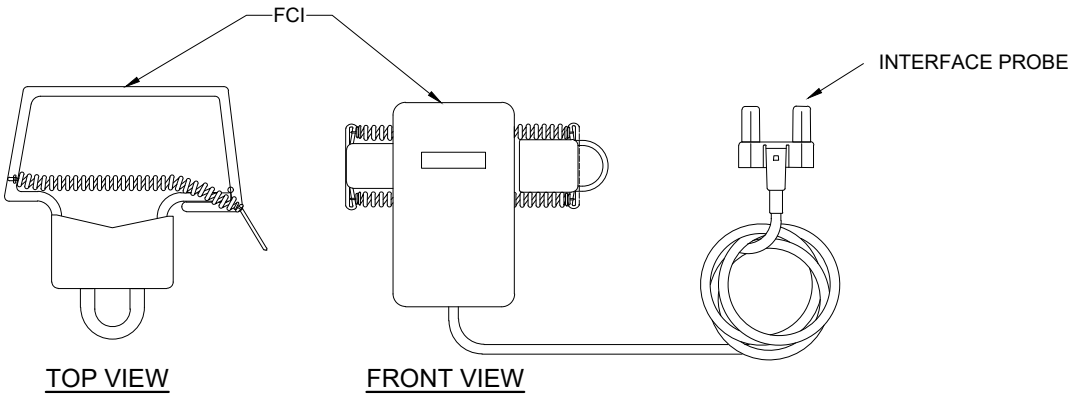

FIGURE 2
FAULT CURRENT INDICATOR

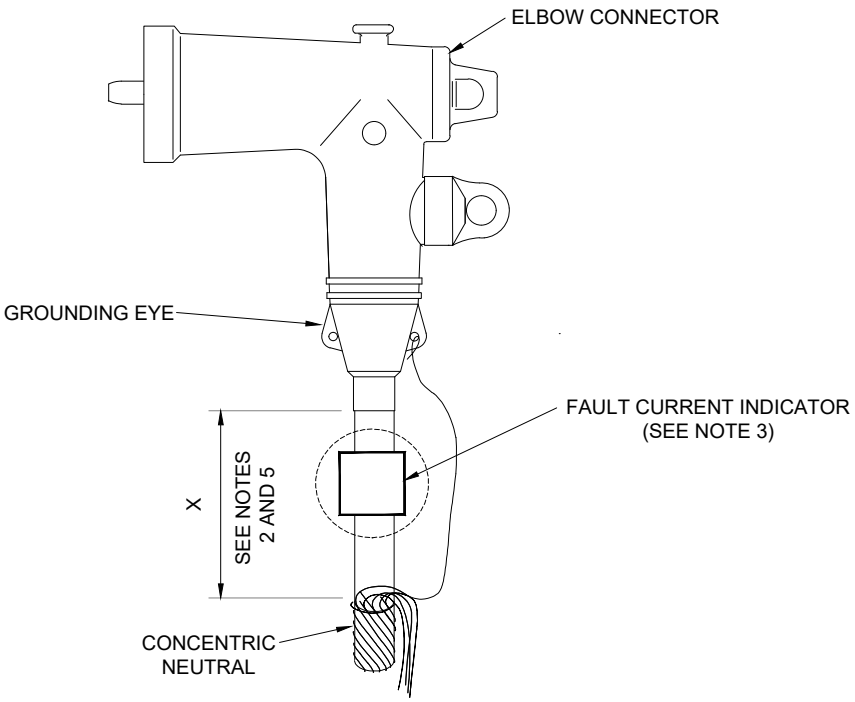

FIGURE 3
FAULT CURRENT INDICATOR LOCATION

TITLE:

WIRELESS FAULT CURRENT INDICATION
SYSTEM ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2502 VERSION 1
DOCUMENT NO. 4325.005
PAGE 3 OF 7 DATE OCT 18, 2022
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
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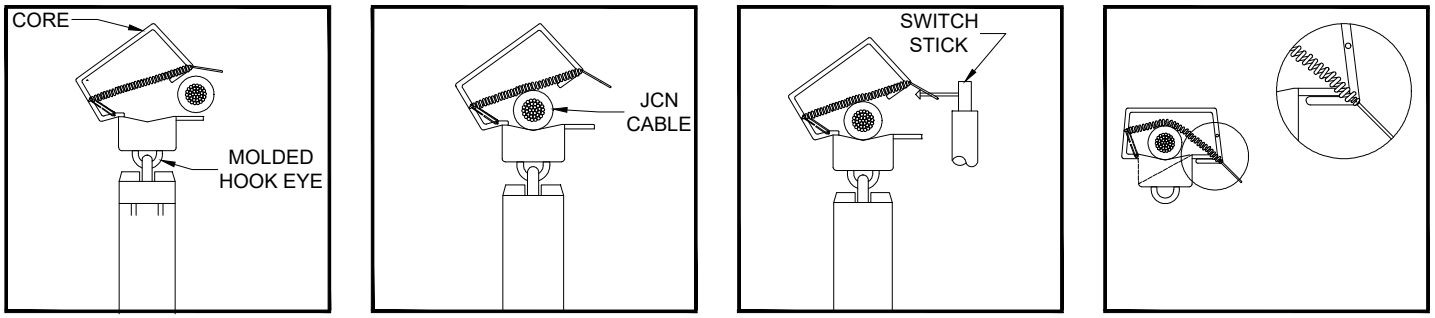

FIGURE 4
FCI INSTALLATION PROCEDURE

STEP 2: INSTALL WIRELESS INTERFACE AS PER MANUFACTURER'S INSTRUCTIONS.

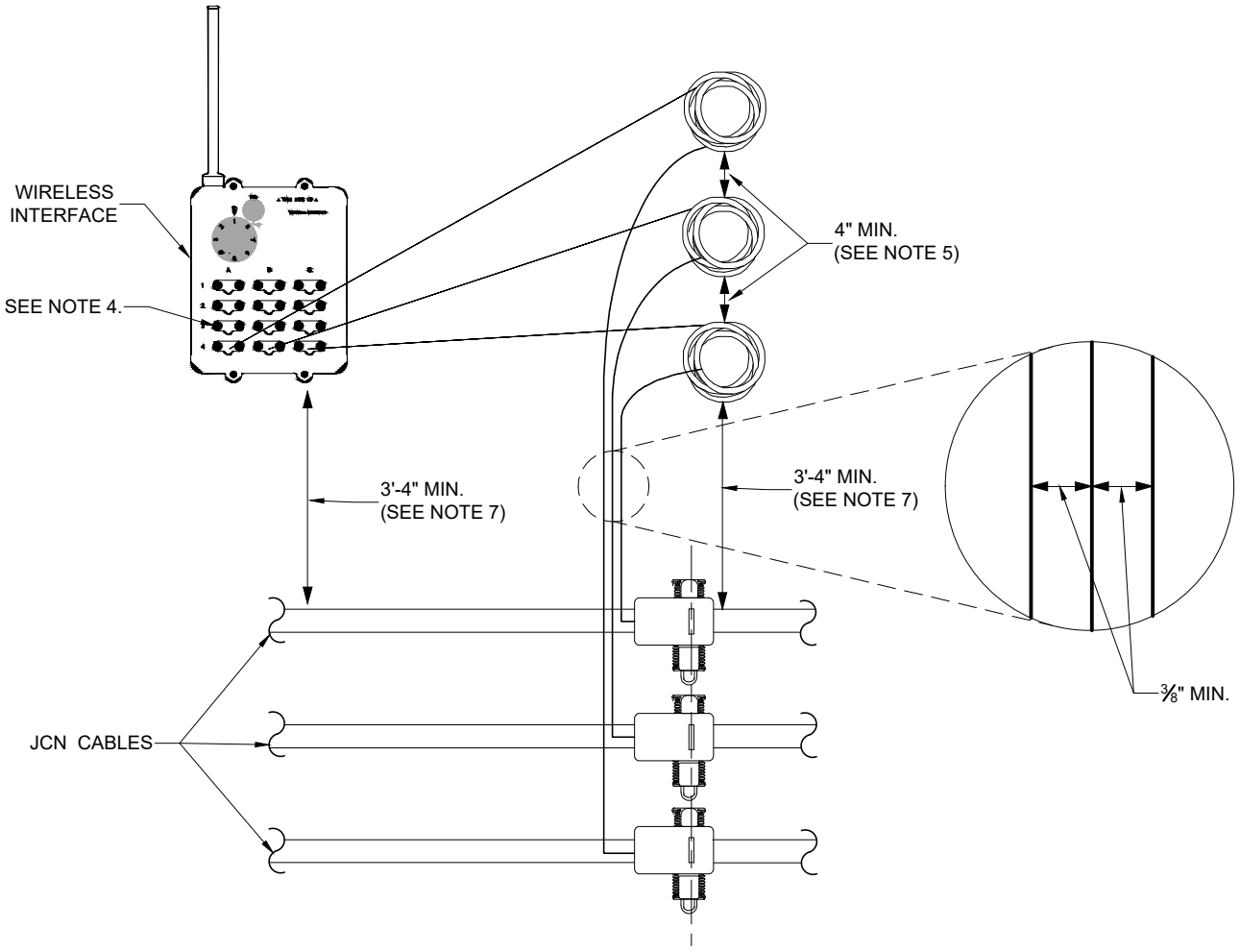

FIGURE 5
WIRELESS INTERFACE INSTALLATION DIAGRAM
(SEE NOTE 5)

TITLE:

WIRELESS FAULT CURRENT INDICATION
SYSTEM ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2502 VERSION 1
DOCUMENT NO. 4325.005
PAGE 4 OF 7 DATE OCT 18, 2022
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174
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APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

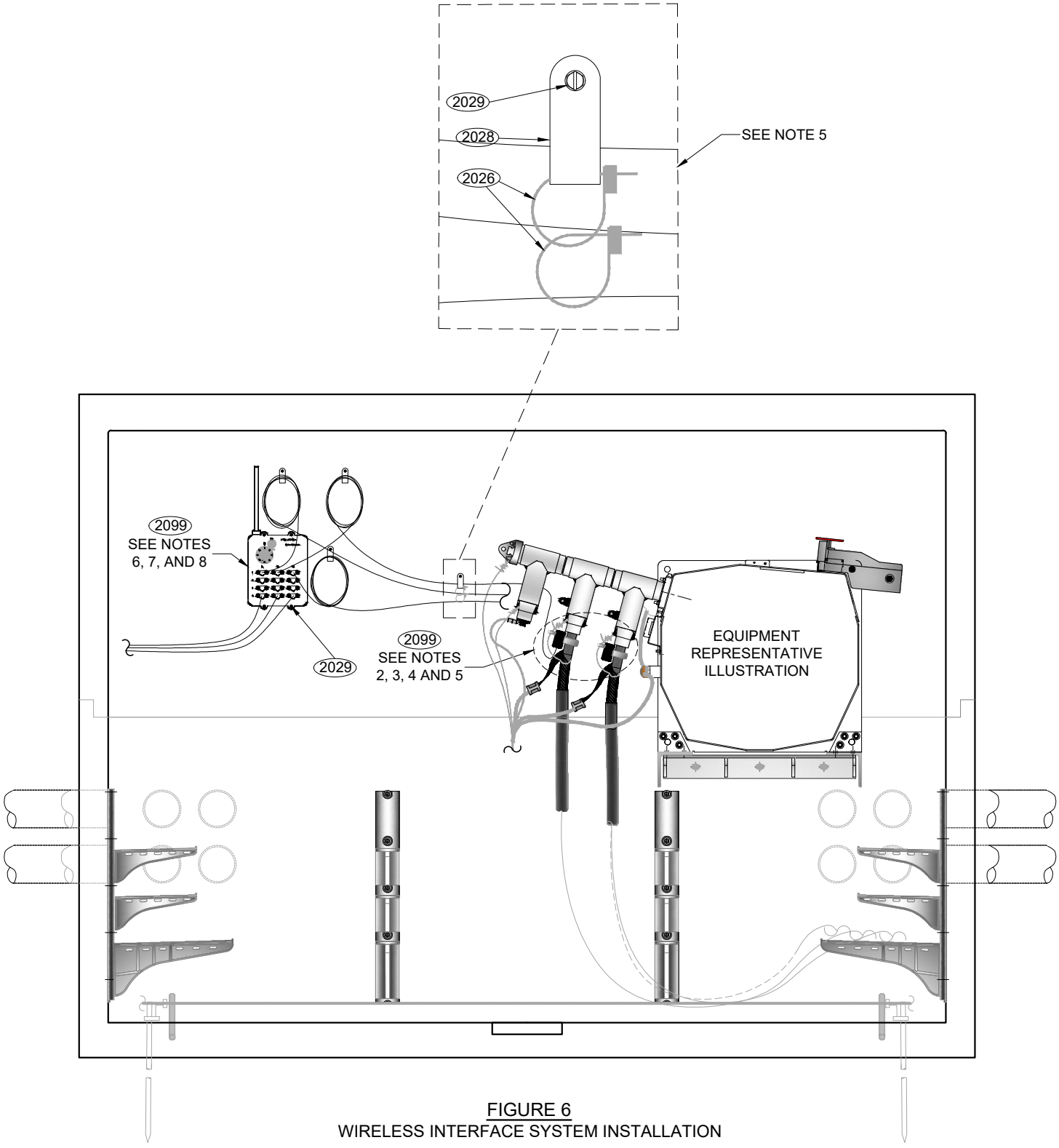

FIGURE 6
WIRELESS INTERFACE SYSTEM INSTALLATION

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

WIRELESS FAULT CURRENT INDICATION
SYSTEM ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2502 VERSION 1
DOCUMENT NO. 4325.005
PAGE 5 OF 7 DATE OCT 18, 2022
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174
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APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

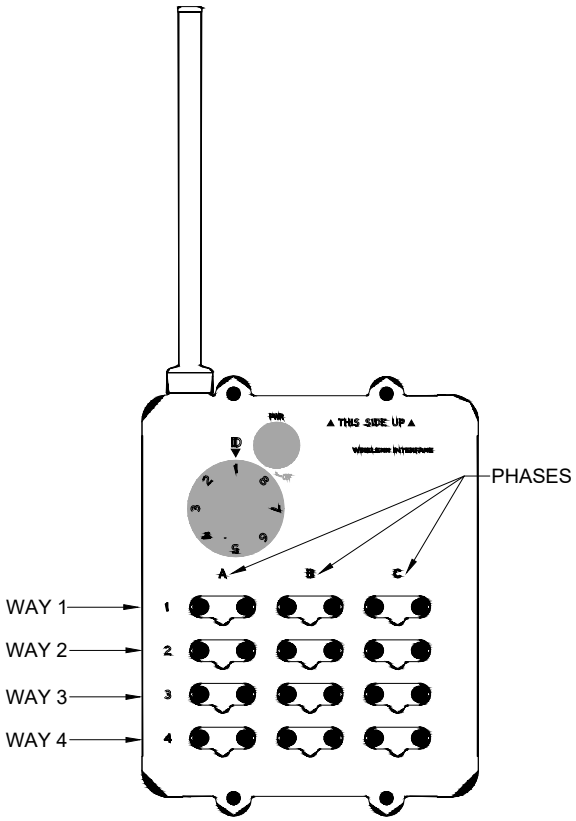


FIGURE 7
WIRELESS INTERFACE CONNECTION
(SEE NOTES 4 AND 8)

LEGEND

OS - OUTGOING SOURCE
LD - LOAD

INTERFACE CONNECTION 1			
6 WAYS PRIMARY JUNCTION			
	A	B	C
WAY 1	-	-	-
WAY 2	LD 1	LD 1	LD 1
WAY 3	LD 2	LD 2	LD 2
WAY 4	LD 3	LD 3	LD 3

INTERFACE CONNECTION 2			
6 WAYS PRIMARY JUNCTION			
	A	B	C
WAY 1	-	-	-
WAY 2	LD 4	LD 4	LD 4
WAY 3	LD 5	LD 5	LD 5
WAY 4	-	-	-

INTERFACE CONNECTION			
GAS INSULATED SWITGEAR 600 A			
	A	B	C
WAY 1	-	-	-
WAY 2	-	-	-
WAY 3	-	-	-
WAY 4	OS	OS	OS
GAS INSULATED SWITGEAR 900 A			
	A	B	C
WAY 1	-	-	-
WAY 2	-	-	-
WAY 3	OS SET 2	OS SET 2	OS SET 2
WAY 4	OS SET 1	OS SET 1	OS SET 1
VACUUM SWITCH			
	A	B	C
WAY 1	-	-	-
WAY 2	LD 1	LD 1	LD 1
WAY 3	LD 2	LD 2	LD 2
WAY 4	OS	OS	OS
4 WAYS PRIMARY JUNCTION			
	A	B	C
WAY 1	-	-	-
WAY 2	LD 1	LD 1	LD 1
WAY 3	LD 2	LD 2	LD 2
WAY 4	LD 3	LD 3	LD 3

TITLE:

WIRELESS FAULT CURRENT INDICATION SYSTEM ASSEMBLY MAXIMUM VOLTAGE: 13.2 KV NOTES

ASSEMBLY NO. ASSY-2502 VERSION 1
DOCUMENT NO. 4325.005
PAGE 6 OF 7 DATE OCT 18, 2022
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

NOTES:

1. WIRELESS FAULT INDICATION SYSTEM ALLOWS THE UTILITY PERSONNEL TO REMOTELY RETRIEVE FROM STREET LEVEL THE STATUS OF FAULT CURRENT INDICATORS MOUNTED IN THE EQUIPMENT INSIDE MANHOLES WITHOUT THE NEED OF OPEN THEM. THIS IMPROVES LINE CREW SAFETY, MINIMIZE FAULT FINDING TIME, AND REDUCE SUBSTANTIALLY THE TRAFFIC INTERRUPTIONS.
2. FAULT CURRENT INDICATOR MUST BE HOT STICK MOUNTING TYPE AND MUST BE INSTALLED ONLY BY TRAINED QUALIFIED PERSONNEL. IT CAN BE USED ON JACKETED CONCENTRIC NEUTRAL OR TAPE SHIELDED CABLE. PROPER PRIMARY CABLE PREPARATION IS NECESSARY TO PROVIDE ENOUGH SPACE FOR THE DEVICE. REFER TO MANUFACTURER'S INSTRUCTIONS TO DETERMINE THE DISTANCE REQUIRED BELOW SEPARABLE CONNECTOR OR CABLE TERMINATION TO ALLOW THE PROPER INSTALLATION OF THE FAULT CURRENT INDICATOR. REFER TO ASSEMBLY NO. ASSY-2507 FOR FURTHER DETAILS.
3. FAULT CURRENT INDICATORS SHALL BE INSTALLED IN ANY OUTGOING SOURCE CABLES, UNPROTECTED LOAD OUTPUT IN SECTIONALIZING DEVICES AND PRIMARY JUNCTION AT LOAD OUTPUT IN UNDERGROUND SYSTEMS. WHEN THE EQUIPMENT OUTGOING SOURCE IS COMPOSED BY MULTIPLE SETS OF PARALLEL CABLES, FAULT CURRENT INDICATORS MUST BE INSTALLED IN ALL CABLES.
4. FAULT CURRENT INDICATORS SHALL BE CONNECTED TO A WIRELESS INTERFACE THROUGH INTERFACE PROBES.
5. THE WAY THE CONCENTRIC NEUTRAL STRANDS ARE TRAINED, THE CORRECT PLACEMENT OF ALL FAULT CURRENT INDICATORS, AND THE PROPER PROBE LEAD TRAINING, ARE ESSENTIAL FOR PROPER FUNCTION OF THE WIRELESS FAULT INDICATION SYSTEM.
6. WIRELESS INTERFACE FOR WIRELESS FAULT INDICATION SYSTEM MUST BE INSTALLED IN VERTICAL POSITION AT THE SAME SIDE OF THE OUTGOING SOURCE, LOCATED AS HIGH AS POSSIBLE ON THE INTERIOR MANHOLE WALL. THE EQUIPMENT SHALL BE FIXED TO THE WALL USING ANCHOR HEX WASHER HEAD CONCRETE SCREWS (ITEM 2029).
7. IT IS IMPERATIVE THAT THE INSTALLER COMPLY WITH ALL RECOMMENDED SYSTEM EQUIPMENT CLEARANCE FROM PRIMARY CABLES. (SEE FIGURE 5)
8. ASSIGNED WIRELESS INTERFACE FREQUENCY ID MUST BE DOCUMENTED ON THE INFORMATION SYSTEM BELOW THE EQUIPMENT THAT IT SERVES.
9. WHEN USING A REMOTE FAULT READER, OPERATOR MUST ENSURE THAT THE ANTENNA IS ORIENTED VERTICALLY. THIS IS A CRITICAL FACTOR FOR OPERATION RANGE.
10. WHEN USING TWO REMOTE FAULT READERS SIMULTANEOUSLY IN THE SAME AREA, THEY MUST BE CONFIGURED USING THE SINGLE-FREQUENCY OPERATION OPTION. REFER TO MANUFACTURER'S INSTRUCTION MANUAL FOR FREQUENCY SELECTION.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

WIRELESS FAULT CURRENT INDICATION
SYSTEM ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV
BILL OF MATERIAL

ASSEMBLY NO. ASSY-2502 VERSION 1
DOCUMENT NO. 4325.005
PAGE 7 OF 7 DATE OCT 18, 2022
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
2026	CABLE TIE	038-83155	AS REQ.
2028	SINGLE HOLE CABLE STRAP FOR COPPER CONDUCTOR	038-83156	AS REQ.
2029	CONCRETE SCREW ANCHOR HEX WASHER HEAD	038-83157	AS REQ.
2099	FAULT CURRENT INDICATOR WIRELESS INTERFACE DEVICE	032-83566	AS REQ.
	REMOTE FAULT READER	032-83567	AS REQ.
	FAULT CURRENT INDICATOR WITH INTERFACE PROBE	032-83565	AS REQ.

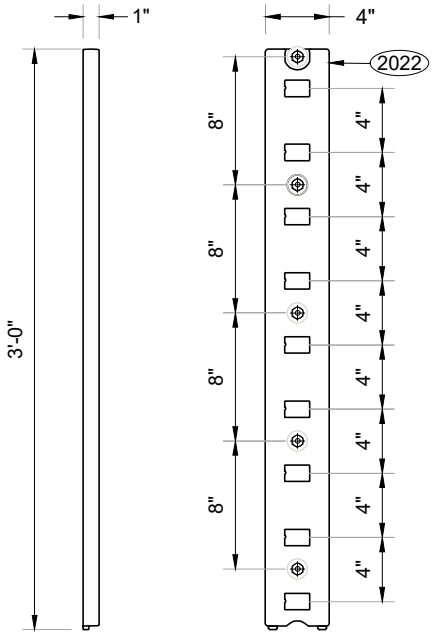
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

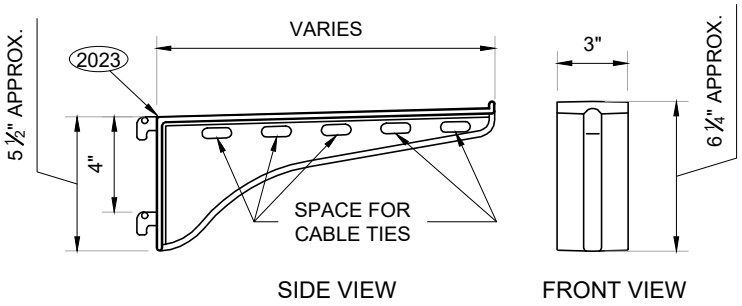
UNDERGROUND NONMETALLIC CABLE RACK ASSEMBLY FOR PRIMARY AND SECONDARY CABLES MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2503 VERSION 1
DOCUMENT NO. 4325.006
PAGE 1 OF 1 DATE SEPT 19, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412



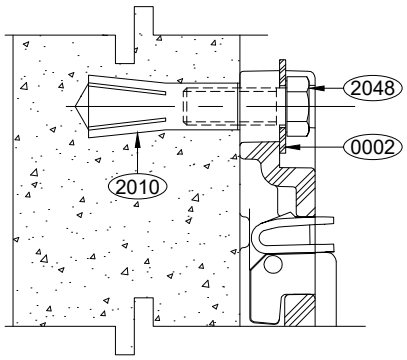
SIDE VIEW FRONT VIEW

CABLE RACK

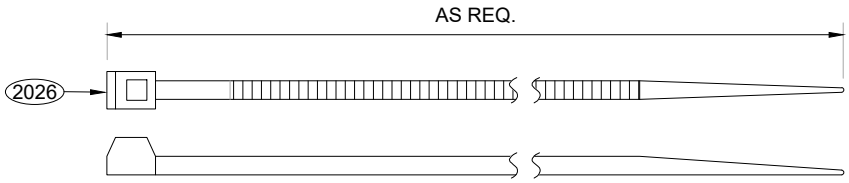


SIDE VIEW FRONT VIEW

CABLE SUPPORT ARM



½" DROP-IN ANCHOR MOUNT



CABLE TIE

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT ROUND WASHER - PER RACK	002-82041	5
2010	½" DROP-IN ANCHOR - PER RACK	038-83219	5
2022	36" CABLE RACK	002-11839	AS REQ.
2023	14" CABLE SUPPORT ARM 20" CABLE SUPPORT ARM	002-11862 002-12597	AS REQ.
2026	CABLE TIE	038-83155	AS REQ.
2048	HEX HEAD BOLT - PER RACK	038-83218	5

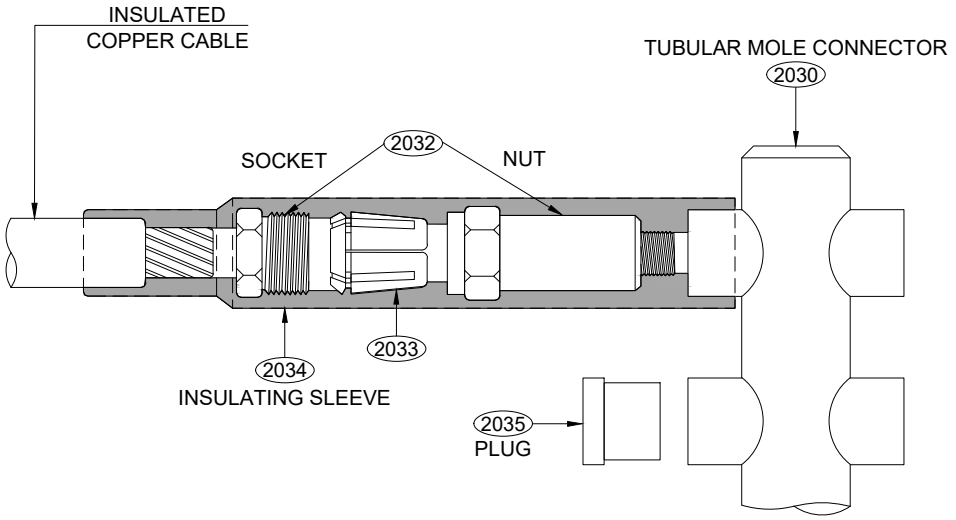
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

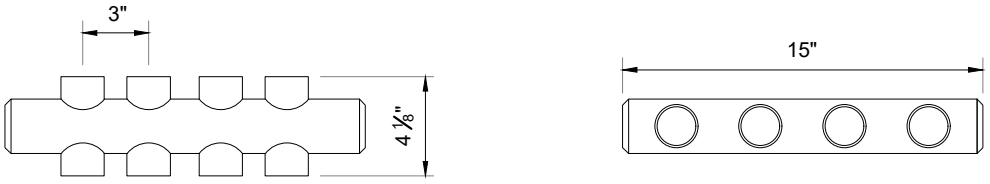
TITLE:

MULTIPLE OUTLET CONNECTOR ASSEMBLY
MAXIMUM VOLTAGE: 240 V

ASSEMBLY NO. ASSY-2504 VERSION 1
DOCUMENT NO. 4325.007
PAGE 1 OF 4 DATE SEPT 19, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412
EMILIO CUADRADO LIC. 3000

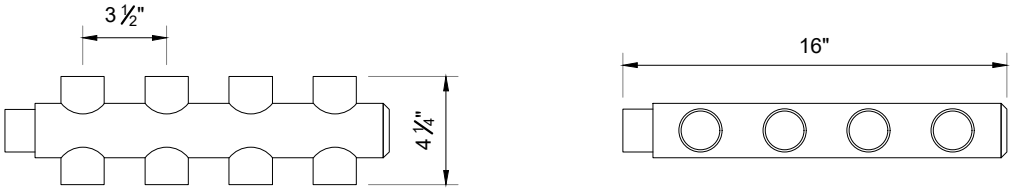


TUBULAR MOLE CONNECTION ASSEMBLY



TOP VIEW SIDE VIEW

TUBULAR MOLE CONNECTOR - 8 OUTLETS
FOR #2 AWG TO 500 MCM



TOP VIEW SIDE VIEW

TUBULAR MOLE CONNECTOR - 9 OUTLETS
FOR #2 AWG TO 500 MCM

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

MULTIPLE OUTLET CONNECTOR ASSEMBLY
MAXIMUM VOLTAGE: 240 V

ASSEMBLY NO. ASSY-2504 VERSION 1
DOCUMENT NO. 4325.007
PAGE 2 OF 4 DATE SEPT 19, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
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EMILIO CUADRADO LIC. 3000

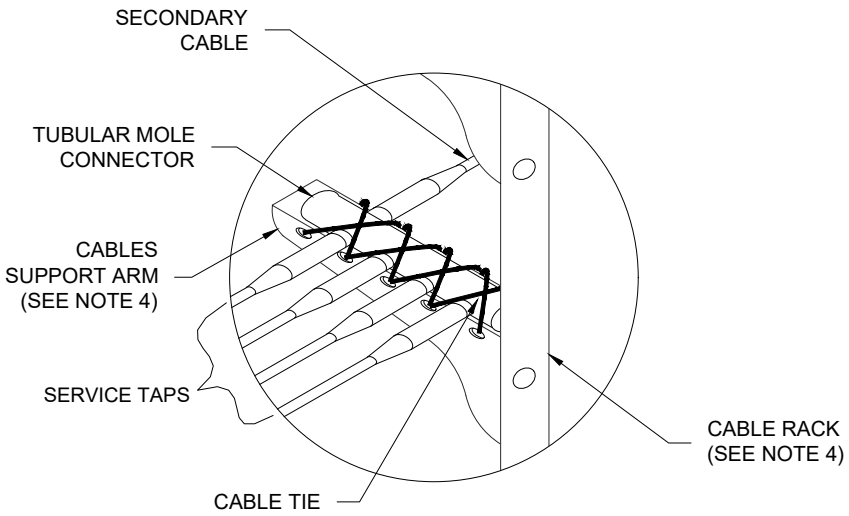


FIGURE A

MATERIALS				
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.	
			SINGLE PHASE	THREE PHASE
2030	TUBULAR MOLE CONNECTOR 8 OUTLETS (#6 AWG - 600 MCM)	038-83158	3	4
	TUBULAR MOLE CONNECTOR 9 OUTLETS (#6 AWG - 600 MCM)	038-83225	3	4
2032	TUBULAR MOLE SOCKET AND NUT	038-83159	3	4
2033	TUBULAR MOLE COMPRESSION CONE	VARIES	3	4
2034	TUBULAR MOLE OUTLET INSULATING SLEEVE	038-83168	3	4
2035	TUBULAR MOLE OUTLET PLUG	038-83169	VARIES	VARIES

NOTES:

1. TUBULAR MOLE CONNECTORS SHALL BE INSTALLED ONLY WHEN USING A 7'-0" X 4'-6" X 4'-0" PULL BOX (SEE STANDARD NO. URD-30), 24" X 36" SERVICE PEDESTAL (SEE STANDARD NO. URD-27-B) AND FOR CABLE GAUGES UP TO 500 MCM - 600V.
2. TUBULAR MOLE CONNECTORS SHALL BE FIRMLY ATTACHED TO THE CABLE SUPPORT ARM USING CABLE TIES WHEN INSTALLED IN A PULL BOX. NO CONNECTOR SHALL BE LEFT ON THE FLOOR OF THE PULL BOX. (SEE FIGURE A)
3. ALL VACANT OUTLETS SHALL BE SEALED USING A TUBULAR MOLE OUTLET PLUG (ITEM 2035).
4. SEE ASSEMBLY NO. ASSY 2503 FOR CABLE SUPPORT ARM AND RACK INSTALLATION AND MATERIALS.

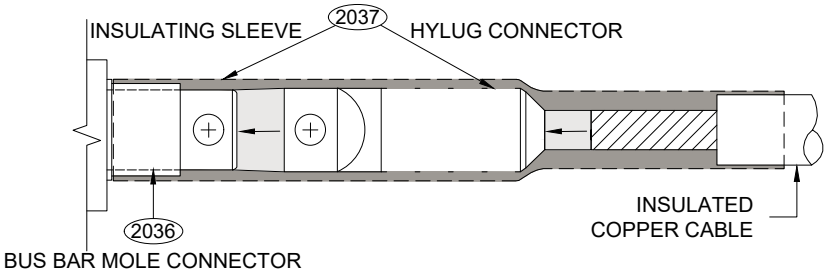
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

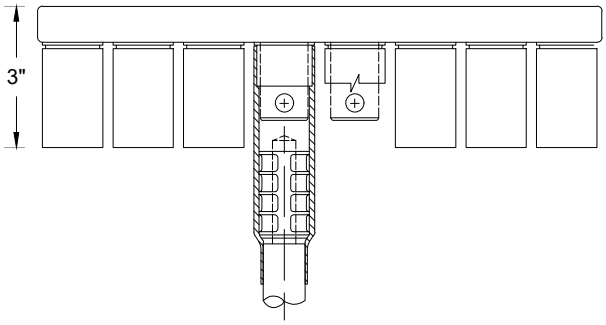
TITLE:

MULTIPLE OUTLET CONNECTOR ASSEMBLY
MAXIMUM VOLTAGE: 240 V

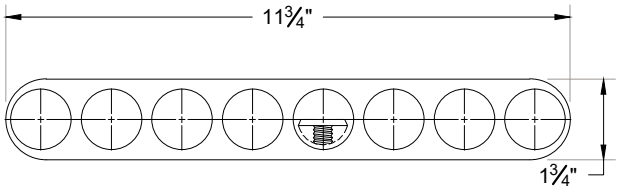
ASSEMBLY NO. ASSY-2504 VERSION 1
DOCUMENT NO. 4325.007
PAGE 3 OF 4 DATE SEPT 19, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412
EMILIO CUADRADO LIC. 3000



BUS BAR MOLE CONNECTION ASSEMBLY



FRONT VIEW



TOP VIEW

BUS BAR MOLE CONNECTOR - 8 OUTLETS
FOR #12 AWG TO 4/0 AWG CABLE

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY
2036	BUS BAR MOLE CONNECTOR 4 OUTLETS (#12 AWG - 4/0 AWG)	038-00745	3
	BUS BAR MOLE CONNECTOR 8 OUTLETS (#12 AWG - 4/0 AWG)	038-01511	3
2037	BUS BAR MOLE TAP KIT WITH INSULATING RUBBER SLEEVE	VARIES	3

NOTES:

1. BUS BAR TYPE MOLE CONNECTOR SHALL BE INSTALLED WHEN USING THE 13" X 24" SERVICE PEDESTAL (SEE STANDARD NO. URD-27-A) AND FOR CABLE GAUGES UP TO 4/0 AWG - 600V.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

MULTIPLE OUTLET CONNECTOR ASSEMBLY
MAXIMUM VOLTAGE: 240 V

ASSEMBLY NO. ASSY-2504 VERSION 1
DOCUMENT NO. 4325.007
PAGE 4 OF 4 DATE SEPT 19, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
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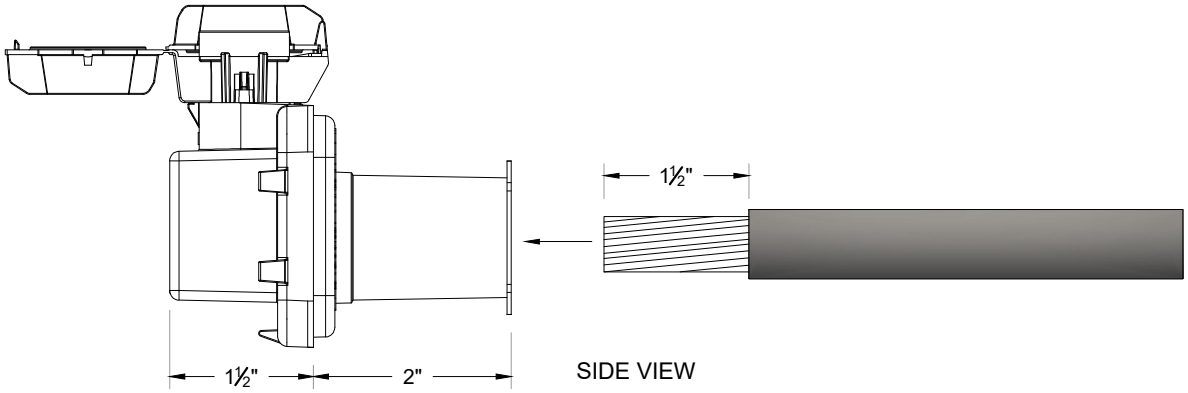
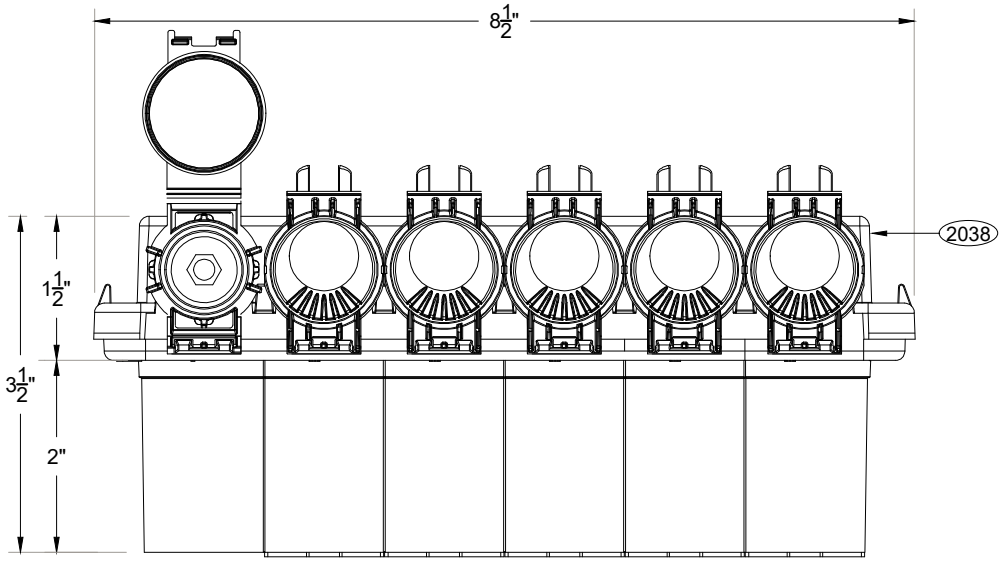
EMILIO CUADRADO LIC. 3000



SIDE VIEW

SEALED BUS BAR CONNECTION ASSEMBLY



TOP VIEW

SEALED BUS BAR CONNECTOR
FOR #12 AWG TO 4/0 AWG

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
2038	SEALED BUS BAR CONNECTOR 6 OUTLETS (#14 AWG - 350 MCM)	038-81471	3

NOTES:

1. SEALED BUS BAR TYPE CONNECTOR SHALL BE INSTALLED WHEN USING THE 12" x 12" SQUARE SERVICE PEDESTAL (SEE STANDARD NO. URD-26-A), 13" X 24" SERVICE PEDESTAL (SEE STANDARD NO. URD-27-A) AND FOR CABLE GAUGES UP TO 4/0 AWG - 600V.

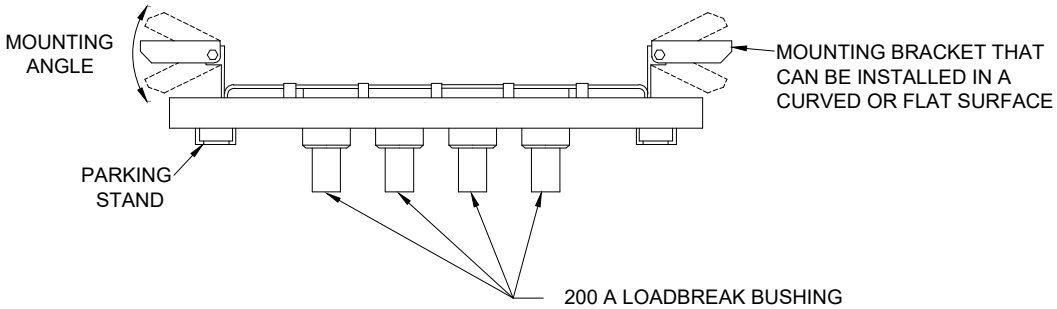
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

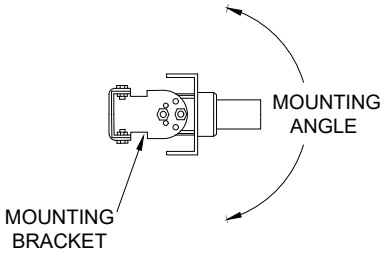
TITLE:

PRIMARY JUNCTION ASSEMBLY
MAXIMUM RATING: 200 A / 600 A
MAXIMUM VOLTAGE: 13.2 KV

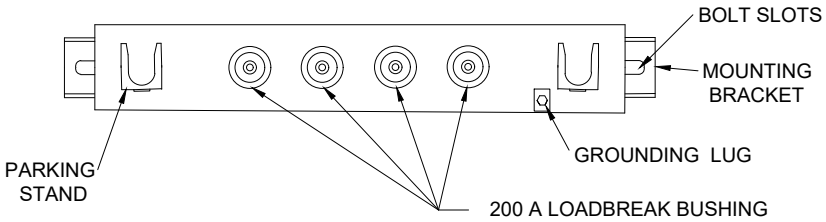
ASSEMBLY NO. ASSY-2505 VERSION 2
DOCUMENT NO. 4325.008
PAGE 1 OF 3 DATE NOV 29, 2022
SUBMITTED LUIS R. SOTO LIC. 11658
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000



TOP VIEW



SIDE VIEW



FRONT VIEW

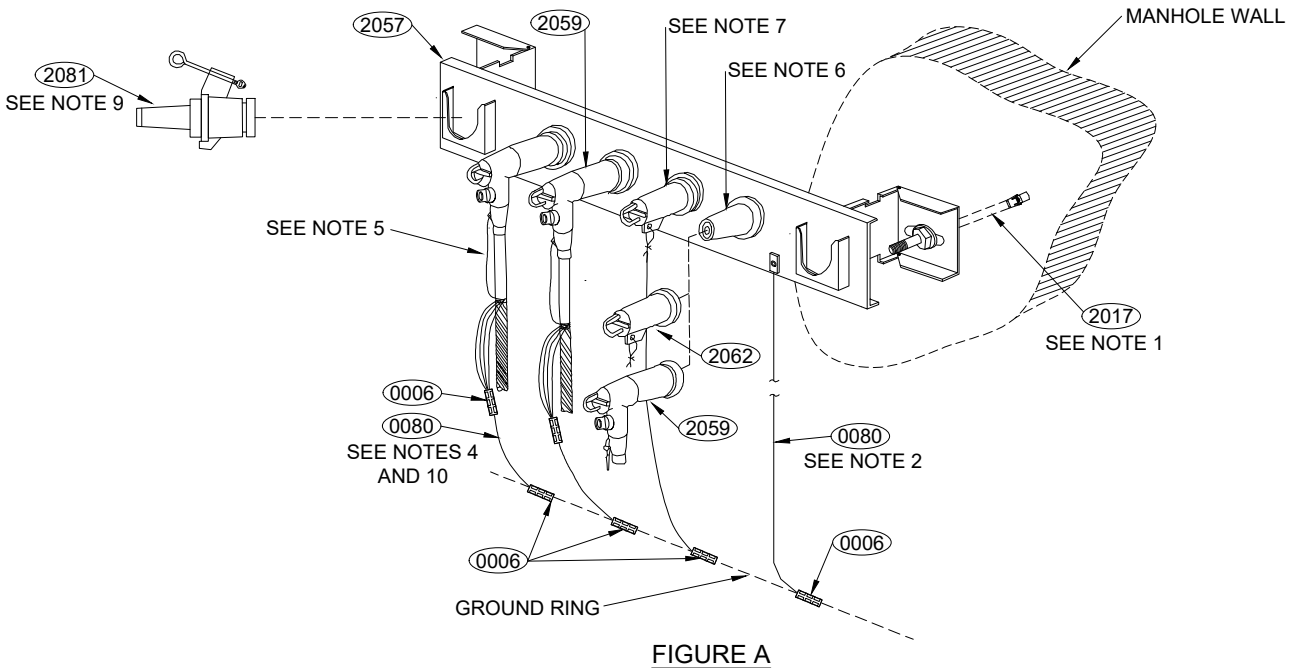


FIGURE A
4 WAYS PRIMARY JUNCTION

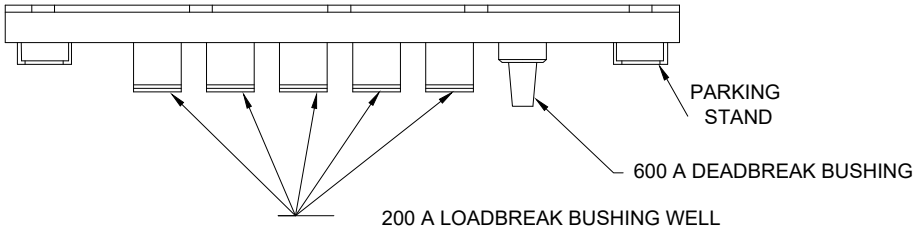
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

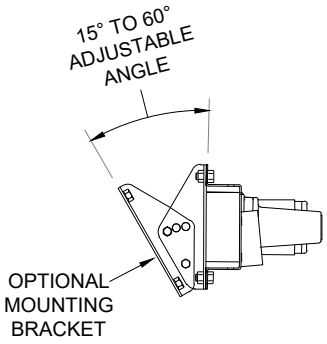
TITLE:

PRIMARY JUNCTION ASSEMBLY
MAXIMUM RATING: 200 A / 600 A
MAXIMUM VOLTAGE: 13.2 KV

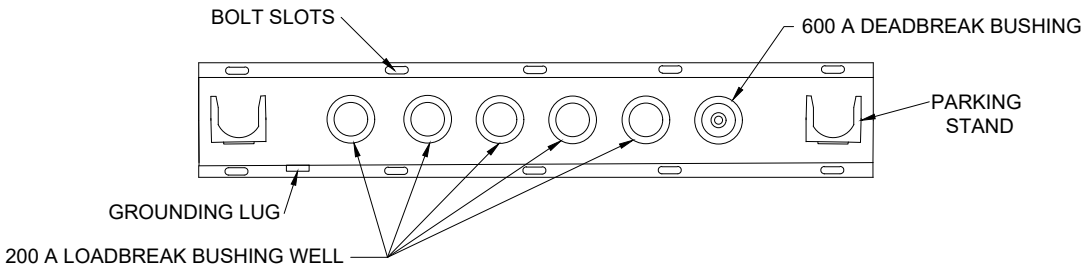
ASSEMBLY NO. ASSY-2505 VERSION 2
DOCUMENT NO. 4325.008
PAGE 2 OF 3 DATE NOV 29, 2022
SUBMITTED LUIS R. SOTO LIC. 11658
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000



TOP VIEW



SIDE VIEW



FRONT VIEW

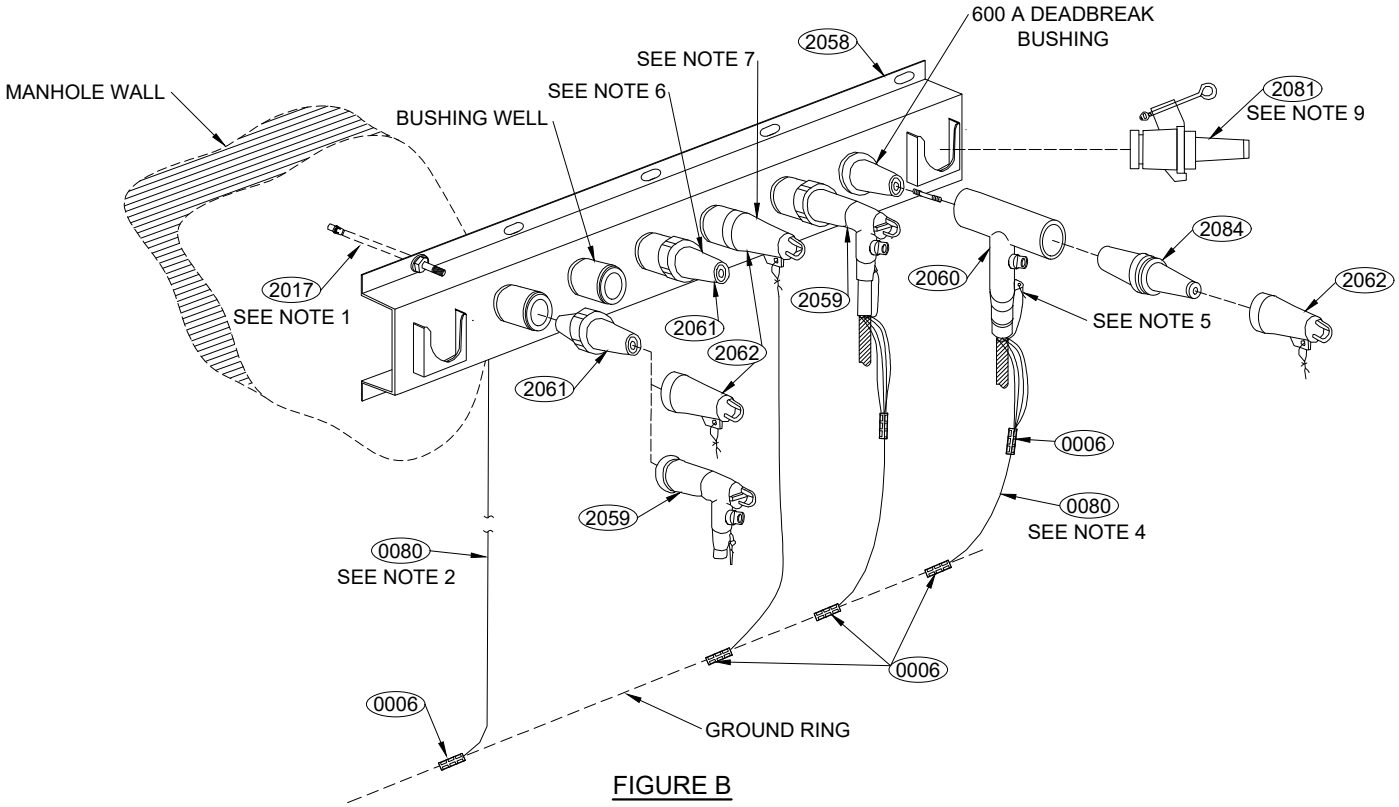


FIGURE B
6 WAYS PRIMARY JUNCTION

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

PRIMARY JUNCTION ASSEMBLY
MAXIMUM RATING: 200 A / 600 A
MAXIMUM VOLTAGE: 13.2 KV
NOTES AND BILL OF MATERIAL

ASSEMBLY NO. ASSY-2505 VERSION 2
DOCUMENT NO. 4325.008
PAGE 3 OF 3 DATE NOV 29, 2022
SUBMITTED LUIS R. SOTO LIC. 11658
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
2017	WEDGE ANCHOR BOLT	038-83147	AS REQ.
2057	4 WAYS PRIMARY LOADBREAK JUNCTION	038-00638	AS REQ.
2058	6 WAYS PRIMARY JUNCTION	038-01032	AS REQ.
2059	LOADBREAK ELBOW CONNECTOR	VARIES	AS REQ.
2060	DEADBREAK ELBOW CONNECTOR	VARIES	AS REQ.
2061	LOADBREAK BUSHING PLUG INSERT	038-00679	AS REQ.
2062	INSULATED CAP WITH GROUND	038-01040	AS REQ.
2081	PARKING BUSHING	VARIES	AS REQ.
2084	LOADBREAK ELBOW TAP PLUG	072-79765	AS REQ.
2086	STRANDED COPPER CABLE, 600 V, THHN	VARIES	AS REQ.

NOTES:

1. THE PRIMARY JUNCTION SHALL BE ATTACHED TO THE MANHOLE WALL USING ½" x 4 ½" STAINLESS STEEL WEDGE ANCHOR BOLTS, MAKING SURE PARKING STANDS ARE IN UPRIGHT POSITION.
2. THE PRIMARY JUNCTION SHALL BE GROUNDED. IT SHALL BE CONNECTED TO THE MANHOLE GROUND RING USING #2 AWG COPPER BARE CONDUCTOR.
3. IT IS IMPORTANT TO IDENTIFY THE UNDERGROUND CABLE TYPE USED AND ITS CHARACTERISTICS IN ORDER TO USE THE CORRECT ELBOW CONNECTOR GROUNDING METHOD.
4. THE UNDERGROUND CABLE CONCENTRIC NEUTRAL OR THE GROUND STRAP FOR THE TAPE SHIELDED UNDERGROUND CABLE IN THE ELBOW CONNECTOR SHALL BE CONNECTED TO GROUND USING A #2 AWG COPPER BARE CONDUCTOR.
5. FOR JACKETED CONCENTRIC NEUTRAL CABLES, ATTACH ONE CONCENTRIC NEUTRAL STRAND TO THE GROUNDING EYE, THE STRAND USED AS DRAIN WIRE MUST BE IN CONTACT WITH ALL OTHER CONCENTRIC NEUTRAL STRANDS. FOR TAPE SHIELDED CABLE, CONNECT A #12 AWG STRANDED COPPER CABLE, 600V, THHN (ITEM 2086), FROM THE GROUNDING EYE TO THE GROUND STRAP. IF THE SEPARABLE CONNECTOR WILL BE INSTALLED IN A MANHOLE OR PULL BOX, THE CABLE GAUGE SHALL BE INCREASE TO #10 AWG.
6. AVAILABLE OR NOT USED BUSHINGS IN THE PRIMARY JUNCTION SHALL BE COVERED WITH AN INSULATED CAP BEFORE SYSTEM ENERGIZATION. DO NOT USE THE PROTECTIVE SHIPPING CAPS, BECAUSE THEY ARE NOT INSULATED AND ARE ONLY INTENDED TO KEEP THE BUSHING SURFACE CLEAN DURING HANDLING AND INSTALLATION.
7. THE INSULATED CAP SHALL BE CONNECTED TO GROUND USING THE GROUND CABLE SUPPLIED WITH THE EQUIPMENT.
8. PRIMARY JUNCTIONS SHALL BE INSTALLED WITH A MINIMUM CLEARANCE OF 4" FROM THE MANHOLE SIDEWALL.
9. USE THE PARKING BUSHING TO TEMPORARILY INSTALL LOADBREAK ELBOW CONNECTORS TO ISOLATE AND SECTIONALIZE ENERGIZED CABLES.
10. ON LOADBREAK ELBOW CONNECTORS AND INSULATED CAPS, LEAVE ENOUGH SLACK GROUNDING CONDUCTOR FOR STICK OPERATIONS.
11. REFER TO ASSEMBLY NO. ASSY-2507 FOR PRIMARY JUNCTION SEPARABLE INSULATED CONNECTOR TYPICAL COMPONENTS AND CONNECTIONS.

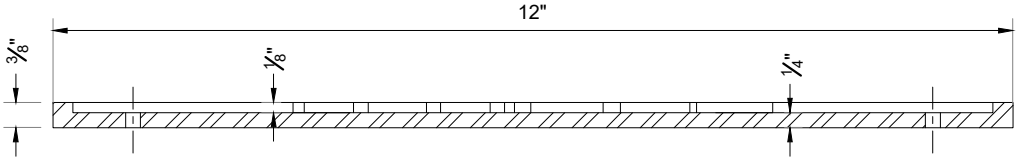
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND CABLE LOCATION WARNING NAMEPLATE
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2506 VERSION 1
DOCUMENT NO. 4325.009
PAGE 1 OF 2 DATE OCT 24, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412



SECTION A

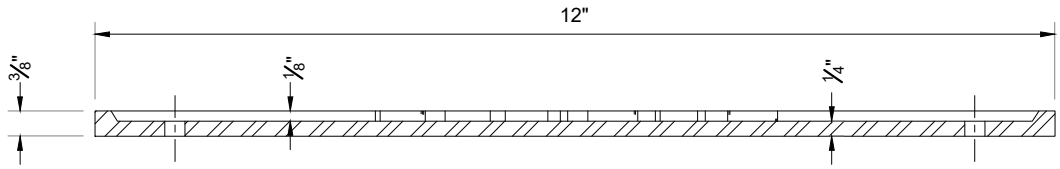
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND CABLE LOCATION WARNING NAMEPLATE
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2506 VERSION 1
DOCUMENT NO. 4325.009
PAGE 2 OF 2 DATE OCT 24, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412



SECTION B

NOTES:

1. THIS NAMEPLATE SHALL BE USED TO IDENTIFY THE ROUTE OF A DIRECTIONAL DRILLING SEGMENT, SPARE CAPPED DUCTS, SHALLOW UNDERGROUND ELECTRICAL LINES OR ANY OTHER CONDITION THAT REQUIRE A WARNING.
2. LUMA WILL REQUIRE THE USE OF THIS IDENTIFICATION NAMEPLATE WHEN DEEMED NECESSARY.
3. THE MATERIAL FOR THIS NAMEPLATE SHALL BE CAST IRON.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

SEPARABLE INSULATED CONNECTORS
AND CABLE TERMINATION ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2507 VERSION 2
DOCUMENT NO. 4325.010
PAGE 1 OF 14 DATE NOV 29, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

I. 200 A LOADBREAK ELBOW CONNECTOR INSTALLATION ASSEMBLY:

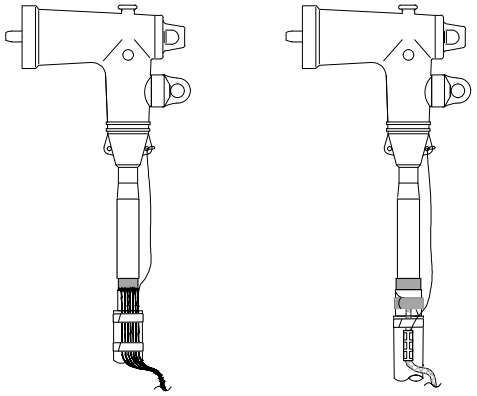


FIGURE A-1
JCN AND TAPE SHIELDED CABLE

STEP 1: SELECT THE PROPER LOADBREAK ELBOW CONNECTOR ACCORDING TO CABLE SHIELD TYPE, GAUGE AND VOLTAGE RATING.

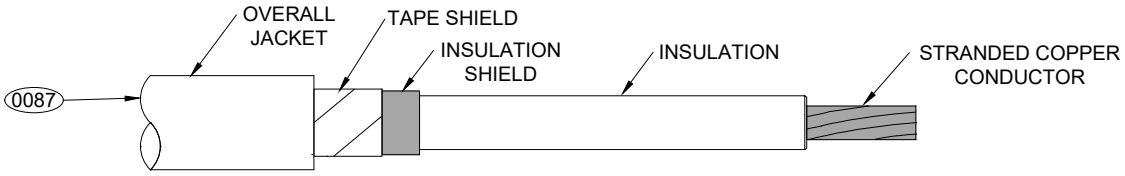


FIGURE B-1
TAPE SHIELDED CABLE

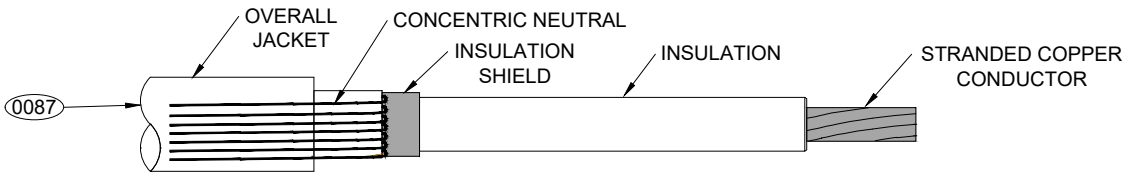


FIGURE C-1
JACKETED CONCENTRIC NEUTRAL (JCN) CABLE

TITLE:

SEPARABLE INSULATED CONNECTORS
AND CABLE TERMINATION ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2507 VERSION 2
DOCUMENT NO. 4325.010
PAGE 2 OF 14 DATE NOV 29, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

STEP 2: PREPARE CABLE PER MANUFACTURER'S INSTRUCTIONS. IF THE LOADBREAK ELBOW CONNECTOR REQUIRES TO INSTALL A FAULT CURRENT INDICATOR, REFER TO STEP 5.

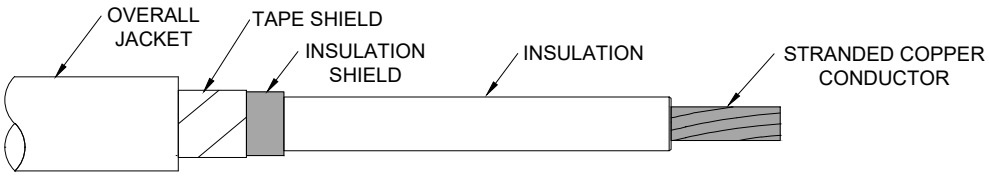


FIGURE D-1
TAPE SHIELDED CABLE

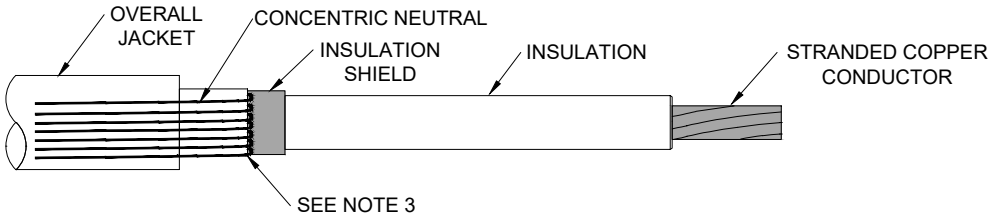


FIGURE E-1
JACKETED CONCENTRIC NEUTRAL (JCN) CABLE

STEP 3: INSTALL GROUND STRAP OR ARRANGE CONCENTRIC NEUTRAL ACCORDING TO MANUFACTURER'S INSTRUCTIONS FOR SPECIFIC CABLE SHIELD TYPE, GAUGE AND VOLTAGE RATING.

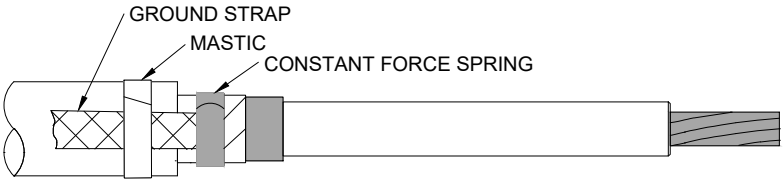


FIGURE F-1
TAPE SHIELDED CABLE

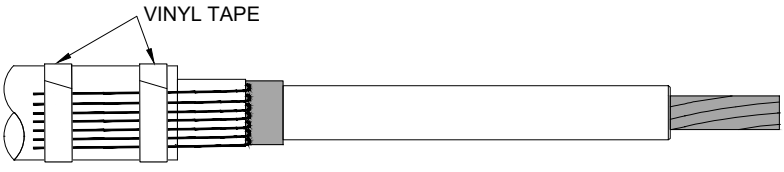


FIGURE G-1
JACKETED CONCENTRIC NEUTRAL (JCN) CABLE

TITLE:

SEPARABLE INSULATED CONNECTORS
AND CABLE TERMINATION ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2507 VERSION 2
DOCUMENT NO. 4325.010
PAGE 3 OF 14 DATE NOV 29, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

STEP 4: ONCE THE LOADBREAK ELBOW CONNECTOR IS COMPLETELY ASSEMBLED, ATTACH A DRAIN WIRE FROM THE ELBOW GROUNDING EYE TO THE GROUND STRAP OR CONCENTRIC NEUTRALS.

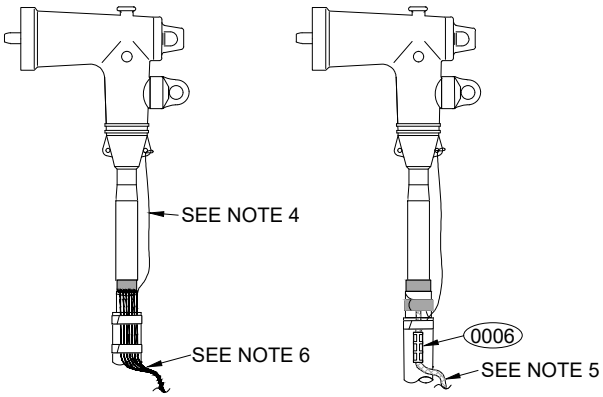


FIGURE H-1
JCN AND TAPE SHIELDED CABLES

STEP 5: INSTALL FAULT CURRENT INDICATOR AS PER MANUFACTURER'S INSTRUCTIONS.

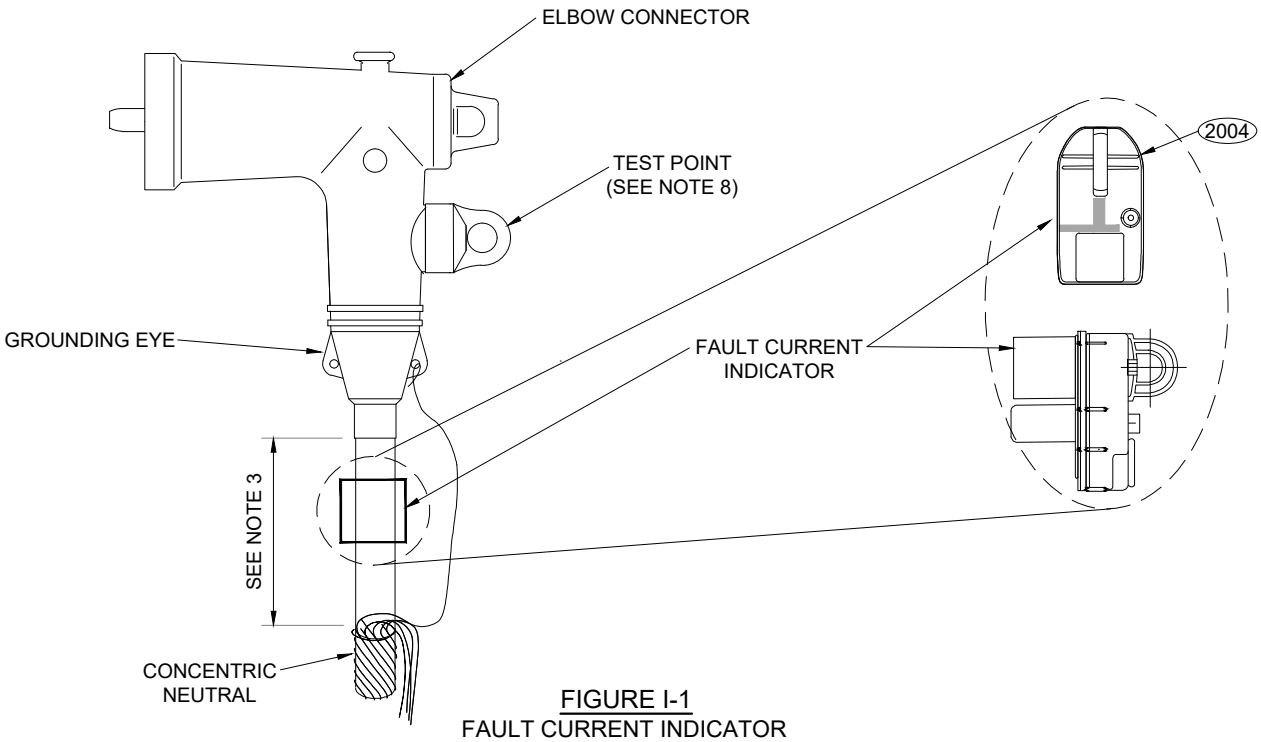


FIGURE I-1
FAULT CURRENT INDICATOR

TITLE:

SEPARABLE INSULATED CONNECTORS AND CABLE TERMINATION ASSEMBLY MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2507 VERSION 2
DOCUMENT NO. 4325.010
PAGE 4 OF 14 DATE NOV 29, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

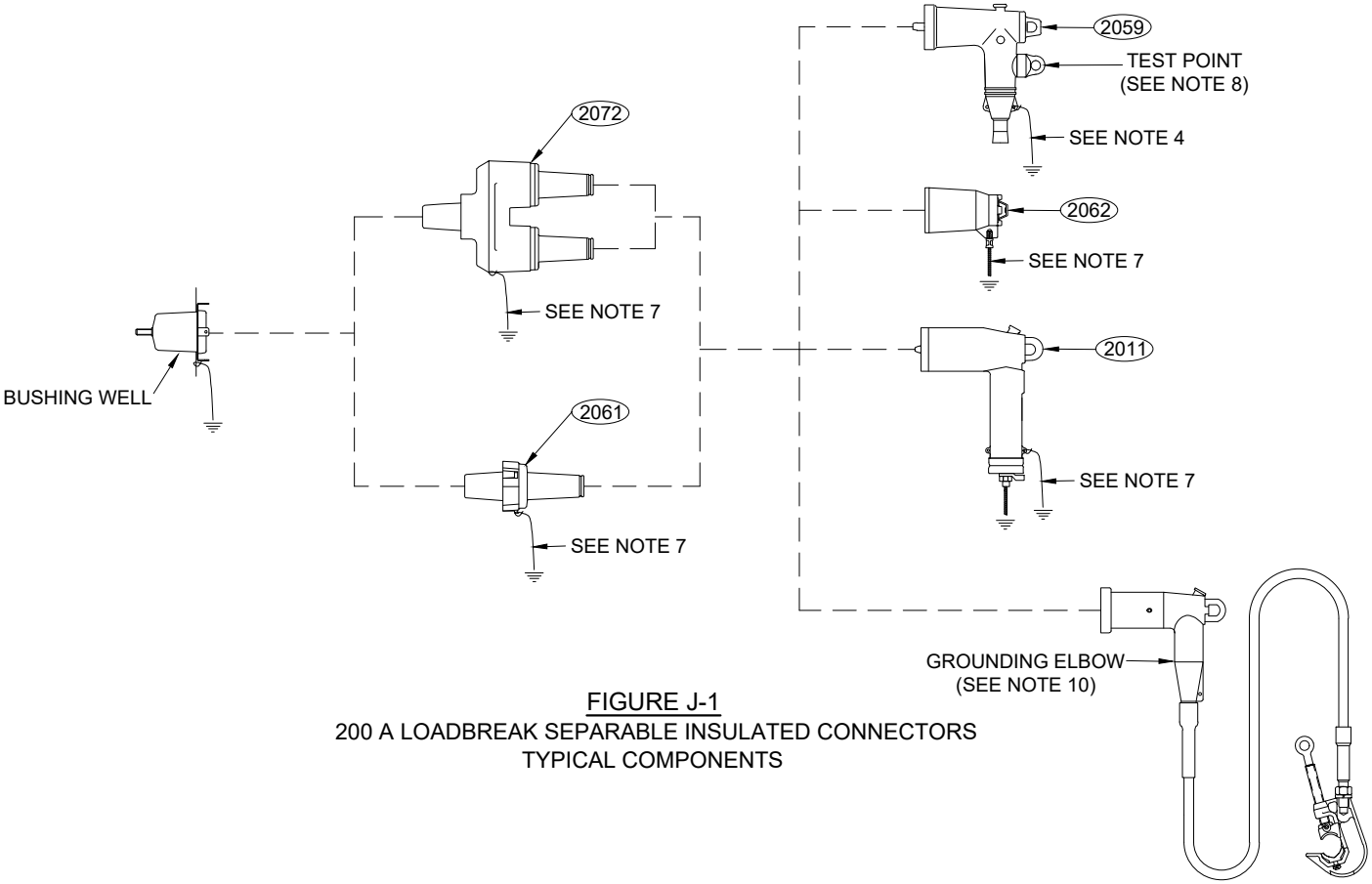


FIGURE J-1
200 A LOADBREAK SEPARABLE INSULATED CONNECTORS
TYPICAL COMPONENTS

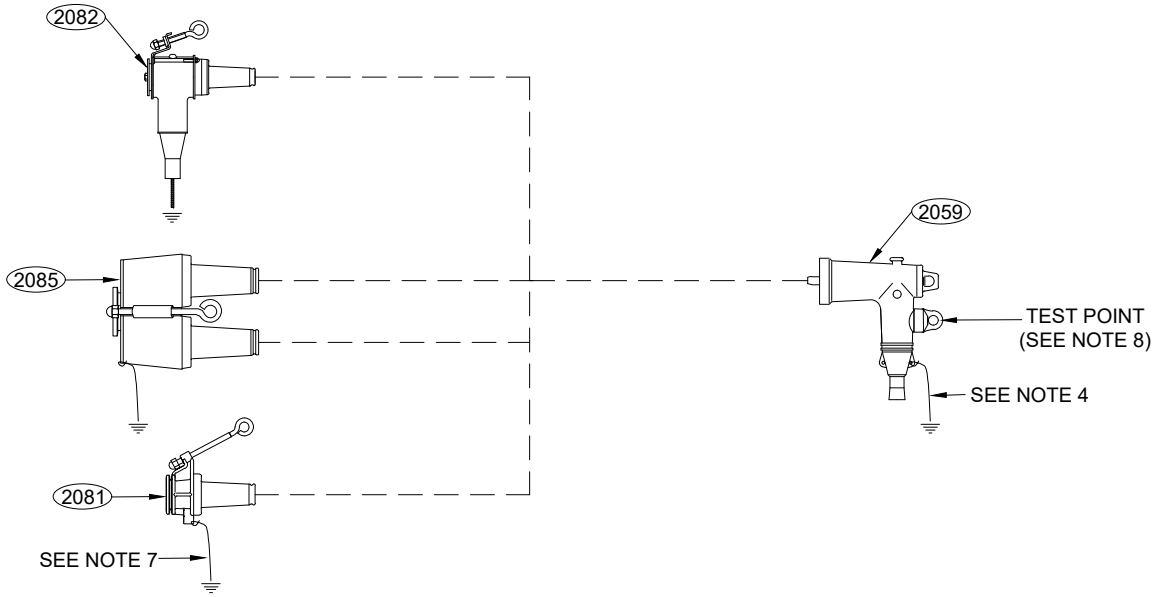


FIGURE K-1
200 A LOADBREAK SEPARABLE INSULATED CONNECTORS
PARKING STANDS

TITLE:

SEPARABLE INSULATED CONNECTORS AND CABLE TERMINATION ASSEMBLY MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2507 VERSION 2
DOCUMENT NO. 4325.010
PAGE 5 OF 14 DATE NOV 29, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

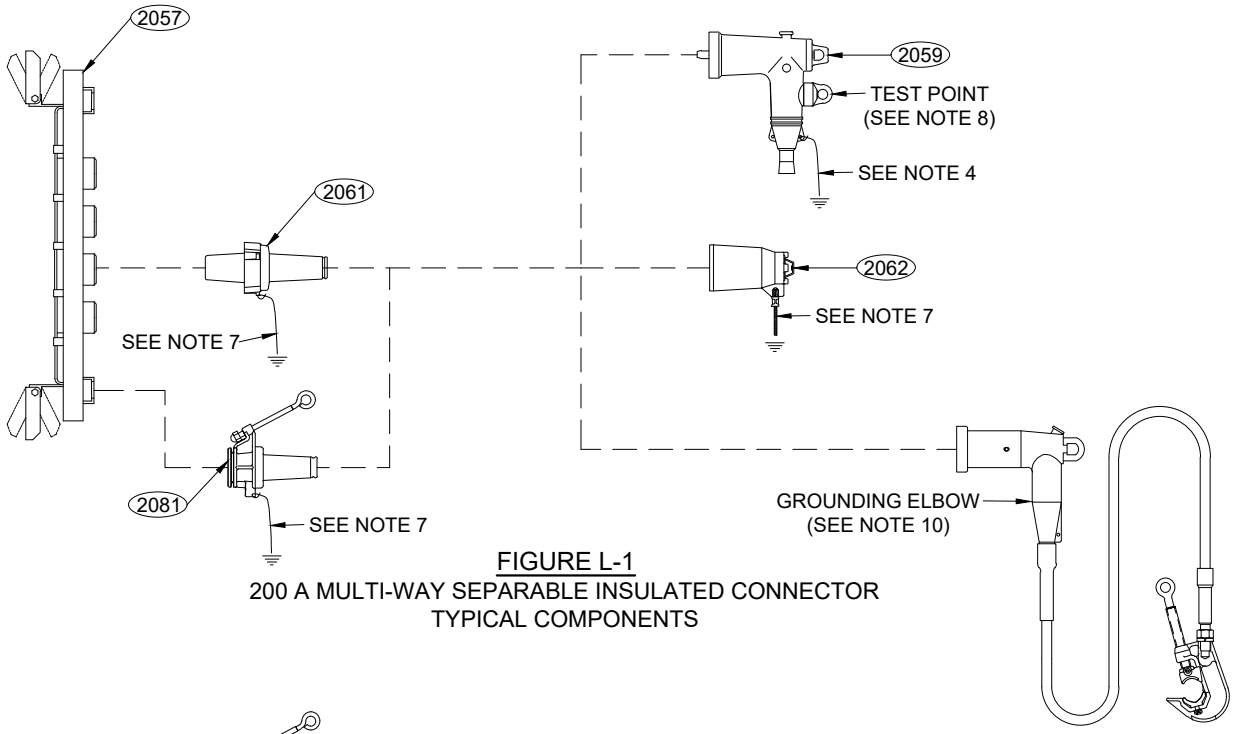


FIGURE L-1
200 A MULTI-WAY SEPARABLE INSULATED CONNECTOR
TYPICAL COMPONENTS

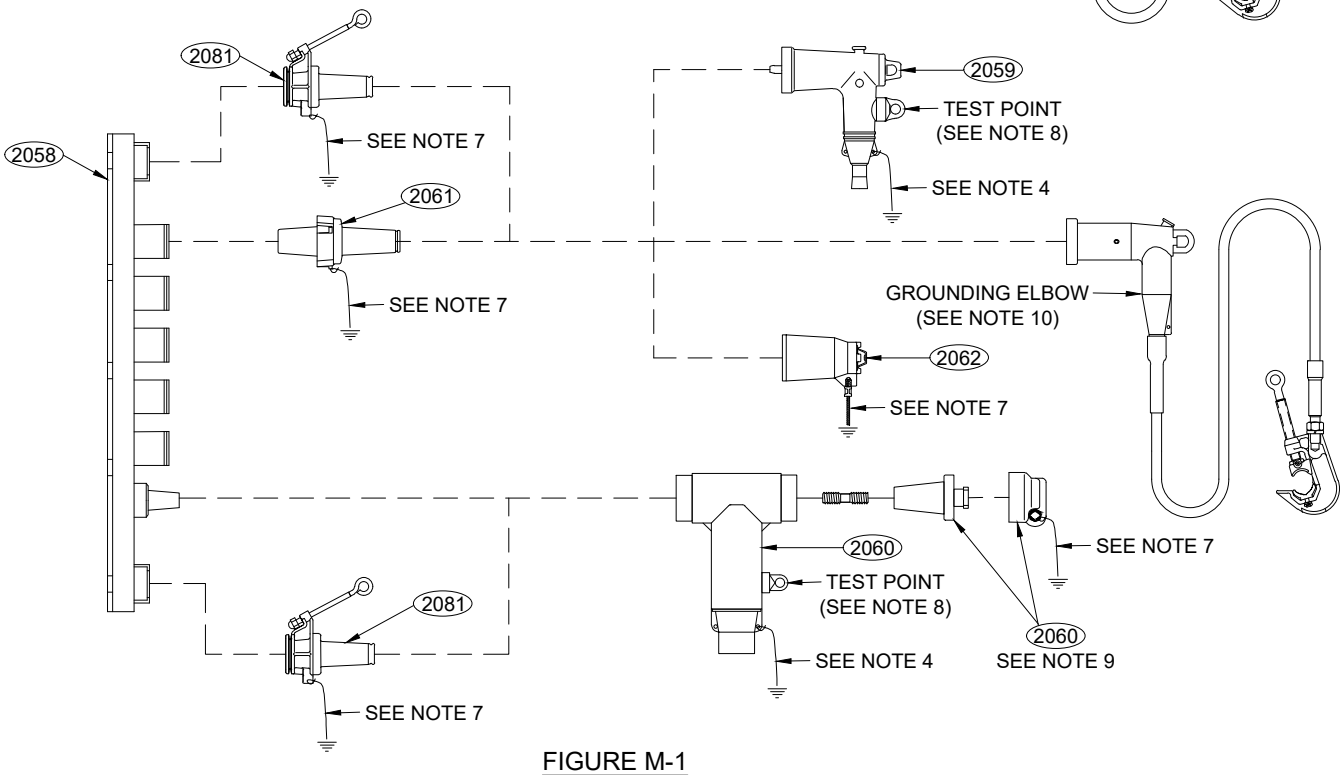


FIGURE M-1
(1) 600 A, (5) 200 A MULTI-WAY SEPARABLE INSULATED CONNECTOR
TYPICAL COMPONENTS

TITLE:

SEPARABLE INSULATED CONNECTORS
AND CABLE TERMINATION ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2507 VERSION 2
DOCUMENT NO. 4325.010
PAGE 6 OF 14 DATE NOV 29, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

II. 600 A AND 900 A DEADBREAK ELBOW CONNECTOR INSTALLATION ASSEMBLY:

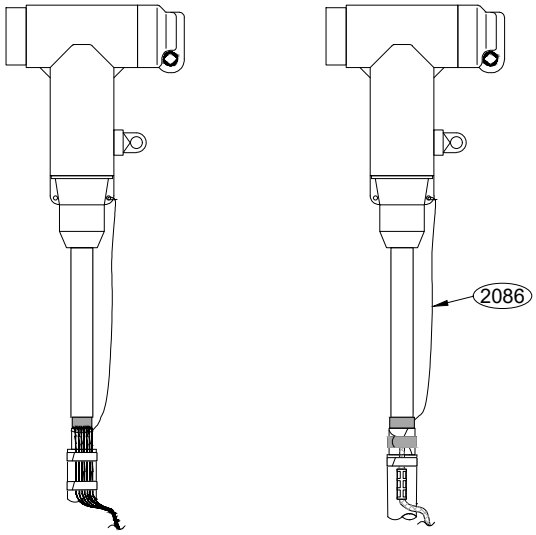


FIGURE A-2
JCN AND TAPE SHIELDED CABLE

STEP 1: SELECT THE PROPER LOADBREAK ELBOW CONNECTOR ACCORDING TO CABLE SHIELD TYPE, GAUGE AND VOLTAGE RATING.

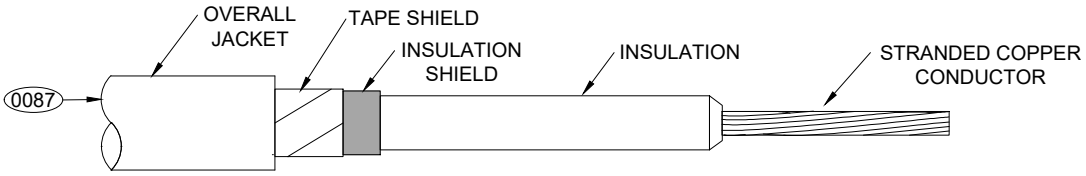


FIGURE B-2
TAPE SHIELDED CABLE

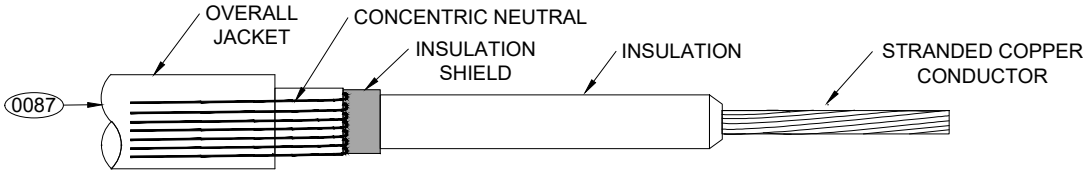


FIGURE C-2
JACKETED CONCENTRIC NEUTRAL (JCN) CABLE

TITLE:

SEPARABLE INSULATED CONNECTORS
AND CABLE TERMINATION ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2507 VERSION 2
DOCUMENT NO. 4325.010
PAGE 7 OF 14 DATE NOV 29, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

STEP 2: PREPARE CABLE PER MANUFACTURER'S INSTRUCTIONS. IF THE DEADBREAK ELBOW CONNECTOR REQUIRES TO INSTALL A FAULT CURRENT INDICATOR, REFER TO STEP 5.

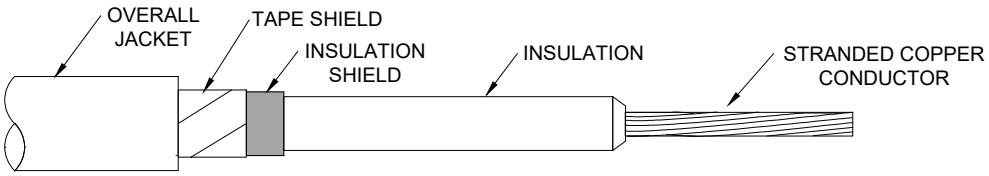


FIGURE D-2
TAPE SHIELDED CABLE

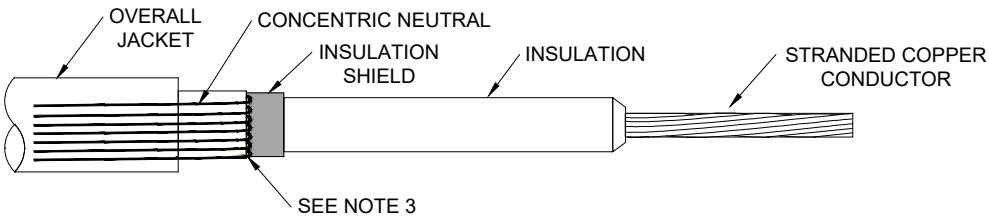


FIGURE E-2
JACKETED CONCENTRIC NEUTRAL (JCN) CABLE

STEP 3: INSTALL GROUND STRAP OR ARRANGE CONCENTRIC NEUTRAL ACCORDING TO MANUFACTURER'S INSTRUCTIONS FOR SPECIFIC CABLE SHIELD TYPE, GAUGE AND VOLTAGE RATING.

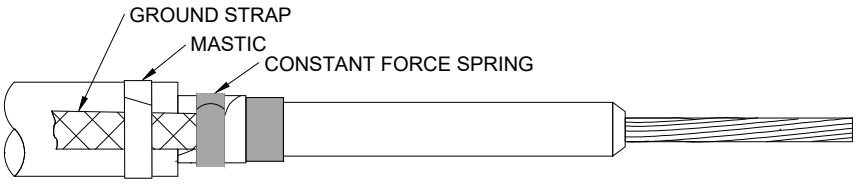


FIGURE F-2
TAPE SHIELDED CABLE

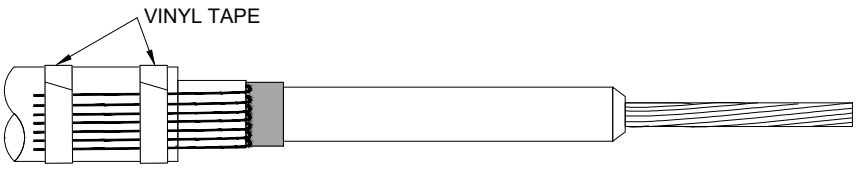


FIGURE G-2
JACKETED CONCENTRIC NEUTRAL (JCN) CABLE

TITLE:

SEPARABLE INSULATED CONNECTORS
AND CABLE TERMINATION ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2507 VERSION 2
DOCUMENT NO. 4325.010
PAGE 8 OF 14 DATE NOV 29, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

STEP 4: ONCE THE LOADBREAK ELBOW CONNECTOR IS COMPLETELY ASSEMBLED, ATTACH A DRAIN WIRE FROM THE ELBOW GROUNDING EYE TO THE GROUND STRAP OR CONCENTRIC NEUTRALS.

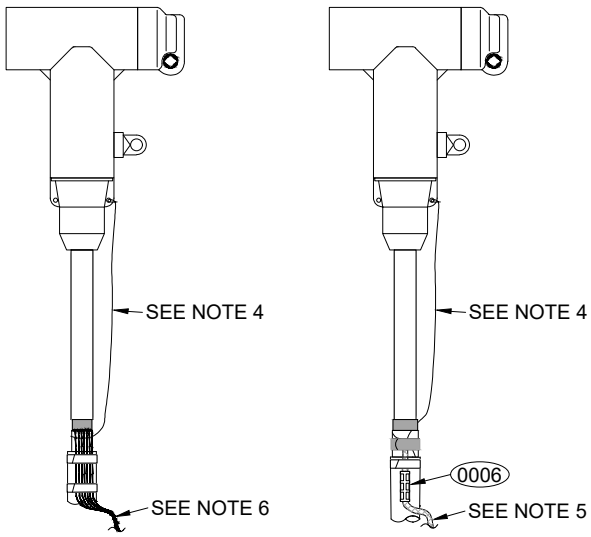


FIGURE H-2
JCN AND TAPE SHIELDED CABLES

STEP 5: INSTALL FAULT CURRENT INDICATOR AS PER MANUFACTURER'S INSTRUCTIONS.

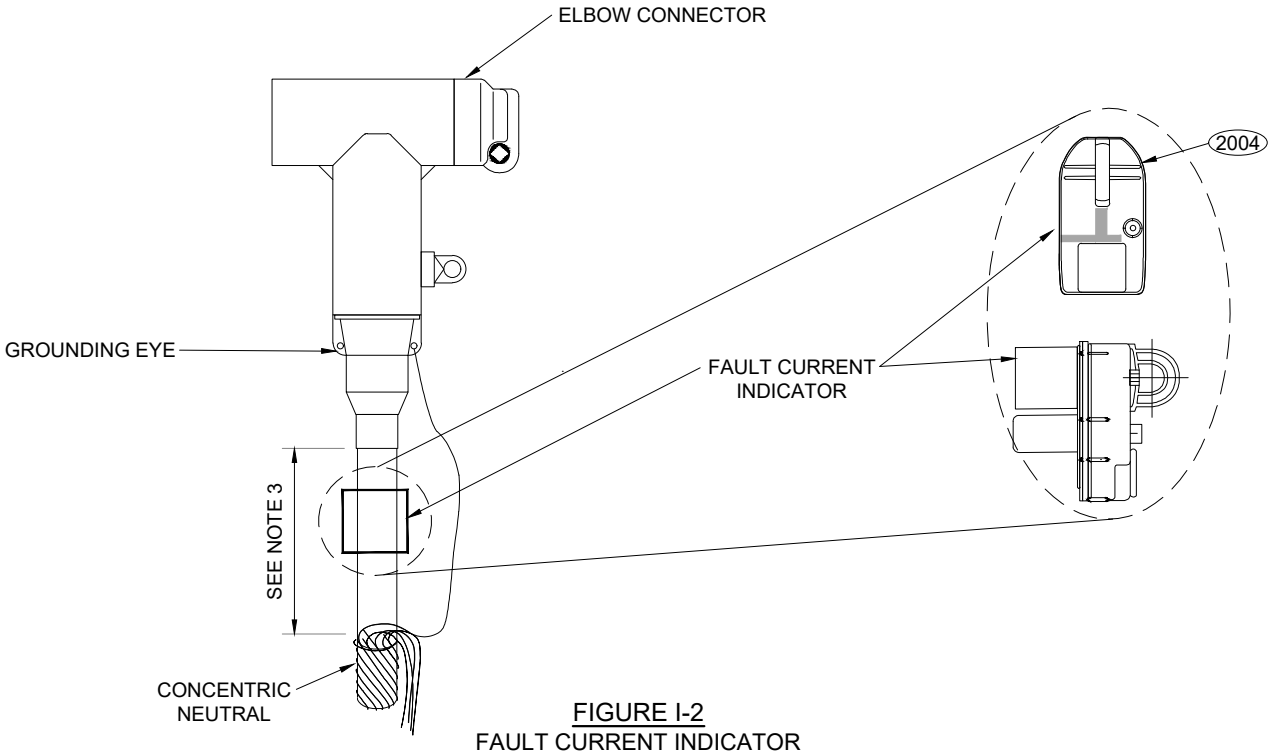


FIGURE I-2
FAULT CURRENT INDICATOR

TITLE:

SEPARABLE INSULATED CONNECTORS AND CABLE TERMINATION ASSEMBLY MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2507 VERSION 2
DOCUMENT NO. 4325.010
PAGE 9 OF 14 DATE NOV 29, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

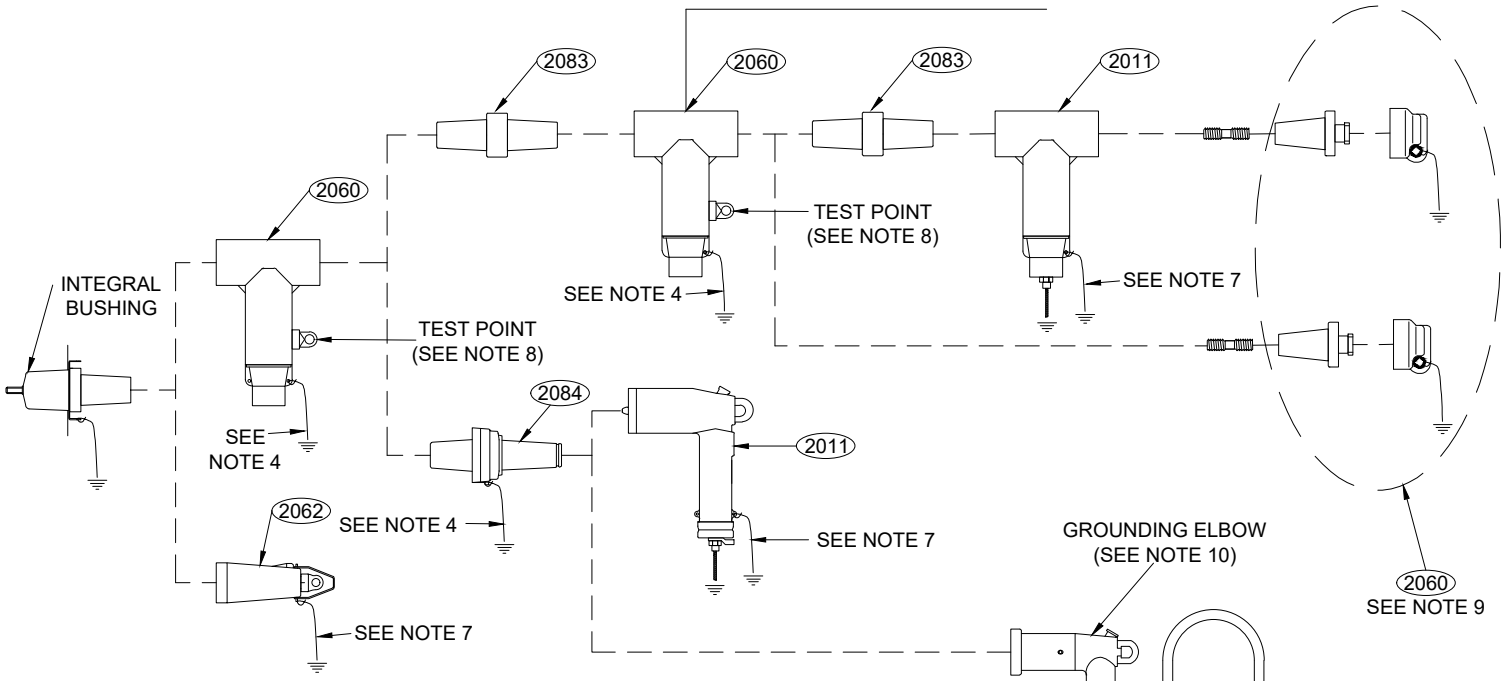


FIGURE J-2
600 A AND 900 A DEADBREAK SEPARABLE INSULATED CONNECTORS
TYPICAL COMPONENTS

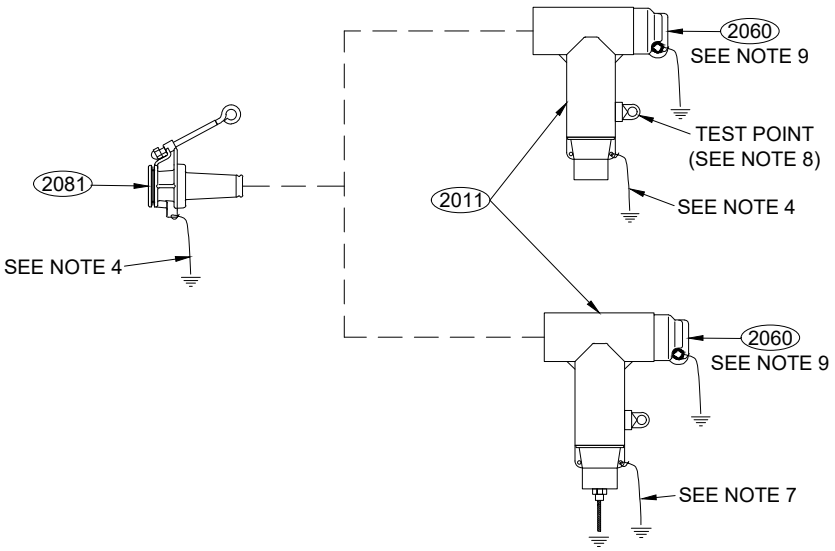


FIGURE K-2
600 A AND 900 A DEADBREAK ELBOW CONNECTOR
PARKING STANDS

TITLE:

SEPARABLE INSULATED CONNECTORS
AND CABLE TERMINATION ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2507 VERSION 2
DOCUMENT NO. 4325.010
PAGE 10 OF 14 DATE NOV 29, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

III. CABLE TERMINATION STRESS CONE INSTALLATION ASSEMBLY:

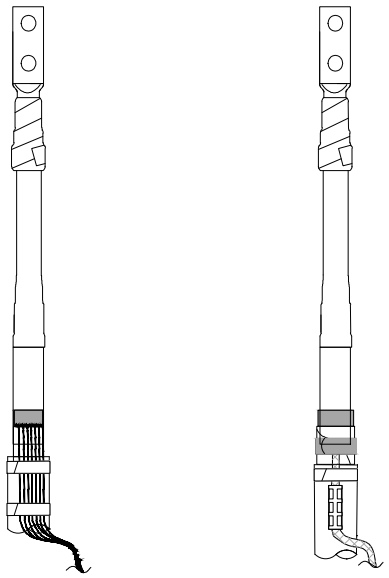


FIGURE A-3
JCN AND TAPE SHIELDED CABLE

STEP 1: SELECT THE PROPER CABLE TERMINATION STRESS CONE ACCORDING TO CABLE SHIELD TYPE, GAUGE AND VOLTAGE RATING.

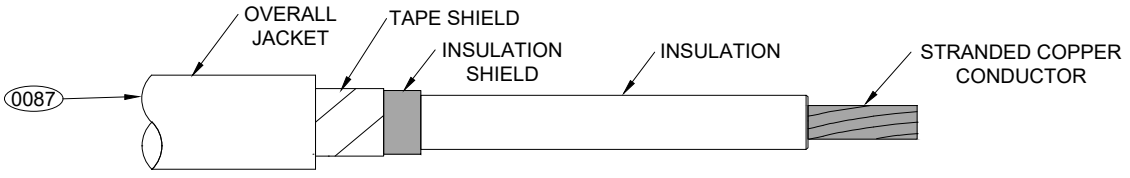


FIGURE B-3
TAPE SHIELDED CABLE

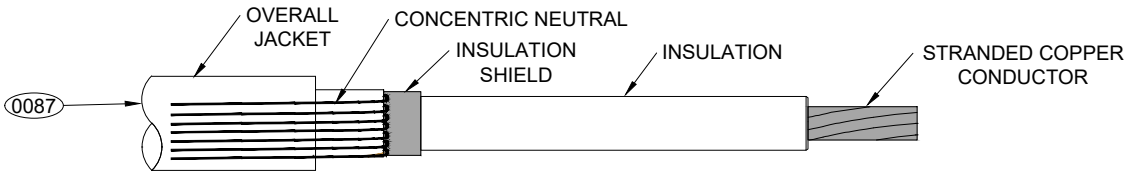


FIGURE C-3
JACKETED CONCENTRIC NEUTRAL (JCN) CABLE

TITLE:

SEPARABLE INSULATED CONNECTORS
AND CABLE TERMINATION ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2507 VERSION 2
DOCUMENT NO. 4325.010
PAGE 11 OF 14 DATE NOV 29, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

STEP 2: PREPARE CABLE PER MANUFACTURER'S INSTRUCTIONS. IF THE CABLE TERMINATION REQUIRES TO INSTALL A FAULT CURRENT INDICATOR, REFER TO STEP 5.

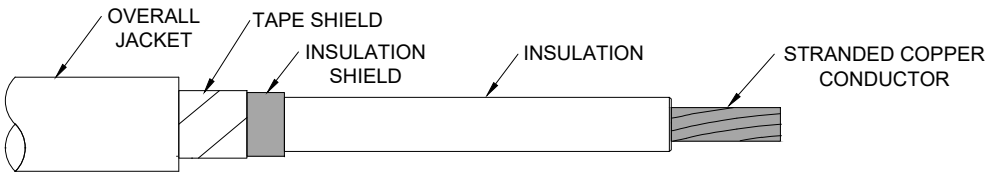


FIGURE D-3
TAPE SHIELDED CABLE

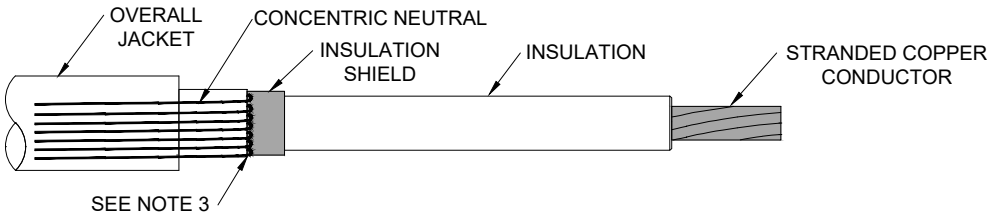


FIGURE E-3
JACKETED CONCENTRIC NEUTRAL (JCN) CABLE

STEP 3: INSTALL GROUND STRAP OR ARRANGE CONCENTRIC NEUTRALS ACCORDING TO MANUFACTURER'S INSTRUCTIONS FOR SPECIFIC CABLE SHIELD TYPE, GAUGE AND VOLTAGE RATING.

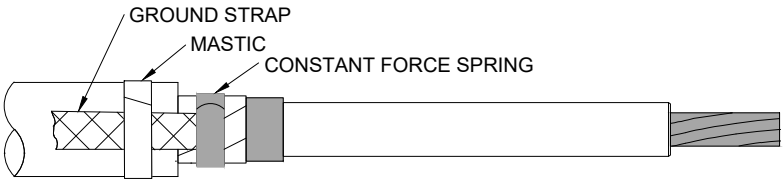


FIGURE F-3
TAPE SHIELDED CABLE

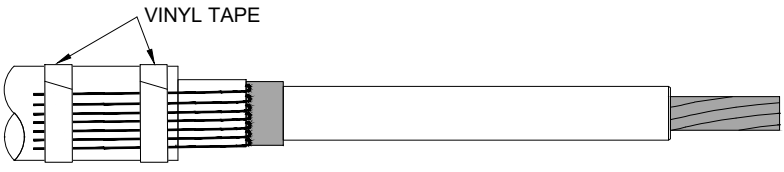


FIGURE G-3
JACKETED CONCENTRIC NEUTRAL (JCN) CABLE

TITLE:

SEPARABLE INSULATED CONNECTORS
AND CABLE TERMINATION ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2507 VERSION 2
DOCUMENT NO. 4325.010
PAGE 12 OF 14 DATE NOV 29, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

STEP 4: ONCE THE CABLE TERMINATION STRESS CONE IS COMPLETELY ASSEMBLED, THE GROUND STRAP SHALL BE CONNECTED TO GROUND (SEE NOTE 5). CONCENTRIC NEUTRALS SHALL BE CONNECTED TO THE SYSTEM NEUTRAL (SEE NOTE 6).

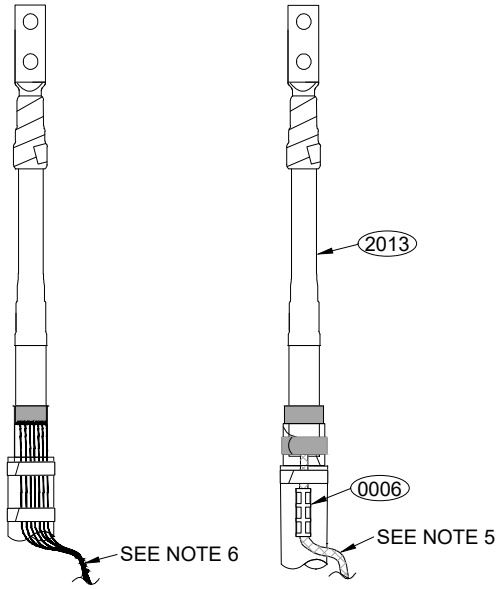


FIGURE H-3
JCN AND TAPE SHIELDED CABLES

STEP 5: INSTALL FAULT CURRENT INDICATOR AS PER MANUFACTURER'S INSTRUCTIONS.

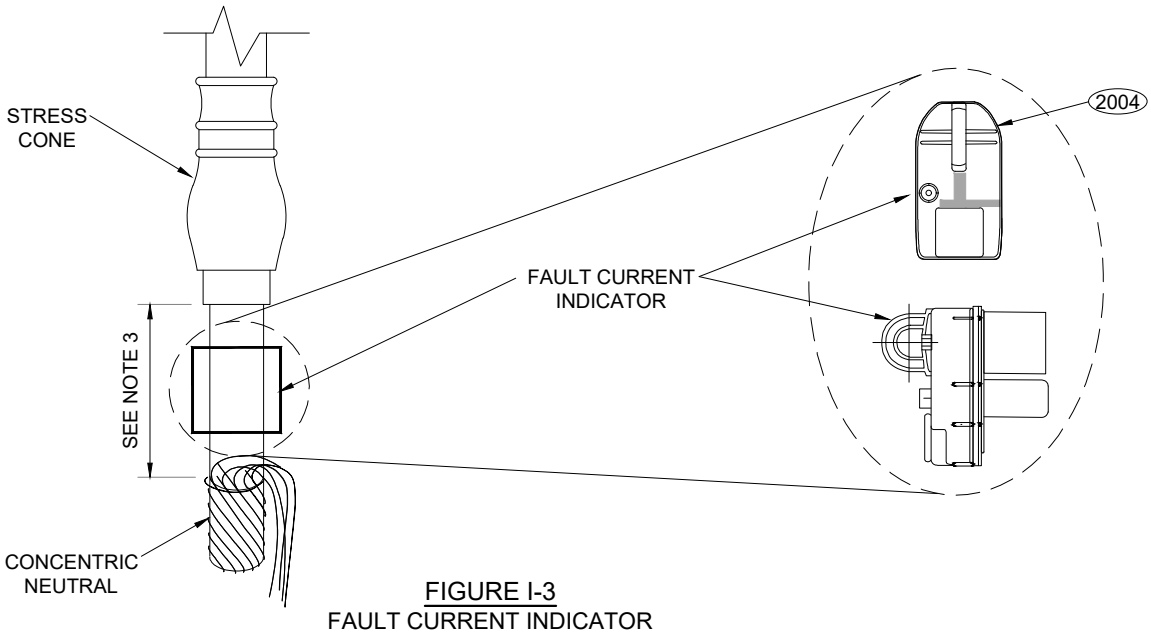


FIGURE I-3
FAULT CURRENT INDICATOR

TITLE:

SEPARABLE INSULATED CONNECTORS AND CABLE TERMINATION ASSEMBLY MAXIMUM VOLTAGE: 13.2 KV NOTES

ASSEMBLY NO. ASSY-2507 VERSION 2
DOCUMENT NO. 4325.010
PAGE 13 OF 14 DATE NOV 29, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

NOTES:

1. THE SELECTION OF THE SEPARABLE CONNECTORS OR CABLE TERMINATION SHALL BE ACCORDING TO THE 15 KV UNDERGROUND CABLE SHIELD TYPE, GAUGE, AND VOLTAGE RATING.
2. DEADBREAK ELBOW CONNECTORS ARE DESIGNED FOR OPERATIONS AS A DEENERGIZED DEVICE. DO NOT OPERATE ENERGIZED.
3. THE FAULT CURRENT INDICATOR CAN BE USED ON JACKETED CONCENTRIC NEUTRAL OR TAPE SHIELDED CABLE. PROPER PRIMARY CABLE PREPARATION IS NECESSARY TO PROVIDE ENOUGH SPACE TO INSTALL A FAULT CURRENT INDICATOR. REFER TO MANUFACTURER'S INSTRUCTIONS TO DETERMINE THE DISTANCE REQUIRED BELOW SEPARABLE CONNECTOR OR CABLE TERMINATION THAT ALLOW THE PROPER INSTALLATION OF THE FAULT CURRENT INDICATOR. REFER TO STEP 5 OF THIS ASSEMBLY, WHERE IS SHOWN THE PREFERRED INSTALLATION METHOD.
4. FOR JACKETED CONCENTRIC NEUTRAL CABLES, ATTACH ONE CONCENTRIC NEUTRAL STRAND TO THE GROUNDING EYE, THE STRAND USED AS DRAIN WIRE MUST BE IN CONTACT WITH ALL OTHER CONCENTRIC NEUTRAL STRANDS. FOR TAPE SHIELDED CABLE, CONNECT A #12 AWG STRANDED COPPER CABLE, 600V, THHN (ITEM 2086), FROM THE GROUNDING EYE TO THE GROUND STRAP. IF THE SEPARABLE CONNECTOR WILL BE INSTALLED IN A MANHOLE OR PULL BOX, THE CABLE GAUGE SHALL BE INCREASE TO #10 AWG.
5. FOR 15 KV TAPE SHIELDED CABLES, THE GROUND STRAP SHALL BE CONNECTED TO THE GROUNDING SYSTEM WITH A #2 AWG COPPER BARE CONDUCTOR (ITEM 0080).
6. FOR 15 KV JACKETED CONCENTRIC NEUTRAL CABLES, THE CONCENTRIC NEUTRAL STRANDS IN THE ELBOW CONNECTORS OR CABLE TERMINATIONS SHALL BE CONNECTED TO THE SYSTEM NEUTRAL USING A COPPER BARE CONDUCTOR (ITEM 0080) WITH A GAUGE THAT MUST BE EQUIVALENT TO 1/3 OF THE GAUGE OF THE 15 KV UNDERGROUND CABLE OF EACH PHASE.
7. ALL DRAIN WIRES ASSOCIATED WITH SEPARABLE INSULATED CONNECTORS SHALL BE EFFECTIVELY CONNECTED TO THE GROUND RING USING A #12 AWG STRANDED COPPER CABLE, 600V, THHN, GREEN (ITEM 2086). IF THE SEPARABLE CONNECTOR WILL BE INSTALLED IN A MANHOLE OR PULL BOX, THE CABLE GAUGE SHALL BE INCREASED TO #10 AWG.
8. THE TEST POINT IS A WAY TO DETERMINE IF THE CABLE IS ENERGIZED. THE VOLTAGE TEST POINT IS NOT INTENDED FOR ACTUAL VOLTAGE MEASUREMENTS OR PHASING OPERATIONS AND HAS NO DIRECT CONNECTION TO THE CONDUCTOR. IT USES AN IMPEDANCE CAPACITANCE TAP AND ONLY VOLTAGE INDICATING INSTRUMENTS DESIGNED FOR THIS APPLICATION TO ESTABLISH THE PRESENCE OF VOLTAGE SHOULD BE USED. A VOLTAGE READING WILL INDICATE THE PRESENCE OF VOLTAGE, BUT A READING OF NO VOLTAGE IS NOT SUFFICIENT TO ESTABLISH A DE-ENERGIZED CIRCUIT BEFORE TOUCHING THE CONNECTOR. OTHER PROCEDURES SHOULD BE IMPLEMENTED TO ESTABLISH A DE-ENERGIZED CIRCUIT.
9. THE DEADBREAK INSULATING PLUG IS USED TO INSULATE AND PLUG THE OPEN END OF A DEADBREAK ELBOW OR BUSHING EXTENDER. THE INSULATED PLUG FEATURES A 1″ HEX NUT FOR DE-ENERGIZED INSTALLATION. THE HEX NUT ALSO FUNCTIONS AS A CAPACITIVE TEST POINT FOR VOLTAGE DETECTION.
10. GROUNDING ELBOWS (WAREHOUSE NO. 072-79584) PROVIDE THE OPERATING COMPONENTS REQUIRED FOR GROUNDING DEADFRONT UNDERGROUND SYSTEMS. IT IS USED TO VISIBLY GROUND CABLES, TRANSFORMERS AND SWITCHGEAR FOR SAFETY WHEN SERVICE IS PERFORM.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

SEPARABLE INSULATED CONNECTORS
AND CABLE TERMINATION ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV
BILL OF MATERIAL

ASSEMBLY NO. ASSY-2507 VERSION 2
DOCUMENT NO. 4325.010
PAGE 14 OF 14 DATE NOV 29, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
0087	15 KV UNDERGROUND CABLE	VARIES	AS REQ.
2004	FAULT CURRENT INDICATOR	VARIES	AS REQ.
2011	ELBOW ARRESTER	VARIES	AS REQ.
2013	INDOOR CABLE TERMINATION STRESS CONE	VARIES	AS REQ.
2057	4 WAYS PRIMARY LOADBREAK JUNCTION	038-00638	AS REQ.
2058	6 WAYS PRIMARY JUNTION	038-01032	AS REQ.
2059	LOADBREAK ELBOW CONNECTOR	VARIES	AS REQ.
2060	DEADBREAK ELBOW CONNECTOR	VARIES	AS REQ.
2061	LOADBREAK BUSHING PLUG INSERT	038-00679	AS REQ.
2062	INSULATED CAP WITH GROUND	VARIES	AS REQ.
2072	LOADBREAK FEED-THRU INSERT	038-01008	AS REQ.
2081	PARKING BUSHING	VARIES	AS REQ.
2082	PARKING STAND ARRESTER	VARIES	AS REQ.
2083	DEADBREAK BUSHING INSERT	038-00752	AS REQ.
2084	LOADBREAK ELBOW TAP PLUG	072-79765	AS REQ.
2085	LOADBREAK FEED-THRU PARKING BUSHING	072-79764	AS REQ.
2086	STRANDED COPPER CABLE 600 V, THHN	VARIES	AS REQ.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

15 KV CABLE SPLICE ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2508 VERSION 1
DOCUMENT NO. 4325.011
PAGE 1 OF 9 DATE SEPT 19, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

I. JACKETED CONCENTRIC NEUTRAL (JCN) TO JACKETED CONCENTRIC NEUTRAL (JCN) CABLE JOINT INSTALLATION:

STEP 1: SELECT THE PROPER SPLICE KIT ACCORDING TO CABLE SHIELD TYPE, GAUGE AND VOLTAGE RATING.

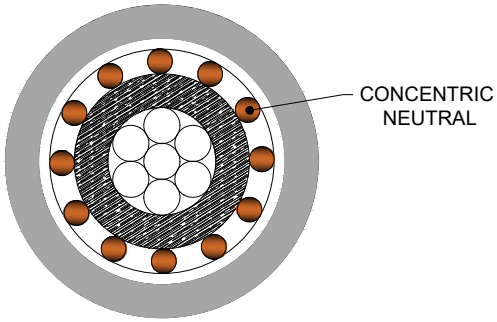


FIGURE A
JACKETED CONCENTRIC NEUTRAL CABLE

STEP 2: PREPARE EACH CABLE SIDE PER MANUFACTURER'S INSTRUCTIONS.

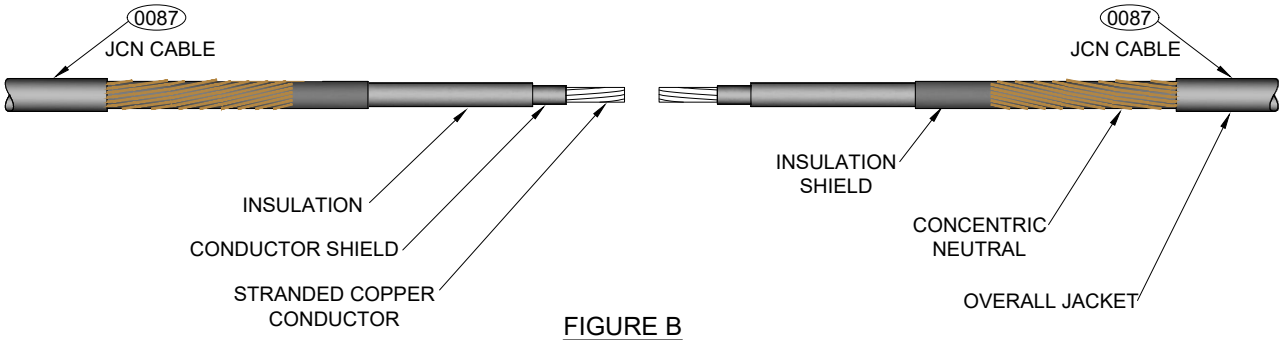


FIGURE B
CABLE PREPARATION

STEP 3: INSTALL SPLICE, BODY, PARTS, AND GROUND STRAPS ACCORDING TO SPLICE MANUFACTURER'S INSTRUCTIONS FOR SPECIFIC CABLE SHIELD TYPE. (SEE NOTES 1 AND 2)

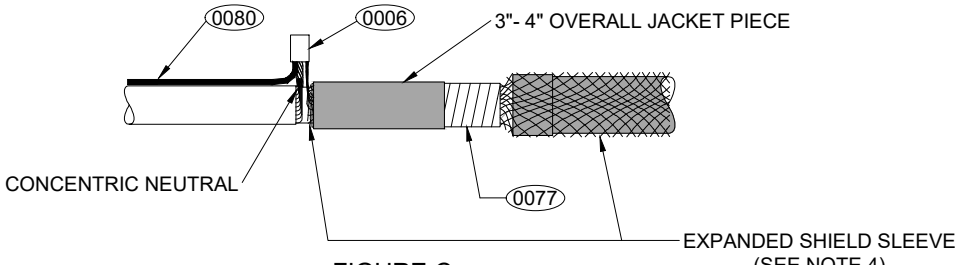


FIGURE C
GROUND CONDUCTOR INSTALLATION

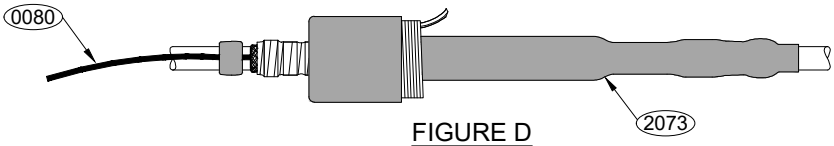


FIGURE D
SPLICE KIT

TITLE:

15 KV CABLE SPLICE ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2508 VERSION 1
DOCUMENT NO. 4325.011
PAGE 2 OF 9 DATE SEPT 19, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

STEP 4: ONCE THE SPLICE IS COMPLETE, APPLY A LAYER OF ARC AND FIRE PROOFING TAPE OVER THE SPLICE TERMINATION IN HALF-LAPPED LAYERS. EXTEND 6" ON EACH SIDE OF THE SPLICE. (REFER TO FIGURE E)

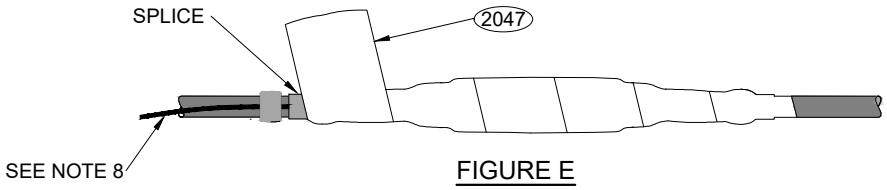
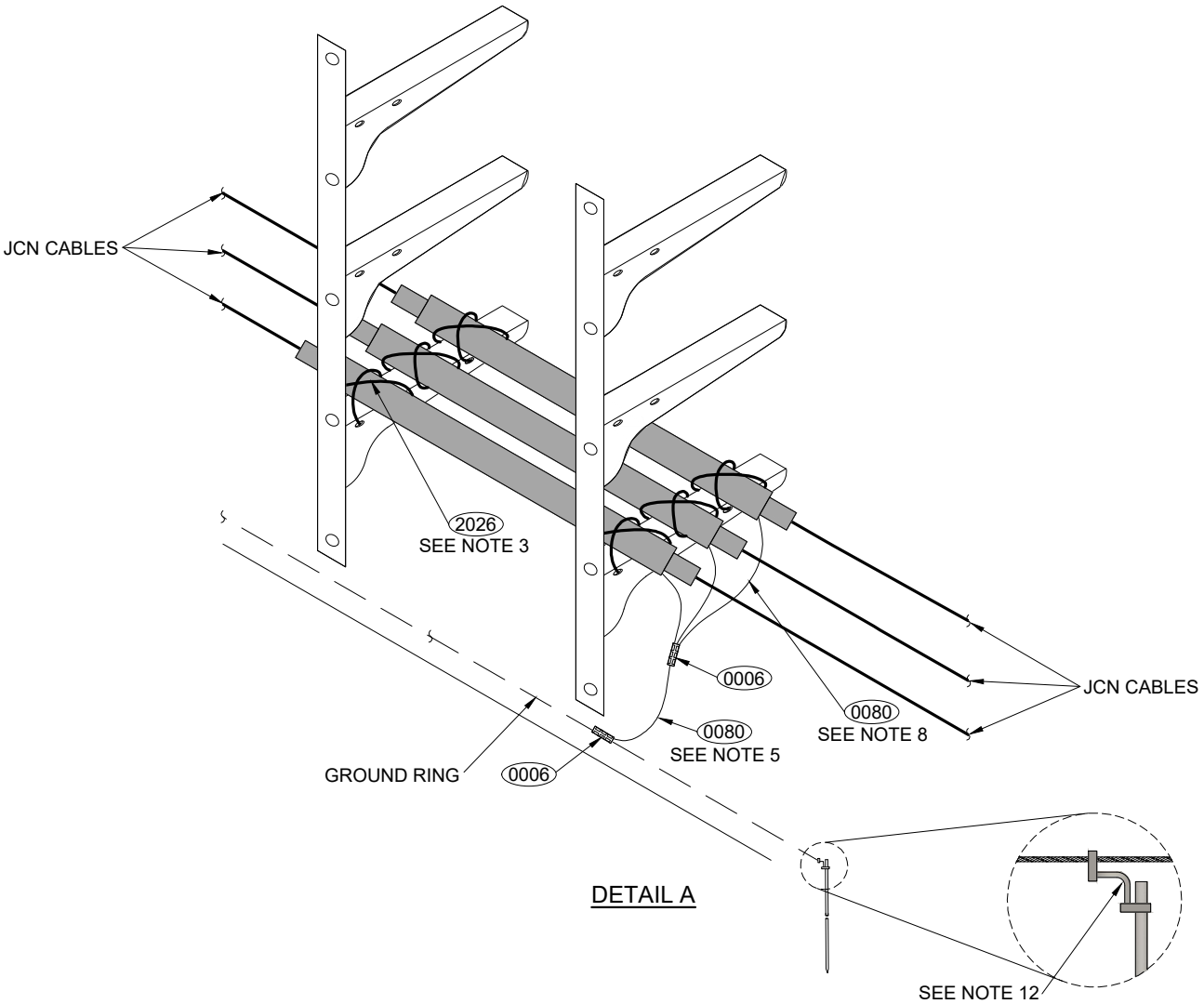


FIGURE E
ARC AND FIRE PROOFING TAPE INSTALLATION

STEP 5: INSTALL THE CABLES IN THE CABLE SUPPORT ARM AND FIX THEM WITH CABLE TIES. USE COMPRESSION CONNECTORS TO CONNECT THE SPLICE GROUND STRAPS OR GROUND CONDUCTORS TO GROUND RING. (REFER TO DETAIL A)



DETAIL A

TITLE:

15 KV CABLE SPLICE ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2508 VERSION 1
DOCUMENT NO. 4325.011
PAGE 3 OF 9 DATE SEPT 19, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

MAINTENANCE USE ONLY

II. TAPE SHIELDED TO JACKETED CONCENTRIC NEUTRAL (JCN) CABLE JOINT INSTALLATION:

STEP 1: SELECT THE PROPER SPLICE KIT ACCORDING TO CABLE SHIELD TYPE, GAUGE AND VOLTAGE RATING.

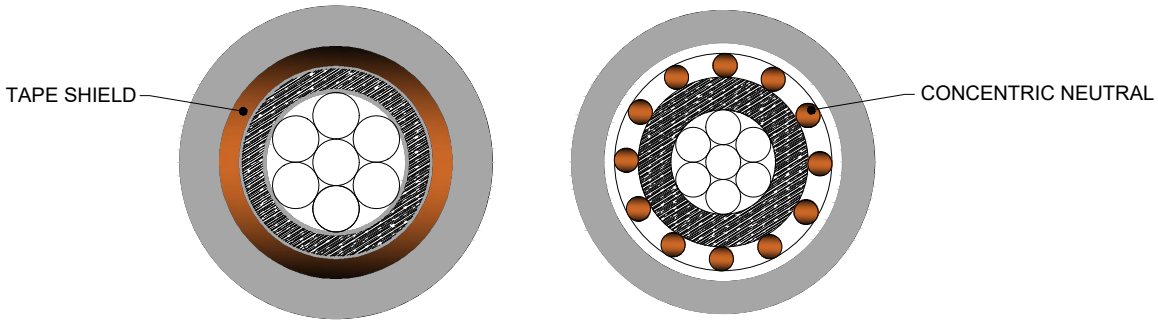


FIGURE F
JACKETED CONCENTRIC NEUTRAL
AND TAPE SHIELDED CABLE

STEP 2: PREPARE EACH CABLE SIDE PER MANUFACTURER'S INSTRUCTIONS.

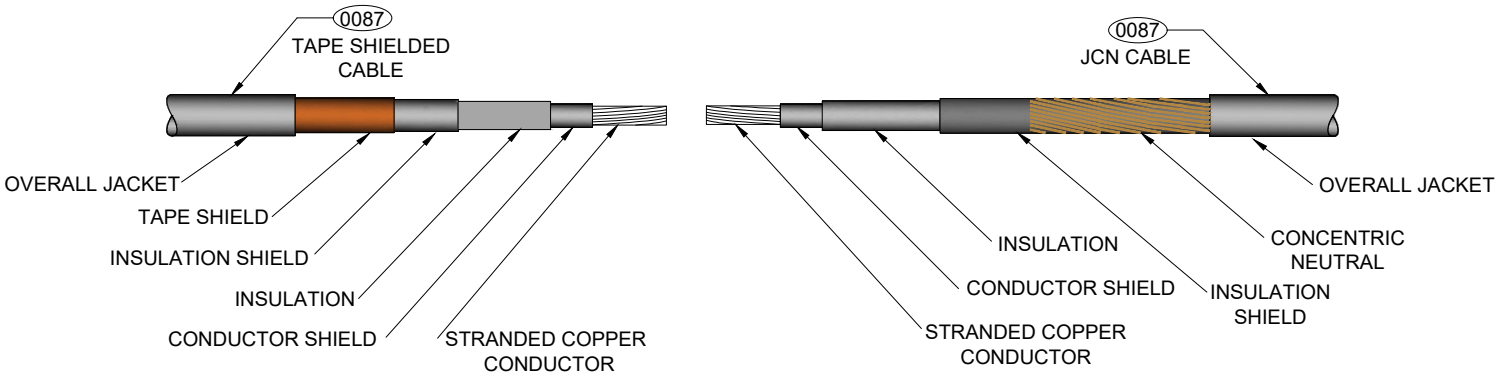


FIGURE G
CABLE PREPARATION

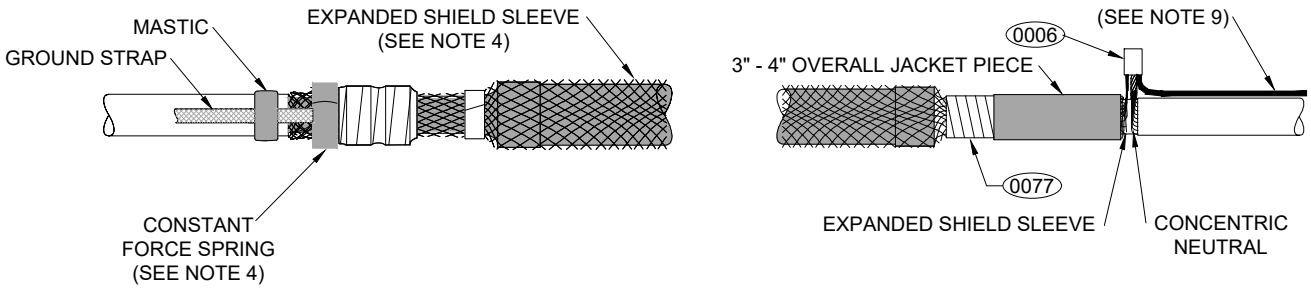
TITLE:

15 KV CABLE SPLICE ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2508 VERSION 1
DOCUMENT NO. 4325.011
PAGE 4 OF 9 DATE SEPT 19, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

MAINTENANCE USE ONLY

STEP 3: INSTALL SPLICE, BODY, PARTS, AND GROUND STRAPS ACCORDING TO SPLICE MANUFACTURER'S INSTRUCTIONS FOR SPECIFIC CABLE SHIELD TYPE. (SEE NOTES 1 AND 2)



TAPE SHIELDED CABLE SIDE JCN CABLE SIDE

FIGURE H
GROUND CONDUCTOR INSTALLATION

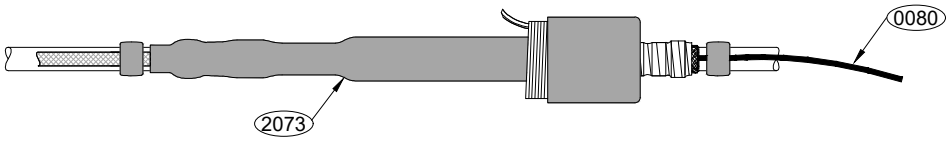


FIGURE I
SLICE KIT

STEP 4: ONCE THE SPLICE IS COMPLETE, APPLY A LAYER OF ARC AND FIRE PROOFING TAPE OVER THE SPLICE TERMINATION IN HALF-LAPPED LAYERS. EXTEND 6" ON EACH SIDE OF THE SPLICE. (REFER TO FIGURE N)

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

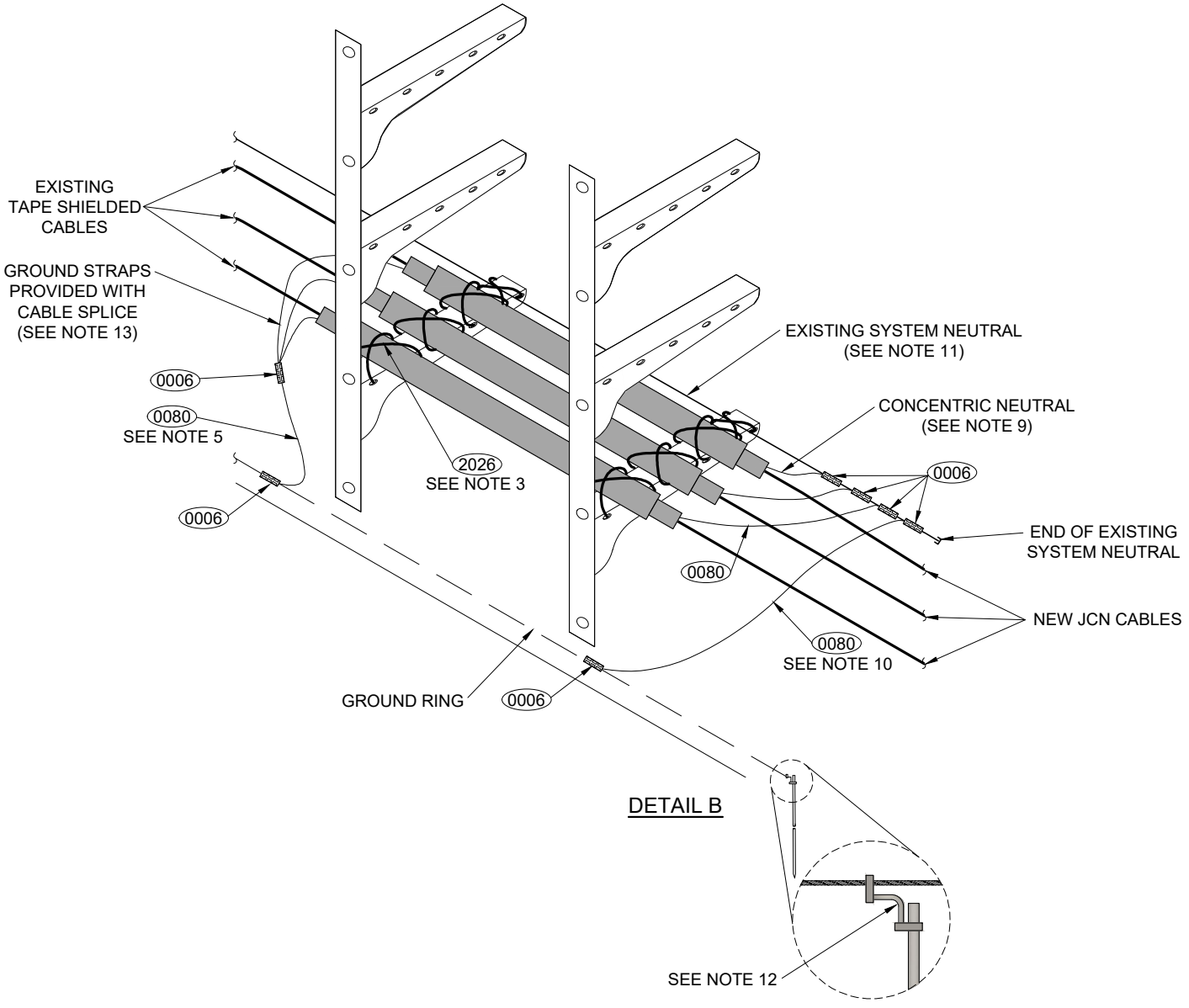
TITLE:

15 KV CABLE SPLICE ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2508 VERSION 1
DOCUMENT NO. 4325.011
PAGE 5 OF 9 DATE SEPT 19, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

MAINTENANCE USE ONLY

STEP 5: INSTALL THE CABLES IN THE CABLE SUPPORT AND FIX THEM WITH CABLE TIES. USE COMPRESSION CONNECTORS TO CONNECT THE GROUND STRAPS OR GROUND CONDUCTORS TO GROUND RING. (REFER TO DETAIL B)



TITLE:

15 KV CABLE SPLICE ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2508 VERSION 1
DOCUMENT NO. 4325.011
PAGE 6 OF 9 DATE SEPT 9, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

MAINTENANCE USE ONLY

III. TAPE SHIELDED TO TAPE SHIELDED CABLE JOINT INSTALLATION:

STEP 1: SELECT THE PROPER SPLICE KIT ACCORDING TO CABLE SHIELD TYPE, GAUGE AND VOLTAGE RATING.

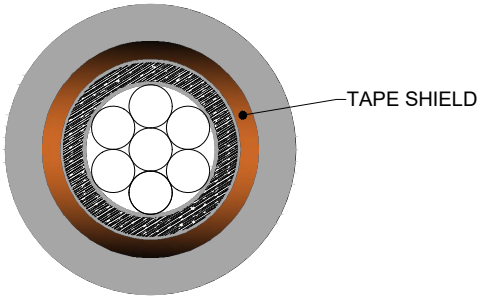


FIGURE J
TAPE SHIELDED CABLE

STEP 2: PREPARE EACH CABLE SIDE PER MANUFACTURER'S INSTRUCTIONS.

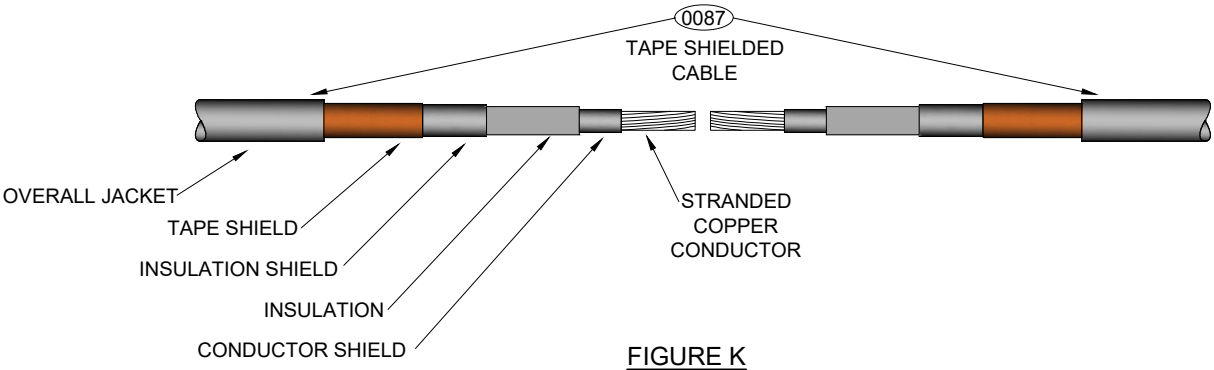


FIGURE K
CABLE PREPARATION

STEP 3: INSTALL SPLICE, BODY, PARTS, AND GROUND STRAP ACCORDING TO SPLICE MANUFACTURER'S INSTRUCTIONS FOR SPECIFIC CABLE SHIELD TYPE. (SEE NOTES 1 AND 2)

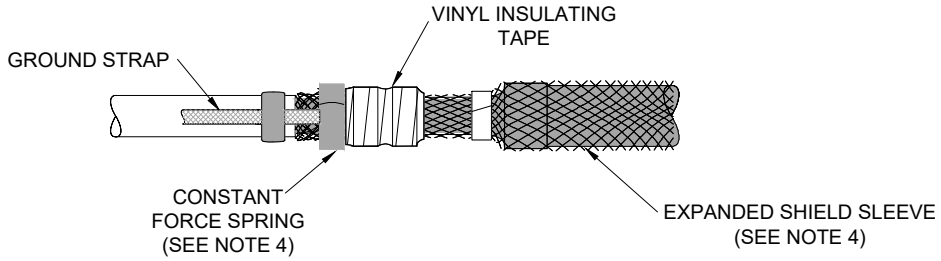


FIGURE L
GROUND STRAP INSTALLATION

TITLE:

15 KV CABLE SPLICE ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2508 VERSION 1
DOCUMENT NO. 4325.011
PAGE 7 OF 9 DATE SEPT 19, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

MAINTENANCE USE ONLY

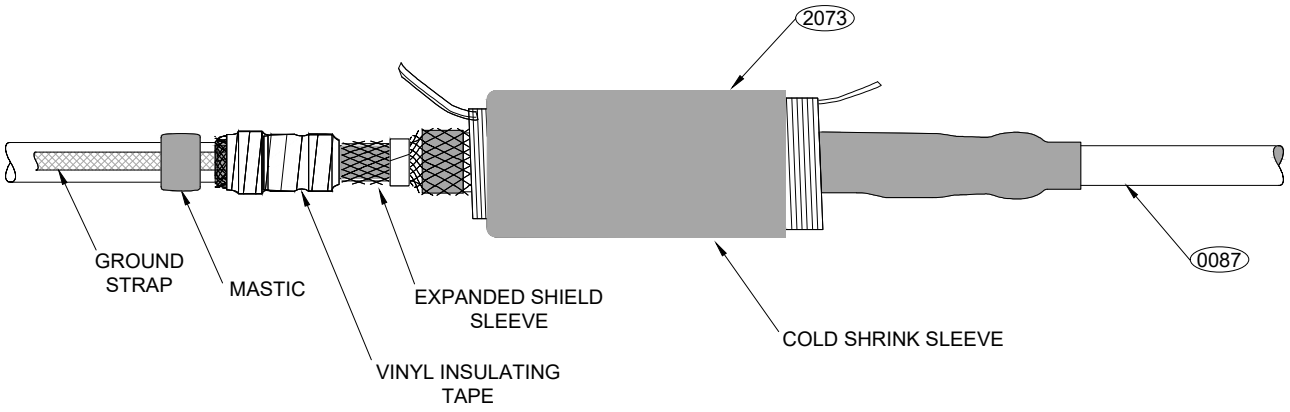


FIGURE M
SLICE KIT

STEP 4: ONCE THE SPLICE IS COMPLETE, APPLY A LAYER OF ARC AND FIRE PROOFING TAPE (ITEM 2047) OVER THE SPLICE TERMINATION IN HALF-LAPPED LAYERS. EXTEND 6" ON EACH SIDE OF THE SPLICE. (REFER TO FIGURE N)

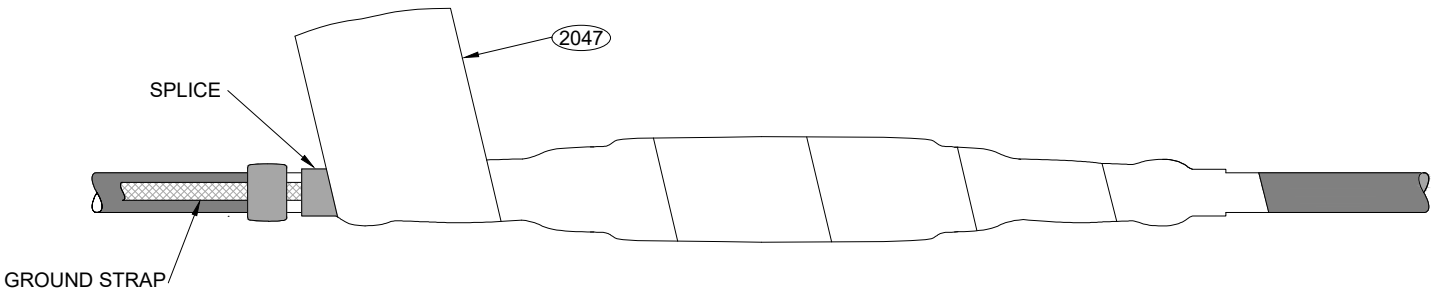


FIGURE N
ARC AND FIRE PROOFING TAPE INSTALLATION

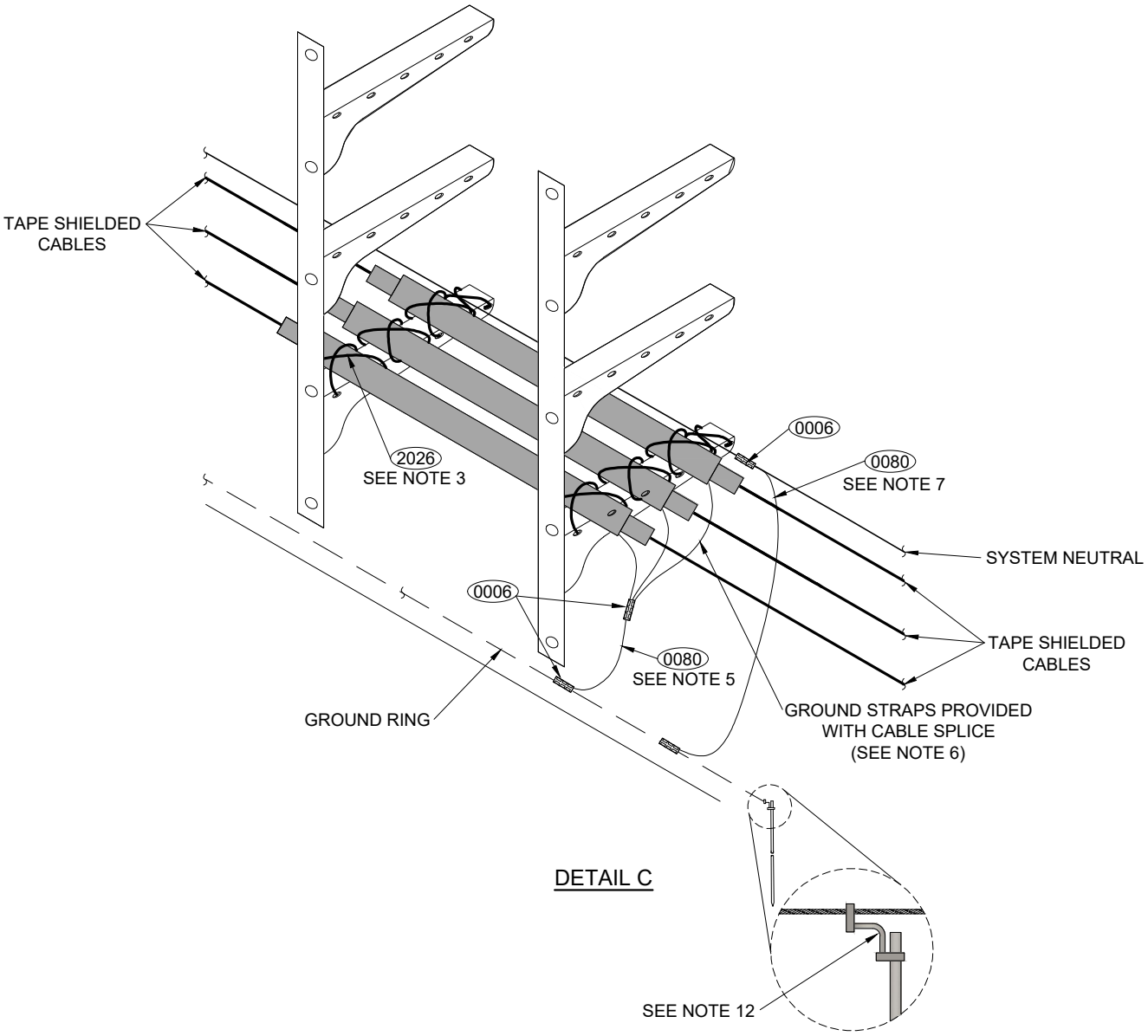
TITLE:

15 KV CABLE SPLICE ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV

ASSEMBLY NO. ASSY-2508 VERSION 1
DOCUMENT NO. 4325.011
PAGE 8 OF 9 DATE SEPT 9, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

MAINTENANCE USE ONLY

STEP 5: INSTALL THE CABLES IN THE CABLE SUPPORT ARM AND FIX THEM WITH CABLE TIES. USE COMPRESSION CONNECTORS TO CONNECT THE SPLICE GROUND STRAPS TO GROUND RING. (REFER TO DETAIL C)



DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

15 KV CABLE SPLICE ASSEMBLY
MAXIMUM VOLTAGE: 13.2 KV
NOTES AND BILL OF MATERIAL

ASSEMBLY NO. ASSY-2508 VERSION 1
DOCUMENT NO. 4325.011
PAGE 9 OF 9 DATE SEPT 19, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0077	HIGH VOLTAGE VINYL ELECTRICAL INSULATING THERMOPLASTIC TAPE	038-01248	AS REQ.
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
0087	15 KV UNDERGROUND CABLE	VARIES	AS REQ.
2026	CABLE TIE	038-83155	AS REQ.
2047	ARC AND FIRE PROOFING TAPE	038-01255	AS REQ.
2073	15 KV UNDERGROUND CABLE SPLICE KIT	VARIES	AS REQ.

NOTES:

1. LOCATIONS OF SPLICES SHALL BE DETERMINED BASED ON PULLING TENSION CALCULATIONS, CURVES AND DISTANCE BETWEEN MANHOLES.
2. THIS DRAWING IS A GENERAL REPRESENTATION FOR THE INSTALLATION OF CABLE JOINTS AND THEIR COMPONENTS. THE METHOD OF SPLICING VARIES BY MANUFACTURER. THE SPLICE MUST BE SELECTED ACCORDING TO THE SHIELD TYPE, CABLE GAUGE AND VOLTAGE RATING.
3. ALL CABLES SHALL BE TIED TO THE CABLE SUPPORT ARM USING A WEATHER RESISTANT CABLE TIE (ITEM 2026).
4. THE EXPANDED SHIELD SLEEVE AND CONSTANT FORCE SPRING SHALL BE INSTALLED PROPERLY TO ENSURE THE CONTINUITY OF THE SHIELD INSIDE THE SPLICE.
5. ALL SPLICES SHALL BE CONNECTED EFFECTIVELY TO THE GROUND RING OF THE PULL BOX OR MANHOLE.
6. THE GROUND STRAPS USED IN THE TAPE SHIELDED CABLE TO TAPE SHIELDED CABLE SPLICE SHALL BE BONDED TOGETHER AND CONNECTED TO THE GROUND RING USING A 4/0 AWG COPPER BARE CONDUCTOR.
7. THE CONDUCTOR TO CONNECT THE SYSTEM NEUTRAL CABLE TO THE GROUND RING OF THE PULL BOX OR MANHOLE SHALL BE #2 AWG COPPER BARE CONDUCTOR.
8. ALL JCN TO JCN CABLE SPLICES SHALL HAVE PROVISION TO CONNECT THE CABLE SPLICE TO GROUND USING A GROUND STRAP OR A GROUND CONDUCTOR. EACH SPLICE GROUND CAN BE CONNECTED INDIVIDUALLY TO THE GROUND RING USING A #2 AWG COPPER BARE CONDUCTOR. WHEN FEASIBLE, ALL SPLICE GROUNDS CAN BE BONDED TOGETHER AND CONNECTED TO THE GROUND RING USING A 4/0 AWG COPPER BARE CONDUCTOR.
9. FOR TAPE SHIELDED CABLE TO JCN CABLE SPLICES, ALL CONCENTRIC NEUTRAL STRANDS SHALL BE CONNECTED TO THE SYSTEM NEUTRAL (4TH WIRE) INSTALLED WITH THE TAPE SHIELDED CABLES. THE CONCENTRIC NEUTRAL STRANDS SHALL BE CONNECTED TO THE SYSTEM NEUTRAL USING A COPPER BARE CONDUCTOR (ITEM 0080) WITH A GAUGE THAT MUST BE EQUIVALENT TO $\frac{1}{3}$ OF THE GAUGE OF THE 15 KV UNDERGROUND CABLE.
10. AS PART OF THE TAPE SHIELDED CABLE TO JCN CABLE SPLICE THE SYSTEM NEUTRAL (4TH WIRE) SHALL BE CONNECTED TO THE GROUND RING WITH A #2 AWG COPPER BARE CONDUCTOR.
11. WHEN A TAPE SHIELDED CABLE TO JCN CABLE SPLICE NEED TO BE INSTALLED BECAUSE A FAULT OF THE TAPE SHIELDED CABLES, THE DAMAGED CABLE SEGMENT SHALL BE REPLACED WITH A JCN CABLE. AS PART OF THE PROCESS OF REMOVAL OF THE DAMAGED CABLES, A SEGMENT OF THE SYSTEM NEUTRAL (4TH WIRE) INSTALLED WITH THE TAPE SHIELDED CABLES IS ALSO REMOVED. WHEN THIS SITUATION OCCURS, AND TO PROVIDE CONTINUITY OF THE SYSTEM NEUTRAL, ALL SPLICE CONCENTRIC NEUTRAL STRANDS THAT COMES FROM THE JCN CABLES NEED TO BE CONNECTED TO THE REMAINING SYSTEM NEUTRAL SEGMENT (4TH WIRE) ON THE TAPE SHIELDED CABLES SIDE.
12. THE GROUND RING SHALL BE EFFECTIVELY CONNECTED TO THE GROUND RODS INSTALLED IN THE PULL BOX OR MANHOLE.
13. TO PROVIDE A CONNECTION TO GROUND FOR THE TAPE SHIELDED CABLE TO JCN CABLE SPLICE, GROUND STRAPS SHALL BE INSTALLED ON THE TAPE SHIELDED CABLE SIDE OF THE SPLICE. THOSE GROUND STRAPS SHALL BE BONDED TOGETHER AND CONNECTED TO THE GROUND RING USING A 4/0 AWG COPPER BARE CONDUCTOR.

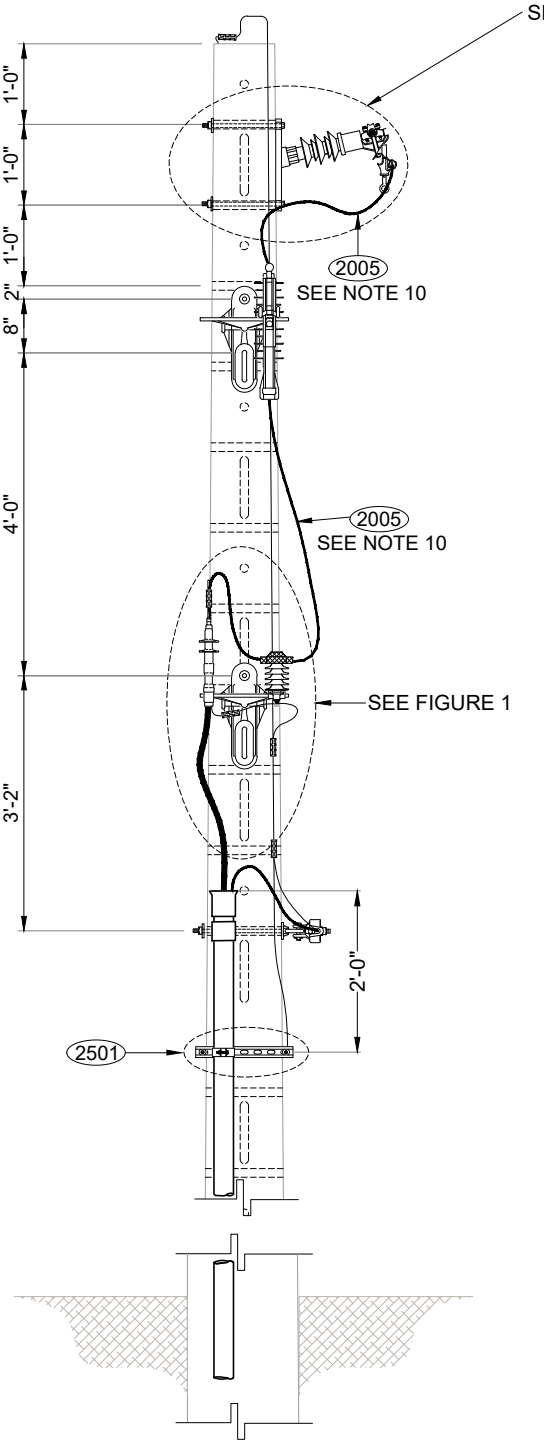
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

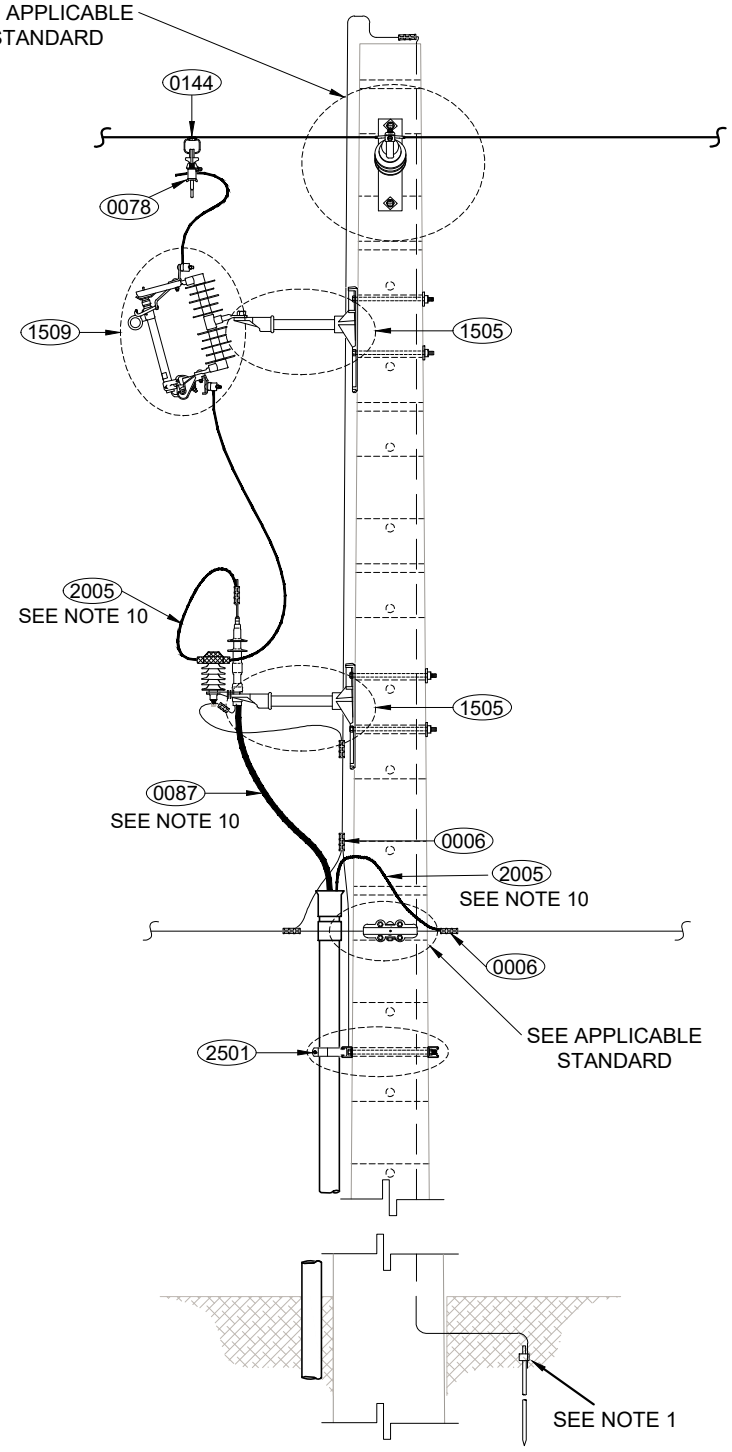
TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM
SINGLE PHASE AND NEUTRAL WITH FUSE CUTOUT
MAXIMUM RATING: 100 A
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	URD-2 VERSION 4
DOCUMENT NO.	4325.012
PAGE	1 OF 4 DATE JAN 10, 2023
SUBMITTED	ROBERTO A. TORRES LIC. 10414
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	EMILIO CUADRADO LIC. 3000



ELEVATION VIEW
VIEW A ASSY-1500



ELEVATION VIEW
VIEW B ASSY-1500

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM
SINGLE PHASE AND NEUTRAL WITH FUSE CUTOUT
MAXIMUM RATING: 100 A
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	URD-2 VERSION 4
DOCUMENT NO.	4325.012
PAGE	2 OF 4 DATE JAN 10, 2023
SUBMITTED	ROBERTO A. TORRES LIC. 10414
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	EMILIO CUADRADO LIC. 3000

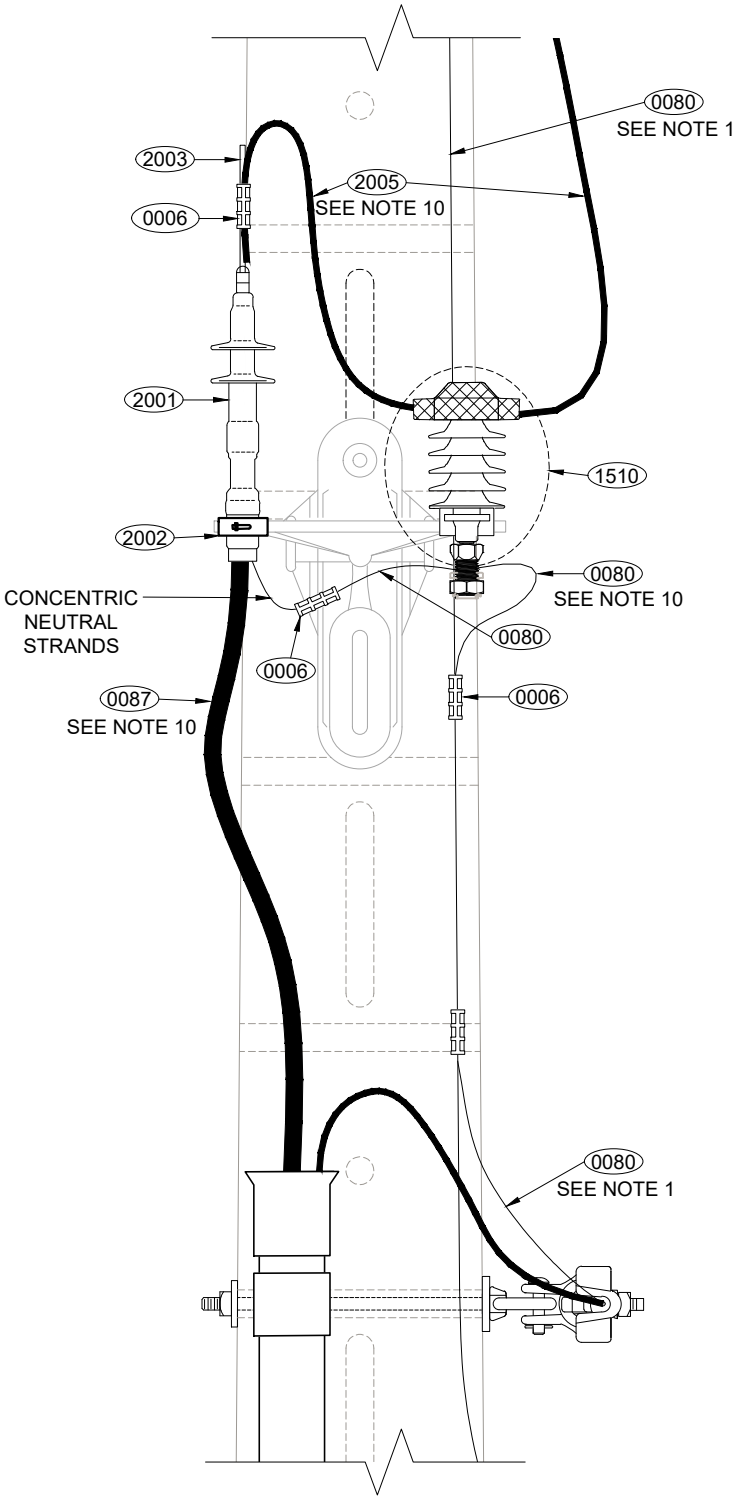


FIGURE 1

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

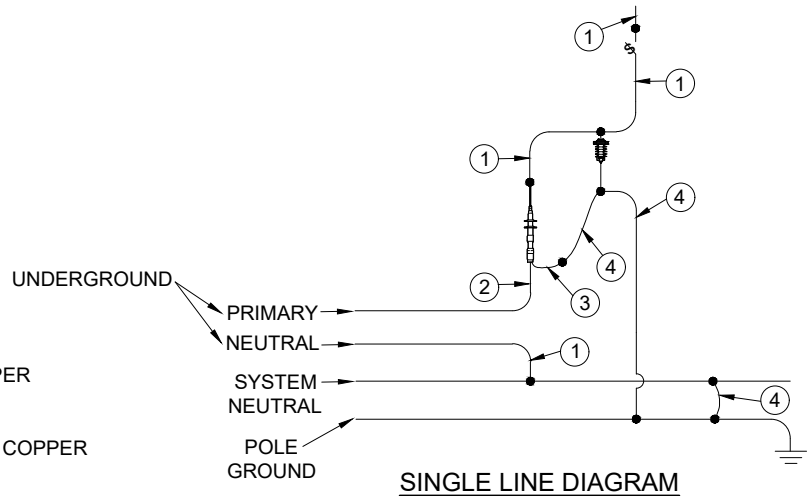
TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM SINGLE PHASE AND NEUTRAL WITH FUSE CUTOUT MAXIMUM RATING: 100 A MAXIMUM VOLTAGE: 13.2 KV NOTES

STANDARD NO. URD-2 VERSION 4
DOCUMENT NO. 4325.012
PAGE 3 OF 4 DATE JAN 10, 2023
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

NOTES:

1. THE NEUTRAL CONDUCTOR MUST BE EFFECTIVELY BONDED TO THE GROUND CONNECTION SYSTEM. REFER TO ASSEMBLY NO. ASSY-1511, POLE GROUND ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
2. ALL MINIMUM VERTICAL CLEARANCES ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1505, FIBERGLASS STAND-OFF BRACKET ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
4. REFER TO ASSEMBLY NO. ASSY-1509, FUSE CUTOUT ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
5. REFER TO ASSEMBLY NO. ASSY-1510, LIGHTNING ARRESTERS ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
6. FOR DETAILS OF THE RISER DUCT AND THE RISER CONCRETE BASE SUPPORT, SEE STANDARDS NO. URD-4 AND URD-4-A.
7. REFER TO ASSEMBLY NO. ASSY-1512, OVERHEAD EQUIPMENT BONDING ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
8. REFER TO STANDARDS NO. URD-4 AND URD-4-A FOR RISER DUCT TERMINATION AND DUCT SEALING.
9. EACH RISER SUPPORT SHALL BE EFFECTIVELY BONDED TO POLE GROUND CONDUCTOR.
10. REFER TO TABLE 1 AND SINGLE LINE DIAGRAM FOR THE CORRESPONDING GAUGES OF THE UNDERGROUND, OVERHEAD AND LIGHTNING ARRESTERS CONDUCTORS.
11. THE CONDUCTORS CONNECTING THE LIVE TERMINAL OF THE LIGHTNING ARRESTER TO THE PRIMARY LINE (LINE LEAD) AND THE CONDUCTOR THAT CONNECTS GROUND TERMINAL TO THE POLE GROUND CONDUCTOR (GROUND LEAD) SHALL BE AS SHORT AS POSSIBLE. THE COMBINATION OF BOTH, THE LINE LEAD LENGTH AND GROUND LEAD LENGTH, SHALL BE LESS THAN 3'.
12. THE MINIMUM HEIGHT FOR THE POLE TO BE USED TO INSTALL THIS STANDARD SHALL BE 50'.
13. TO DETERMINE THE CORRESPONDING DUCT SIZE FOR THIS STANDARD, REFER TO STANDARD NO. URD-54.



SINGLE LINE DIAGRAM

LEGEND:

(1) 1C - #2 AWG, 600 V, COPPER
(2) 1C - #2 AWG, 15 KV UNDERGROUND CABLE, COPPER
(3) CONCENTRIC NEUTRAL
(4) 1C - #2 AWG, BARE, COPPER

CABLE TERMINATION
FUSE CUTOUT
LIGTHNING ARRESTER
COMPRESSION, POST OR TERMINAL CONNECTOR

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM SINGLE PHASE AND NEUTRAL WITH FUSE CUTOUT MAXIMUM RATING: 100 A MAXIMUM VOLTAGE: 13.2 KV BILL OF MATERIAL

STANDARD NO. URD-2 VERSION 4
DOCUMENT NO. 4325.012
PAGE 4 OF 4 DATE JAN 10, 2023
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	AS REQ.	4
0078	HOT LINE CLAMP	VARIES	1
0080	COPPER BARE CONDUCTOR	006-82621	AS REQ.
0087	15 KV UNDERGROUND CABLE	006-82624	AS REQ.
0144	STIRRUP	VARIES	1
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE A	2
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	1
1510	LIGHTNING ARRESTERS ASSEMBLY	ASSY-1510 FIGURE B	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	OVERHEAD EQUIPMENT BONDING ASSEMBLY	ASSY-1512 FIGURE D	1
2001	OUTDOOR CABLE TERMINATION STRESS CONE	038-01461	1
2002	CABLE AND STRESS CONE SUPPORT BRACKET	038-82668	1
2003	PIN TERMINAL CONNECTOR	002-09742	1
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	006-00833	AS REQ.
2501	RISER SUPPORT ASSEMBLY	ASSY-2501	AS REQ.

TABLE 1 - CONDUCTOR SELECTION TABLE			
15 KV UNDERGROUND CABLE	OVERHEAD CONDUCTOR	LIGHTNING ARRESTER	
HOT WIRE AND NEUTRAL (COPPER)	HOT WIRE (COPPER)	HOT WIRE (COPPER)	GROUND CONDUCTOR (COPPER BARE)
1C - #2 AWG - 15 KV 1C - #2 AWG - 600V	1C - #2 AWG	1C - #2 AWG	1C - #2 AWG

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM
THREE PHASE WITH DISCONNECTING SWITCHES
MAXIMUM RATING: 600 A
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-3 VERSION 5
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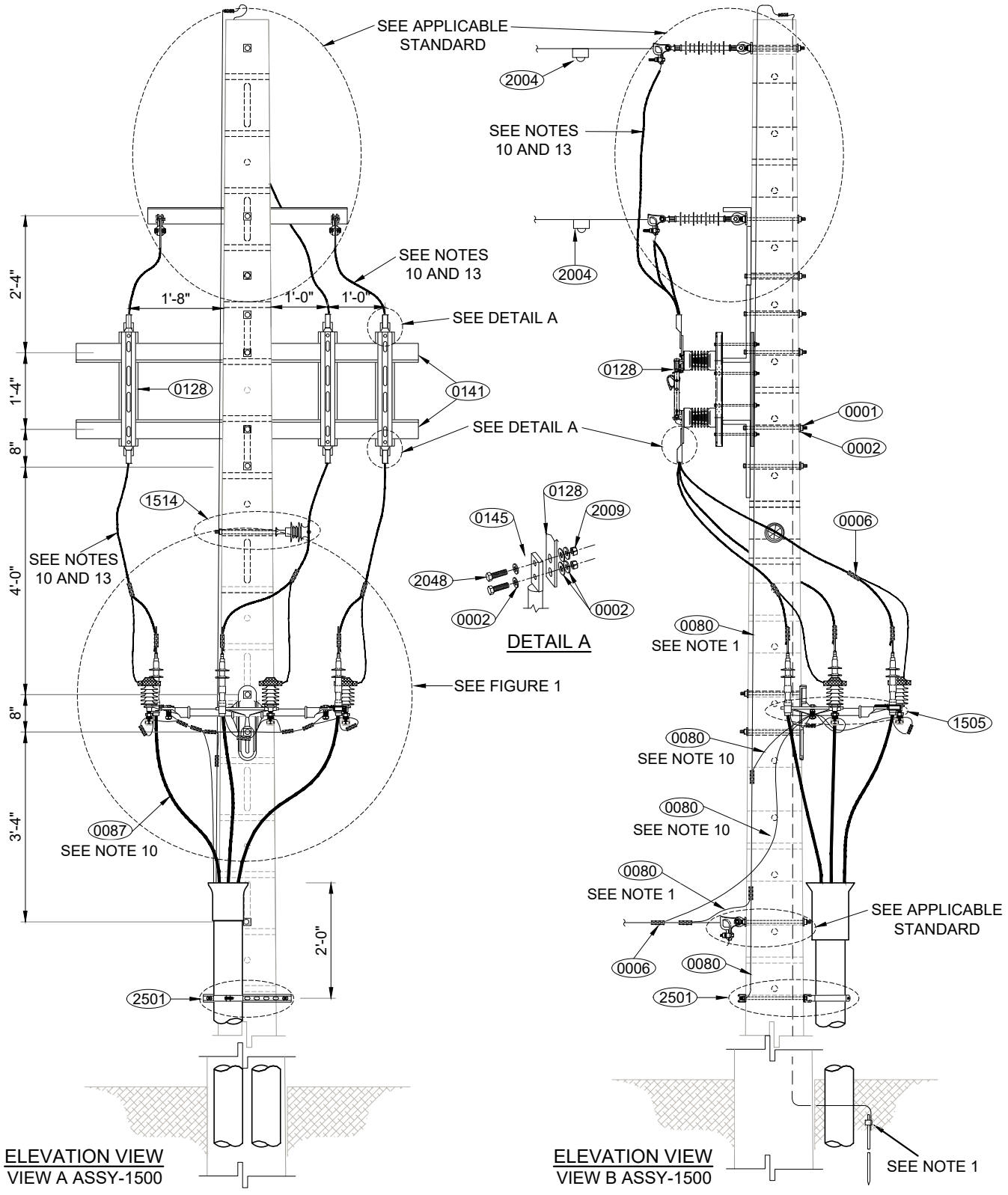
PAGE 1 OF 4 DATE JAN 10, 2023
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000



DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM THREE PHASE WITH DISCONNECTING SWITCHES MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-3 VERSION 5
DOCUMENT NO. 4325.013
PAGE 2 OF 4 DATE JAN 10, 2023
SUBMITTED ROBERTO A. TORRES LIC. 10414
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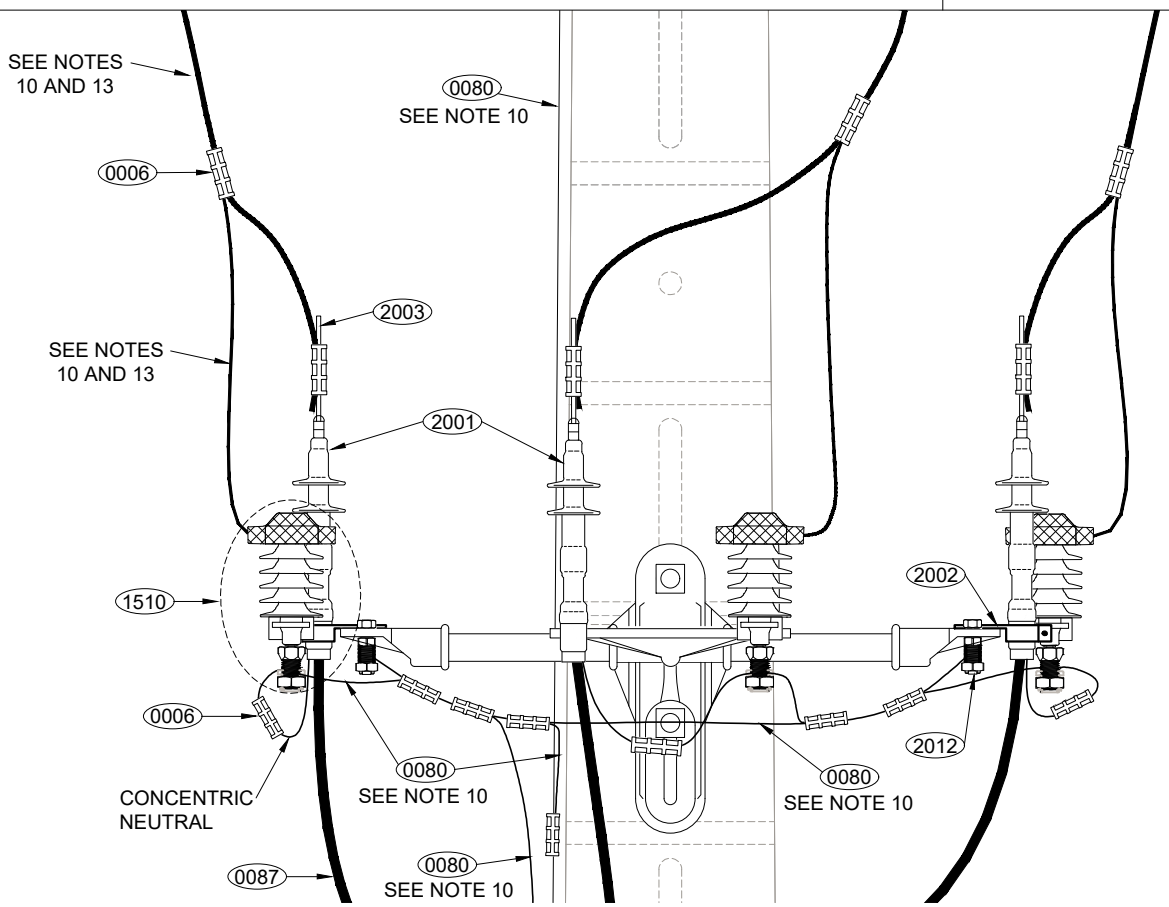
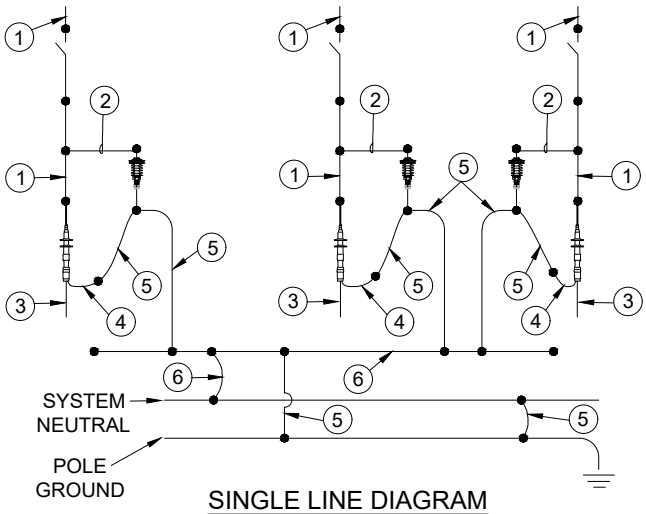


FIGURE 1



SINGLE LINE DIAGRAM

LEGEND:

1. OVERHEAD CONDUCTOR
2. LIGHTNING ARRESTER HOT WIRE
3. 15 KV UNDERGROUND CABLE
4. CONCENTRIC NEUTRAL
5. LIGHTNING ARRESTER GROUND CONDUCTOR / GROUND BONDING JUMPERS
6. POLE COMMON NEUTRAL CONDUCTOR

CABLE TERMINATION

AIR BREAK SWITCH

LIGTHNING ARRESTER

COMPRESSION, POST OR TERMINAL CONNECTOR

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM THREE PHASE WITH DISCONNECTING SWITCHES MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV NOTES

STANDARD NO. URD-3 VERSION 5
DOCUMENT NO. 4325.013
PAGE 3 OF 4 DATE JAN 10, 2023
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

TABLE 1 - CONDUCTOR SELECTION TABLE

①	②	③	⑤	⑥
OVERHEAD CONDUCTOR	LIGHTNING ARRESTER HOT WIRE	15 KV UNDERGROUND CABLE (COPPER)	LIGHTNING ARRESTER GROUND CONDUCTOR / GROUND BONDING JUMPER (COPPER BARE)	POLE COMMON NEUTRAL CONDUCTOR (COPPER BARE)
1C - 4/0 AWG	1C - #2 AWG	1C - 4/0 AWG - 15 KV	1C - #2 AWG	1C - 1/0 AWG
1C - 336.4 MCM	1C - #2 AWG	1C - 500 MCM - 15 KV	1C - #2 AWG	1C - 4/0 AWG
1C - 556.5 MCM	1C - #2 AWG	1C - 750 MCM - 15 KV	1C - #2 AWG	1C - 300 AWG

NOTES:

1. THE NEUTRAL CONDUCTOR MUST BE EFFECTIVELY BONDED TO THE GROUND CONNECTION SYSTEM. REFER TO ASSEMBLY NO. ASSY-1511, POLE GROUND ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
2. ALL MINIMUM VERTICAL CLEARANCES ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1505, FIBERGLASS STAND-OFF BRACKET ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
4. TO DETERMINE THE CORRESPONDING DUCT SIZE FOR THIS STANDARD, REFER TO STANDARD NO. URD-54.
5. REFER TO ASSEMBLY NO. ASSY-1510, LIGHTNING ARRESTERS ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
6. FOR DETAILS OF THE RISER DUCT AND THE RISER CONCRETE BASE SUPPORT, SEE STANDARDS NO. URD-4 AND URD-4-A.
7. REFER TO ASSEMBLY NO. ASSY-1512, OVERHEAD EQUIPMENT BONDING ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
8. REFER TO STANDARDS NO. URD-4 AND URD-4-A FOR RISER DUCT TERMINATION AND DUCT SEALING.
9. EACH RISER SUPPORT SHALL BE EFFECTIVELY BONDED TO POLE GROUND CONDUCTOR.
10. REFER TO TABLE 1 AND SINGLE LINE DIAGRAM FOR THE CORRESPONDING GAUGES OF THE UNDERGROUND, OVERHEAD AND LIGHTNING ARRESTERS CONDUCTORS.
11. THE CONDUCTORS CONNECTING THE LIVE TERMINAL OF THE LIGHTNING ARRESTER TO THE PRIMARY LINE (LINE LEAD) AND THE CONDUCTOR THAT CONNECTS GROUND TERMINAL TO THE POLE GROUND CONDUCTOR (GROUND LEAD) SHALL BE AS SHORT AS POSSIBLE. THE COMBINATION OF BOTH, THE LINE LEAD LENGTH AND GROUND LEAD LENGTH, SHALL BE LESS THAN 3'.
12. THE MINIMUM HEIGHT FOR THE POLE TO BE USED TO INSTALL THIS STANDARD SHALL BE 50'.
13. THE CONDUCTOR TO BE USED AS JUMPER SHALL BE OF THE SAME MATERIAL, GAUGE AND TYPE OF THE CONDUCTOR TO WHICH THEY WILL BE CONNECTED, IN ORDER TO ENSURE THAT THE AMPACITY AND TRANSFER CAPACITY OF THIS LINE IS NOT AFFECTED. REFER TO THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST (DOCUMENT NO. 4301.004) TO DETERMINE THE WAREHOUSE ITEM OF THE JUMPER TO BE USED ACCORDING TO THE REQUIREMENTS ESTABLISHED ABOVE. THE CONDUCTORS TO BE USED AS JUMPERS ARE THE FOLLOWING:
    ALUMINUM SPACER CONDUCTOR (ACSR) 15 KV - ITEM 0028
    COPPER BARE CONDUCTOR - ITEM 0080
    ALUMINUM BARE CONDUCTOR (ACSR) - ITEM 0106
    ALUMINUM BARE CONDUCTOR (AAAC) - ITEM 0106

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM THREE PHASE WITH DISCONNECTING SWITCHES MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV BILL OF MATERIAL

STANDARD NO. URD-3 VERSION 5
DOCUMENT NO. 4325.013
PAGE 4 OF 4 DATE JAN 10, 2023
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0001	THROUGH BOLT	VARIES	4
0002	FLAT SQUARE WASHER	VARIES	24
	SPLIT LOCK WASHER	VARIES	12
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	13
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
0087	15 KV UNDERGROUND CABLE	VARIES	AS REQ.
0128	AIR BREAK SWITCH	032-02785	3
0141	CROSSARM	008-00714	2
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	6
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	1
1510	LIGHTNING ARRESTERS ASSEMBLY	ASSY-1510 FIGURE B	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	OVERHEAD EQUIPMENT BONDING ASSEMBLY	ASSY-1512 FIGURE C, FIGURE D	2
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	1
2001	OUTDOOR CABLE TERMINATION STRESS CONE	VARIES	3
2002	CABLE AND STRESS CONE SUPPORT BRACKET	VARIES	3
2003	PIN TERMINAL CONNECTOR	VARIES	3
2004	FAULT CURRENT INDICATOR	032-82528	3
2009	½" HEXAGONAL NUTS	VARIES	12
2012	BRONZE MALE SERVICE POST CONNECTOR	VARIES	2
2048	HEX HEAD BOLT	038-83218	12
2501	RISER SUPPORT ASSEMBLY	ASSY-2501	AS REQ.

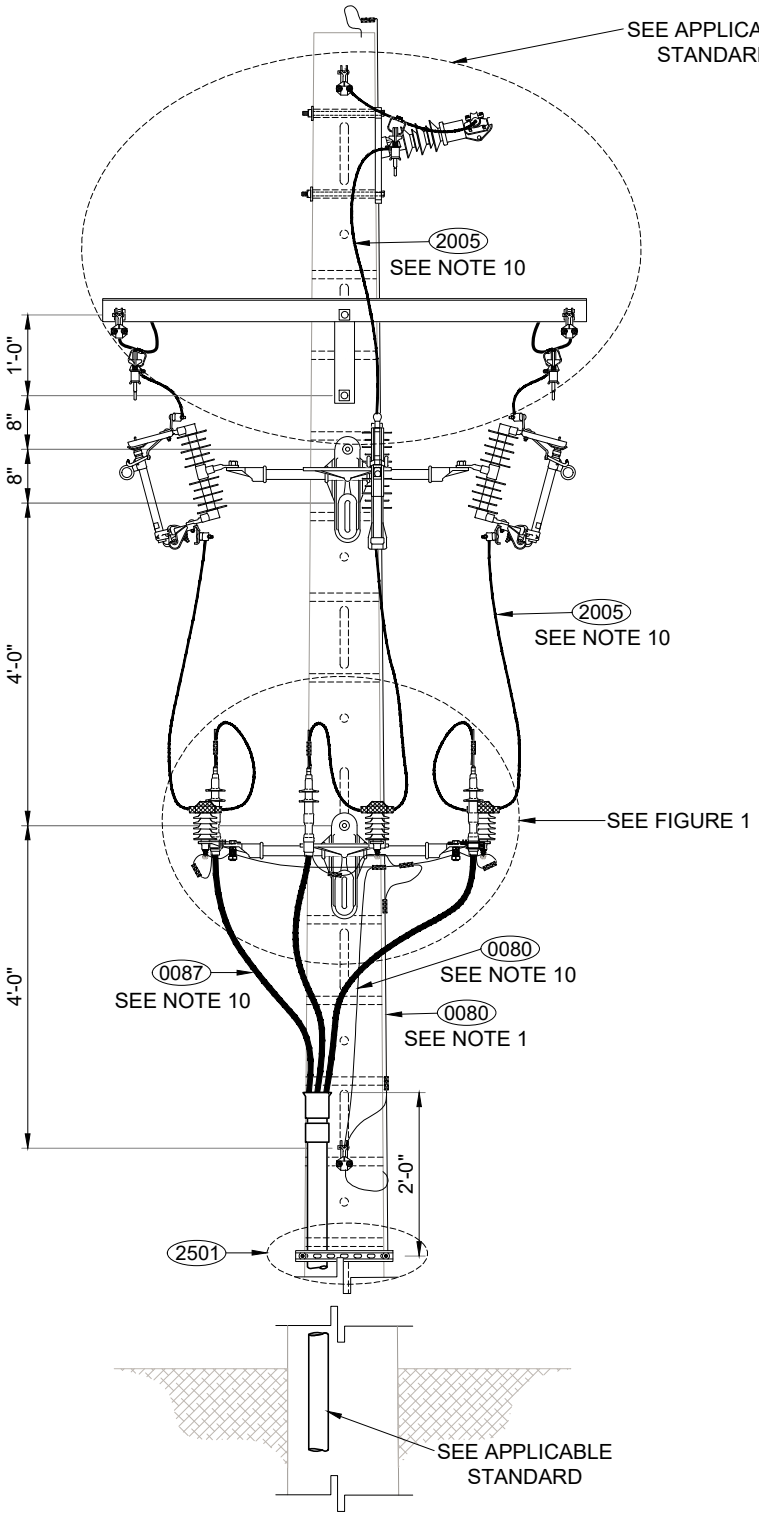
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

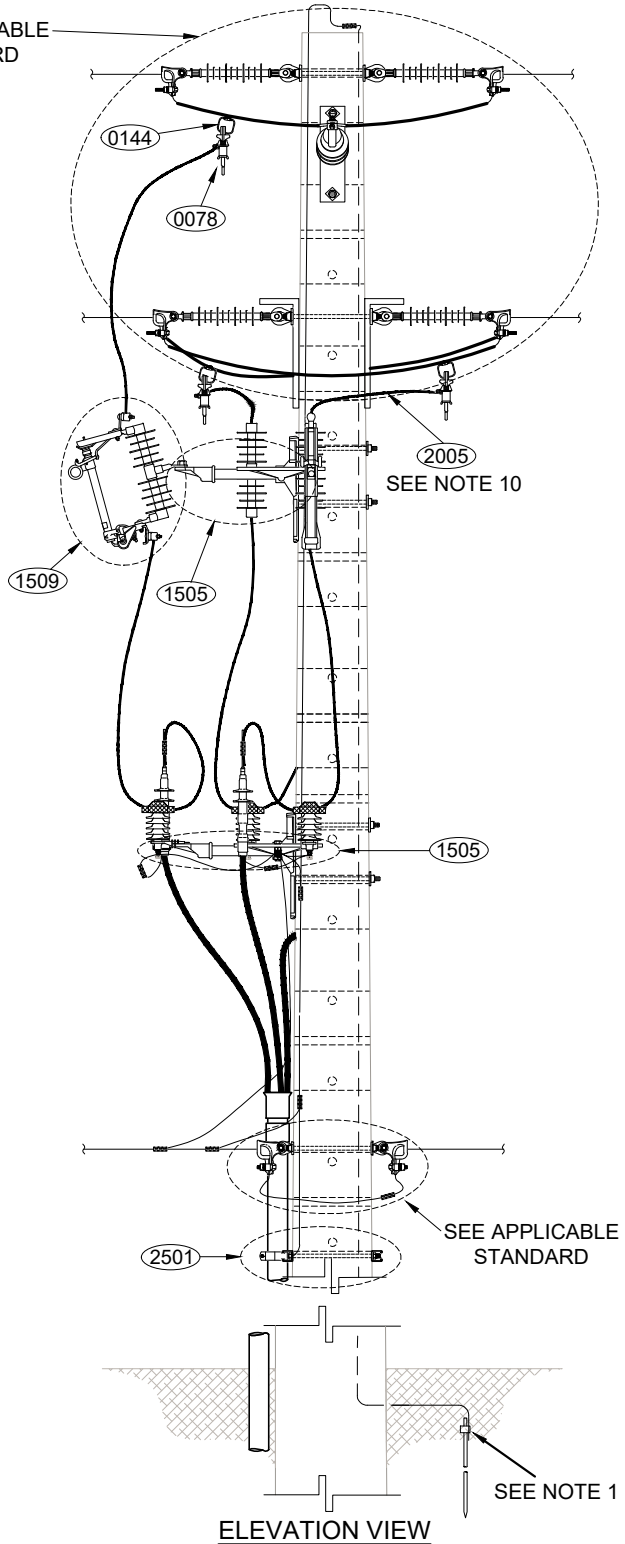
TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM
THREE PHASE WITH FUSE CUTOUTS
MAXIMUM RATING: 100 A
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	URD-3-A VERSION 2
DOCUMENT NO.	4325.014
PAGE	1 OF 4 DATE JAN 10, 2023
SUBMITTED	ROBERTO A. TORRES LIC. 10414
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	EMILIO CUADRADO LIC. 3000



ELEVATION VIEW
VIEW A ASSY-1500



ELEVATION VIEW
VIEW B ASSY-1500

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM
THREE PHASE WITH FUSE CUTOUTS
MAXIMUM RATING: 100 A
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	URD-3-A VERSION 2
DOCUMENT NO.	4325.014
PAGE	2 OF 4 DATE JAN 10, 2023
SUBMITTED	ROBERTO A. TORRES LIC. 10414
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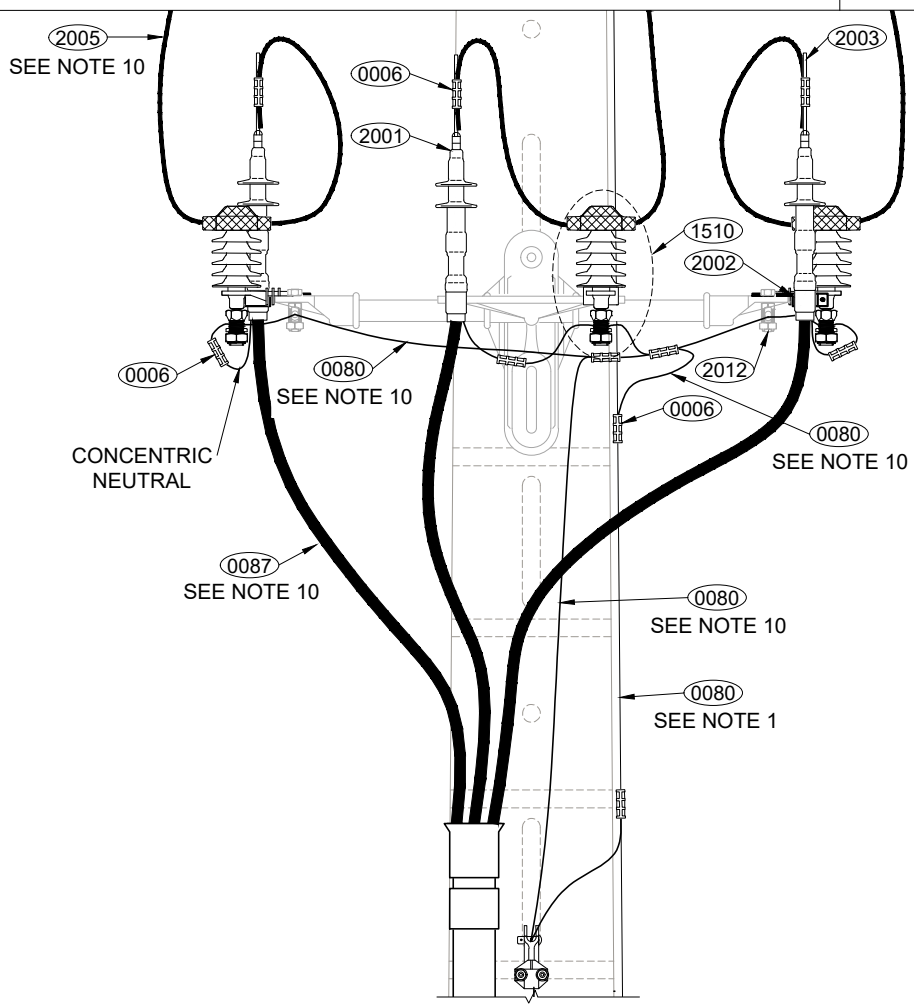
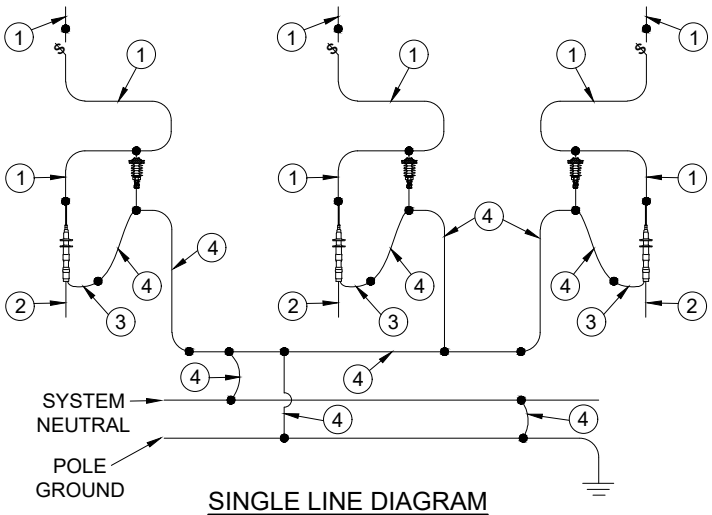


FIGURE 1



SINGLE LINE DIAGRAM

LEGEND:

1. 1C - #2 AWG, 600V, COPPER
2. 1C - #2 AWG, 15 KV UNDERGROUND CABLE, COPPER
3. CONCENTRIC NEUTRAL
4. 1C - #2 AWG, BARE, COPPER

- CABLE TERMINATION
- FUSE CUTOUT
- LIGTHNING ARRESTER
- COMPRESSION, POST OR TERMINAL CONNECTOR

TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM THREE PHASE WITH FUSE CUTOUTS MAXIMUM RATING: 100 A MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-3-A VERSION 2
DOCUMENT NO. 4325.014
PAGE 3 OF 4 DATE JAN 10, 2023
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

TABLE 1 - CONDUCTOR SELECTION TABLE

15 KV UNDERGROUND CABLE	OVERHEAD CONDUCTOR	LIGHTNING ARRESTER	
HOT WIRE (COPPER)	HOT WIRE (COPPER)	HOT WIRE (COPPER)	GROUND CONDUCTOR (COPPER BARE)
1C - #2 AWG - 15KV	1C - #2 AWG	1C - #2 AWG	1C - #2 AWG

NOTES:

1. THE NEUTRAL CONDUCTOR MUST BE EFFECTIVELY BONDED TO THE GROUND CONNECTION SYSTEM. REFER TO ASSEMBLY NO. ASSY-1511, POLE GROUND ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
2. ALL MINIMUM VERTICAL CLEARANCES ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1505, FIBERGLASS STAND-OFF BRACKET ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
4. REFER TO ASSEMBLY NO. ASSY-1509, FUSE CUTOUT ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
5. REFER TO ASSEMBLY NO. ASSY-1510, LIGHTNING ARRESTERS ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
6. FOR DETAILS OF THE RISER DUCT AND THE RISER CONCRETE BASE SUPPORT, SEE STANDARDS NO. URD-4 AND URD-4-A.
7. REFER TO ASSEMBLY NO. ASSY-1512, OVERHEAD EQUIPMENT BONDING ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
8. REFER TO STANDARDS NO. URD-4 AND URD-4-A FOR RISER DUCT TERMINATION AND DUCT SEALING.
9. EACH RISER SUPPORT SHALL BE EFFECTIVELY BONDED TO POLE GROUND CONDUCTOR.
10. REFER TO TABLE 1 AND SINGLE LINE DIAGRAM FOR THE CORRESPONDING GAUGES OF THE UNDERGROUND, OVERHEAD AND LIGHTNING ARRESTERS CONDUCTORS.
11. THE CONDUCTORS CONNECTING THE LIVE TERMINAL OF THE LIGHTNING ARRESTER TO THE PRIMARY LINE (LINE LEAD) AND THE CONDUCTOR THAT CONNECTS GROUND TERMINAL TO THE POLE GROUND CONDUCTOR (GROUND LEAD) SHALL BE AS SHORT AS POSSIBLE. THE COMBINATION OF BOTH, THE LINE LEAD LENGTH AND GROUND LEAD LENGTH, SHALL BE LESS THAN 3'.
12. THE MINIMUM HEIGHT FOR THE POLE TO BE USED TO INSTALL THIS STANDARD SHALL BE 50'.
13. TO DETERMINE THE CORRESPONDING DUCT SIZE FOR THIS STANDARD, REFER TO STANDARD NO. URD-54.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM THREE PHASE WITH FUSE CUTOUTS MAXIMUM RATING: 100 A MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-3-A VERSION 2
DOCUMENT NO. 4325.014
PAGE 4 OF 4 DATE JAN 10, 2023
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	10
0078	HOT LINE CLAMP	072-00348	3
0080	COPPER BARE CONDUCTOR	006-82621	AS REQ.
0087	15 KV UNDERGROUND CABLE	006-82624	AS REQ.
0144	STIRRUP	VARIES	3
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	2
1509	FUSE CUTOUT ASSEMBLY	ASSY-1509	3
1510	LIGHTNING ARRESTERS ASSEMBLY	ASSY-1510 FIGURE B	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	OVERHEAD EQUIPMENT BONDING ASSEMBLY	ASSY-1512 FIGURE D	1
2001	OUTDOOR CABLE TERMINATION STRESS CONE	038-01461	3
2002	CABLE AND STRESS CONE SUPPORT BRACKET	038-82668	3
2003	PIN TERMINAL CONNECTOR	002-09742	3
2005	STRANDED COPPER CABLE, 600V, XHHW-2	006-00833	AS REQ.
2012	BRONZE MALE SERVICE POST CONNECTOR	002-82925	2
2501	RISER SUPPORT ASSEMBLY	ASSY-2501	AS REQ.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM
THREE PHASE WITH DISCONNECTING SWITCHES
MAXIMUM RATING: 900 A
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	URD-3-B VERSION 2
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PAGE	1 OF 7 DATE JAN 10, 2023
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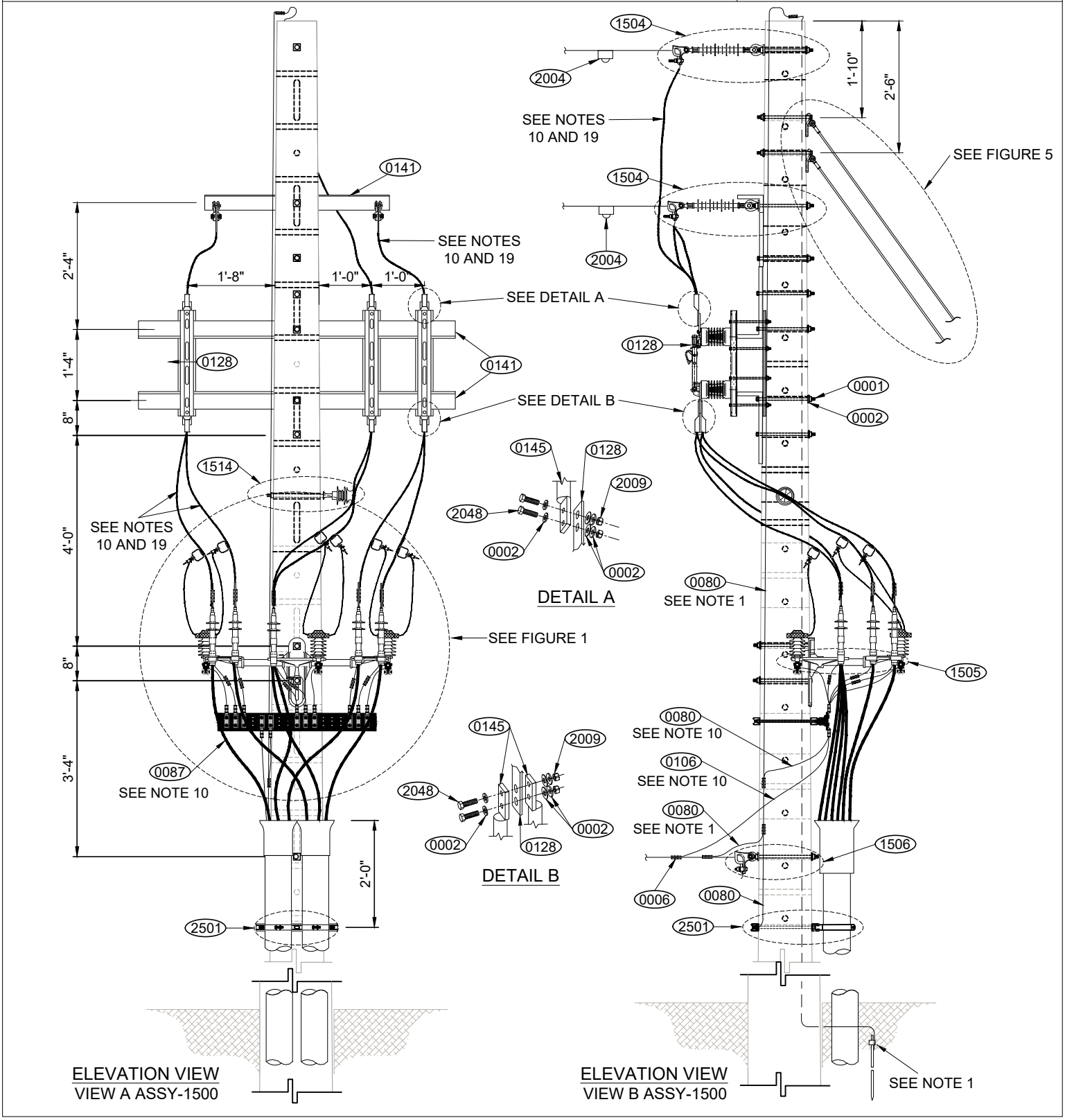
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	EMILIO CUADRADO LIC. 3000



DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM THREE PHASE WITH DISCONNECTING SWITCHES MAXIMUM RATING: 900 A MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	URD-3-B VERSION 2
DOCUMENT NO.	4325.015
PAGE	2 OF 7 DATE JAN 10, 2023
SUBMITTED	ROBERTO A. TORRES LIC. 10414
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	EMILIO CUADRADO LIC. 3000

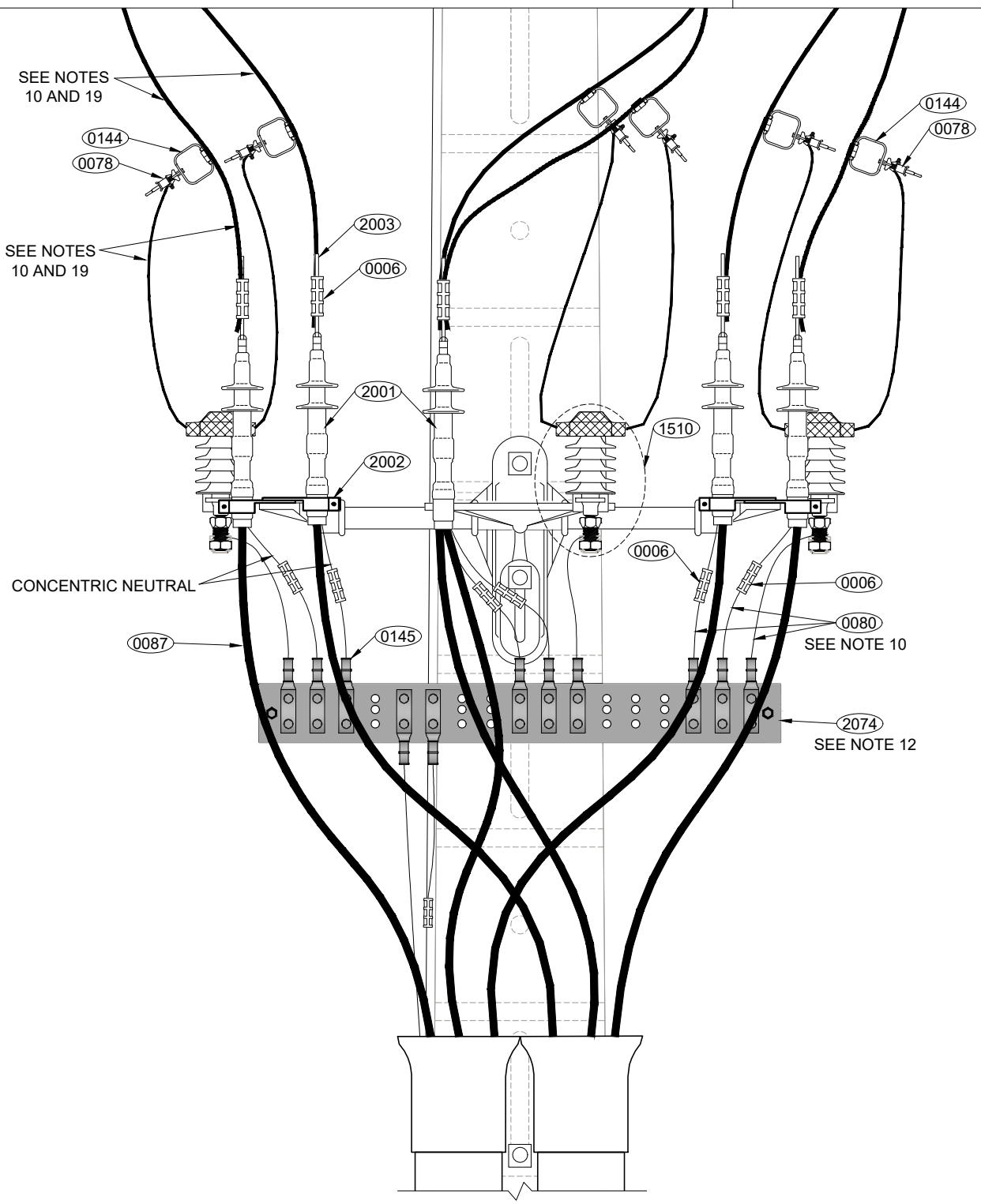


FIGURE 1

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM THREE PHASE WITH DISCONNECTING SWITCHES MAXIMUM RATING: 900 A MAXIMUM VOLTAGE: 13.2 KV

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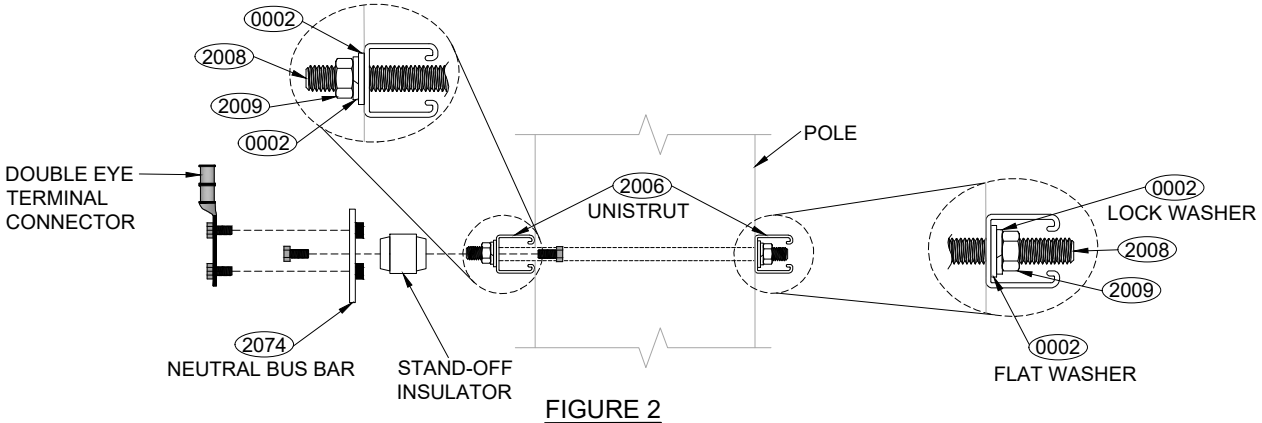


FIGURE 2

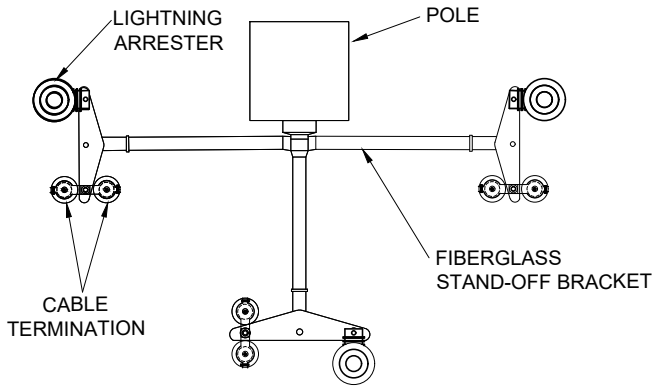


FIGURE 3

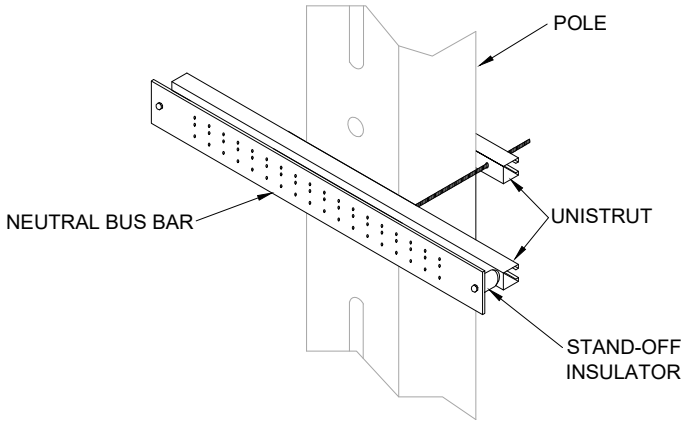
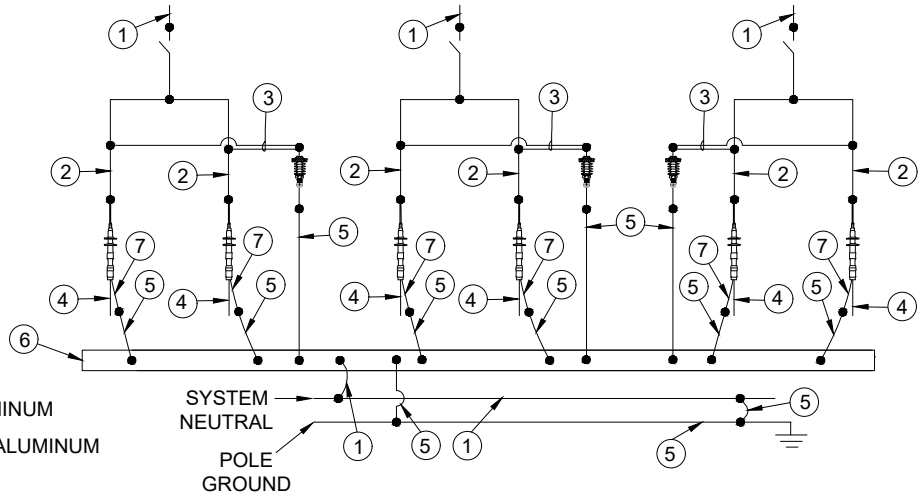


FIGURE 4



SINGLE LINE DIAGRAM

LEGEND:

1. 1C - 795 MCM, BARE, ALUMINUM
2. 1C - 336.4 MCM, SPACER, ALUMINUM
3. 1C - #2 AWG
4. 1C - 750 MCM, 15 KV UNDERGROUND CABLE, COPPER
5. 1C - #2 AWG, BARE, COPPER
6. NEUTRAL BUS BAR
7. CONCENTRIC NEUTRAL

- CABLE TERMINATION
- AIR BREAK SWITCH
- LIGTHNING ARRESTER
- COMPRESSION, POST OR TERMINAL CONNECTOR

TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM THREE PHASE WITH DISCONNECTING SWITCHES MAXIMUM RATING: 900 A MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-3-B VERSION 2
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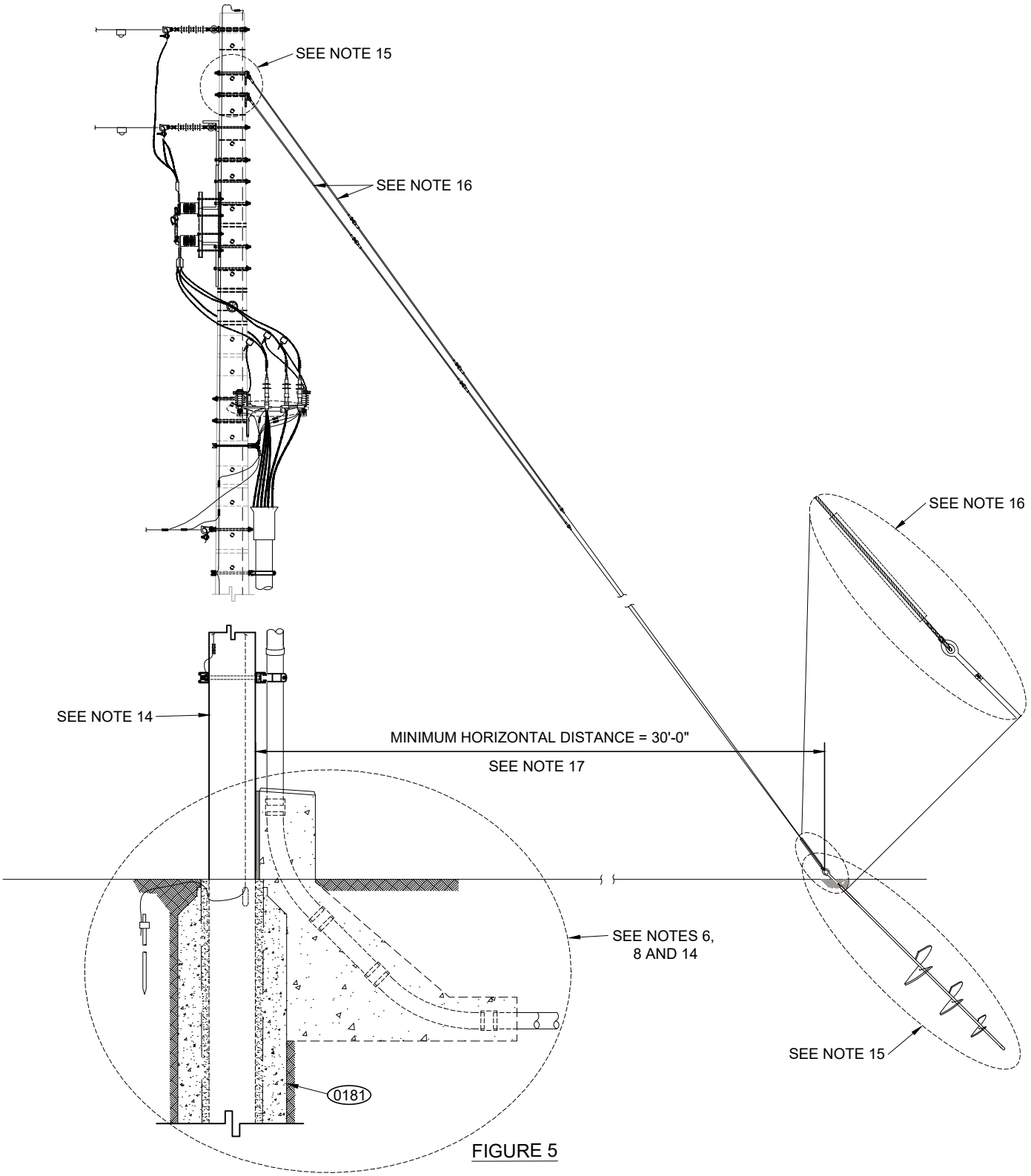

FIGURE 5

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM THREE PHASE WITH DISCONNECTING SWITCHES MAXIMUM RATING: 900 A MAXIMUM VOLTAGE: 13.2 KV NOTES

STANDARD NO. URD-3-B VERSION 2
DOCUMENT NO. 4325.015
PAGE 5 OF 7 DATE JAN 10, 2023
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APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

TABLE 1 - CONDUCTOR SELECTION TABLE			
15 KV UNDERGROUND CABLE	OVERHEAD CONDUCTOR	LIGHTNING ARRESTER	
HOT WIRE (COPPER)	HOT WIRE	HOT WIRE	GROUND CONDUCTOR (COPPER BARE)
2C - 750 MCM - 15KV	1C - 795 MCM (ALUMINUM BARE) 2C - 336.4 MCM (ALUMINUM SPACER)	2C - #2 AWG	1C - #2 AWG

NOTES:

1. THE NEUTRAL CONDUCTOR MUST BE EFFECTIVELY BONDED TO THE GROUND CONNECTION SYSTEM. REFER TO ASSEMBLY NO. ASSY-1511, POLE GROUND ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
2. ALL MINIMUM VERTICAL CLEARANCES ARE BASED UPON NESC RULE 235C.
3. REFER TO ASSEMBLY NO. ASSY-1505, FIBERGLASS STAND-OFF BRACKET ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
4. TO DETERMINE THE CORRESPONDING DUCT SIZE FOR THIS STANDARD, REFER TO STANDARD NO. URD-54.
5. REFER TO ASSEMBLY NO. ASSY-1510, LIGHTNING ARRESTERS ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
6. FOR DETAILS OF THE RISER DUCT AND THE RISER CONCRETE BASE SUPPORT, SEE STANDARD NO. URD-4-A.
7. REFER TO ASSEMBLY NO. ASSY-1512, OVERHEAD EQUIPMENT BONDING ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
8. REFER TO STANDARD NO. URD-4-A FOR RISER DUCT TERMINATION AND DUCT SEALING.
9. EACH RISER SUPPORT SHALL BE EFFECTIVELY BONDED TO POLE GROUND CONDUCTOR.
10. REFER TO TABLE 1 AND SINGLE LINE DIAGRAM FOR THE CORRESPONDING GAUGES OF THE UNDERGROUND, OVERHEAD AND LIGHTNING ARRESTERS CONDUCTORS.
11. THE CONDUCTORS CONNECTING THE LIVE TERMINAL OF THE LIGHTNING ARRESTER TO THE PRIMARY LINE (LINE LEAD) AND THE CONDUCTOR THAT CONNECTS GROUND TERMINAL TO THE POLE GROUND CONDUCTOR (GROUND LEAD) SHALL BE AS SHORT AS POSSIBLE. THE COMBINATION OF BOTH, THE LINE LEAD LENGTH AND GROUND LEAD LENGTH, SHALL BE LESS THAN 3'.
12. REFER TO FIGURE 2 AND FIGURE 4 FOR THE NEUTRAL BUS BAR INSTALLATION DETAILS.
13. REFER TO FIGURE 3 FOR INSTALLATION OF TERMINATIONS AND LIGHTNING ARRESTERS ON THE FIBERGLASS STAND-OFF BRACKET.
14. THE POLE TO INSTALL THIS STANDARD SHALL BE 50' HIGH, H6 CLASS CONCRETE OR S8 CLASS STEEL, WITH A SELF SUPPORT BASE AND 7' DEPTH EMBEDMENT.
15. THIS STANDARD REQUIRES THE INSTALLATION OF TWO GUY WIRES ATTACHED AT 22" AND 30" FROM THE POLE TOP. THESE GUYS SHALL BE ATTACHED TO ONE SCREW TYPE ANCHOR ROD WITH CAPACITY FOR TWO GUYS SIMULTANEOUSLY. FOR INSTALLATION DETAILS AND MATERIALS, REFER TO STANDARD NO. F-4-2, SCREW TYPE ANCHOR, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
16. THE GUYS WIRES SHALL BE INSTALLED USING MULTIPLE FIBERGLASS GUY STRAIN INSULATORS (ITEM 0154) TO PROTECT FROM CONTACT WITH ENERGIZED COMPONENTS. FOR INSTALLATION DETAILS AND MATERIALS, REFER TO STANDARD NO. E-1-2-3, ½" SINGLE GUY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
17. THE MINIMUM HORIZONTAL DISTANCE BETWEEN THE RISER POLE AND THE ANCHOR ROD SHALL BE 30'.
18. THE MAXIMUM DISTANCE BETWEEN THE RISER POLE AND THE NEXT POLE SHALL NOT EXCEED 100'.
19. THE CONDUCTOR TO BE USED AS JUMPER SHALL BE OF THE SAME MATERIAL, GAUGE AND TYPE OF THE CONDUCTOR TO WHICH THEY WILL BE CONNECTED, IN ORDER TO ENSURE THAT THE AMPACITY AND TRANSFER CAPACITY OF THIS LINE IS NOT AFFECTED. REFER TO THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST (DOCUMENT NO. 4301.004) TO DETERMINE THE WAREHOUSE ITEM OF THE JUMPER TO BE USED ACCORDING TO THE REQUIREMENTS ESTABLISHED ABOVE. THE CONDUCTORS TO BE USED AS JUMPERS ARE THE FOLLOWING:
    - ALUMINUM SPACER CONDUCTOR (ACSR) 15 KV - ITEM 0028
    - COPPER BARE CONDUCTOR - ITEM 0080
    - ALUMINUM BARE CONDUCTOR (ACSR) - ITEM 0106
    - ALUMINUM BARE CONDUCTOR (AAAC) - ITEM 0106

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM
THREE PHASE WITH DISCONNECTING SWITCHES
MAXIMUM RATING: 900 A
MAXIMUM VOLTAGE: 13.2 KV
BILL OF MATERIAL

STANDARD NO. URD-3-B VERSION 2
DOCUMENT NO. 4325.015
PAGE 6 OF 7 DATE JAN 10, 2023
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0001	THROUGH BOLT	VARIES	4
0002	FLAT SQUARE WASHER	VARIES	68
	SPLIT LOCK WASHER	VARIES	34
0006	COMPRESSION SPICES AND CONNECTORS	VARIES	14
0078	HOT LINE CLAMP	072-00330	6
0080	COPPER BARE CONDUCTOR	006-82621	AS REQ.
0087	15 KV UNDERGROUND CABLE	006-82628	AS REQ.
0106	ALUMINUM BARE CONDUCTOR	042-82942	AS REQ.
0128	AIR BREAK SWITCH	032-02785	3
0141	CROSSARM	VARIES	3
0144	STIRRUP	002-14601	6
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	20
0181	PRECAST CONCRETE FOUNDATION	VARIES	1
1504	PRIMARY DEADEND ASSEMBLY	ASSY-1504	3
1505	FIBERGLASS STAND-OFF BRACKET ASSEMBLY	ASSY-1505 FIGURE C	1
1506	NEUTRAL, SECONDARY AND JOINT USE DEADEND ASSEMBLY	ASSY-1506	1
1510	LIGHTNING ARRESTERS ASSEMBLY	ASSY-1510 FIGURE B	3
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
1512	OVERHEAD EQUIPMENT BONDING ASSEMBLY	ASSY-1512 FIGURE C, FIGURE D	2
1514	PIN TYPE POLYMER INSULATOR ASSEMBLY	ASSY-1514 FIGURE A	1

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND CABLE CONNECTION TO OVERHEAD SYSTEM THREE PHASE WITH DISCONNECTING SWITCHES MAXIMUM RATING: 900 A MAXIMUM VOLTAGE: 13.2 KV BILL OF MATERIAL

STANDARD NO. URD-3-B VERSION 2
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
2001	OUTDOOR CABLE TERMINATION STRESS CONE	038-01479	6
2002	CABLE AND STRESS CONE SUPPORT BRACKET	038-77378	6
2003	PIN TERMINAL CONNECTOR	002-82941	6
2004	FAULT CURRENT INDICATOR	032-82528	3
2006	1 5/8" STRUT CHANNEL	VARIES	AS REQ.
2008	1/2" FULLY THREADED ROD	VARIES	AS REQ.
2009	1/2" HEXAGONAL NUTS	VARIES	34
2048	HEX HEAD BOLT	038-83218	34
2074	NEUTRAL BUS BAR	038-83390	1
2501	RISER SUPPORT ASSEMBLY	ASSY-2501	AS REQ.
E-1-2-3	1/2" SINGLE GUY STANDARD	E-1-2-3	2
F-4-2	SCREW TYPE ANCHOR STANDARD	F-4-2	1
URD-4-A	PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER WITH PRECAST CONCRETE FOUNDATION STANDARD	URD-4-A	1

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-4 VERSION 5
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PAGE 1 OF 5 DATE JAN 10, 2023
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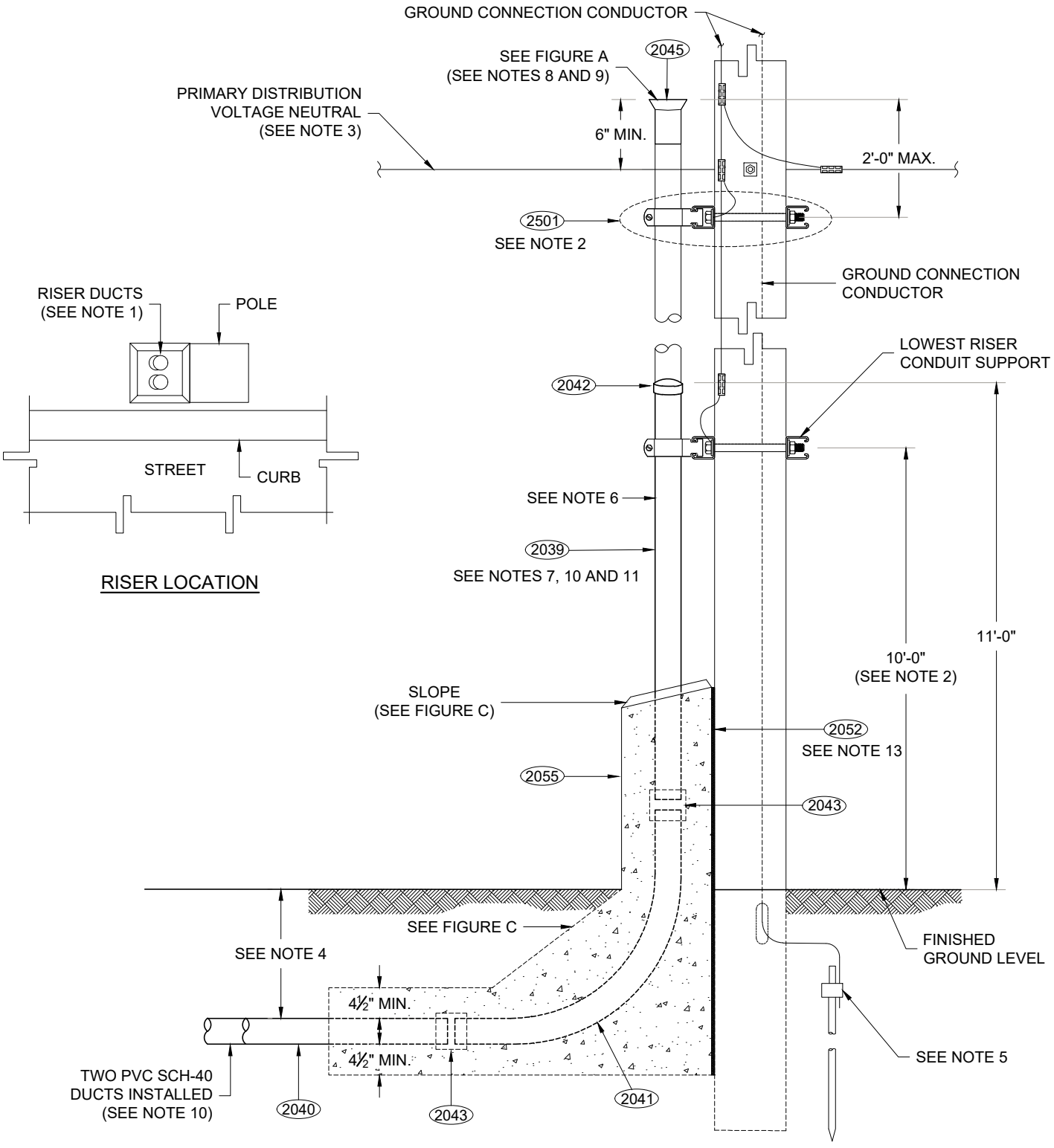
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412



DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-4 VERSION 5
DOCUMENT NO. 4325.016
PAGE 2 OF 5 DATE JAN 10, 2023
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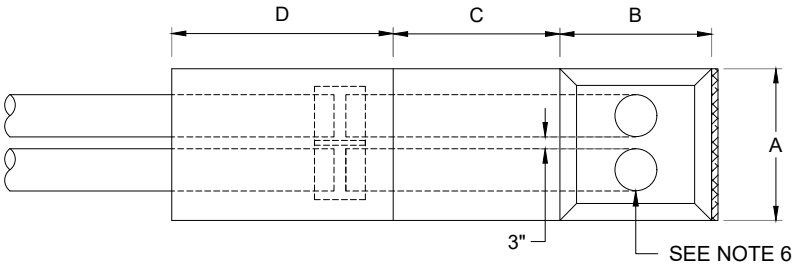
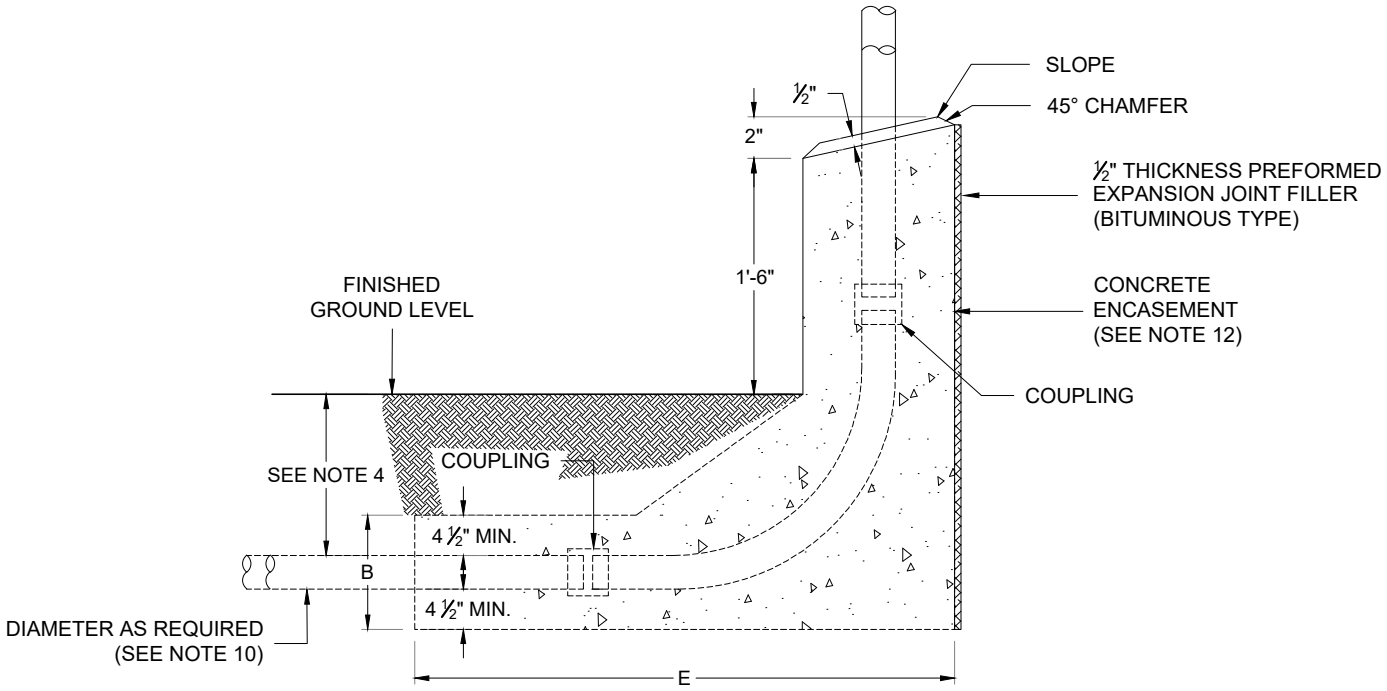


TOP VIEW



SIDE VIEW

DUCT SIZE	A	B	C	D	E	BEND RADIUS
2"	16"	11"	32-½"	12"	4'-7½"	36"
3"	18"	12"	32-½"	12"	4'-8½"	36"
4"	20"	13"	41"	12"	5'-6"	48"
6"	24"	15"	41"	12"	5'-8"	48"

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

PRIMARY AND SECONDARY
DISTRIBUTION VOLTAGE RISER
MAXIMUN VOLTAGE: 13.2 KV

STANDARD NO. URD-4 VERSION 5
DOCUMENT NO. 4325.016
PAGE 3 OF 5 DATE JAN 10, 2023
SUBMITTED JOSE M. OROZCO LIC. 16380
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

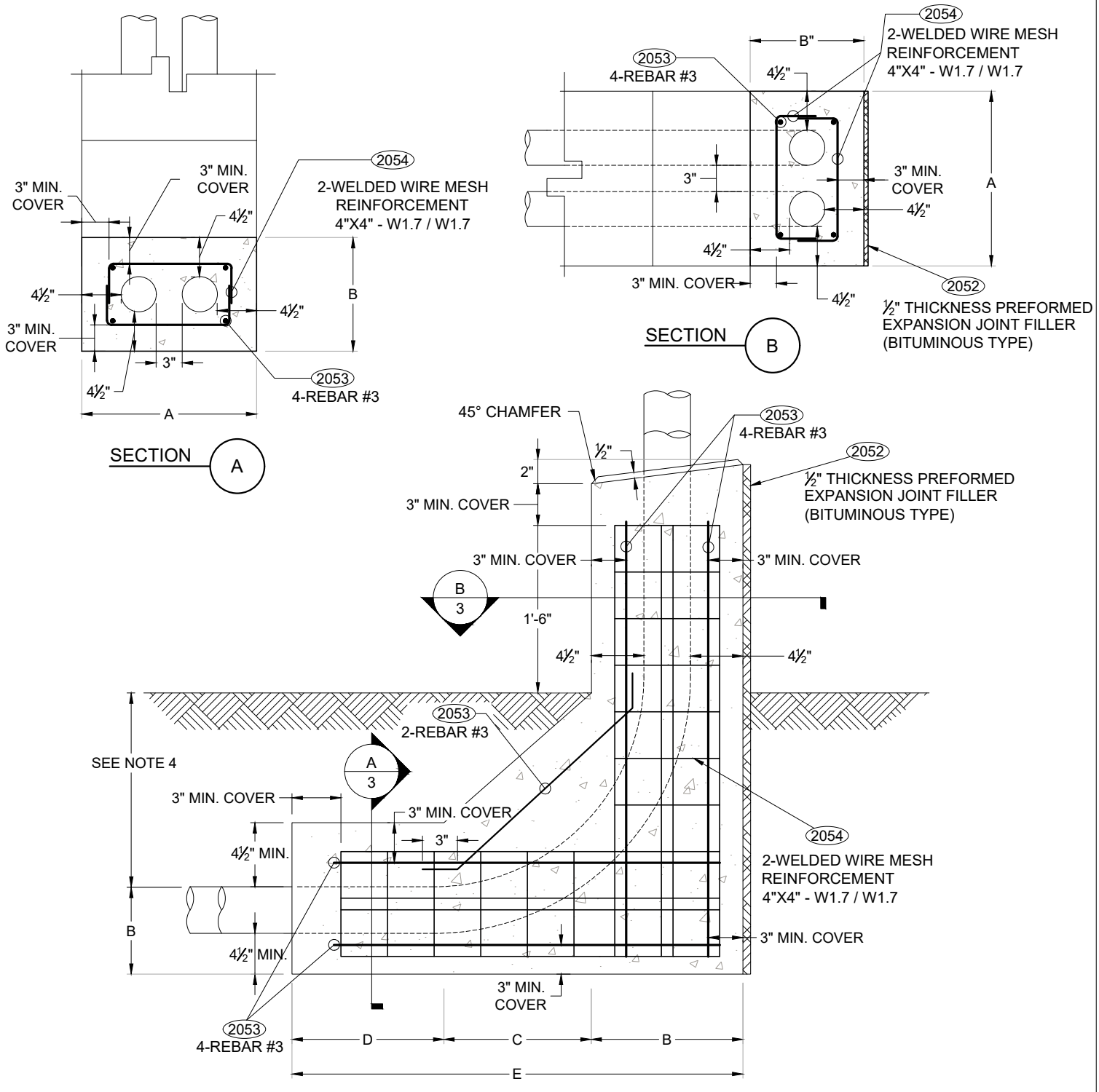


FIGURE A
DUCT CONCRETE ENCASEMENT

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER MAXIMUM VOLTAGE: 13.2 KV NOTES

STANDARD NO. URD-4 VERSION 5
DOCUMENT NO. 4325.016
PAGE 4 OF 5 DATE JAN 10, 2023
SUBMITTED LUIS R. SOTO LIC. 11658
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APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES:

1. RISER DUCTS SHALL BE INSTALLED PARALLEL TO THE STREET, ON THE SIDE OF THE POLE THAT IS IN THE OPPOSITE DIRECTION OF VEHICULAR TRAFFIC, WHERE IT IS LESS SUSCEPTIBLE TO DAMAGE FROM VEHICLE IMPACT.
2. THE RISER DUCT SHALL BE ATTACHED TO THE POLE WITH A STRUT CHANNEL BRACKET. (SEE ASSEMBLY NO. ASSY-2501)
3. THE TOP OF THE RISER DUCT SHALL BE 6" MINIMUM ABOVE THE NEUTRAL CONDUCTOR FOR PRIMARY DISTRIBUTION VOLTAGE. FOR SECONDARY DISTRIBUTION VOLTAGE, THE TOP OF THE RISER DUCT SHALL BE 12" BELOW THE SECONDARY VOLTAGE LINE. WHEN THERE ARE MULTIPLE FEEDERS ON THE POLE, THE TOP OF THE RISER DUCT SHALL BE INSTALLED JUST BELOW THE FEEDER TO BE CONNECTED. WORK TO BE DONE NEAR ENERGIZED LINES SHALL BE COORDINATED WITH LUMA.
4. DEPTH SHALL BE 48" FOR PRIMARY DISTRIBUTION VOLTAGE AND 36" FOR SECONDARY DISTRIBUTION VOLTAGE.
5. FOR GROUND ROD INSTALLATION AND CONNECTION, SEE ASSEMBLY NO. ASSY-1511, POLE GROUND ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
6. A SPARE DUCT SHALL BE INSTALLED IN THE SAME TRENCH AS THE DUCT WITH THE ENERGIZED LINE BETWEEN THE POLE AND THE NEXT INSTALLED EQUIPMENT. THE SPARE DUCT SHALL EXTEND 11' ABOVE THE FINISHED GROUND LEVEL AND SHALL HAVE A PVC END CAP TO PREVENT THE ENTRY OF WATER, WILD LIFE OR FOREIGN OBJECTS. NO SPARE DUCT IS REQUIRED FOR INSTALLATION OF A SINGLE METER MOUNTING DEVICE FOR SECONDARY DISTRIBUTION VOLTAGE.
7. RISERS' DUCTS INSTALLED IN PRIVATE POLES CAN BE RIGID GALVANIZED STEEL, FIBERGLASS OR PVC SCH-80.
8. THE RISER DUCT SHALL HAVE A PVC END BELL AT THE TOP. FOR PRIVATE SECONDARY VOLTAGE RISER, THE OWNER CAN USE WEATHERHEAD ON THE TOP OF THE RISER INSTEAD OF A PVC END BELL.
9. THE RISER DUCT TOP SHALL BE SEALED WITH A SEALING COMPOUND (ITEM 2014) TO PREVENT THE ENTRY OF WATER, WILD LIFE OR FOREIGN OBJECTS.
10. THE DIAMETER OF THE RISER DUCT WILL DEPEND ON THE GAUGE OF THE CABLE USED IN THE UNDERGROUND SYSTEM DESIGN. (SEE STANDARD NO. URD-54)
11. THE RISER DUCT SHALL BE LABELED TO IDENTIFY ITS PURPOSE. SOME ALTERNATIVES COULD BE THE FEEDER NUMBER, CUSTOMER'S NAME, CUSTOMER'S ADDRESS, COMPANY OR BUILDING'S NAME, MANHOLE NUMBER, SWITCHING UNIT NUMBER, TRANSFORMER NUMBER, ETC. A DURABLE ENGINEERING GRADE VINYL LABEL WITH GOOD ADHESIVE SHALL BE USED FOR LABELING. THE VINYL LABEL SHALL HAVE A YELLOW BACKGROUND AND AND BLACK LETTERING. IT SHALL BE INSTALLED ON THE RISER DUCT AT APPROXIMATELY 10' HEIGHT ABOVE FINISHED GROUND LEVEL.
12. THE DESIGN OF THE DUCT CONCRETE ENCASEMENT SHALL REMAIN THE SAME FOR ANY TYPE OF POLE. THE SECTION OF THE CONCRETE ENCASEMENT THAT IS IN CONTACT WITH THE POLE AND THE CONCRETE FOUNDATION SHALL HAVE THE SHAPE OF THE POLE AND CONCRETE FOUNDATION, SQUARE OR ROUND.
13. A ½" THICK PREFORMED EXPANSION JOINT FILLER SHALL BE INSTALLED BETWEEN THE POLE AND THE DUCT CONCRETE ENCASEMENT. THE PREFORMED EXPANSION JOINT FILLER SHALL BE BITUMINOUS TYPE, WATERPROOF, PERMANENT, FLEXIBLE AND SELF-SEALING. THIS MATERIAL SHALL MEET THE REQUIREMENTS OF STANDARD NO. ASTM D994 - STANDARD SPECIFICATION FOR PREFORMED EXPANSION JOINT FILLER FOR CONCRETE (BITUMINOUS TYPE). THE FILLER SHALL BE FURNISHED IN A SINGLE PIECE FOR THE FULL DEPTH AND WIDTH REQUIRED FOR EACH JOINT.
14. THE CONCRETE MIX SHALL BE DESIGNED DETERMINING THE PROPORTIONS OF PORTLAND CEMENT, COARSE AND FINE AGGREGATES, AND WATER NECESSARY TO COMPLY WITH THE SPECIFIED MINIMUM COMPRESSIVE STRENGTH AND THE VOLUMETRIC PROPORTIONING METHODS, SUCH AS OUTLINED IN THE AMERICAN CONCRETE INSTITUTE (ACI) STANDARD NO. PRC-211.1 - RECOMMENDED PRACTICE FOR SELECTING PROPORTIONS FOR NORMAL, HEAVYWEIGHT, AND MASS CONCRETE.
15. THE MINIMUM COMPRESSIVE STRENGTH FOR CONCRETE SHALL BE 3,000 PSI AT 28 DAYS, AS TESTED IN ACCORDANCE WITH STANDARD NO. ASTM C39 - STANDARD TEST METHOD FOR COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS.
16. THE TYPE II PORTLAND CEMENT SHALL BE IN CONFORMANCE WITH THE REQUIREMENTS OF STANDARD NO. ASTM C150 - STANDARD SPECIFICATION OF PORTLAND CEMENT; AND COARSE AND FINE AGGREGATES SHALL BE IN CONFORMANCE WITH THE REQUIREMENTS OF STANDARD NO. ASTM C33 - STANDARD SPECIFICATION FOR CONCRETE AGGREGATES.
17. THE COARSE AGGREGATE FOR CONCRETE SHALL CONSIST OF CLEAN CRUSHED STONE OR PEA GRAVEL. THIS MATERIAL SHOULD BE UNIFORMLY GRADE AND THE SIZES ARE FROM ½", NOMINAL MAXIMUM AGGREGATE SIZE, DOWN TO ⅜". IT SHALL BE FREE FROM SOFT AND DISINTEGRATED PIECES, CLAY, ORGANIC OR OTHER DELETERIOUS MATTER.
18. THE REINFORCING STEEL SHALL BE FABRICATED AND PLACED IN CONFORMANCE WITH STANDARD NO. ACI 318- SPECIFICATION OF BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE. THE REINFORCING STEEL SHALL BE DEFORMED BAR AND GRADE 60 (MINIMUM YIELD STRENGTH EQUAL TO 60,000 PSI), ACCORDING TO STANDARD NO. ASTM A615 - STANDARD SPECIFICATION FOR DEFORMED AND PLAIN CARBON-STEEL BARS FOR CONCRETE REINFORCEMENT, AND IT SHALL BE NEW BILLET-STEEL, AS REQUIRED.
19. THE WELDED WIRE MESH REINFORCEMENT SHALL MEET THE REQUIREMENTS OF STANDARD NO. ASTM A185 - STANDARD SPECIFICATION FOR STEEL WELDED WIRE REINFORCEMENT, PLAIN, FOR CONCRETE; AND STANDARD NO. ASTM A1064 - STANDARD SPECIFICATION FOR CARBON-STEEL WIRE AND WELDED WIRE REINFORCEMENT, PLAIN AND DEFORMED, FOR CONCRETE.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER MAXIMUM VOLTAGE: 13.2 KV BILL OF MATERIAL

STANDARD NO. URD-4 VERSION 5
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PAGE 5 OF 5 DATE JAN 10, 2023
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DIGITIZED VICTOR R. FEBRES LIC. 3412

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
2014	DUCT SEALING COMPOUND	003-02935	AS REQ.
2039	PVC SCH-80 DUCT	VARIES	AS REQ.
2040	PVC SCH-40 DUCT	VARIES	AS REQ.
2041	90° PVC ELBOW	VARIES	2
2042	PVC END CAP	VARIES	1
2043	PVC COUPLING	VARIES	5
2045	PVC END BELL	VARIES	1
2052	PREFORMED EXPANSION JOINT FILLER	038-46670	AS REQ.
2053	STEEL REINFORCEMENT REBAR	VARIES	6
2054	WELDED WIRE MESH REINFORCEMENT	002-53608	SEE TABLE 1
2055	READY MIX CONCRETE	038-44668	SEE TABLE 1
2501	RISER SUPPORT ASSEMBLY	ASSY-2501	AS REQ.

TABLE 1		
DUCT SIZE	CONCRETE	WIRE MESH
2"	0.78 CUBIC YARD	16"X18'
3"	1.00 CUBIC YARD	20"X18½'
4"	1.25 CUBIC YARD	28"X20'
6"	1.75 CUBIC YARD	32"X20½'

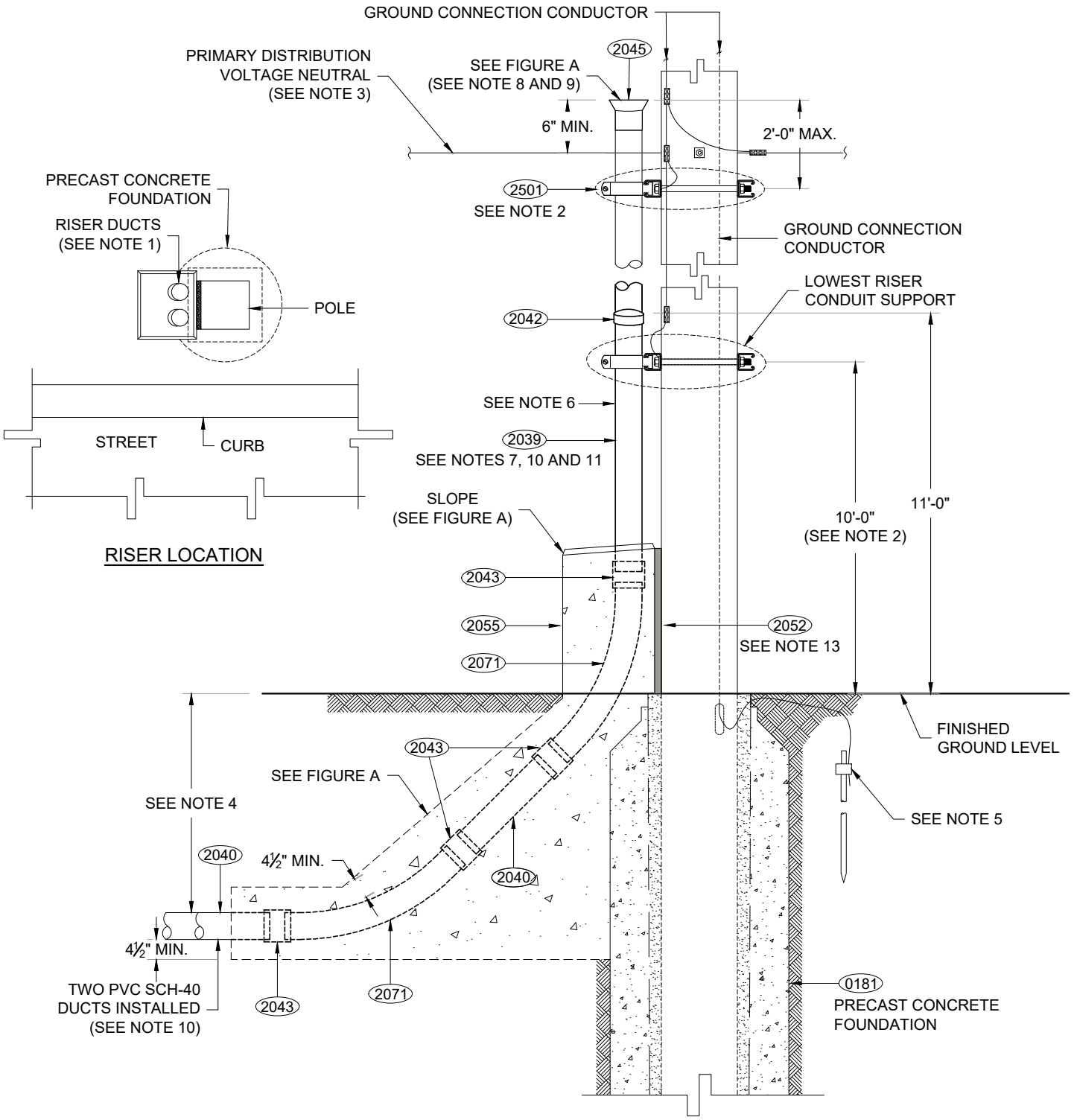
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER WITH PRECAST CONCRETE FOUNDATION MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	URD-4-A VERSION 1
DOCUMENT NO.	4325.017
PAGE	1 OF 5 DATE SEPT 21, 2022
SUBMITTED	LUIS R. SOTO LIC. 11658
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	VICTOR R. FEBRES LIC. 3412



DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER
WITH PRECAST CONCRETE FOUNDATION
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-4-A VERSION 1
DOCUMENT NO. 4325.017
PAGE 2 OF 5 DATE SEPT 21, 2022
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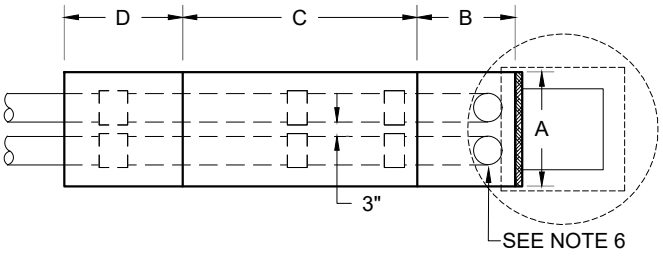
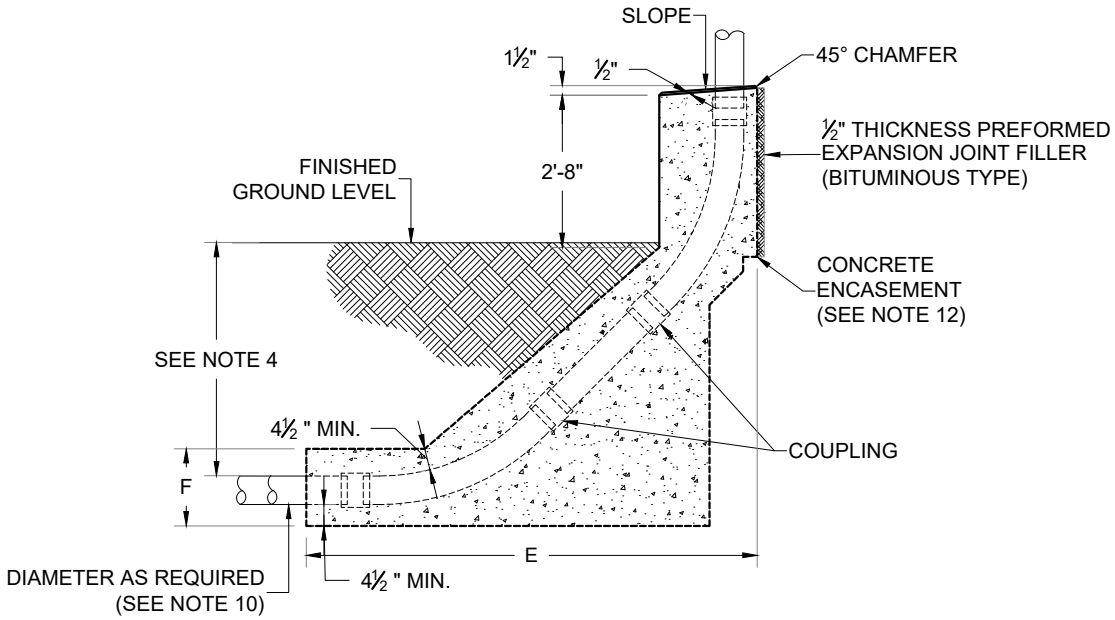


TOP VIEW



SIDE VIEW

DUCT SIZE	A	B	C	D	E	F	BEND RADIUS
2"	16"	16"	38"	24"	6'-6"	12- ½"	36"
3"	18"	17"	38"	24"	6'-7"	13- ½"	36"
4"	20"	18"	49"	24"	7'-7"	14- ½"	48"
6"	24"	20"	49"	24"	7'-9"	16- ½"	48"

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER WITH PRECAST CONCRETE FOUNDATION MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-4-A VERSION 1
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SUBMITTED JOSE M. OROZCO LIC. 16380
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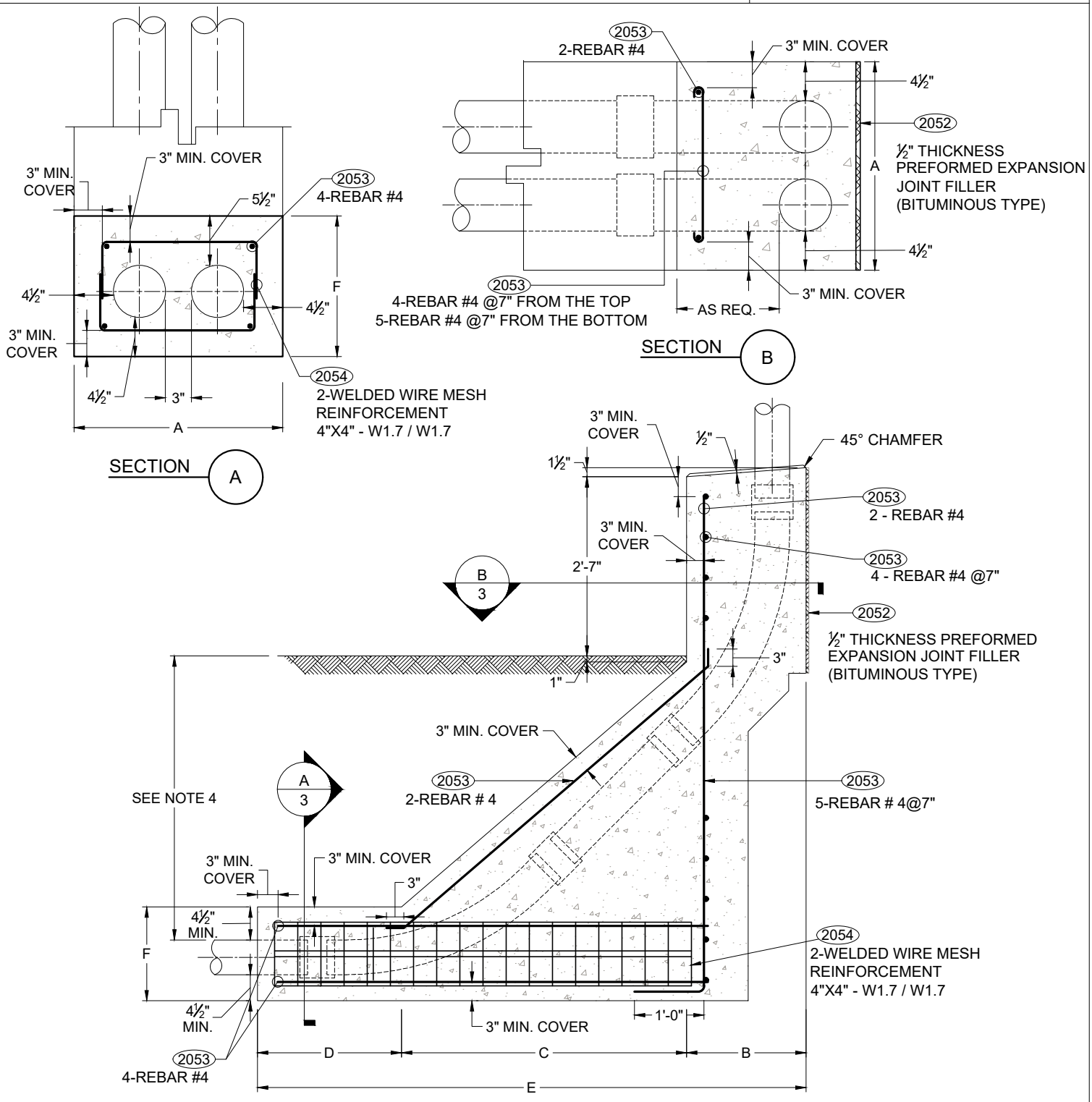

FIGURE A

DUCT CONCRETE ENCASEMENT

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER WITH PRECAST CONCRETE FOUNDATION MAXIMUM VOLTAGE: 13.2 KV NOTES

STANDARD NO. URD-4-A VERSION 1
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APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES:

1. RISER DUCTS SHALL BE INSTALLED PARALLEL TO THE STREET, ON THE SIDE OF THE POLE THAT IS IN THE OPPOSITE DIRECTION OF VEHICULAR TRAFFIC, WHERE IT IS LESS SUSCEPTIBLE TO DAMAGE FROM VEHICLE IMPACT.
2. THE RISER DUCT SHALL BE ATTACHED TO THE POLE WITH A STRUT CHANNEL BRACKET. (SEE ASSEMBLY NO. ASSY-2501)
3. THE TOP OF THE RISER DUCT SHALL BE 6" MINIMUM ABOVE THE NEUTRAL CONDUCTOR FOR PRIMARY DISTRIBUTION VOLTAGE. FOR SECONDARY DISTRIBUTION VOLTAGE, THE TOP OF THE RISER DUCT SHALL BE 12" BELOW THE SECONDARY VOLTAGE LINE. WHEN THERE ARE MULTIPLE FEEDERS ON THE POLE, THE TOP OF THE RISER DUCT SHALL BE INSTALLED JUST BELOW THE FEEDER TO BE CONNECTED. WORK TO BE DONE NEAR ENERGIZED LINES SHALL BE COORDINATED WITH LUMA.
4. DEPTH SHALL BE 48" FOR PRIMARY DISTRIBUTION VOLTAGE AND 36" FOR SECONDARY DISTRIBUTION VOLTAGE.
5. FOR GROUND ROD INSTALLATION AND CONNECTION, SEE ASSEMBLY NO. ASSY-1511, POLE GROUND ASSEMBLY, OF THE OVERHEAD ELECTRICAL DISTRIBUTION SYSTEM MANUAL.
6. A SPARE DUCT SHALL BE INSTALLED IN THE SAME TRENCH AS THE DUCT WITH THE ENERGIZED LINE BETWEEN THE POLE AND THE NEXT INSTALLED EQUIPMENT. THE SPARE DUCT SHALL EXTEND 11' ABOVE THE FINISHED GROUND LEVEL AND SHALL HAVE A PVC END CAP TO PREVENT THE ENTRY OF WATER, WILD LIFE OR FOREIGN OBJECTS. NO SPARE DUCT IS REQUIRED FOR INSTALLATION OF A SINGLE METER MOUNTING DEVICE FOR SECONDARY DISTRIBUTION VOLTAGE.
7. RISERS' DUCTS INSTALLED IN PRIVATE POLES CAN BE RIGID GALVANIZED STEEL, FIBERGLASS OR PVC SCH-80.
8. THE RISER DUCT SHALL HAVE A PVC END BELL AT THE TOP. FOR PRIVATE SECONDARY VOLTAGE RISER, THE OWNER CAN USE WEATHERHEAD ON THE TOP OF THE RISER INSTEAD OF A PVC END BELL.
9. THE RISER DUCT TOP SHALL BE SEALED WITH A SEALING COMPOUND (ITEM 2014) TO PREVENT THE ENTRY OF WATER, WILD LIFE OR FOREIGN OBJECTS.
10. THE DIAMETER OF THE RISER DUCT WILL DEPEND ON THE GAUGE OF THE CABLE USED IN THE UNDERGROUND SYSTEM DESIGN. (SEE STANDARD NO. URD-54)
11. THE RISER DUCT SHALL BE LABELED TO IDENTIFY ITS PURPOSE. SOME ALTERNATIVES COULD BE THE FEEDER NUMBER, CUSTOMER'S NAME, CUSTOMER'S ADDRESS, COMPANY OR BUILDING'S NAME, MANHOLE NUMBER, SWITCHING UNIT NUMBER, TRANSFORMER NUMBER, ETC. A DURABLE ENGINEERING GRADE VINYL LABEL WITH GOOD ADHESIVE SHALL BE USED FOR LABELING. THE VINYL LABEL SHALL HAVE A YELLOW BACKGROUND AND AND BLACK LETTERING. IT SHALL BE INSTALLED ON THE RISER DUCT AT APPROXIMATELY 10' HEIGHT ABOVE FINISHED GROUND LEVEL.
12. THE DESIGN OF THE DUCT CONCRETE ENCASEMENT SHALL REMAIN THE SAME FOR ANY TYPE OF POLE. THE SECTION OF THE CONCRETE ENCASEMENT THAT IS IN CONTACT WITH THE POLE AND THE CONCRETE FOUNDATION SHALL HAVE THE SHAPE OF THE POLE AND CONCRETE FOUNDATION, SQUARE OR ROUND.
13. A ½" THICK PREFORMED EXPANSION JOINT FILLER SHALL BE INSTALLED BETWEEN THE POLE AND THE DUCT CONCRETE ENCASEMENT. THE PREFORMED EXPANSION JOINT FILLER SHALL BE BITUMINOUS TYPE, WATERPROOF, PERMANENT, FLEXIBLE AND SELF-SEALING. THIS MATERIAL SHALL MEET THE REQUIREMENTS OF STANDARD NO. ASTM D994 - STANDARD SPECIFICATION FOR PREFORMED EXPANSION JOINT FILLER FOR CONCRETE (BITUMINOUS TYPE). THE FILLER SHALL BE FURNISHED IN A SINGLE PIECE FOR THE FULL DEPTH AND WIDTH REQUIRED FOR EACH JOINT.
14. THE CONCRETE MIX SHALL BE DESIGNED DETERMINING THE PROPORTIONS OF PORTLAND CEMENT, COARSE AND FINE AGGREGATES, AND WATER NECESSARY TO COMPLY WITH THE SPECIFIED MINIMUM COMPRESSIVE STRENGTH AND THE VOLUMETRIC PROPORTIONING METHODS, SUCH AS OUTLINED IN THE AMERICAN CONCRETE INSTITUTE (ACI) STANDARD NO. PRC-211.1 - RECOMMENDED PRACTICE FOR SELECTING PROPORTIONS FOR NORMAL, HEAVYWEIGHT, AND MASS CONCRETE.
15. THE MINIMUM COMPRESSIVE STRENGTH FOR CONCRETE SHALL BE 3,000 PSI AT 28 DAYS, AS TESTED IN ACCORDANCE WITH STANDARD NO. ASTM C39 - STANDARD TEST METHOD FOR COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS.
16. THE TYPE II PORTLAND CEMENT SHALL BE IN CONFORMANCE WITH THE REQUIREMENTS OF STANDARD NO. ASTM C150 - STANDARD SPECIFICATION OF PORTLAND CEMENT; AND COARSE AND FINE AGGREGATES SHALL BE IN CONFORMANCE WITH THE REQUIREMENTS OF STANDARD NO. ASTM C33 - STANDARD SPECIFICATION FOR CONCRETE AGGREGATES.
17. THE COARSE AGGREGATE FOR CONCRETE SHALL CONSIST OF CLEAN CRUSHED STONE OR PEA GRAVEL. THIS MATERIAL SHOULD BE UNIFORMLY GRADE AND THE SIZES ARE FROM ½", NOMINAL MAXIMUM AGGREGATE SIZE, DOWN TO ⅜". IT SHALL BE FREE FROM SOFT AND DISINTEGRATED PIECES, CLAY, ORGANIC OR OTHER DELETERIOUS MATTER.
18. THE REINFORCING STEEL SHALL BE FABRICATED AND PLACED IN CONFORMANCE WITH STANDARD NO. ACI 318- SPECIFICATION OF BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE. THE REINFORCING STEEL SHALL BE DEFORMED BAR AND GRADE 60 (MINIMUM YIELD STRENGTH EQUAL TO 60,000 PSI), ACCORDING TO STANDARD NO. ASTM A615 - STANDARD SPECIFICATION FOR DEFORMED AND PLAIN CARBON-STEEL BARS FOR CONCRETE REINFORCEMENT, AND IT SHALL BE NEW BILLET-STEEL, AS REQUIRED.
19. THE WELDED WIRE MESH REINFORCEMENT SHALL MEET THE REQUIREMENTS OF STANDARD NO. ASTM A185 - STANDARD SPECIFICATION FOR STEEL WELDED WIRE REINFORCEMENT, PLAIN, FOR CONCRETE; AND STANDARD NO. ASTM A1064 - STANDARD SPECIFICATION FOR CARBON-STEEL WIRE AND WELDED WIRE REINFORCEMENT, PLAIN AND DEFORMED, FOR CONCRETE.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

PRIMARY AND SECONDARY DISTRIBUTION VOLTAGE RISER
WITH PRECAST CONCRETE FOUNDATION
MAXIMUM VOLTAGE: 13.2 KV
BILL OF MATERIAL

STANDARD NO. URD-4-A VERSION 1
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PAGE 5 OF 5 DATE SEPT 21, 2022
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APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0181	PRECAST CONCRETE FONDATION	VARIES	1
1511	POLE GROUND ASSEMBLY	ASSY-1511	1
2014	DUCT SEALING COMPOUND	003-02935	AS REQ.
2039	PVC SCH-80 DUCT	VARIES	AS REQ.
2040	PVC SCH-40 DUCT	VARIES	AS REQ.
2042	PVC END CAP	VARIES	AS REQ.
2043	PVC COUPLING	VARIES	AS REQ.
2045	PVC END BELL	VARIES	AS REQ.
2052	PREFORMED EXPANSION JOINT FILLER	038-46670	AS-REQ.
2053	STEEL REINFORCEMENT REBAR	VARIES	6
2054	WELDED WIRE MESH REINFORCEMENT	002-53608	SEE TABLE 1
2055	READY MIX CONCRETE	038-44668	SEE TABLE 1
2071	45° PVC ELBOW	VARIES	4
2501	RISER SUPPORT ASSEMBLY	ASSY-2501	AS REQ.

TABLE 1		
DUCT SIZE	CONCRETE	WIRE MESH
2"	0.75 CUBIC YARD	24"x10'
3"	1.00 CUBIC YARD	24"x10'
4"	1.25 CUBIC YARD	28"x12'
6"	1.50 CUBIC YARD	32"x12'

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

TRENCH DETAIL FOR INSTALLATION OF PRIMARY DISTRIBUTION CIRCUITS MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-6 VERSION 2
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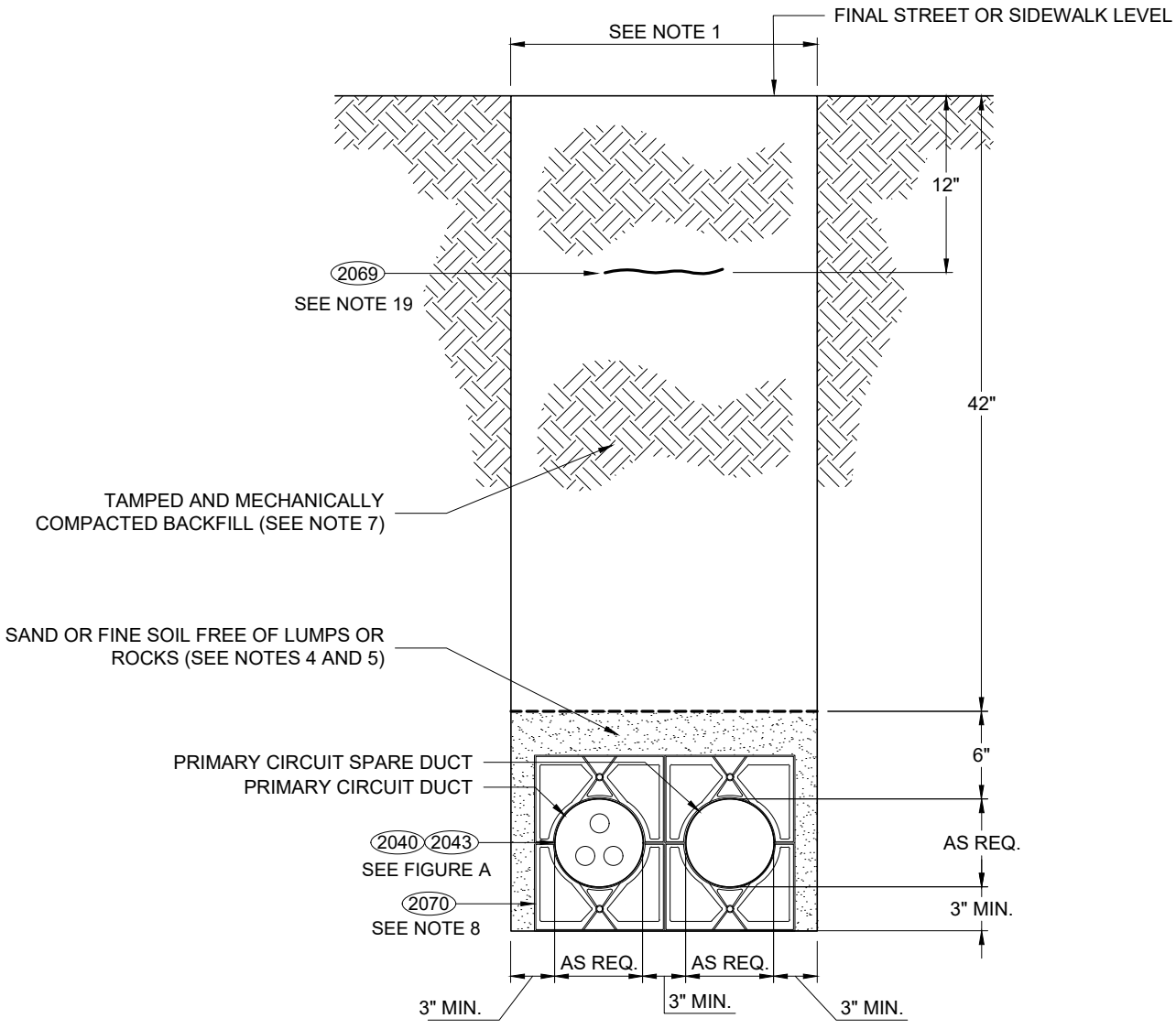
DIGITIZED VICTOR R. FEBRES LIC. 3412
EMILIO CUADRADO LIC. 3000



TITLE:

TRENCH DETAIL FOR THE INSTALLATION OF PRIMARY DISTRIBUTION CIRCUITS MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-6 VERSION 2
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PAGE 2 OF 4 DATE SEPT 23, 2022
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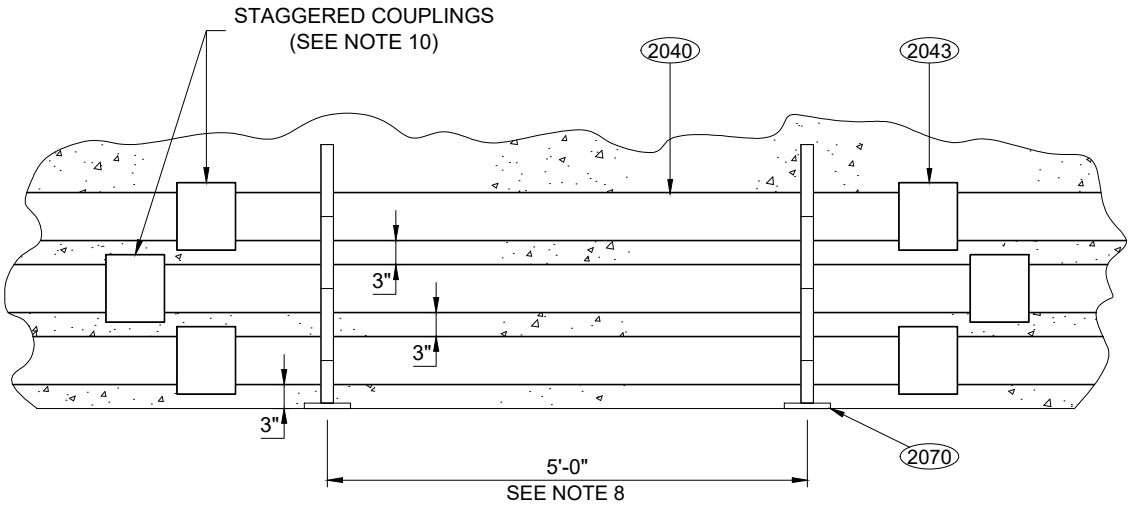

FIGURE A
DUCTS COUPLING INSTALLATION

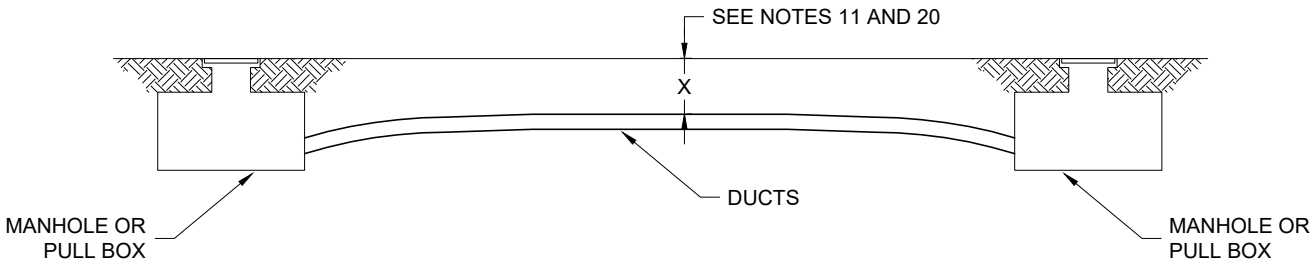

FIGURE B
DUCTS DOUBLE SLOPE GRADING

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

TRENCH DETAIL FOR INSTALLATION OF PRIMARY DISTRIBUTION CIRCUITS MINIMUM VOLTAGE: 13.2 KV NOTES

STANDARD NO. URD-6 VERSION 2
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PAGE 3 OF 4 DATE SEPT 23, 2022
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APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412
EMILIO CUADRADO LIC. 3000

NOTES:

1. THE WIDTH OF DUCTS TRENCH WILL VARY ACCORDING TO THE NUMBER AND SIZE OF DUCTS, SOIL HEAT CONDUCTING PROPERTIES AND SPACING BETWEEN DUCTS.
2. A SPARE DUCT SHALL BE REQUIRED FOR EACH DUCT CARRYING A PRIMARY FEEDER. THIS REQUIREMENT INCLUDES THE SINGLE PHASE TRANSFORMER LOOPS IN A RESIDENTIAL DISTRIBUTION SYSTEM.
3. WHEN MORE THAN ONE CIRCUIT IS INSTALLED IN THE SAME TRENCH, THEY SHALL BE INSTALLED IN SEPARATED DUCTS.
4. ALL DUCTS INSTALLED FROM MANHOLE TO MANHOLE OF ANY UNDERGROUND MAIN FEEDER OR BRANCH FEEDER SHALL BE PROTECTED WITH A CONCRETE ENCASING WITH A MINIMUM THICKNESS OF 3". ALSO, ALL DUCTS' TRENCH INSTALLED IN ROADWAYS, STREET CROSSINGS OR IN CLOSE PROXIMITY OF LESS THAN 3' FROM ANOTHER PRIVATE OR PUBLIC UTILITY SERVICE SHALL BE ENCASED IN CONCRETE.
5. THE CONCRETE USED SHALL BE PROPORTIONED AND MIXED TO OBTAIN A 28 DAY COMPRESSIVE STRENGTH OF 3,000 PSI. ALL CONCRETE SHALL BE MIXED AND DELIVERED IN ACCORDANCE WITH THE REQUIREMENTS SET FOR IN THE STANDARD NO. ASTM C94, SPECIFICATIONS FOR READY MIX CONCRETE, LATEST EDITION.
6. IF THE BOTTOM OF THE TRENCH CONTAINS SHARP MATERIALS, THE DUCTS SHALL BE LAID ON A 4" THICK LAYER OF SAND OR SOIL FREE OF LUMPS OR ROCKS.
7. BACKFILL SHALL BE PLACED IN UNIFORM LAYERS, NOT TO EXCEED 8" DEPTH, AND COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY AT THE PROPER MOISTURE CONTENT OF THE UNDISTURBED SOIL ACCORDING TO LATEST VERSION OF STANDARD NO. ASTM D698.
8. DUCT SPACERS ARE REQUIRED EVERY 5' OR LESS.
9. DUCTS TO BE INSTALLED IN A TRENCH SHALL BE PVC SCH-40.
10. FOR 4" DIAMETER OR LARGER DUCT, THE DUCT COUPLINGS REQUIRED SHALL HAVE 6" FROM THE CENTER TO EACH END. THE DUCT COUPLINGS SHALL BE STAGGERED, SO THAT THERE IS NO COUPLING ADJACENT TO ANOTHER ONE (SEE FIGURE A).
11. ALL DUCTS SHALL BE UNIFORMLY GRADED SO THAT WATER WILL DRAIN INTO A MANHOLE. THE MINIMUM GRADE FOR DUCTS SHALL BE 1" PER 100'. THE PREFERRED METHOD OF GRADING IS A DOUBLE SLOPE IN SUCH WAY THAT THE WATER DRAINS TOWARD BOTH MANHOLES (SEE FIGURE B).
12. DUCTS SHALL BE LOCATED SO THAT THE RUN WILL FOLLOW AS NEARLY AS POSSIBLE A STRAIGHT LINE BETWEEN MANHOLES.
13. IN LOCATIONS WHERE STREET LINES ARE NOT DETERMINATED BY CURBS, SIDEWALK OR PLANTING AREAS, THE INSTALLATION OF DUCTS SHALL BE DONE ACCORDING TO STANDARD NO. URD-24.
14. THE CONDUIT SYSTEM SHALL BE INSTALLED WITH ENOUGH SEPARATION FROM CONDUIT OF OTHER SERVICES. FOR SPECIFIC DETAILS OF SEPARATION DISTANCE, SEE STANDARD NO. URD-24.
15. AFTER CONDUITS HAVE BEEN INSTALLED, IT IS NECESSARY TO CHECK THE INTERNAL CONDITION OF EACH DUCT. THEY SHALL BE CLEANED, AND ANY DEBRIS REMOVED. A MANDREL SHALL BE USED TO PERFORM THIS PROCESS AND PULL BACK WITH A #8 GALVANIZED STEEL PULLING WIRE OR PULLING ROPE/TAPE (9/16") LEFT IN PLACE FOR CONTINUOUS RUNS TO ASSIST CABLE INSTALLATION.
16. RADIAL SEPARATION OF CONDUIT SYSTEM FROM GAS AND OTHER LINES THAT TRANSPORT FLAMMABLE MATERIAL SHALL NOT BE LESS THAN 12" AND SHOULD HAVE SUFFICIENT SEPARATION TO PERMIT THE USE OF DUCT MAINTENANCE EQUIPMENT (NESC 320.B.5).
17. ALL DUCTS SHALL BE TERMINATED WITH A PVC END BELL AT MANHOLES, PULL BOXES AND SERVICE PEDESTALS.
18. IF THE CONDUIT RUN IS TO BE DEAD ENDED FOR COMPLETION AT SOME FUTURE TIME, THE END OF EACH DUCT SHALL BE CLOSED WITH DUCT SEALING PLUGS. THE END OF THE CONCRETE SHEATHING SHALL BE STEPPED BACK APPROXIMATELY 6" FROM EACH HORIZONTAL ROW OF DUCTS. THE END OF THE CONDUIT SHALL EXTEND BEYOND THE SHEATHING TO PERMIT CONNECTION TO FUTURE DUCTS. ALL DUCTS SHALL BE TERMINATED INSIDE A 24" X 36" SERVICE PEDESTAL. (SEE STANDARD NO. URD-27-B)
19. A HAZARD WARNING TAPE SHALL BE INSTALLED AT EACH 12" OF TRENCH WIDTH AND 12" BELOW THE FINAL GRADE OF THE SOIL OR PAVEMENT.
20. DISTANCE "X" SHOWN AT FIGURE B SHALL NOT BE LESS THAN 48" FOR DUCTS' TRENCH FOR PRIMARY VOLTAGE CIRCUITS.
21. REFER TO STANDARD NO. URD-54, TO DETERMINE THE PROPER DUCT DIAMETER FOR THE CORRESPONDING CABLES GAUGE.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

TRENCH DETAIL FOR
INSTALLATION OF PRIMARY DISTRIBUTION CIRCUITS
MINIMUM VOLTAGE: 13.2 KV
BILL OF MATERIAL

STANDARD NO. URD-6 VERSION 2
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APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412
EMILIO CUADRADO LIC. 3000

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
2040	PVC SCH-40 DUCT	VARIES	AS REQ.
2043	PVC COUPLING	VARIES	AS REQ.
2069	HAZARD WARNING TAPE	072-83464	AS REQ.
2070	DUCT SPACER	VARIES	AS REQ.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

TRENCH DETAIL FOR INSTALLATION OF PRIMARY AND SECONDARY DISTRIBUTION CIRCUITS MAXIMUM VOLTAGE: 13.2 KV

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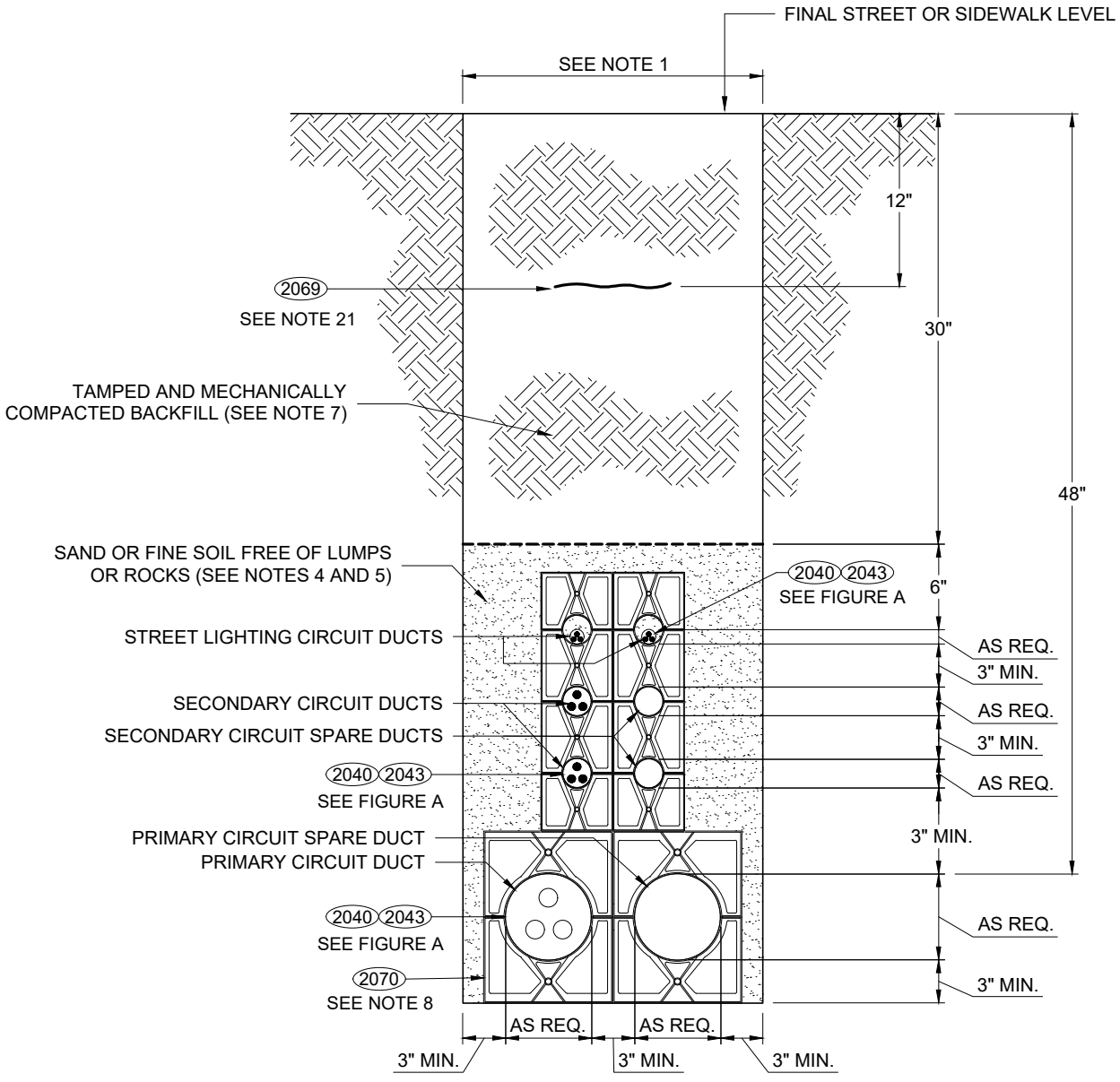

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

TRENCH DETAIL FOR INSTALLATION OF PRIMARY AND SECONDARY DISTRIBUTION CIRCUITS MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	URD-7 VERSION 2
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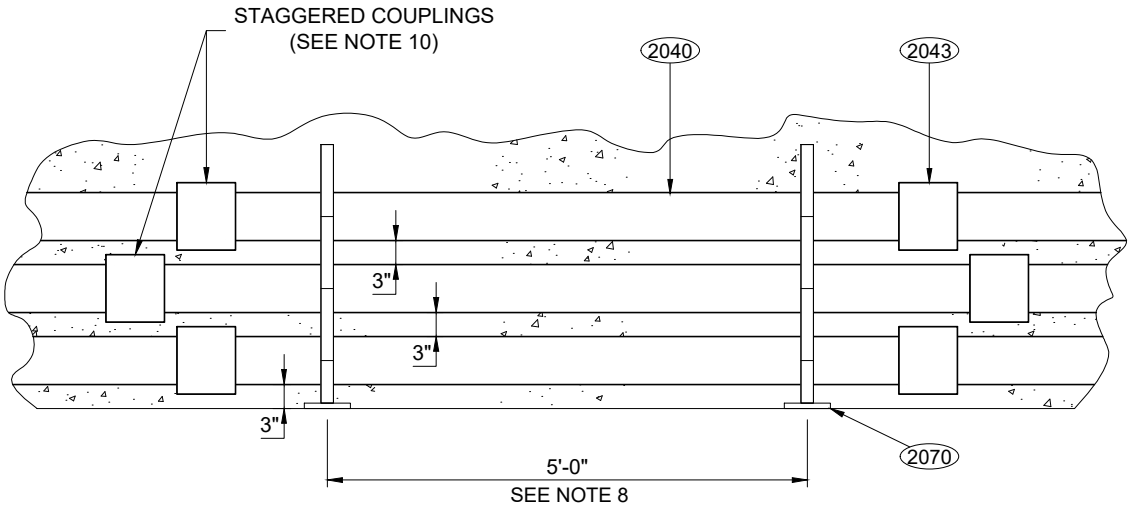

FIGURE A
DUCTS COUPLING INSTALLATION

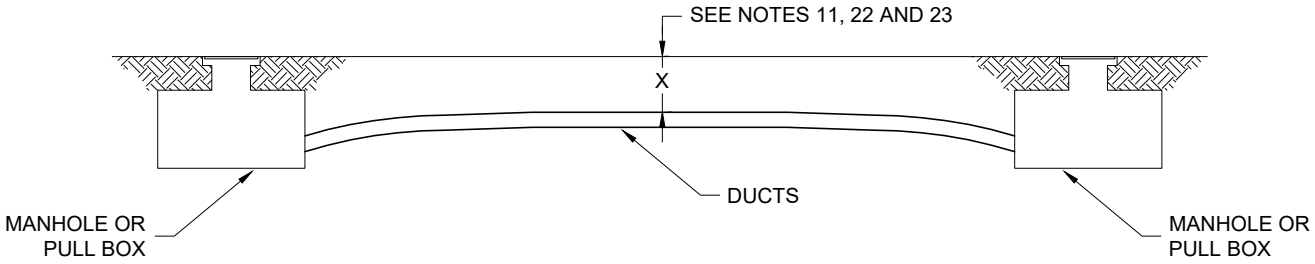

FIGURE B
DUCTS DOUBLE SLOPE GRADING

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

TRENCH DETAIL FOR INSTALLATION OF PRIMARY AND SECONDARY DISTRIBUTION CIRCUITS MAXIMUM VOLTAGE: 13.2 KV NOTES

STANDARD NO. URD-7 VERSION 2
DOCUMENT NO. 4325.019
PAGE 3 OF 4 DATE SEPT 23, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
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APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES:

1. THE WIDTH OF DUCTS TRENCH WILL VARY ACCORDING TO THE NUMBER AND SIZE OF DUCTS, SOIL HEAT CONDUCTING PROPERTIES AND SPACING BETWEEN DUCTS.
2. A SPARE DUCT SHALL BE REQUIRED FOR EACH DUCT CARRYING A PRIMARY FEEDER. THIS REQUIREMENT INCLUDES THE SINGLE PHASE TRANSFORMER LOOPS IN A RESIDENTIAL DISTRIBUTION SYSTEM. A SPARE DUCT SHALL BE REQUIRED FOR EACH DUCT CARRYING A SECONDARY FEEDER BETWEEN A TRANSFORMER AND A SERVICE PEDESTAL / PULL BOX, AND BETWEEN SERVICE PEDESTALS. THIS REQUIREMENT EXCLUDE THE SECONDARY SERVICE TAPS.
3. WHEN MORE THAN ONE CIRCUIT IS INSTALLED IN THE SAME TRENCH, THEY SHALL BE INSTALLED IN SEPARATED DUCTS.
4. ALL DUCTS INSTALLED FROM MANHOLE TO MANHOLE OF ANY UNDERGROUND MAIN FEEDER OR BRANCH FEEDER SHALL BE PROTECTED WITH A CONCRETE ENCASING WITH A MINIMUM THICKNESS OF 3". ALSO, ALL DUCTS' TRENCH INSTALLED IN ROADWAYS, STREET CROSSINGS OR IN CLOSE PROXIMITY OF LESS THAN 3' FROM ANOTHER PRIVATE OR PUBLIC UTILITY SERVICE SHALL BE ENCASED IN CONCRETE.
5. THE CONCRETE USED SHALL BE PROPORTIONED AND MIXED TO OBTAIN A 28 DAY COMPRESSIVE STRENGTH OF 3,000 PSI. ALL CONCRETE SHALL BE MIXED AND DELIVERED IN ACCORDANCE WITH THE REQUIREMENTS SET FOR IN THE STANDARD NO. ASTM C94, SPECIFICATIONS FOR READY MIX CONCRETE LATEST EDITION.
6. IF THE BOTTOM OF THE TRENCH CONTAINS SHARP MATERIALS, THE DUCTS SHALL BE LAID ON A 4" THICK LAYER OF SAND OR SOIL FREE OF LUMPS OR ROCKS.
7. BACKFILL SHALL BE PLACED IN UNIFORM LAYERS, NOT TO EXCEED 8" DEPTH, AND COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY AT THE PROPER MOISTURE CONTENT OF THE UNDISTURBED SOIL ACCORDING TO LATEST VERSION OF STANDARD NO. ASTM D698.
8. DUCT SPACERS ARE REQUIRED EVERY 5' OR LESS.
9. DUCTS TO BE INSTALLED IN A TRENCH SHALL BE PVC SCH-40.
10. FOR 4" DIAMETER OR LARGER DUCT, THE DUCT COUPLINGS REQUIRED SHALL HAVE 6" FROM THE CENTER TO EACH END. THE DUCT COUPLINGS SHALL BE STAGGERED, SO THAT THERE IS NO COUPLING ADJACENT TO ANOTHER ONE (SEE FIGURE A).
11. ALL DUCTS SHALL BE UNIFORMLY GRADED SO THAT WATER WILL DRAIN INTO A MANHOLE. THE MINIMUM GRADE FOR DUCTS SHALL BE 1" PER 100'. THE PREFERRED METHOD OF GRADING IS A DOUBLE SLOPE IN SUCH WAY THAT THE WATER DRAINS TOWARD BOTH MANHOLES (SEE FIGURE B).
12. DUCTS SHALL BE LOCATED SO THAT THE RUN WILL FOLLOW AS NEARLY AS POSSIBLE A STRAIGHT LINE BETWEEN MANHOLES.
13. IN LOCATIONS WHERE STREET LINES ARE NOT DETERMINATED BY CURBS, SIDEWALK OR PLANTING AREAS, THE INSTALLATION OF DUCTS SHALL BE DONE ACCORDING TO STANDARD NO. URD-24.
14. THE CONDUIT SYSTEM SHALL BE INSTALLED WITH ENOUGH SEPARATION FROM CONDUIT OF OTHER SERVICES. FOR SPECIFIC DETAILS OF SEPARATION DISTANCE, SEE STANDARD NO. URD-24.
15. AFTER CONDUITS HAVE BEEN INSTALLED, IT IS NECESSARY TO CHECK THE INTERNAL CONDITION OF EACH DUCT. THEY SHALL BE CLEANED, AND ANY DEBRIS REMOVED. A MANDREL SHALL BE USED TO PERFORM THIS PROCESS AND PULL BACK WITH A #8 GALVANIZED STEEL PULLING WIRE OR PULLING ROPE/TAPE (9/16") LEFT IN PLACE FOR CONTINUOUS RUNS TO ASSIST CABLE INSTALLATION.
16. RADIAL SEPARATION OF CONDUIT SYSTEM FROM GAS AND OTHER LINES THAT TRANSPORT FLAMMABLE MATERIAL SHALL NOT BE LESS THAN 12" AND SHOULD HAVE SUFFICIENT SEPARATION TO PERMIT THE USE OF DUCT MAINTENANCE EQUIPMENT (NESC 320.B.5).
17. ALL DUCTS SHALL BE TERMINATED WITH A PVC END BELL AT MANHOLES, PULL BOXES AND SERVICE PEDESTALS.
18. IF THE CONDUIT RUN IS TO BE DEAD ENDED FOR COMPLETION AT SOME FUTURE TIME, THE END OF EACH DUCT SHALL BE CLOSED WITH DUCT SEALING PLUGS. THE END OF THE CONCRETE SHEATHING SHALL BE STEPPED BACK APPROXIMATELY 6" FROM EACH HORIZONTAL ROW OF DUCT. THE END OF THE CONDUIT SHALL EXTEND BEYOND THE SHEATHING TO PERMIT CONNECTION TO FUTURE DUCTS. ALL DUCTS SHALL BE TERMINATED INSIDE A 24" X 36" SERVICE PEDESTAL (SEE STANDARD NO. URD-27-B).
19. DUCTS FOR SECONDARY CIRCUITS AND SERVICE LATERALS SHALL HAVE A MINIMUM DIAMETER OF 2".
20. DUCTS FOR STREET LIGHTING CIRCUITS SHALL HAVE A MINIMUM DIAMETER OF ¾".
21. A HAZARD WARNING TAPE SHALL BE INSTALLED AT EACH 12" OF TRENCH WIDTH AND 12" BELOW THE FINAL GRADE OF THE SOIL OR PAVEMENT.
22. DISTANCE "X" SHOWN AT FIGURE B SHALL NOT BE LESS THAN 36" FOR DUCTS TRENCH THAT INCLUDES SECONDARY VOLTAGE CIRCUITS.
23. DISTANCE "X" SHOWN AT FIGURE B SHALL NOT BE LESS THAN 48" FOR DUCTS TRENCH FOR PRIMARY VOLTAGE CIRCUITS.
24. REFER TO STANDARD NO. URD-54 TO DETERMINE THE PROPER DUCT DIAMETER FOR THE CORRESPONDING CABLES GAUGE.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

TRENCH DETAIL FOR
INSTALLATION OF PRIMARY AND SECONDARY
DISTRIBUTION CIRCUITS
MAXIMUM VOLTAGE: 13.2 KV
BILL OF MATERIAL

STANDARD NO. URD-7 VERSION 2
DOCUMENT NO. 4325.019
PAGE 4 OF 4 DATE SEPT 23, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
2040	PVC SCH-40 DUCT	VARIES	AS REQ.
2043	PVC COUPLING	VARIES	AS REQ.
2069	HAZARD WARNING TAPE	072-83464	AS REQ.
2070	DUCT SPACER	VARIES	AS REQ.

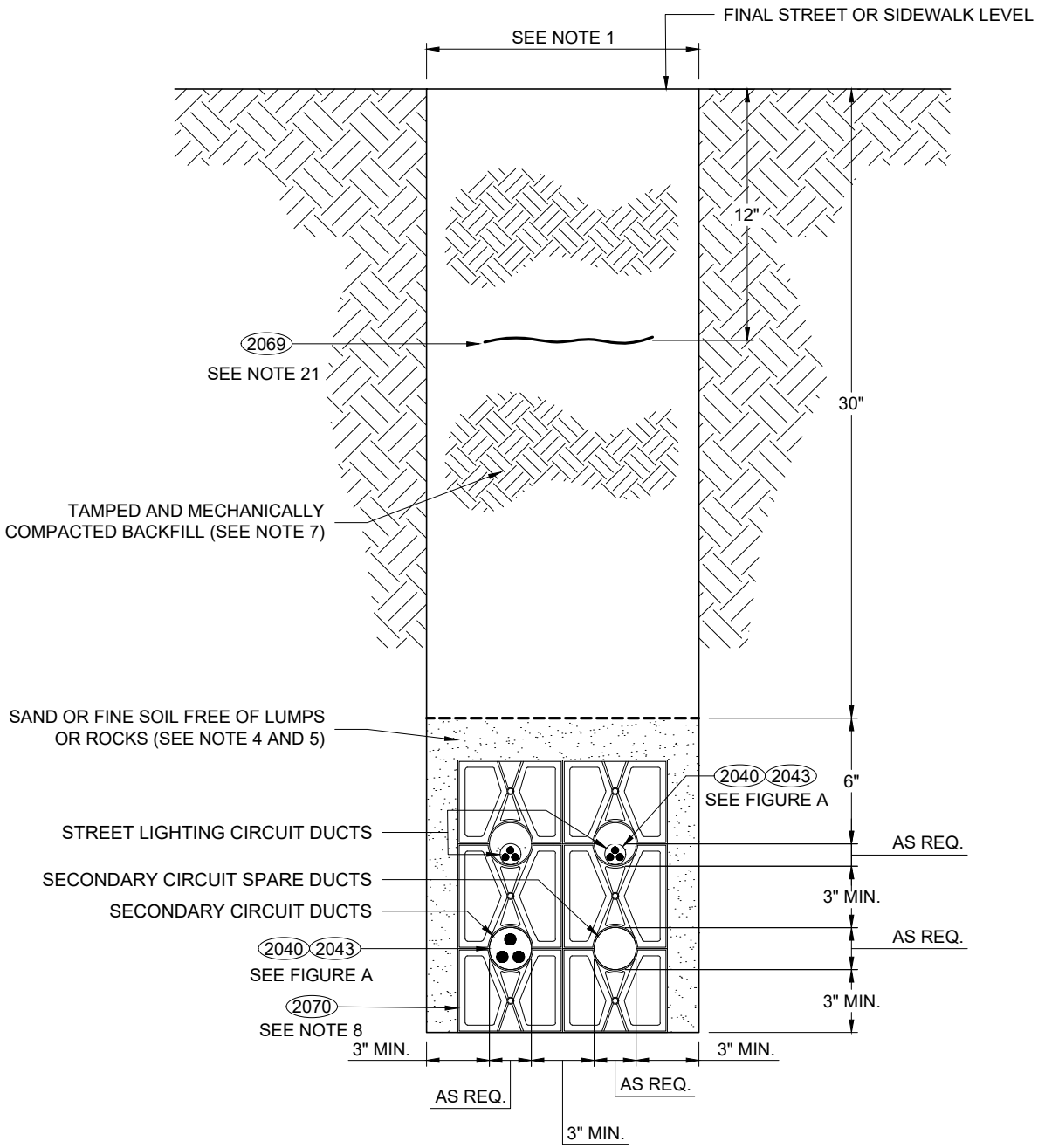
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

TRENCH DETAIL FOR INSTALLATION OF SECONDARY DISTRIBUTION CIRCUITS MAXIMUM VOLTAGE: 480 V

STANDARD NO. URD-8 VERSION 2
DOCUMENT NO. 4325.020
PAGE 1 OF 4 DATE SEPT 23, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412



DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

TRENCH DETAIL FOR INSTALLATION OF SECONDARY DISTRIBUTION CIRCUITS MAXIMUM VOLTAGE: 480 V

STANDARD NO. URD-8 VERSION 2
DOCUMENT NO. 4325.020
PAGE 2 OF 4 DATE SEPT 23, 2022
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REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

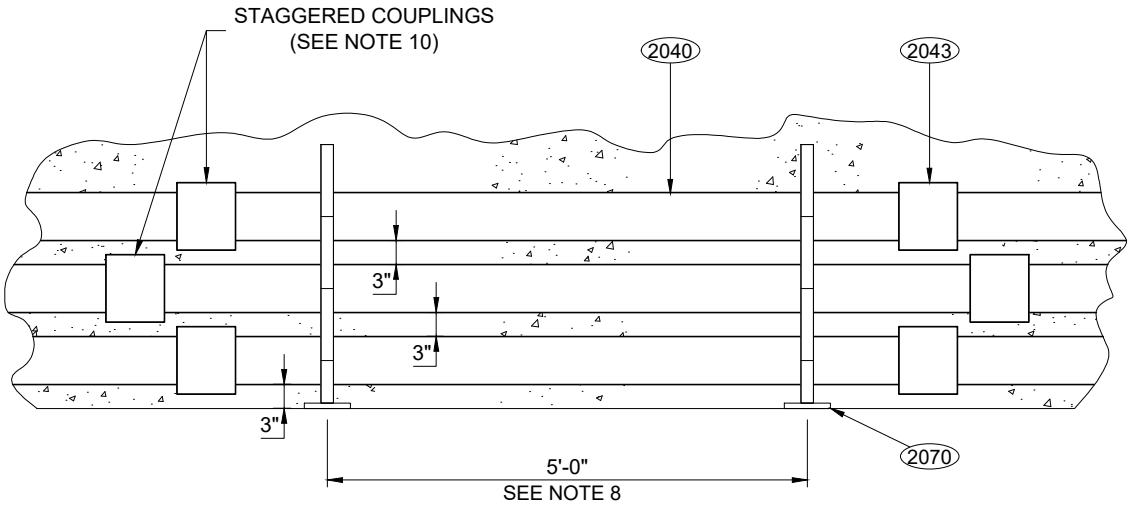

FIGURE A
DUCTS COUPLING INSTALLATION

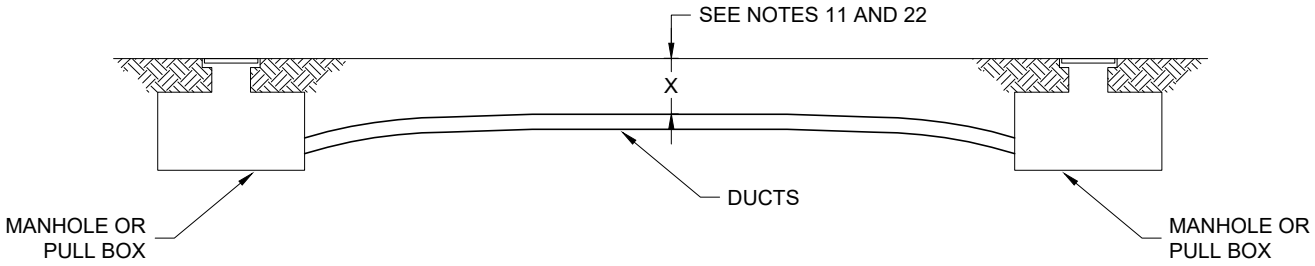

FIGURE B
DUCTS DOUBLE SLOPE GRADING

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

TRENCH DETAIL FOR INSTALLATION OF SECONDARY DISTRIBUTION CIRCUITS MAXIMUM VOLTAGE: 480 V NOTES

STANDARD NO. URD-8 VERSION 2
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PAGE 3 OF 4 DATE SEPT 23, 2022
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REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES:

1. THE WIDTH OF DUCTS TRENCH WILL VARY ACCORDING TO THE NUMBER AND SIZE OF DUCTS, SOIL HEAT CONDUCTING PROPERTIES AND SPACING BETWEEN DUCTS.
2. A SPARE DUCT SHALL BE REQUIRED FOR EACH DUCT CARRYING A PRIMARY FEEDER. THIS REQUIREMENT INCLUDES THE SINGLE PHASE TRANSFORMER LOOPS IN A RESIDENTIAL DISTRIBUTION SYSTEM. A SPARE DUCT SHALL BE REQUIRED FOR EACH DUCT CARRYING A SECONDARY FEEDER BETWEEN A TRANSFORMER AND A SERVICE PEDESTAL / PULL BOX, AND BETWEEN SERVICE PEDESTALS. THIS REQUIREMENT EXCLUDE THE SECONDARY SERVICE TAPS.
3. WHEN MORE THAN ONE CIRCUIT IS INSTALLED IN THE SAME TRENCH, THEY SHALL BE INSTALLED IN SEPARATED DUCTS.
4. ALL DUCTS INSTALLED FROM MANHOLE TO MANHOLE OF ANY UNDERGROUND MAIN FEEDER OR BRANCH FEEDER SHALL BE PROTECTED WITH A CONCRETE ENCASING WITH A MINIMUM THICKNESS OF 3". ALSO, ALL DUCTS' TRENCH INSTALLED IN ROADWAYS, STREET CROSSINGS OR IN CLOSE PROXIMITY OF LESS THAN 3' FROM ANOTHER PRIVATE OR PUBLIC UTILITY SERVICE SHALL BE ENCASED IN CONCRETE.
5. THE CONCRETE USED SHALL BE PROPORTIONED AND MIXED TO OBTAIN A 28 DAY COMPRESSIVE STRENGTH OF 3,000 PSI. ALL CONCRETE SHALL BE MIXED AND DELIVERED IN ACCORDANCE WITH THE REQUIREMENTS SET FOR IN THE STANDARD NO. ASTM C94, SPECIFICATIONS FOR READY MIX CONCRETE LATEST EDITION.
6. IF THE BOTTOM OF THE TRENCH CONTAINS SHARP MATERIALS, THE DUCTS SHALL BE LAID ON A 4" THICK LAYER OF SAND OR SOIL FREE OF LUMPS OR ROCKS.
7. BACKFILL SHALL BE PLACED IN UNIFORM LAYERS, NOT TO EXCEED 8" DEPTH, AND COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY AT THE PROPER MOISTURE CONTENT OF THE UNDISTURBED SOIL ACCORDING TO LATEST VERSION OF STANDARD NO. ASTM D698.
8. DUCT SPACERS ARE REQUIRED EVERY 5' OR LESS.
9. DUCTS TO BE INSTALLED IN A TRENCH SHALL BE PVC SCH-40.
10. FOR 4" DIAMETER OR LARGER DUCT, THE DUCT COUPLINGS REQUIRED SHALL HAVE 6" FROM THE CENTER TO EACH END. THE DUCT COUPLINGS SHALL BE STAGGERED, SO THAT THERE IS NO COUPLING ADJACENT TO ANOTHER ONE (SEE FIGURE A).
11. ALL DUCTS SHALL BE UNIFORMLY GRADED SO THAT WATER WILL DRAIN INTO A MANHOLE. THE MINIMUM GRADE FOR DUCTS SHALL BE 1" PER 100'. THE PREFERRED METHOD OF GRADING IS A DOUBLE SLOPE IN SUCH WAY THAT THE WATER DRAINS TOWARD BOTH MANHOLES (SEE FIGURE B).
12. DUCTS SHALL BE LOCATED SO THAT THE RUN WILL FOLLOW AS NEARLY AS POSSIBLE A STRAIGHT LINE BETWEEN MANHOLES.
13. IN LOCATIONS WHERE STREET LINES ARE NOT DETERMINATED BY CURBS, SIDEWALK OR PLANTING AREAS, THE INSTALLATION OF DUCTS SHALL BE DONE ACCORDING TO STANDARD NO. URD-24.
14. THE CONDUIT SYSTEM SHALL BE INSTALLED WITH ENOUGH SEPARATION FROM CONDUIT OF OTHER SERVICES. FOR SPECIFIC DETAILS OF SEPARATION DISTANCE, SEE STANDARD NO. URD-24.
15. AFTER CONDUITS HAVE BEEN INSTALLED, IT IS NECESSARY TO CHECK THE INTERNAL CONDITION OF EACH DUCT. THEY SHALL BE CLEANED, AND ANY DEBRIS REMOVED. A MANDREL SHALL BE USED TO PERFORM THIS PROCESS AND PULL BACK WITH A #8 GALVANIZED STEEL PULLING WIRE OR PULLING ROPE/TAPE (9/16") LEFT IN PLACE FOR CONTINUOUS RUNS TO ASSIST CABLE INSTALLATION.
16. RADIAL SEPARATION OF CONDUIT SYSTEM FROM GAS AND OTHER LINES THAT TRANSPORT FLAMMABLE MATERIAL SHALL NOT BE LESS THAN 12" AND SHOULD HAVE SUFFICIENT SEPARATION TO PERMIT THE USE OF DUCT MAINTENANCE EQUIPMENT (NESC 320.B.5).
17. ALL DUCTS SHALL BE TERMINATED WITH A PVC END BELL AT MANHOLES, PULL BOXES AND SERVICE PEDESTALS.
18. IF THE CONDUIT RUN IS TO BE DEAD ENDED FOR COMPLETION AT SOME FUTURE TIME, THE END OF EACH DUCT SHALL BE CLOSED WITH DUCT SEALING PLUGS. THE END OF THE CONCRETE SHEATHING SHALL BE STEPPED BACK APPROXIMATELY 6" FROM EACH HORIZONTAL ROW OF DUCT. THE END OF THE CONDUIT SHALL EXTEND BEYOND THE SHEATHING TO PERMIT CONNECTION TO FUTURE DUCTS. ALL DUCTS SHALL BE TERMINATED INSIDE A 24" X 36" SERVICE PEDESTAL (SEE STANDARD NO. URD-27-B).
19. DUCTS FOR SECONDARY CIRCUITS AND SERVICE LATERALS SHALL HAVE A MINIMUM DIAMETER OF 2".
20. DUCTS FOR STREET LIGHTING CIRCUITS SHALL HAVE A MINIMUM DIAMETER OF ¾".
21. A HAZARD WARNING TAPE SHALL BE INSTALLED AT EACH 12" OF TRENCH WIDTH AND 12" BELOW THE FINAL GRADE OF THE SOIL OR PAVEMENT.
22. DISTANCE "X" SHOWN AT FIGURE B SHALL NOT BE LESS THAN 36" FOR DUCTS TRENCH THAT INCLUDES SECONDARY VOLTAGE CIRCUITS.
23. REFER TO STANDARD NO. URD-54 TO DETERMINE THE PROPER DUCT DIAMETER FOR THE CORRESPONDING CABLES GAUGE.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

TRENCH DETAIL FOR
INSTALLATION OF SECONDARY DISTRIBUTION CIRCUITS
MAXIMUM VOLTAGE: 480 V
BILL OF MATERIAL

STANDARD NO. URD-8 VERSION 2
DOCUMENT NO. 4325.020
PAGE 4 OF 4 DATE SEPT 23, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
2040	PVC SCH-40 DUCT	VARIES	AS REQ.
2043	PVC COUPLING	VARIES	AS REQ.
2069	HAZARD WARNING TAPE	072-83464	AS REQ.
2070	DUCT SPACER	VARIES	AS REQ.

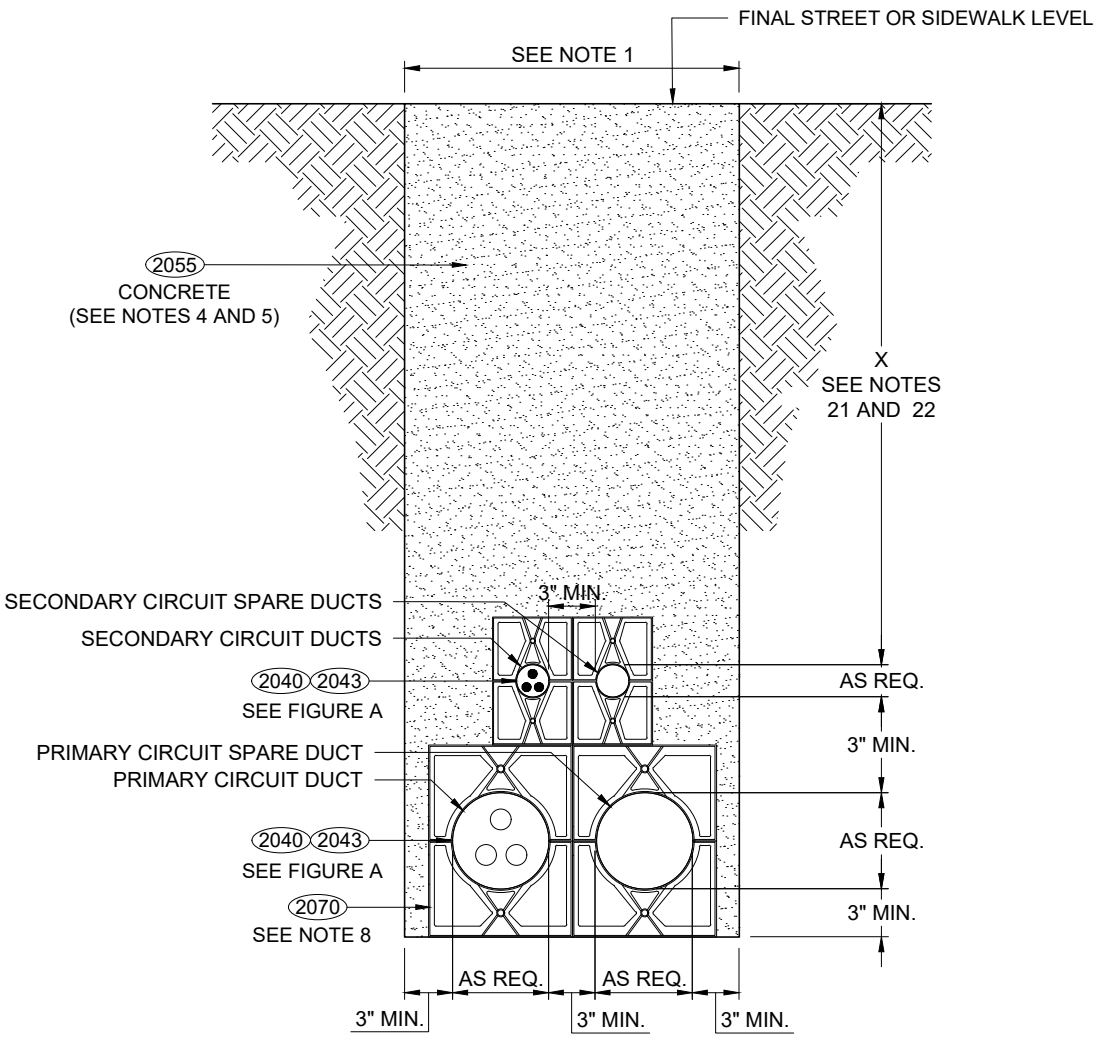
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

TRENCH DETAIL FOR INSTALLATION OF PRIMARY AND SECONDARY DISTRIBUTION CIRCUITS ON ROCKY TERRAIN MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-9 VERSION 2
DOCUMENT NO. 4325.021
PAGE 1 OF 4 DATE SEPT 23, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412



TITLE:

TRENCH DETAIL FOR INSTALLATION OF PRIMARY AND SECONDARY DISTRIBUTION CIRCUITS ON ROCKY TERRAIN MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-9 VERSION 2
DOCUMENT NO. 4325.021
PAGE 2 OF 4 DATE SEPT 23, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
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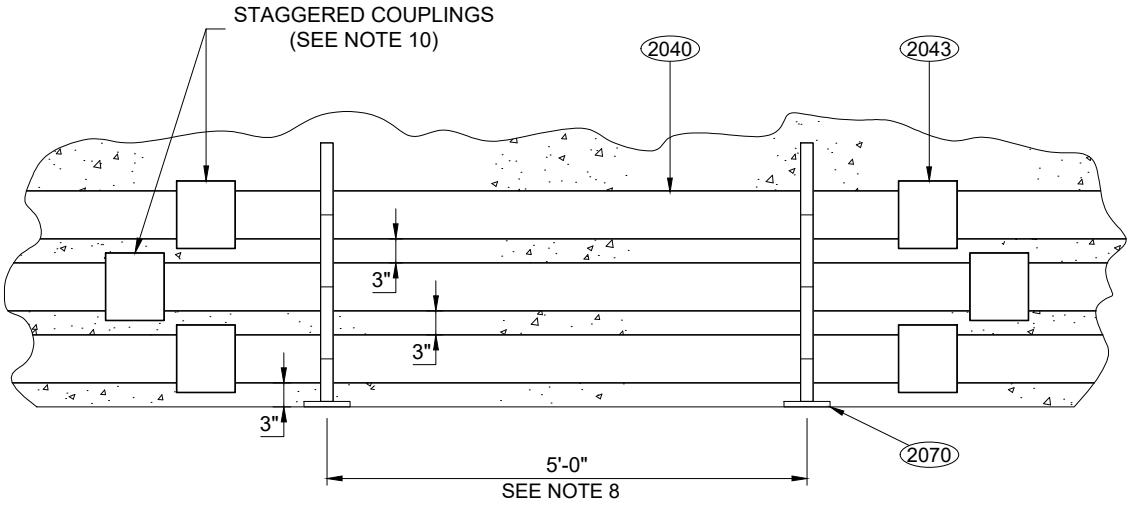

FIGURE A
DUCTS COUPLING INSTALLATION

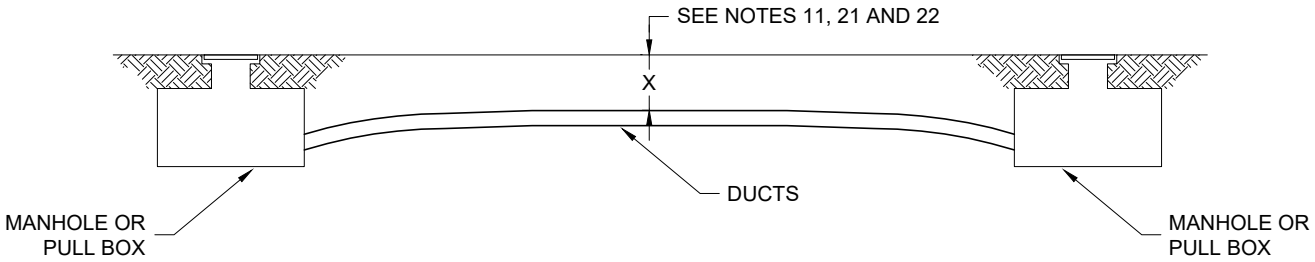

FIGURE B
DUCTS DOUBLE SLOPE GRADING

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

TRENCH DETAIL FOR INSTALLATION OF PRIMARY AND SECONDARY DISTRIBUTION CIRCUITS ON ROCKY TERRAIN MAXIMUM VOLTAGE: 13.2 KV NOTES

STANDARD NO. URD-9 VERSION 2
DOCUMENT NO. 4325.021
PAGE 3 OF 4 DATE SEPT 23, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES:

1. THE WIDTH OF DUCTS TRENCH WILL VARY ACCORDING TO THE NUMBER AND SIZE OF DUCTS, SOIL HEAT CONDUCTING PROPERTIES AND SPACING BETWEEN DUCTS.
2. A SPARE DUCT SHALL BE REQUIRED FOR EACH DUCT CARRYING A PRIMARY FEEDER. THIS REQUIREMENT INCLUDES THE SINGLE PHASE TRANSFORMER LOOPS IN A RESIDENTIAL DISTRIBUTION SYSTEM. A SPARE DUCT SHALL BE REQUIRED FOR EACH DUCT CARRYING A SECONDARY FEEDER BETWEEN A TRANSFORMER AND A SERVICE PEDESTAL / PULL BOX, AND BETWEEN SERVICE PEDESTALS. THIS REQUIREMENT EXCLUDE THE SECONDARY SERVICE TAPS.
3. WHEN MORE THAN ONE CIRCUIT IS INSTALLED IN THE SAME TRENCH, THEY SHALL BE INSTALLED IN SEPARATED DUCTS.
4. ALL DUCTS INSTALLED FROM MANHOLE TO MANHOLE OF ANY UNDERGROUND MAIN FEEDER OR BRANCH FEEDER SHALL BE PROTECTED WITH A CONCRETE ENCASING WITH A MINIMUM THICKNESS OF 3". ALSO, ALL DUCTS' TRENCH INSTALLED IN ROADWAYS, STREET CROSSINGS OR IN CLOSE PROXIMITY OF LESS THAN 3' FROM ANOTHER PRIVATE OR PUBLIC UTILITY SERVICE SHALL BE ENCASED IN CONCRETE.
5. THE CONCRETE USED SHALL BE PROPORTIONED AND MIXED TO OBTAIN A 28 DAY COMPRESSIVE STRENGTH OF 3,000 PSI. ALL CONCRETE SHALL BE MIXED AND DELIVERED IN ACCORDANCE WITH THE REQUIREMENTS SET FOR IN THE STANDARD NO. ASTM C94, SPECIFICATIONS FOR READY MIX CONCRETE LATEST EDITION.
6. IF THE BOTTOM OF THE TRENCH CONTAINS SHARP MATERIALS, THE DUCTS SHALL BE LAID ON A 4" THICK LAYER OF SAND OR SOIL FREE OF LUMPS OR ROCKS.
7. BACKFILL SHALL BE PLACED IN UNIFORM LAYERS, NOT TO EXCEED 8" DEPTH, AND COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY AT THE PROPER MOISTURE CONTENT OF THE UNDISTURBED SOIL ACCORDING TO LATEST VERSION OF STANDARD NO. ASTM D698.
8. DUCT SPACERS ARE REQUIRED EVERY 5' OR LESS.
9. DUCTS TO BE INSTALLED IN A TRENCH SHALL BE PVC SCH-40.
10. FOR 4" DIAMETER OR LARGER DUCT, THE DUCT COUPLINGS REQUIRED SHALL HAVE 6" FROM THE CENTER TO EACH END. THE DUCT COUPLINGS SHALL BE STAGGERED, SO THAT THERE IS NO COUPLING ADJACENT TO ANOTHER ONE (SEE FIGURE A).
11. ALL DUCTS SHALL BE UNIFORMLY GRADED SO THAT WATER WILL DRAIN INTO A MANHOLE. THE MINIMUM GRADE FOR DUCTS SHALL BE 1" PER 100'. THE PREFERRED METHOD OF GRADING IS A DOUBLE SLOPE IN SUCH WAY THAT THE WATER DRAINS TOWARD BOTH MANHOLES (SEE FIGURE B).
12. DUCTS SHALL BE LOCATED SO THAT THE RUN WILL FOLLOW AS NEARLY AS POSSIBLE A STRAIGHT LINE BETWEEN MANHOLES.
13. IN LOCATIONS WHERE STREET LINES ARE NOT DETERMINATED BY CURBS, SIDEWALK OR PLANTING AREAS, THE INSTALLATION OF DUCTS SHALL BE DONE ACCORDING TO STANDARD NO. URD-24.
14. THE CONDUIT SYSTEM SHALL BE INSTALLED WITH ENOUGH SEPARATION FROM CONDUIT OF OTHER SERVICES. FOR SPECIFIC DETAILS OF SEPARATION DISTANCE, SEE STANDARD NO. URD-24.
15. AFTER CONDUITS HAVE BEEN INSTALLED, IT IS NECESSARY TO CHECK THE INTERNAL CONDITION OF EACH DUCT. THEY SHALL BE CLEANED, AND ANY DEBRIS REMOVED. A MANDREL SHALL BE USED TO PERFORM THIS PROCESS AND PULL BACK WITH A #8 GALVANIZED STEEL PULLING WIRE OR PULLING ROPE/TAPE (9/16") LEFT IN PLACE FOR CONTINUOUS RUNS TO ASSIST CABLE INSTALLATION.
16. RADIAL SEPARATION OF CONDUIT SYSTEM FROM GAS AND OTHER LINES THAT TRANSPORT FLAMMABLE MATERIAL SHALL NOT BE LESS THAN 12" AND SHOULD HAVE SUFFICIENT SEPARATION TO PERMIT THE USE OF DUCT MAINTENANCE EQUIPMENT (NESC 320.B.5).
17. ALL DUCTS SHALL BE TERMINATED WITH A PVC END BELL AT MANHOLES, PULL BOXES AND SERVICE PEDESTALS.
18. IF THE CONDUIT RUN IS TO BE DEAD ENDED FOR COMPLETION AT SOME FUTURE TIME, THE END OF EACH DUCT SHALL BE CLOSED WITH DUCT SEALING PLUGS. THE END OF THE CONCRETE SHEATHING SHALL BE STEPPED BACK APPROXIMATELY 6" FROM EACH HORIZONTAL ROW OF DUCT. THE END OF THE CONDUIT SHALL EXTEND BEYOND THE SHEATHING TO PERMIT CONNECTION TO FUTURE DUCTS. ALL DUCTS SHALL BE TERMINATED INSIDE A 24" X 36" SERVICE PEDESTAL (SEE STANDARD NO. URD-27-B).
19. DUCTS FOR SECONDARY CIRCUITS AND SERVICE LATERALS SHALL HAVE A MINIMUM DIAMETER OF 2".
20. DUCTS FOR STREET LIGHTING CIRCUITS SHALL HAVE A MINIMUM DIAMETER OF ¾".
21. DISTANCE "X" SHALL COMPLY WITH THE REQUIREMENTS OF NESC TABLE 352-1.
22. IF DISTANCE "X" IS LESS THAN 36" FOR SECONDARY CIRCUITS AND 48" FOR PRIMARY CIRCUITS, THE CONDUITS SHALL BE ENCASED IN A LAYER OF CONCRETE UP TO GROUND LEVEL.
23. REFER TO STANDARD NO. URD-54 TO DETERMINE THE PROPER DUCT DIAMETER FOR THE CORRESPONDING CABLES GAUGE.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

TRENCH DETAIL FOR INSTALLATION OF PRIMARY AND SECONDARY DISTRIBUTION CIRCUITS ON ROCKY TERRAIN
MAXIMUM VOLTAGE: 13.2 KV
BILL OF MATERIAL

STANDARD NO. URD-9 VERSION 2
DOCUMENT NO. 4325.X021
PAGE 4 OF 4 DATE SEPT 23, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
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APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
2040	PVC SCH-40 DUCT	VARIES	AS REQ.
2043	PVC COUPLING	VARIES	AS REQ.
2055	READY MIX CONCRETE	038-44668	AS REQ.
2070	DUCT SPACER	VARIES	AS REQ.

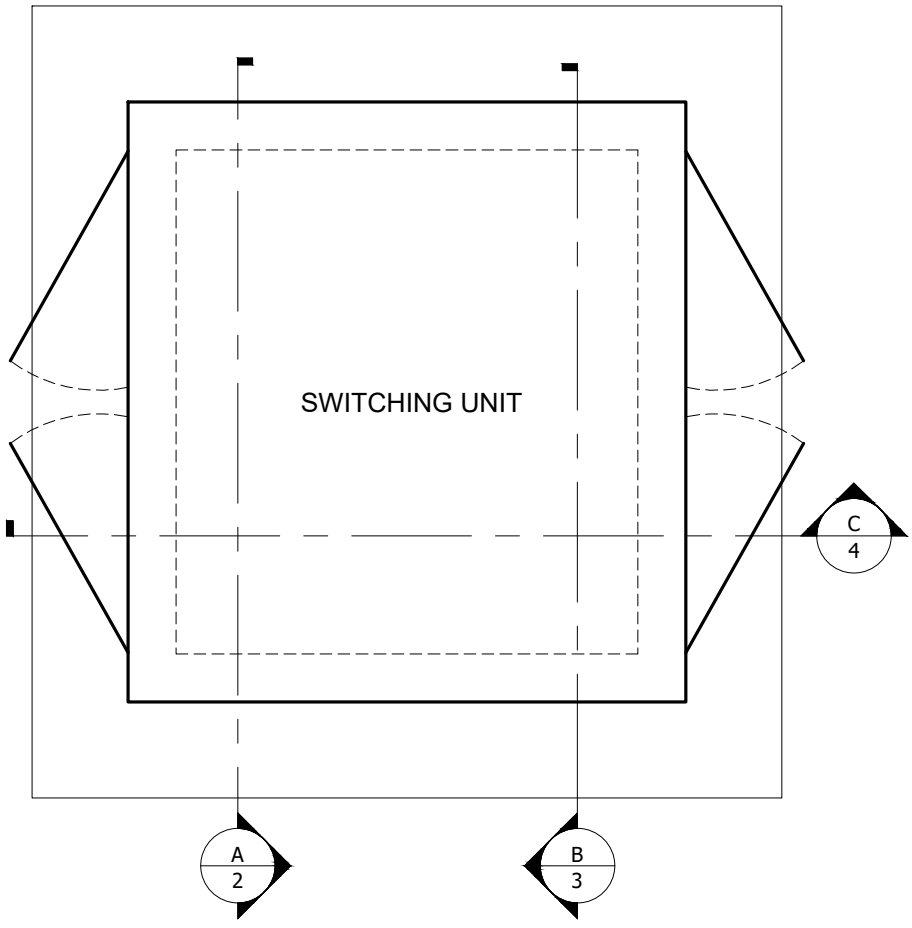
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT
FOR THREE PHASE LOADS
MAXIMUM RATING: 600 A
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-B VERSION 1
DOCUMENT NO. 4325.022
PAGE 1 OF 13 DATE OCT 4, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

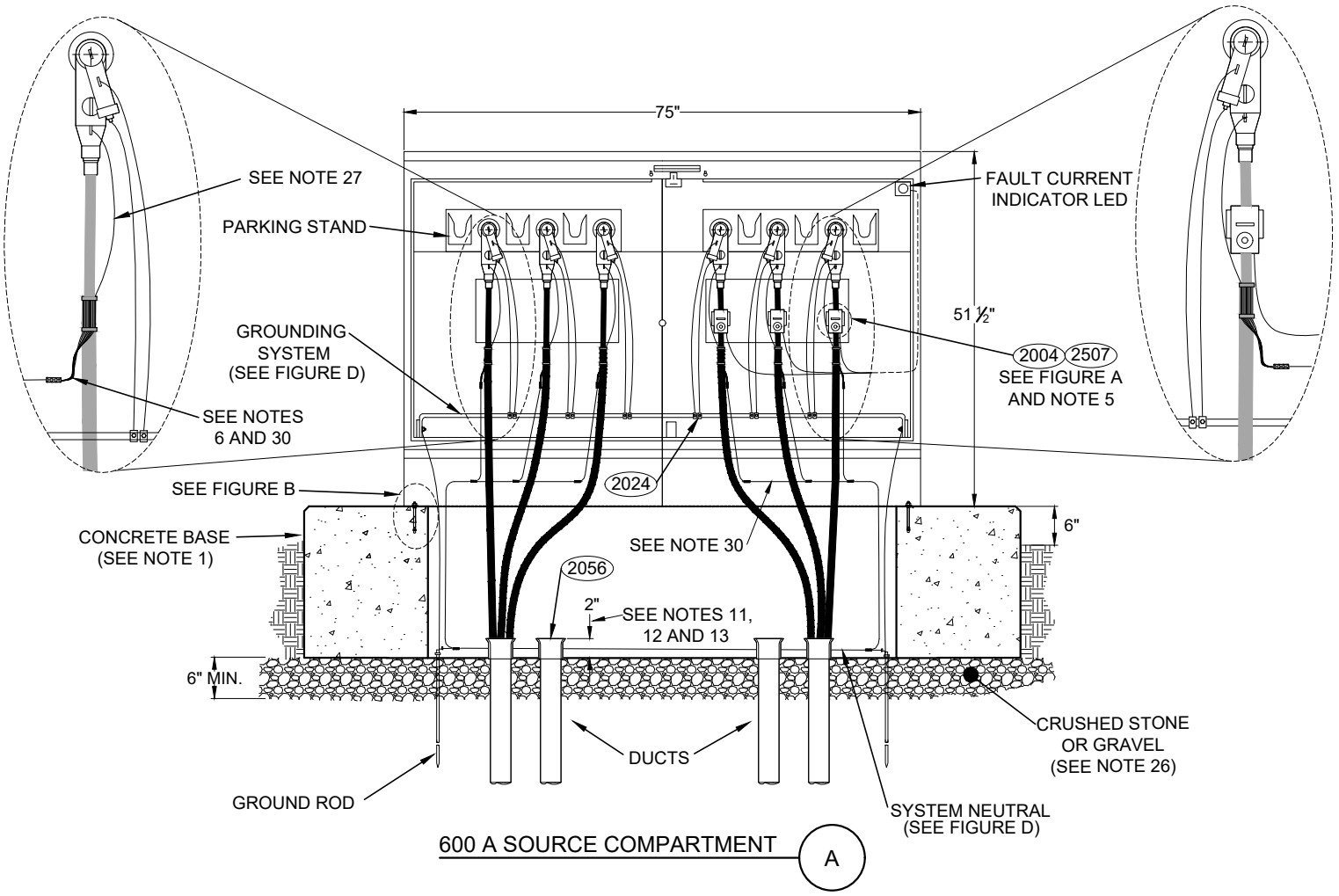


SWITCHING UNIT PLAN VIEW
TWO SOURCES - TWO LOADS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT FOR THREE PHASE LOADS MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-B VERSION 1
DOCUMENT NO. 4325.022
PAGE 2 OF 13 DATE OCT 4, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000



600 A SOURCE COMPARTMENT (A)

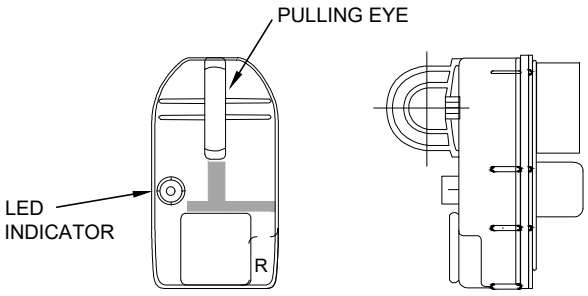


FIGURE A
FAULT CURRENT INDICATOR

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT FOR THREE PHASE LOADS MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-B VERSION 1
DOCUMENT NO. 4325.022
PAGE 3 OF 13 DATE OCT 4, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
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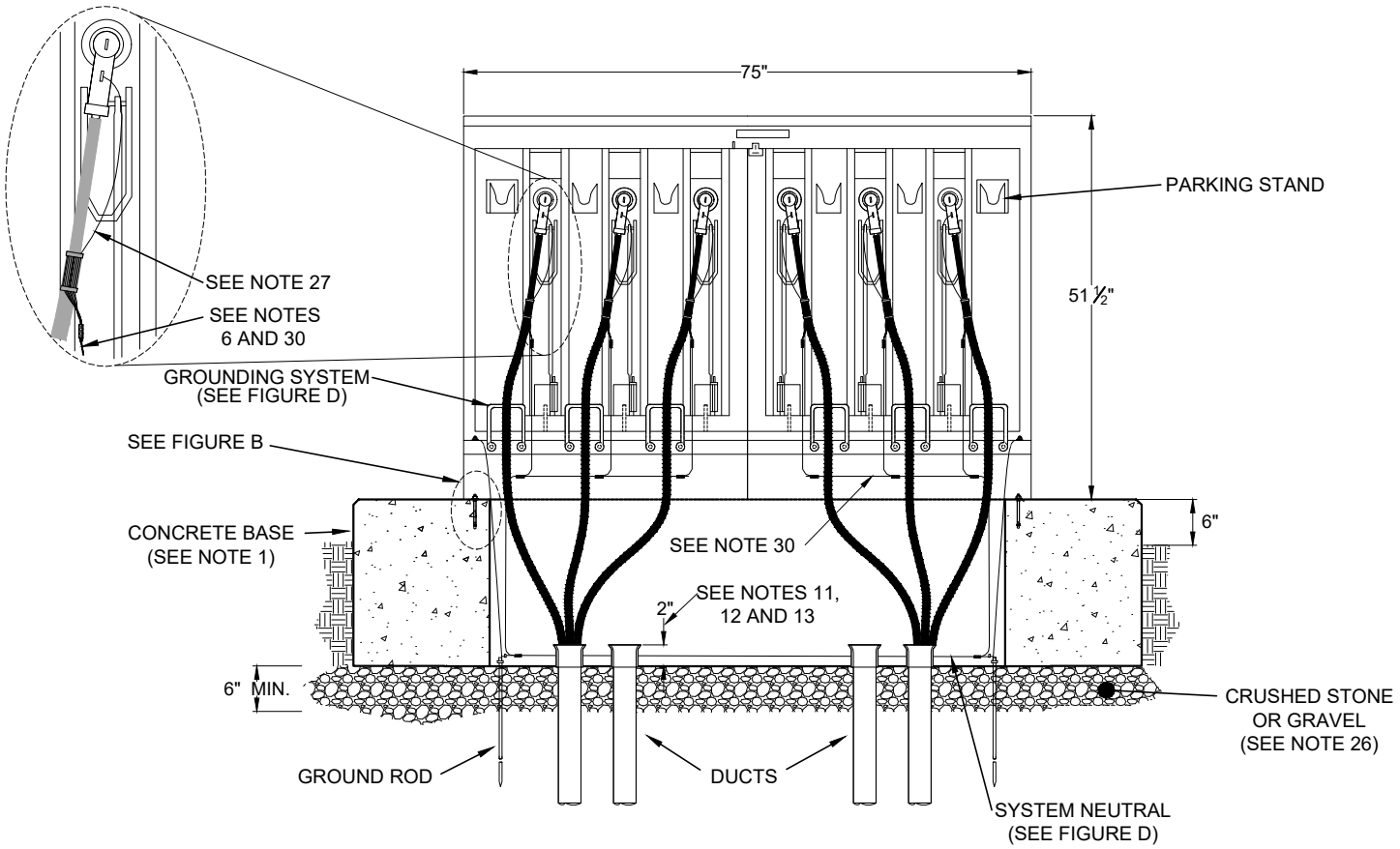
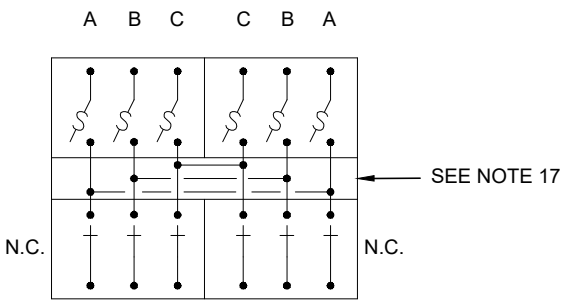
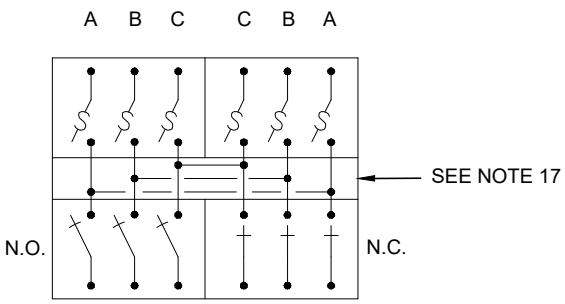
DIGITIZED EMILIO CUADRADO LIC. 3000



200 A LOAD COMPARTMENT B



NORMALLY CLOSE CONNECTION DIAGRAM



NORMALLY OPEN CONNECTION DIAGRAM

FUSE

N.O. DISCONNECTING SWITCH

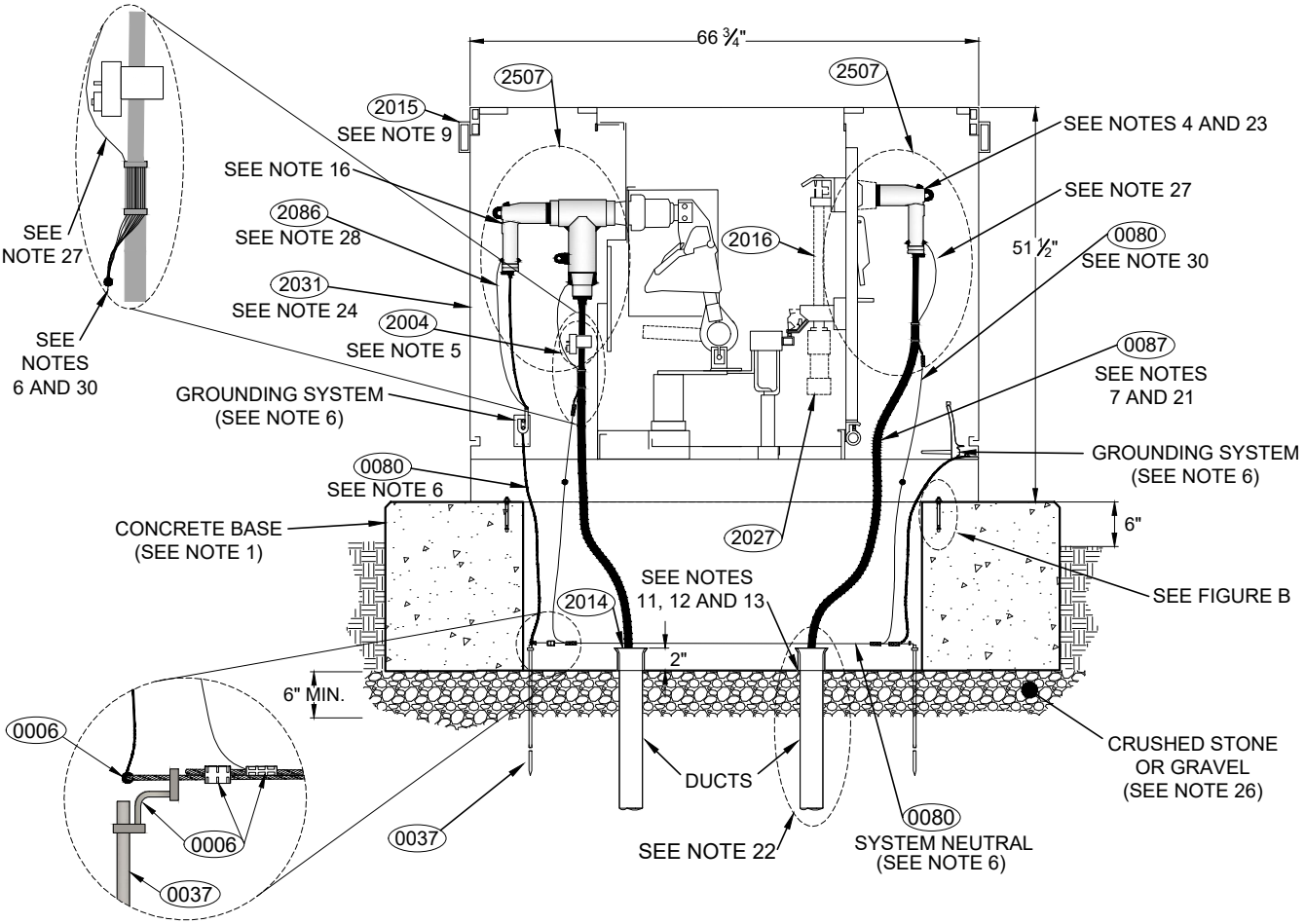
N.C. DISCONNECTING SWITCH

N.C. = NORMALLY CLOSE
N.O. = NORMALLY OPEN

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT FOR THREE PHASE LOADS MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-B VERSION 1
DOCUMENT NO. 4325.022
PAGE 4 OF 13 DATE OCT 4, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000



SOURCE AND LOAD SIDE VIEW C

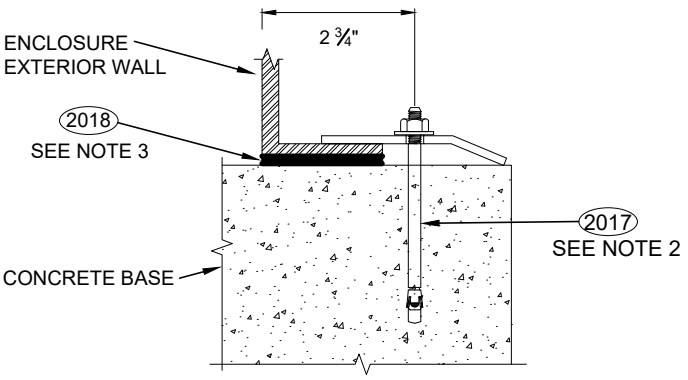
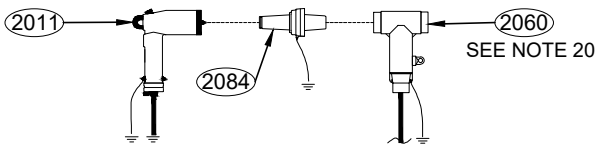
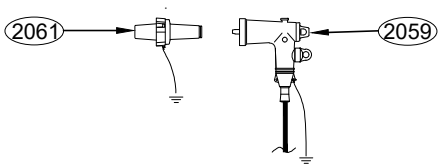


FIGURE B
SWITCHING UNIT MOUNTING



SOURCE SIDE
SEPARABLE INSULATED CONNECTORS



LOAD SIDE
SEPARABLE INSULATED CONNECTORS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT FOR THREE PHASE LOADS MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-B VERSION 1
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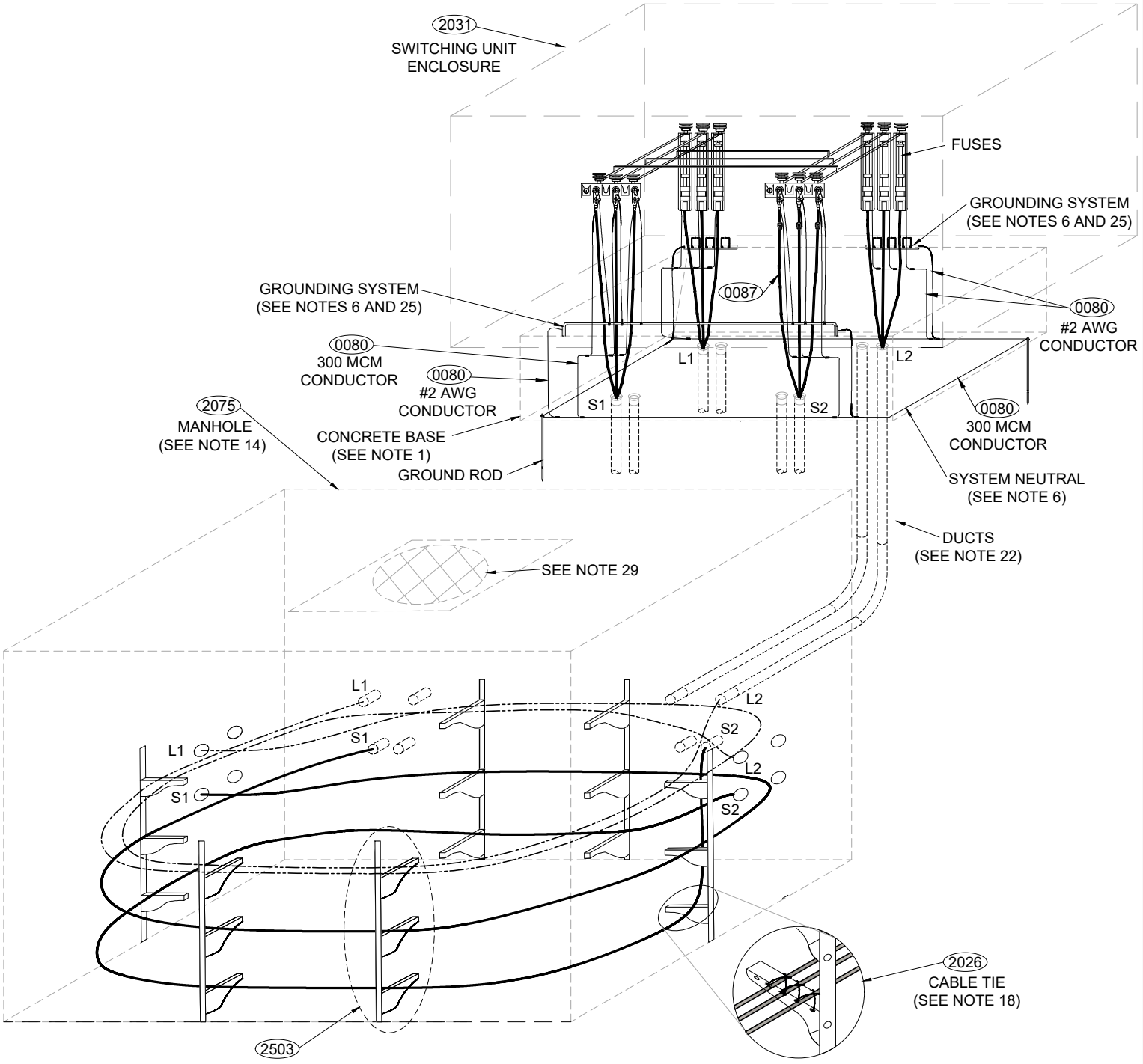

FIGURE D
GROUNDING SYSTEM AND CABLE TYPICAL INSTALLATION
JACKETED CONCENTRIC NEUTRAL CABLE
(SEE NOTE 19)

LEGEND:
S - SOURCE CIRCUITS (3 WIRES)
L - LOAD CIRCUITS (3 WIRES)

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT
FOR THREE PHASE LOADS
MAXIMUM RATING: 600 A
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-B VERSION 1
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DIGITIZED EMILIO CUADRADO LIC. 3000

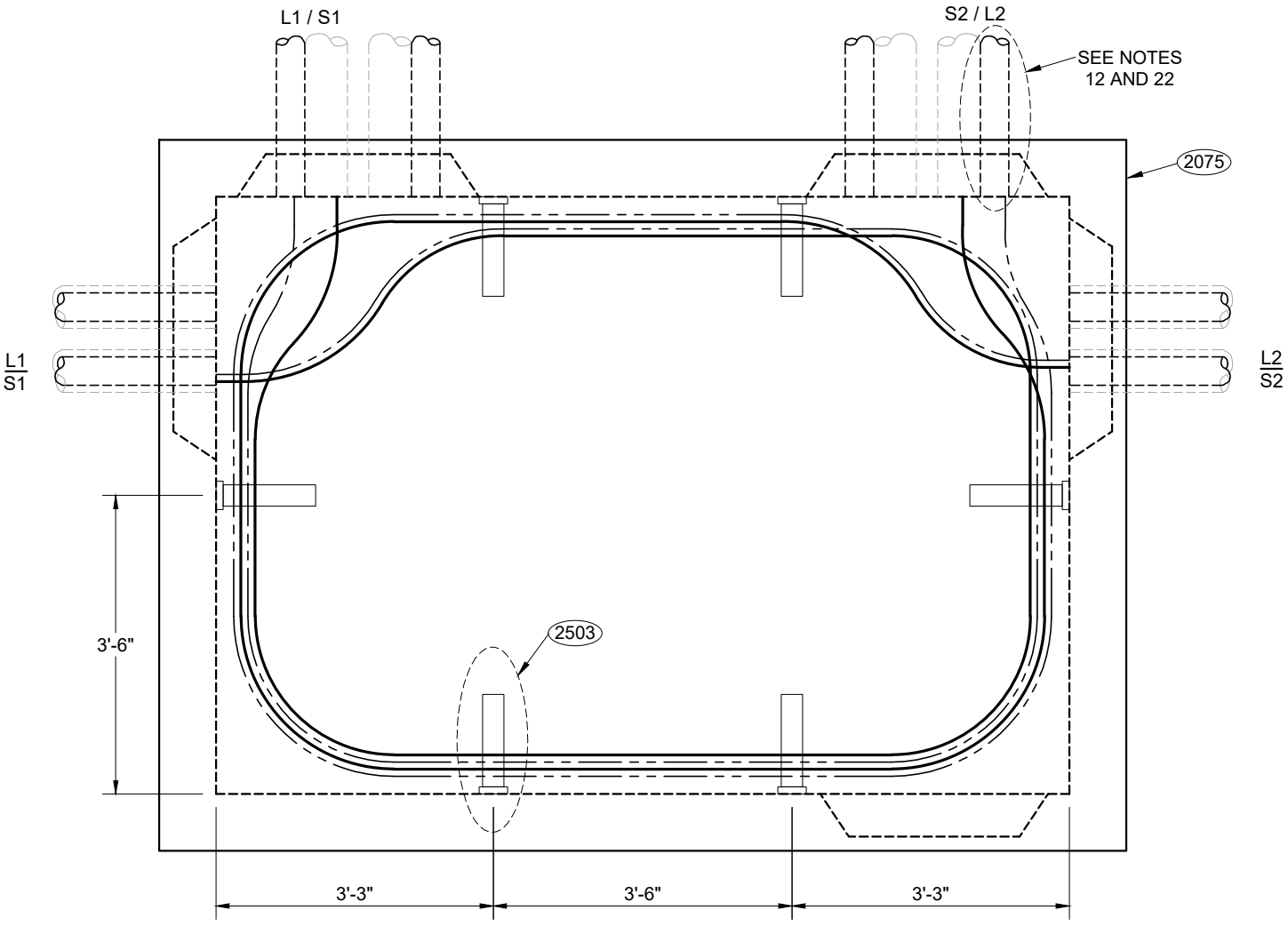

FIGURE E
10' x 7' x 8' MANHOLE CABLE TYPICAL INSTALLATION
TOP VIEW

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT
FOR THREE PHASE LOADS
MAXIMUM RATING: 600 A
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-B VERSION 1
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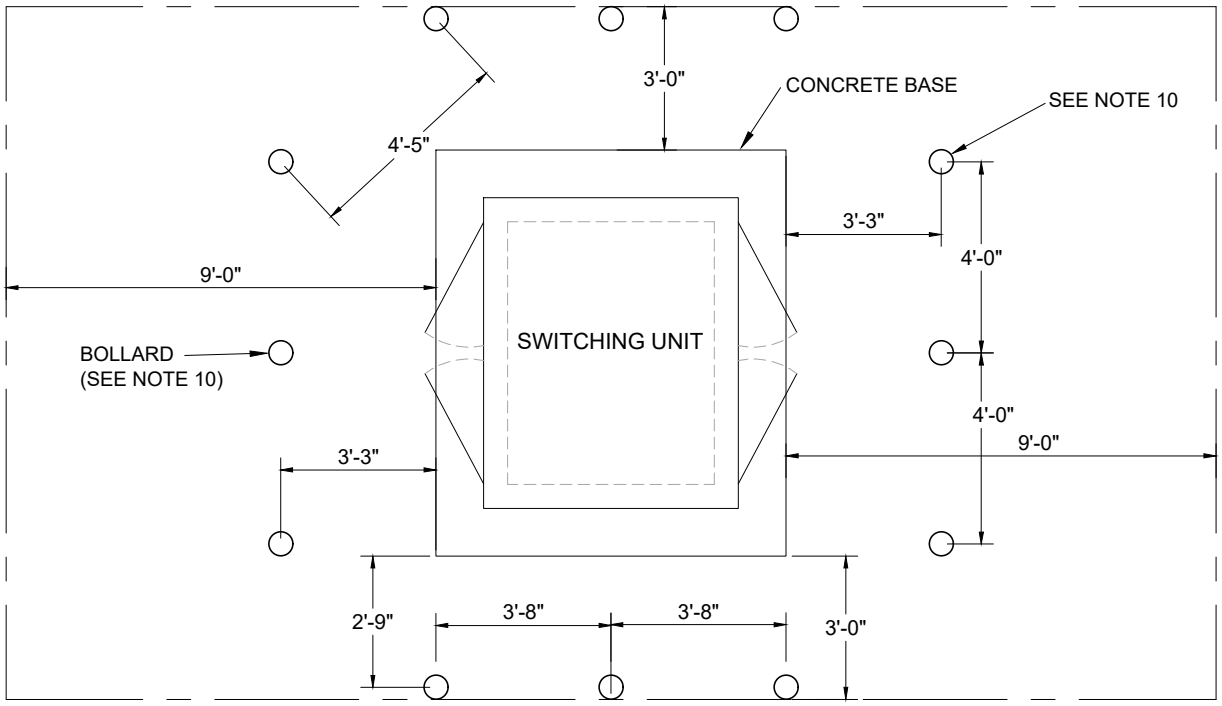

FIGURE F
BOLLARD CONFIGURATION

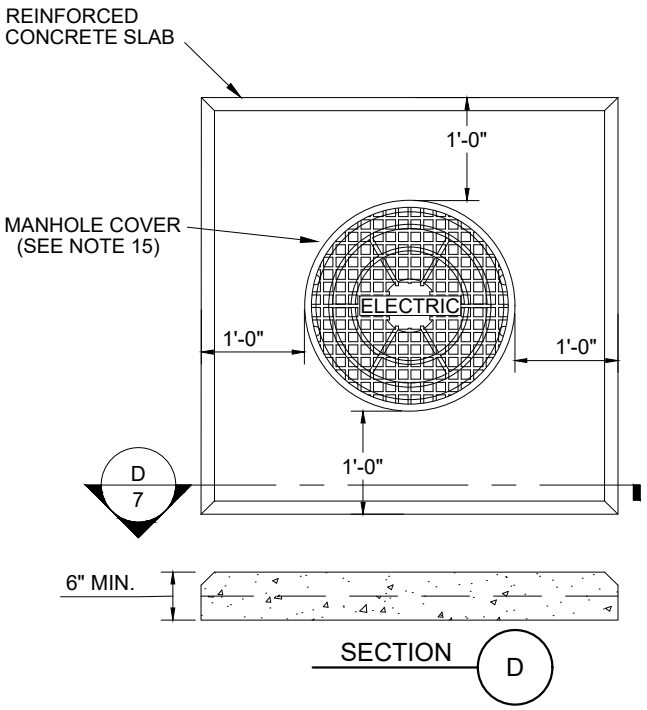

FIGURE G
MANHOLE COVER PROTECTION

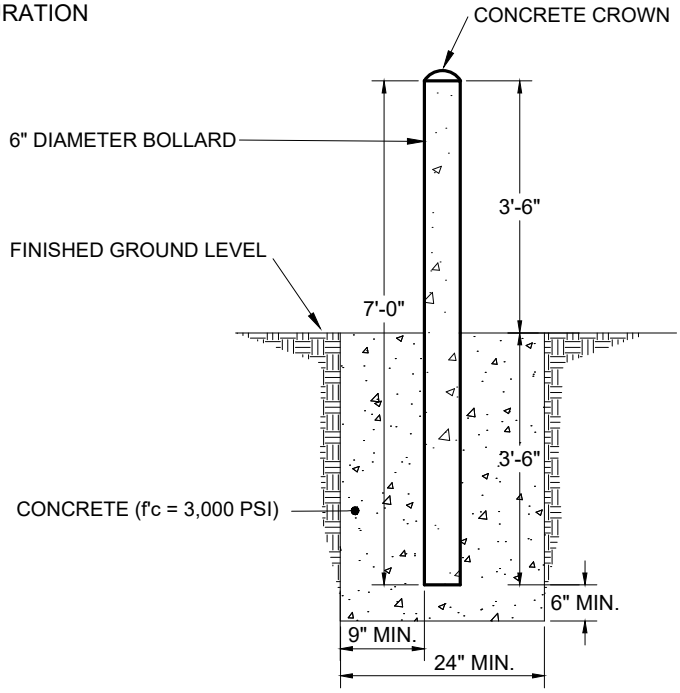

FIGURE H
BOLLARD DETAIL

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT FOR THREE PHASE LOADS MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-B VERSION 1
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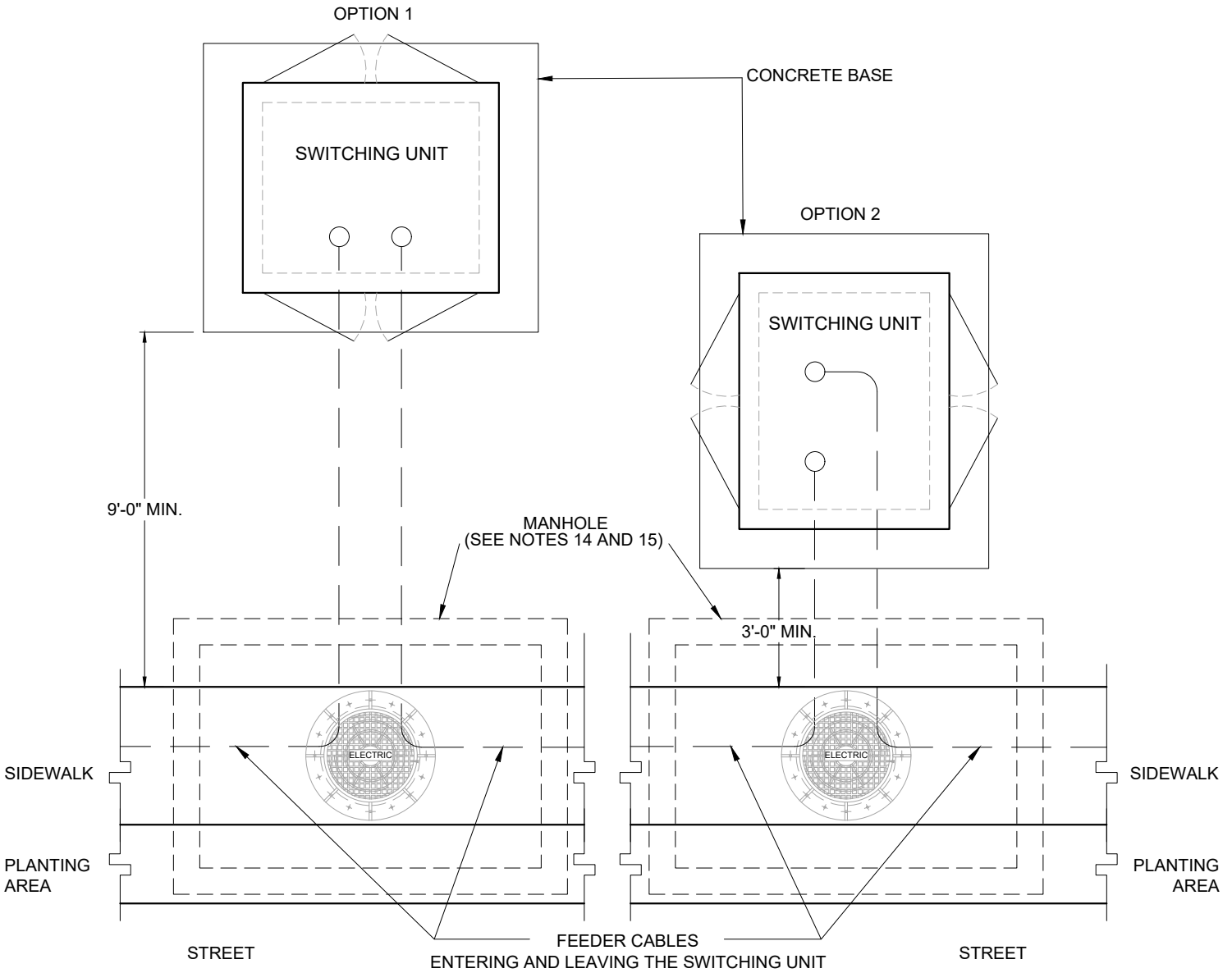

FIGURE I
SWITCHING UNIT TYPICAL LOCATION

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT
FOR THREE PHASE LOADS
MAXIMUM RATING: 600 A
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-B VERSION 1
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APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

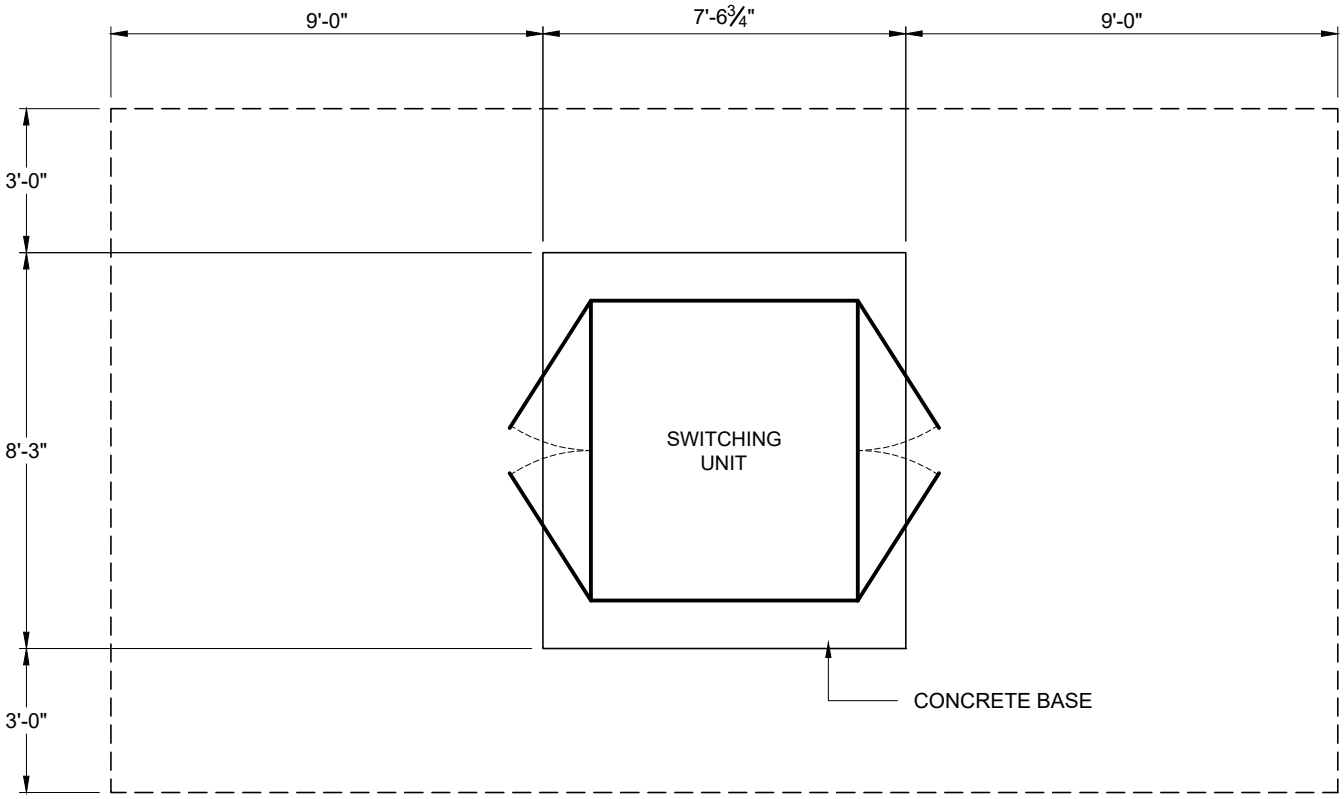

FIGURE J
MINIMUM CLEARANCE REQUIREMENTS FOR SWITCHING UNIT
(SEE NOTE 8)

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT FOR THREE PHASE LOADS MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV NOTES

STANDARD NO. URD-11-B VERSION 1
DOCUMENT NO. 4325.022
PAGE 10 OF 13 DATE OCT 4, 2022
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

NOTES:

1. THE SWITCHING UNIT SHALL BE INSTALLED ON A PRECAST OR CAST IN PLACE CONCRETE BASE. THE STANDARD NO. URD-53 SHOWS THE CONCRETE BASE TO BE USED AND THE SPECIFICATIONS FOR ITS CONSTRUCTION. AFTER THE SWITCHING UNIT IS INSTALLED ON THE CONCRETE BASE, A 12" WIDE STRIP OF THE CONCRETE BASE SHALL BE EXPOSED AROUND ITS ENCLOSURE.
2. STAINLESS STEEL ANCHOR BOLTS SHALL BE USED TO INSTALL THE SWITCHING UNIT ENCLOSURE ON THE CONCRETE BASE. ANCHOR BOLT LOCATIONS ARE TO BE DRILLED INTO THE CONCRETE BASE AFTER THE SWITCHING UNIT IS SET IN PLACE. USE A 5/8" DIAMETER WEDGE ANCHOR BOLT WITH AN EMBEDMENT DEPTH OF 4 3/4". ENSURE TO ANCHOR PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. AN ELASTOMERIC JOINT SEALANT SHALL BE USED BETWEEN THE SWITCHING UNIT ENCLOSURE AND THE CONCRETE BASE. THE SEALANT SHALL BE INSTALLED AROUND THE ENTIRE BOTTOM OF THE SWITCHING UNIT, WHERE IT MAKES CONTACT WITH THE CONCRETE BASE. (SEE FIGURE B)
4. AN ELBOW CONNECTOR SHALL BE USED ON THE 15 KV UNDERGROUND CABLE FOR CONNECTION AT THE SOURCE AND LOAD SIDE OF THE SWITCHING UNIT. IT IS IMPORTANT TO IDENTIFY THE UNDERGROUND CABLE TYPE USED AND ITS CHARACTERISTICS, IN ORDER TO USE THE CORRECT MATERIAL.
5. A FAULT CURRENT INDICATOR SHALL BE INSTALLED ON THE OUTGOING FEEDER OF THE SWITCHING UNIT. THE FAULT CURRENT INDICATOR SHALL HAVE A VISIBLE FAULT INDICATION AND SHALL BE HOT STICK MOUNTING TYPE. (SEE FIGURE A AND ASSEMBLY NO. ASSY-2507)
6. THE NEUTRAL SYSTEM FOR 750 MCM MAIN FEEDERS CONSISTS OF A 300 MCM COPPER BARE CONDUCTOR (ITEM 0080) CONNECTED TO A GROUND ROD. EXTEND TWO LINES OF 300 MCM COPPER BARE CONDUCTOR (ITEM 0080) FROM THE NEUTRAL SYSTEM TO THE SOURCE SIDE CUBICLES, AND TWO LINES OF #2 AWG COPPER BARE CONDUCTOR (ITEM 0080) FROM THE NEUTRAL SYSTEM TO THE LOAD SIDE CUBICLES. CONNECT ALL CONCENTRIC NEUTRALS STRANDS AT SOURCE SIDE FROM EACH ELBOW CONNECTOR TO THE NEUTRAL SYSTEM. IF THE CONCENTRIC NEUTRALS STRANDS DO NOT REACH THE NEUTRAL SYSTEM, A #2 AWG COPPER BARE CONDUCTOR OR AN EQUIVALENT TO 1/3 OF THE GAUGE OF EACH ENERGIZED CABLE SHOULD BE CONNECTED INDEPENDENTLY. THE GROUNDING SYSTEM ARE LOCALIZED AT SOURCE AND LOAD SIDES OF THE EQUIPMENT (REFER TO FIGURE D). THE SWITCHING UNIT ENCLOSURE AND CABLE TERMINATIONS SHALL BE INTERCONNECTED INDEPENDENTLY TO THE NEUTRAL SYSTEM WITH A #2 AWG COPPER BARE CONDUCTOR (ITEM 0080) AT EACH CORNER OF THE EQUIPMENT. DURING INSTALLATION OF THE NEUTRAL SYSTEM LINES EXTENSIONS, ENSURE THAT THE FUSE MECHANISM AND THE SEPARABLE INSULATED CONNECTORS ARE FREE OF OBSTRUCTIONS FOR THEIR PROPER OPERATION.
7. THE SWITCHING UNIT AND CABLES SHALL BE LABELED TO INDICATE FROM WHICH EQUIPMENT THE CABLES COME AND TO WHICH EQUIPMENT THE CABLES GO OR TO WHOM THEY PROVIDE SERVICE.
8. THE SWITCHING UNIT SHALL HAVE A 9' LONG AREA, FROM THE EDGE OF THE CONCRETE BASE, CLEAR OF OBSTRUCTION IN FRONT OF ITS DOOR FOR OPERATION AND MAINTENANCE. IN ADDITION, THERE SHALL BE A 3' LONG AREA, FROM THE EDGE OF THE CONCRETE BASE, CLEAR OF OBSTRUCTIONS ON THE SIDES AND BACK OF THE SWITCHING UNIT. THESE AREAS SHALL BE KEPT CLEAR AT ALL TIMES, INCLUDING FENCES, WALLS OR ANY VEGETATION. (SEE FIGURE J)
9. THE SWITCHING UNIT SHALL BE PADLOCKED AT ALL TIMES, EXCEPT WHEN QUALIFIED PERSONNEL HAVE TO PERFORM ANY OPERATION OR MAINTENANCE ON THE EQUIPMENT. DO NOT LEAVE THE SWITCH OPERATING SHAFT ACCESS COVER UNLOCKED IF THE GEAR IS LEFT UNATTENDED BY A QUALIFIED PERSON.
10. ANY SWITCHING UNIT INSTALLED IN AN AREA EXPOSED TO VEHICULAR TRAFFIC, WHERE DAMAGE TO EQUIPMENT IS PROBABLE, SHALL BE PROTECTED AGAINST IMPACT. THE PROTECTION BARRIER USED SHALL BE INSTALLED IN A WAY THAT ALLOWS DOOR OPENING AND EQUIPMENT OPERATION. FOR EQUIPMENT PROTECTION, USE CONCRETE FILLED PIPES OR BOLLARDS. THEY SHALL BE RIGID GALVANIZED STEEL PIPES WITH A DIAMETER OF 6" AND MINIMUM HEIGHT OF 42" ABOVE FINISHED GROUND LEVEL. THE RIGID GALVANIZED STEEL PIPES SHALL BE EMBEDDED 42" BELOW FINAL GROUND LEVEL. THE AMOUNT OF BOLLARDS TO BE INSTALLED DEPENDS ON THE SWITCHING UNIT LOCATION. BOLLARDS ARE NOT REQUIRED ON SIDES WHERE SWITCHING UNIT FACES A STRUCTURE OR BARRIER WHICH RESTRICT VEHICULAR TRAFFIC. CAUTION MUST BE TAKEN WHEN INSTALLING BOLLARDS, SO THAT THEY DO NOT MAKE CONTACT WITH ANY UNDERGROUND INFRASTRUCTURE. FOR TYPICAL LOCATION OF BOLLARDS AROUND A SWITCHING UNIT, SEE FIGURE F. FOR BOLLARD INSTALLATION DETAIL, SEE FIGURE H.
11. ONCE THE CONCRETE BASE AND PVC DUCTS ARE INSTALLED, MAKE SURE THE CRUSHED STONE OR GRAVEL AT THE BOTTOM OF THE CONCRETE BASE DOES NOT COVER THE DUCTS. THE DUCTS AND PVC END BELLS SHALL BE 2" ABOVE THE CRUSHED STONE OR GRAVEL.
12. ALL PVC DUCTS IN A CONCRETE BASE AND MANHOLE WALLS SHALL HAVE A PVC END BELL (ITEM 2045) TERMINATION TO PROVIDE A SMOOTH AND SAFE CABLE ENTRY.
13. AFTER INSTALLATION OF ALL CABLES IS COMPLETED, THE DUCTS IN USE SHALL BE SEALED WITH A NONHARDENING SEALING COMPOUND (ITEM 2014), AND A DUCT SEALING PLUG (ITEM 2056) SHALL BE INSTALLED IN EACH SPARE DUCT TO PREVENT WATER OR FOREIGN OBJECTS INTRUSION.
14. A 10' X 7' X 8' MANHOLE SHALL BE INSTALLED IN FRONT OF EVERY SWITCHING UNIT FOR CABLES ENTERING AND LEAVING THE SWITCHING UNIT IF IT IS TO BE TRANSFERRED TO LUMA. STANDARD NO. URD-31 SHOWS THE MANHOLE INSTALLATION. LOCATION OF THE SWITCHING UNIT AND MANHOLE WILL BE ACCORDING TO THE DESIGN OF THE UNDERGROUND SYSTEM. (SEE FIGURE D)
15. THE MANHOLE COVER SHALL BE INSTALLED FLUSH WITH THE FINISH GRADE. THE MANHOLE COVER FRAME AND THE MANHOLE ROOF WILL BE BELOW GROUND. THE PREFERRED LOCATION FOR THE MANHOLE COVER IS ON THE SIDEWALK, BUT IT CAN BE INSTALLED ON THE STREET OR PLANTING AREA. IF THE MANHOLE COVER IS INSTALLED IN A PLANTING AREA, IT SHALL BE PROTECTED WITH A REINFORCED CONCRETE SLAB WITH MINIMUM THICKNESS OF 6" AND EXTENDING 12" AROUND THE MANHOLE COVER (REFER TO FIGURE G). 6" x 6" TYPE WELDED WIRE MESH CAN BE USED FOR THE CONSTRUCTION OF THE CONCRETE SLAB.
16. ELBOW ARRESTERS SHALL BE INSTALLED AT NORMALLY OPEN AND NORMALLY CLOSE POINTS OF THE THREE PHASE MAIN FEEDER. SELECTION OF THE ELBOW ARRESTER RATING SHALL BE BASED ON THE SYSTEM VOLTAGE.
17. THE PHASE LOCATION ILLUSTRATED IN THE CONNECTION DIAGRAM IS THE ONLY PERMITTED CONNECTION, AND NO VARIATION WILL BE ALLOWED.
18. ALL CABLES SHALL BE TIED TO THE CABLE SUPPORT USING WEATHER RESISTANT CABLE TIES (ITEM 2026).

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT FOR THREE PHASE LOADS MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV NOTES

STANDARD NO. URD-11-B VERSION 1
DOCUMENT NO. 4325.022
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SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

NOTES:

19. FIGURES D AND E ARE REPRESENTATIONS OF THE POSSIBLE CABLE ROUTES ENTERING AND LEAVING THE SWITCHING UNIT THROUGH THE MANHOLE. NOT ALL CABLES THAT MAY EXIST IN THE SWITCHING UNIT ARE ILLUSTRATED.
20. 600 A DEADBREAK ELBOW CONNECTOR IS DESIGNED FOR OPERATIONS AS A DEENERGIZED DEVICE. DO NOT OPERATE IT ENERGIZED.
21. ENSURE TO IDENTIFY CABLES PHASES USING APPLICABLE COLOR CODE. REFER TO NEC'S LATEST EDITION.
22. REFER TO STANDARD NO. URD-54 FOR DUCT SIZING.
23. REFER TO ASSEMBLY NO. ASSY-2507, SEPARABLE INSULATED CONNECTORS AND CABLE TERMINATION ASSEMBLY.
24. DEAD FRONT SWITCHING UNIT AMPERAGE RATING IS 600 A AT SOURCE SIDE, AND 200 A AT LOAD SIDE. THE 15 KV UNDERGROUND CABLE MAXIMUM GAUGE ALLOWABLE SHALL BE 750 MCM FOR THE SOURCE SIDE, AND 4/0 AWG OR #2 AWG, AS APPLICABLE, FOR THE LOAD SIDE.
25. THE GROUND RESISTANCE WILL NOT EXCEED 5 OHMS.
26. FOR MATERIAL DETAILS AND INSTRUCTIONS TO INSTALL THE CONCRETE BASE, REFER TO STANDARD NO. URD-53.
27. FOR JCN CABLES, ONE CONCENTRIC NEUTRAL STRAND CONNECTED TO THE ELBOW CONNECTOR GROUNDING EYE WILL BE USED AS DRAIN WIRE. (REFER TO ASSEMBLY NO. ASSY-2507)
28. ALL DRAIN WIRES ASSOCIATED WITH SEPARABLE CONNECTORS SHALL BE EFFECTIVELY CONNECTED TO THE GROUNDING SYSTEM USING A #12 AWG STRANDED COPPER CABLE, 600V, THHN, GREEN (ITEM 2086).
29. FOR GROUNDING CONNECTION, REFER TO STANDARD NO. URD-31.
30. NEUTRAL CABLE FROM EACH SINGLE LOAD SHALL BE CONNECTED DIRECTLY TO THE NEUTRAL SYSTEM USING A COMPRESSION CONNECTOR (ITEM 0006). DURING INSTALLATION OF THE NEUTRAL SYSTEM LINES EXTENSIONS AT LOAD COMPARTMENTS, ENSURE THAT THE FUSE MECHANISM AND SEPARABLE INSULATED CONNECTORS ARE FREE OF OBSTRUCTION FOR THEIR PROPER OPERATION.
31. CONCENTRIC NEUTRALS OF THE LOAD SIDE SHALL BE EFFECTIVELY CONNECTED TO THE GROUNDING SYSTEM.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT
FOR THREE PHASE LOADS
MAXIMUM RATING: 600 A
MAXIMUM VOLTAGE: 13.2 KV
BILL OF MATERIAL

STANDARD NO. URD-11-B VERSION 1
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DIGITIZED EMILIO CUADRADO LIC. 3000

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION CONNECTORS AND SPLICES	VARIES	AS REQ.
0037	$\frac{5}{8}$" x 8' GROUND ROD	002-02465	AS REQ.
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
0087	15 KV UNDERGROUND CABLE	VARIES	AS REQ.
2004	FAULT CURRENT INDICATOR	VARIES	3
2011	ELBOW ARRESTER	VARIES	6
2014	DUCT SEALING COMPOUND	003-02935	AS REQ.
2015	PADLOCK	VARIES	6
2016	SMU-20 TYPE FUSE	VARIES	6
2017	WEDGE ANCHOR BOLT	038-83148	4
2018	ELASTOMERIC JOINT SEALANT	038-83149	AS REQ.
2024	MECHANICAL GROUNDING CONNECTOR	038-03620	AS REQ.
2026	CABLE TIE	038-83155	AS REQ.
2027	SME-20 FUSE UNIT END FITTING	VARIES	6
2031	DEAD FRONT SWITCHING UNIT	038-83414	1
2045	PVC END BELL	VARIES	AS REQ.
2056	DUCT SEALING PLUG	VARIES	AS REQ.
2059	LOADBREAK ELBOW CONNECTOR	VARIES	6

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT
FOR THREE PHASE LOADS
MAXIMUM RATING: 600 A
MAXIMUM VOLTAGE: 13.2 KV
BILL OF MATERIAL

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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
2060	DEADBREAK ELBOW CONNECTOR	VARIES	6
2061	LOADBREAK BUSHING PLUG INSERT	038-00679	6
2075	10' x 7' x 8' MANHOLE WITH COVER	038-70153	1
2084	LOADBREAK ELBOW TAP PLUG	072-79765	6
2086	STRANDED COPPER CABLE, 600 V, THHN	040-00774	AS REQ.
2503	UNDERGROUND NONMETALLIC CABLE RACK ASSEMBLY	ASSY-2503	AS REQ.
2507	SEPARABLE INSULATED CONNECTORS AND CABLE TERMINATION ASSEMBLY	ASSY-2507	AS REQ.
URD-54	DUCT SIZING STANDARD	URD-54	AS REQ.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT
FOR SINGLE PHASE LOADS
MAXIMUM RATING: 600 A
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-C VERSION 1
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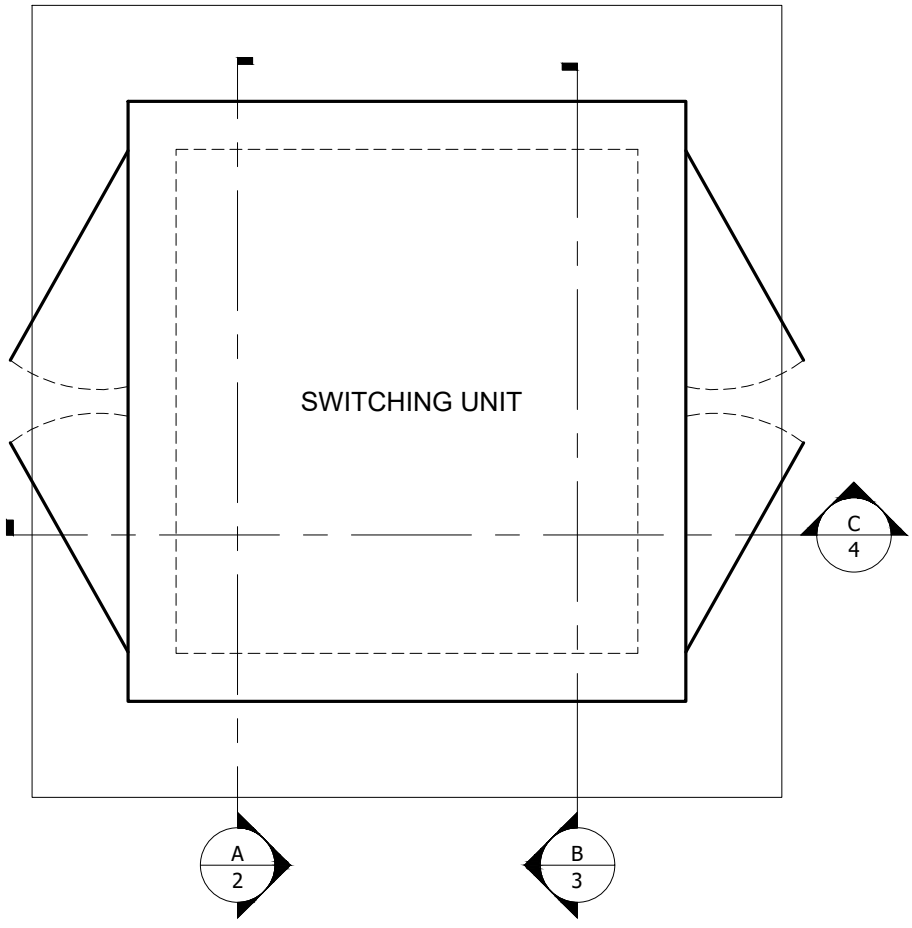

SWITCHING UNIT PLAN VIEW
TWO SOURCES - TWO LOADS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT FOR SINGLE PHASE LOADS MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-C VERSION 1
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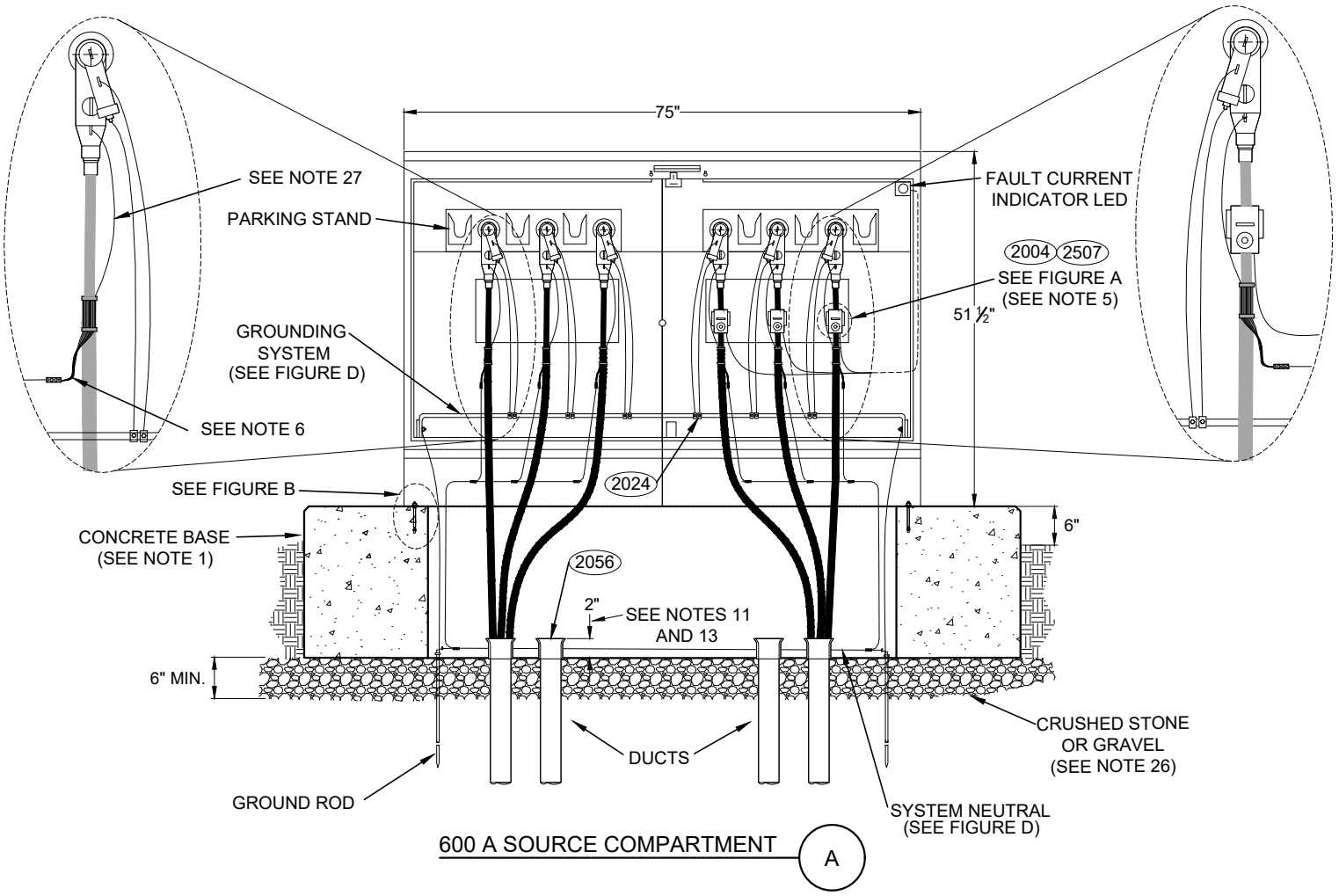

600 A SOURCE COMPARTMENT — A

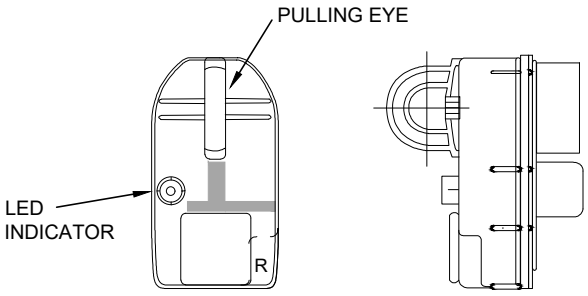

FIGURE A
FAULT CURRENT INDICATOR

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT FOR SINGLE PHASE LOADS MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-C VERSION 1
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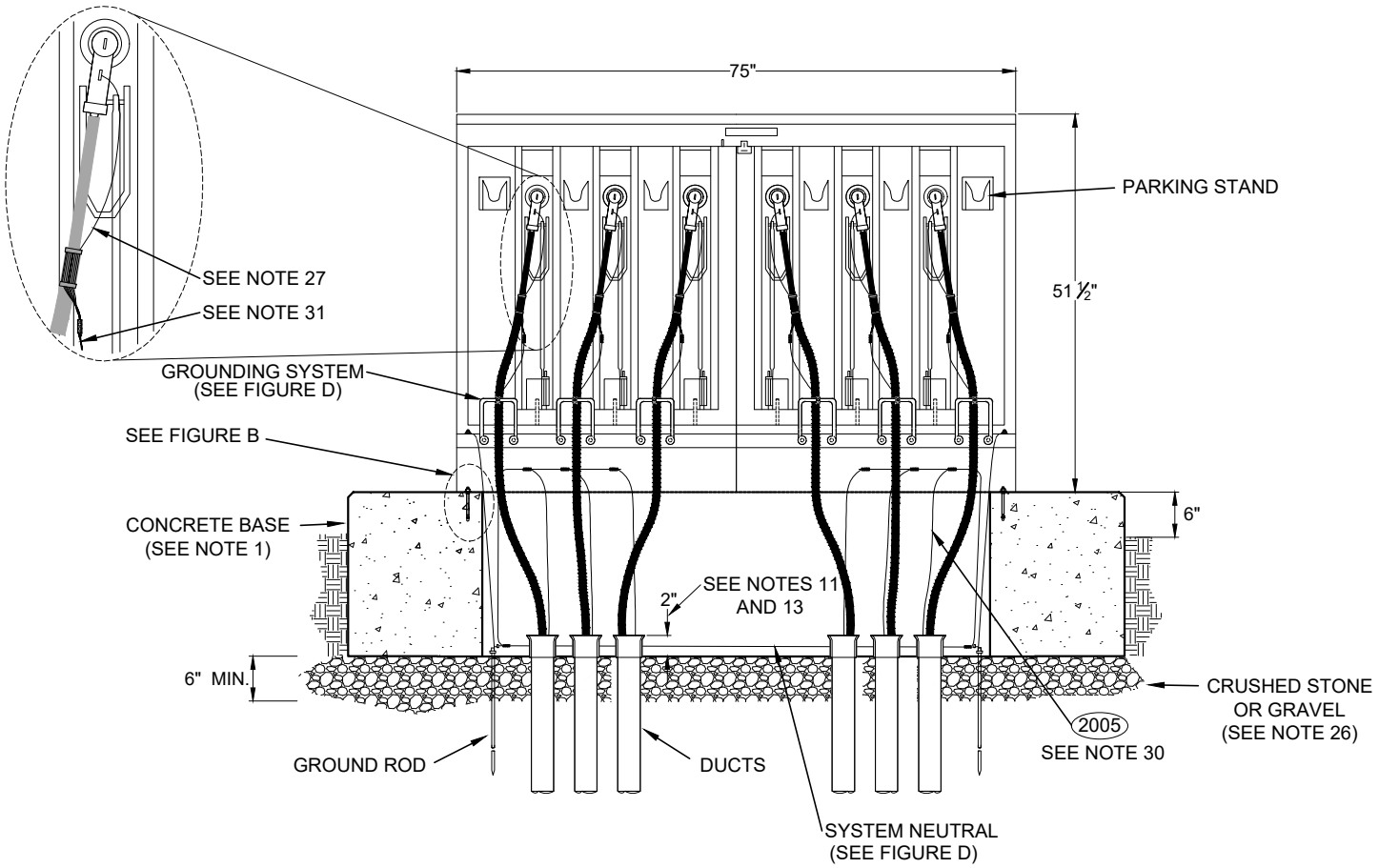
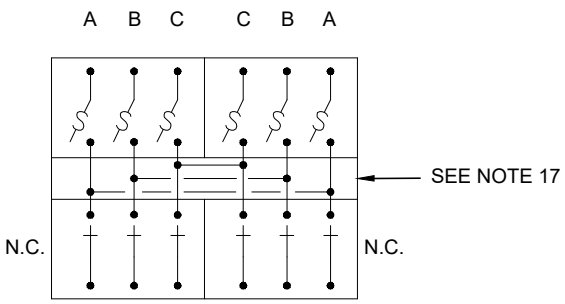
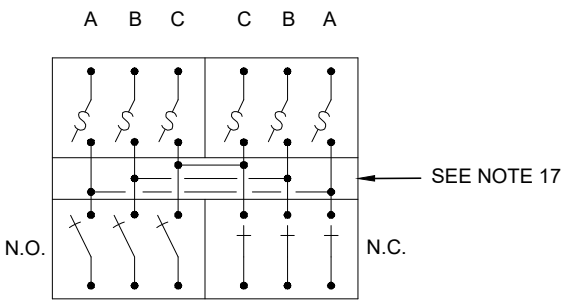
SUBMITTED KARY E. GONZALEZ MONZON
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000



200 A LOAD COMPARTMENT — B



NORMALLY CLOSE CONNECTION DIAGRAM



NORMALLY OPEN CONNECTION DIAGRAM

FUSE

N.O. DISCONNECTING SWITCH

N.C. DISCONNECTING SWITCH

N.C. = NORMALLY CLOSE
N.O. = NORMALLY OPEN

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT
FOR SINGLE PHASE LOADS
MAXIMUM RATING: 600 A
MAXIMUM VOLTAGE: 13.2 KV

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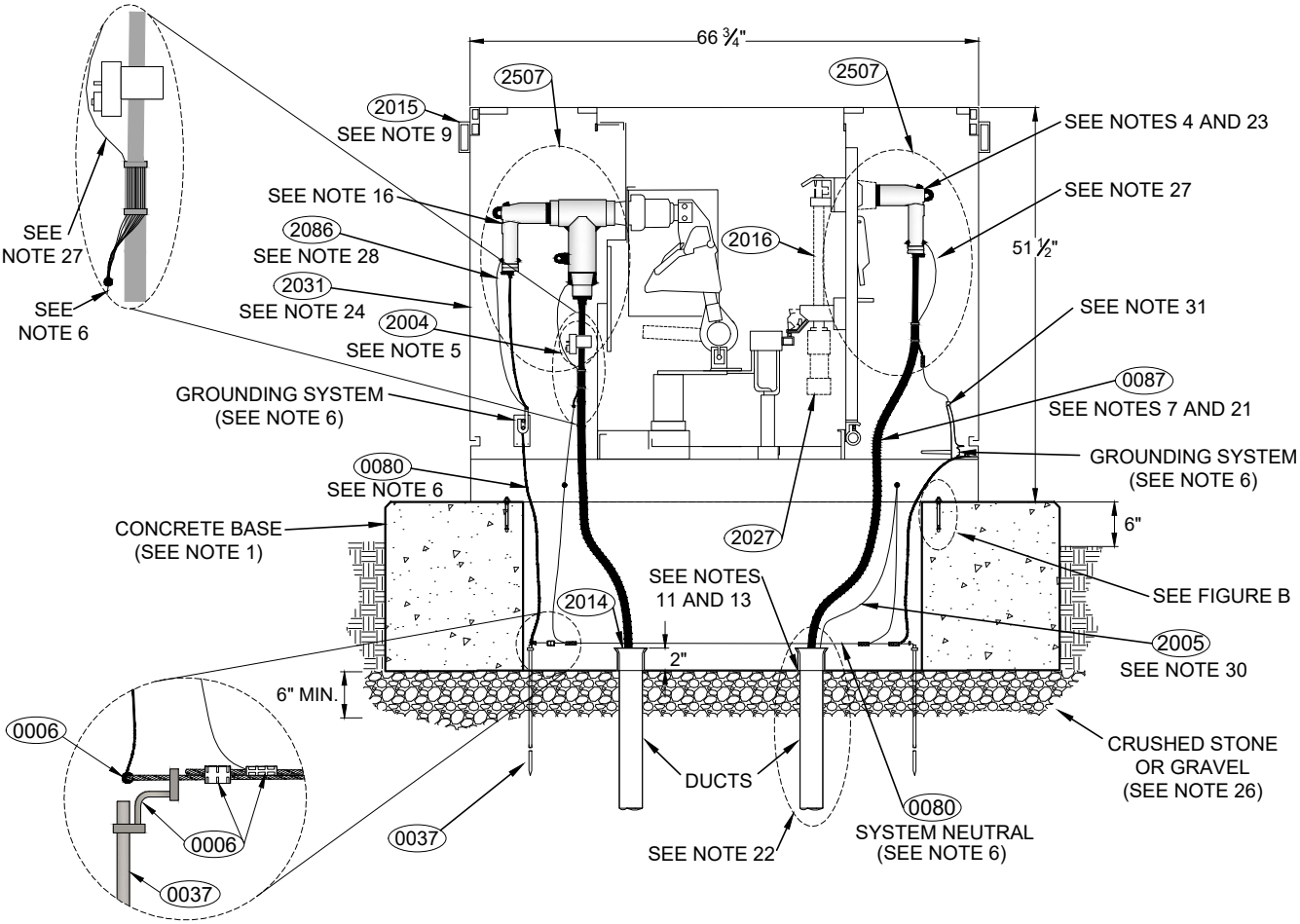


SOURCE AND LOAD SIDE VIEW C

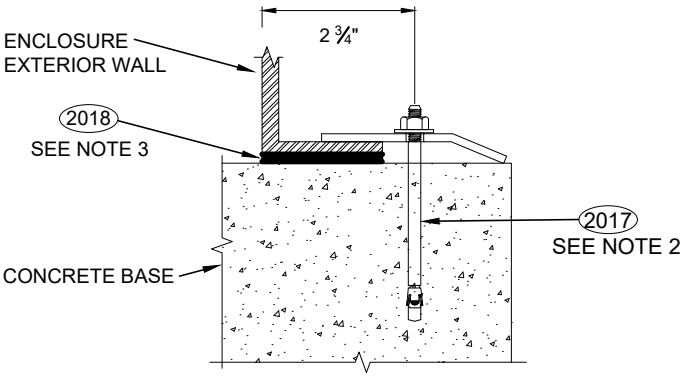
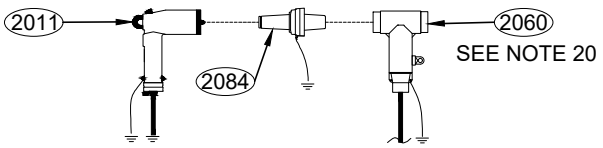
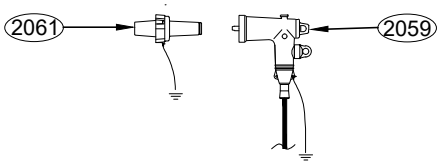


FIGURE B
SWITCHING UNIT MOUNTING



SOURCE SIDE
SEPARABLE INSULATED CONNECTORS



LOAD SIDE
SEPARABLE INSULATED CONNECTORS

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT
FOR SINGLE PHASE LOADS
MAXIMUM RATING: 600 A
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-C VERSION 1
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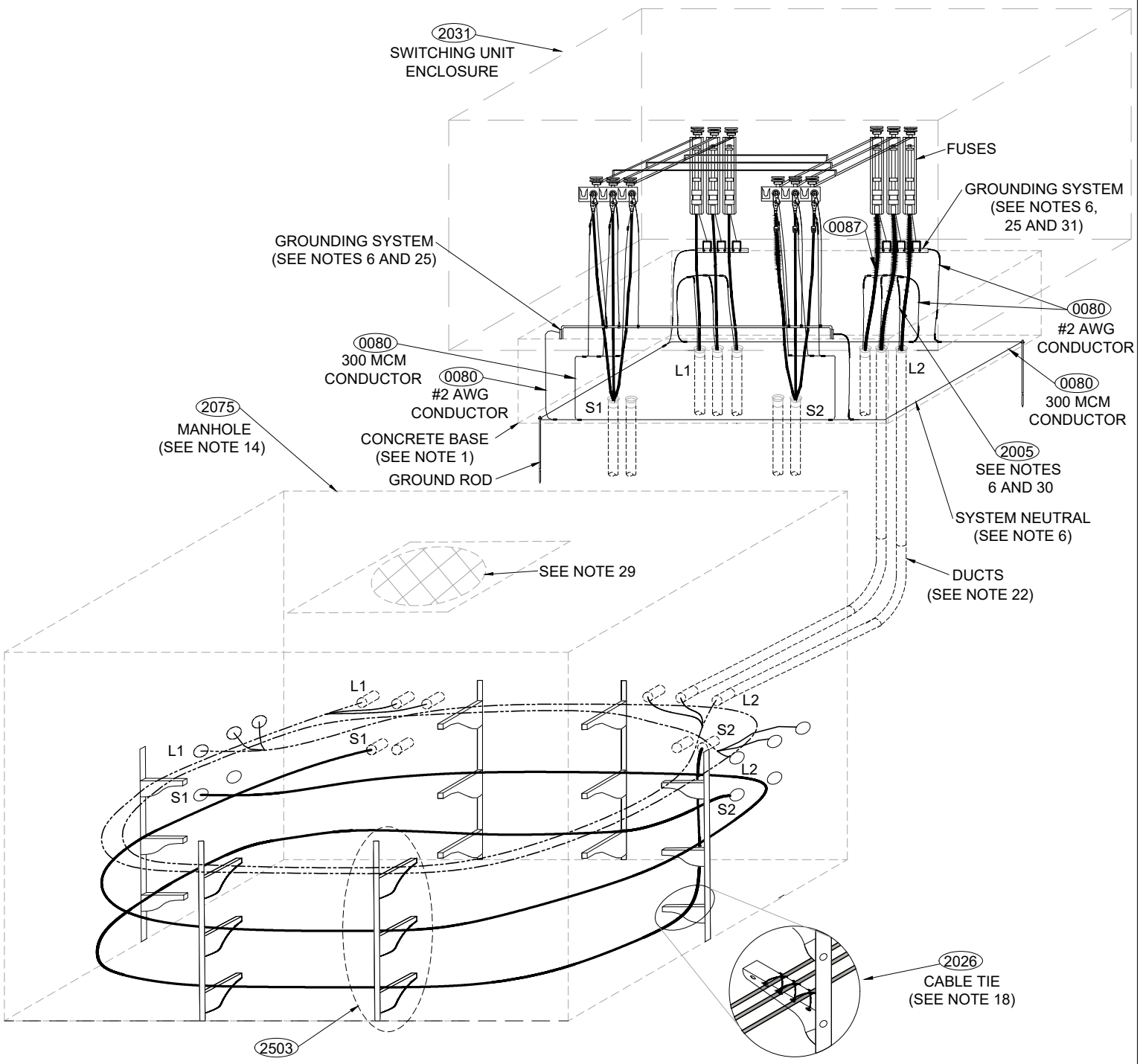

FIGURE D
GROUNDING SYSTEM AND CABLE TYPICAL INSTALLATION
JACKETED CONCENTRIC NEUTRAL CABLE
(SEE NOTE 19)

LEGEND:
S - SOURCE CIRCUITS (3 WIRES)
L - LOAD CIRCUITS (2 WIRES)

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT
FOR SINGLE PHASE LOADS
MAXIMUM RATING: 600 A
MAXIMUM VOLTAGE: 13.2 KV

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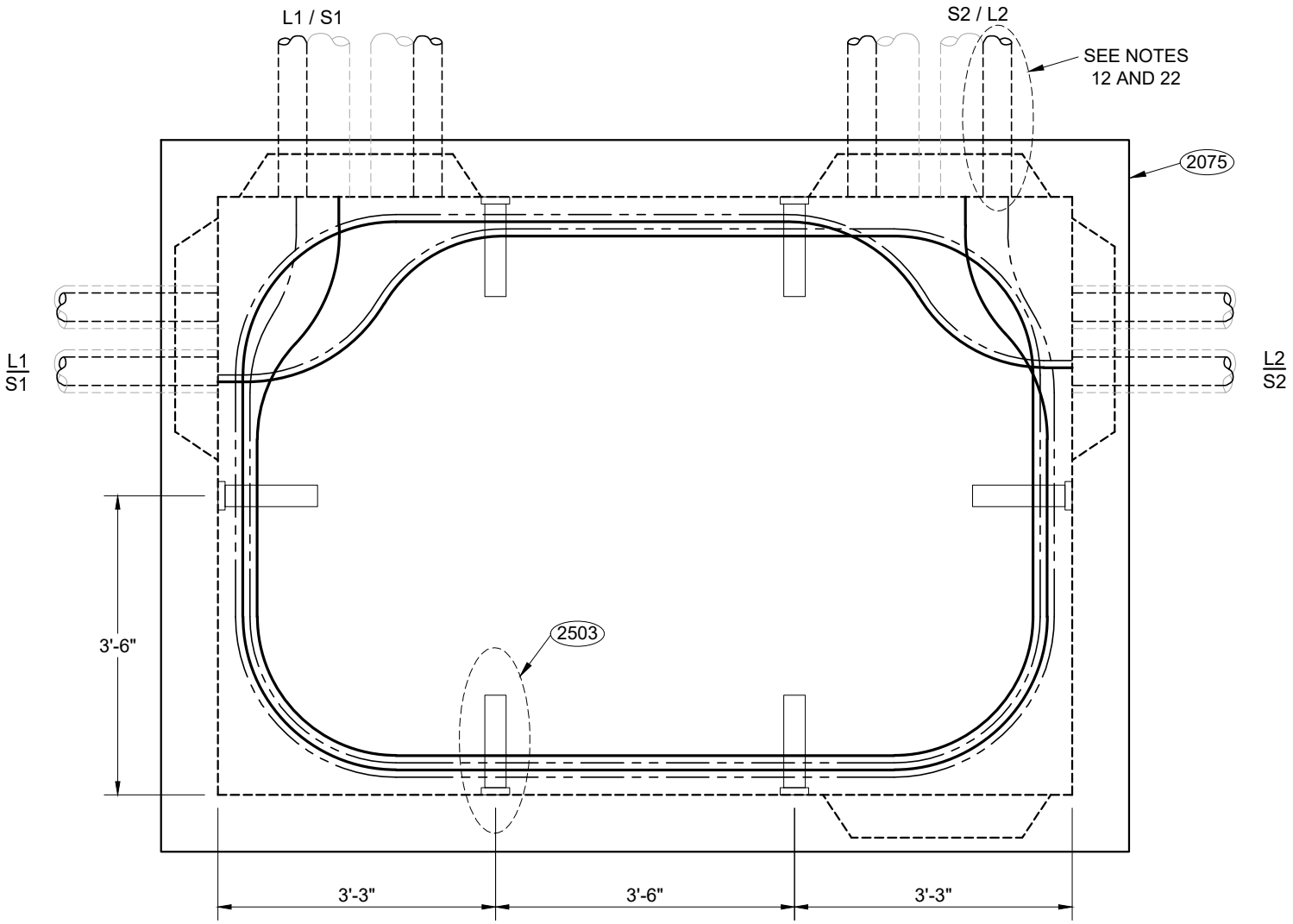

FIGURE E
10' x 7' x 8' MANHOLE CABLE TYPICAL INSTALLATION
TOP VIEW

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT
FOR SINGLE PHASE LOADS
MAXIMUM RATING: 600 A
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-C VERSION 1
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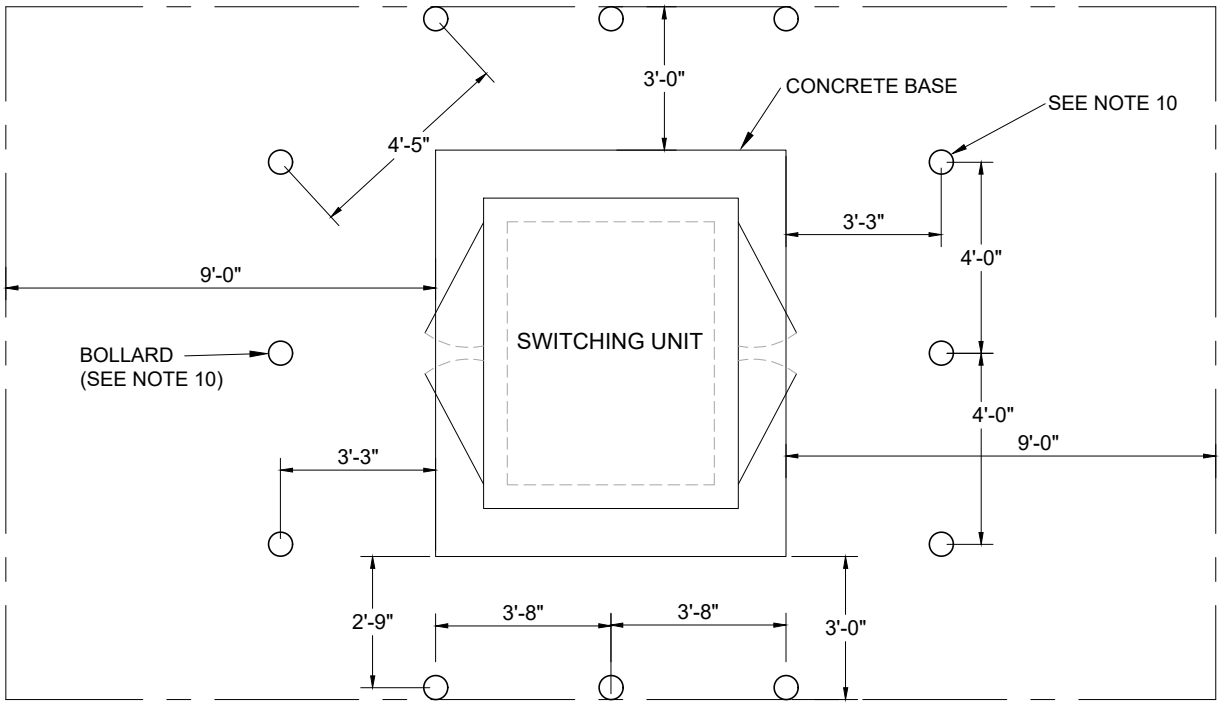

FIGURE F
BOLLARD CONFIGURATION

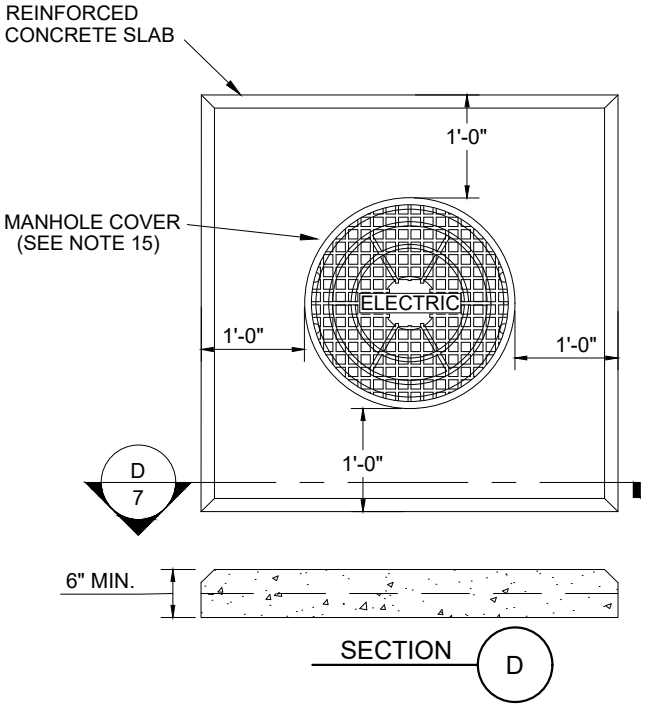

FIGURE G
MANHOLE COVER PROTECTION

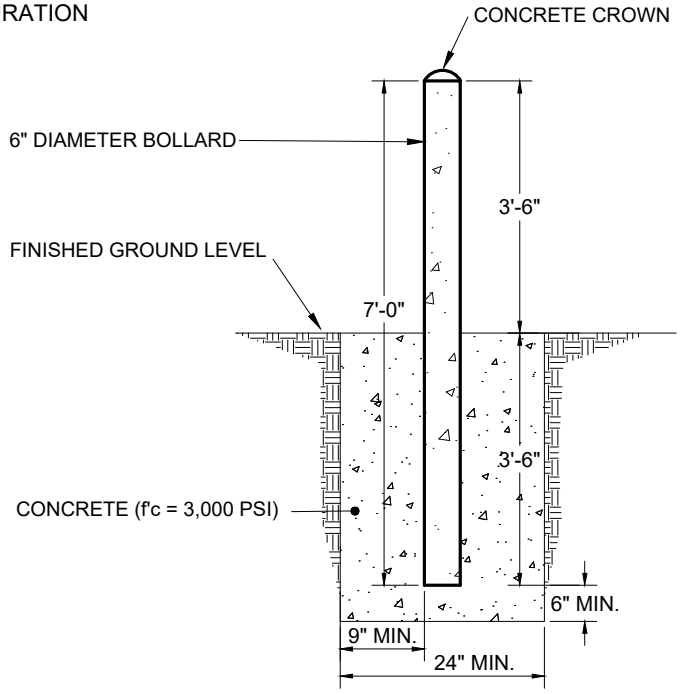

FIGURE H
BOLLARD DETAIL

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT FOR SINGLE PHASE LOADS MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-C VERSION 1
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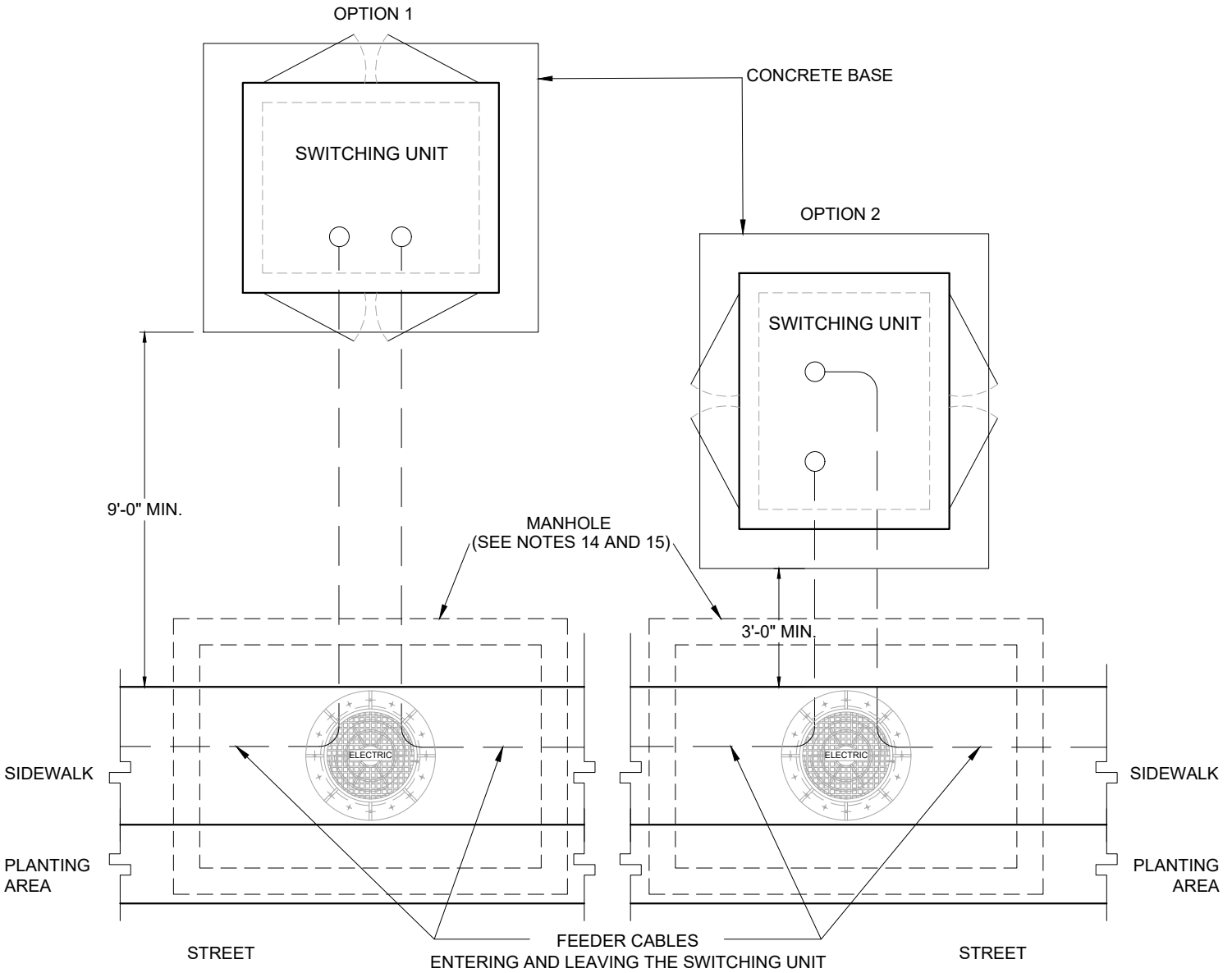

FIGURE I
SWITCHING UNIT TYPICAL LOCATION

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT FOR SINGLE PHASE LOADS MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV

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DIGITIZED VICTOR R. FEBRES LIC. 3412

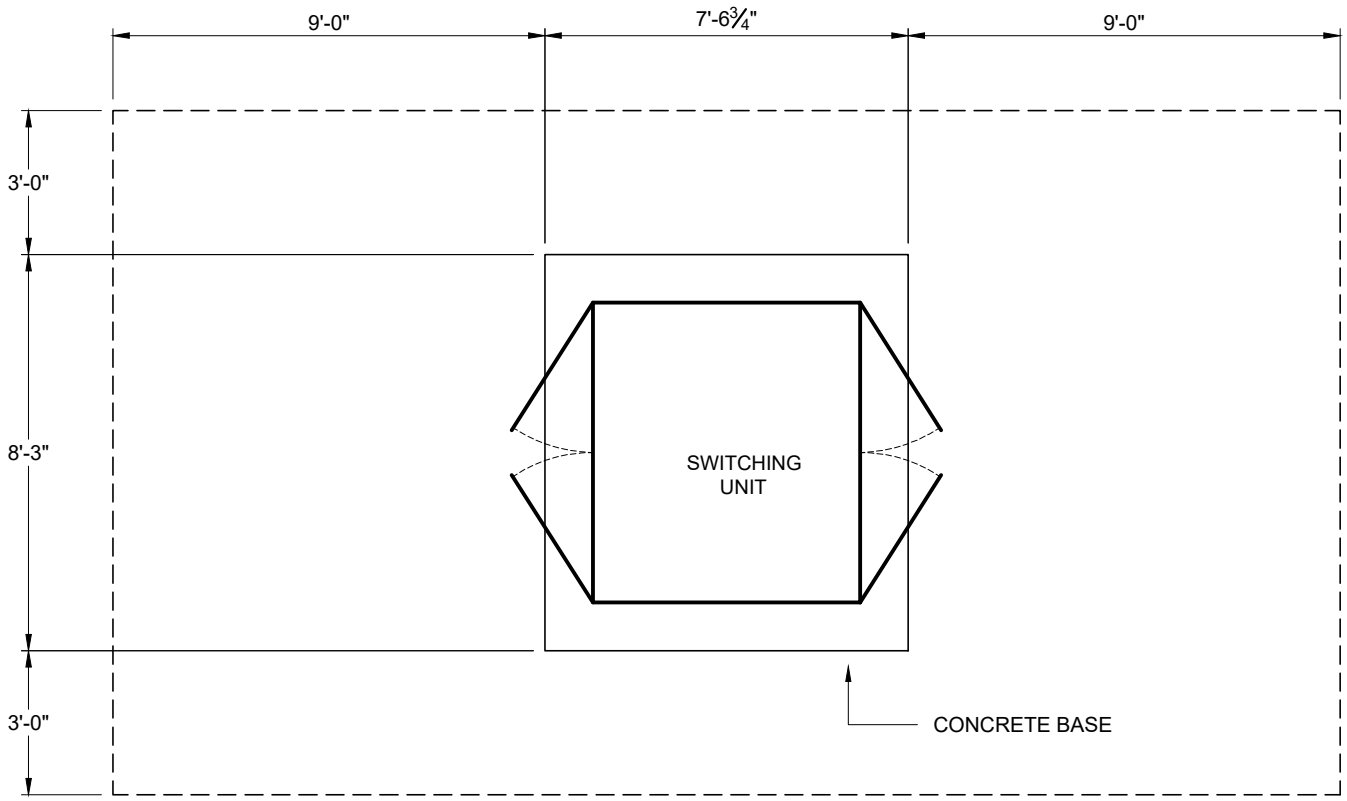

FIGURE J
MINIMUM CLEARANCE REQUIREMENTS FOR SWITCHING UNIT
(SEE NOTE 8)

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT FOR SINGLE PHASE LOADS MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV NOTES

STANDARD NO. URD-11-C VERSION 1
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APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

NOTES:

1. THE SWITCHING UNIT SHALL BE INSTALLED ON A PRECAST OR CAST IN PLACE CONCRETE BASE. THE STANDARD NO. URD-53 SHOWS THE CONCRETE BASE TO BE USED AND THE SPECIFICATIONS FOR ITS CONSTRUCTION. AFTER THE SWITCHING UNIT IS INSTALLED ON THE CONCRETE BASE, A 12" WIDE STRIP OF THE CONCRETE BASE SHALL BE EXPOSED AROUND ITS ENCLOSURE.
2. STAINLESS STEEL ANCHOR BOLTS SHALL BE USED TO INSTALL THE SWITCHING UNIT ENCLOSURE ON THE CONCRETE BASE. ANCHOR BOLT LOCATIONS ARE TO BE DRILLED INTO THE CONCRETE BASE AFTER THE SWITCHING UNIT IS SET IN PLACE. USE A ⅝" DIAMETER WEDGE ANCHOR BOLT WITH AN EMBEDMENT DEPTH OF 4 ¾". ENSURE TO ANCHOR PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. AN ELASTOMERIC JOINT SEALANT SHALL BE USED BETWEEN THE SWITCHING UNIT ENCLOSURE AND THE CONCRETE BASE. THE SEALANT SHALL BE INSTALLED AROUND THE ENTIRE BOTTOM OF THE SWITCHING UNIT, WHERE IT MAKES CONTACT WITH THE CONCRETE BASE. (SEE FIGURE B)
4. AN ELBOW CONNECTOR SHALL BE USED ON THE 15 KV UNDERGROUND CABLE FOR CONNECTION AT THE SOURCE AND LOAD SIDE OF THE SWITCHING UNIT. IT IS IMPORTANT TO IDENTIFY THE UNDERGROUND CABLE TYPE USED AND ITS CHARACTERISTICS, IN ORDER TO USE THE CORRECT MATERIAL.
5. A FAULT CURRENT INDICATOR SHALL BE INSTALLED ON THE OUTGOING FEEDER OF THE SWITCHING UNIT. THE FAULT CURRENT INDICATOR SHALL HAVE A VISIBLE FAULT INDICATION AND SHALL BE HOT STICK MOUNTING TYPE. (SEE FIGURE A AND ASSEMBLY NO. ASSY-2507)
6. THE NEUTRAL SYSTEM FOR 750 MCM MAIN FEEDERS CONSISTS OF A 300 MCM COPPER BARE CONDUCTOR (ITEM 0080) CONNECTED TO A GROUND ROD. EXTEND TWO LINES OF 300 MCM COPPER BARE CONDUCTOR (ITEM 0080) FROM THE NEUTRAL SYSTEM TO THE SOURCE SIDE CUBICLES, AND TWO LINES OF #2 AWG COPPER BARE CONDUCTOR (ITEM 0080) FROM THE NEUTRAL SYSTEM TO THE LOAD SIDE CUBICLES. CONNECT ALL CONCENTRIC NEUTRALS STRANDS AT SOURCE SIDE FROM EACH ELBOW CONNECTOR TO THE NEUTRAL SYSTEM. IF THE CONCENTRIC NEUTRALS STRANDS DO NOT REACH THE NEUTRAL SYSTEM, A #2 AWG COPPER BARE CONDUCTOR OR AN EQUIVALENT TO ⅓ OF THE GAUGE OF EACH ENERGIZED CABLE SHOULD BE CONNECTED INDEPENDENTLY. THE GROUNDING SYSTEM ARE LOCALIZED AT SOURCE AND LOAD SIDES OF THE EQUIPMENT (REFER TO FIGURE D). THE SWITCHING UNIT ENCLOSURE AND CABLE TERMINATIONS SHALL BE INTERCONNECTED INDEPENDENTLY TO THE NEUTRAL SYSTEM WITH A #2 AWG COPPER BARE CONDUCTOR (ITEM 0080) AT EACH CORNER OF THE EQUIPMENT. DURING INSTALLATION OF THE NEUTRAL SYSTEM LINES EXTENSIONS, ENSURE THAT THE FUSE MECHANISM AND THE SEPARABLE INSULATED CONNECTORS ARE FREE OF OBSTRUCTIONS FOR THEIR PROPER OPERATION.
7. THE SWITCHING UNIT AND CABLES SHALL BE LABELED TO INDICATE FROM WHICH EQUIPMENT THE CABLES COME AND TO WHICH EQUIPMENT THE CABLES GO OR TO WHOM THEY PROVIDE SERVICE.
8. THE SWITCHING UNIT SHALL HAVE A 9' LONG AREA, FROM THE EDGE OF THE CONCRETE BASE, CLEAR OF OBSTRUCTION IN FRONT OF ITS DOOR FOR OPERATION AND MAINTENANCE. IN ADDITION, THERE SHALL BE A 3' LONG AREA, FROM THE EDGE OF THE CONCRETE BASE, CLEAR OF OBSTRUCTIONS ON THE SIDES AND BACK OF THE SWITCHING UNIT. THESE AREAS SHALL BE KEPT CLEAR AT ALL TIMES, INCLUDING FENCES, WALLS OR ANY VEGETATION. (SEE FIGURE J)
9. THE SWITCHING UNIT SHALL BE PADLOCKED AT ALL TIMES, EXCEPT WHEN QUALIFIED PERSONNEL HAVE TO PERFORM ANY OPERATION OR MAINTENANCE ON THE EQUIPMENT. DO NOT LEAVE THE SWITCH OPERATING SHAFT ACCESS COVER UNLOCKED IF THE GEAR IS LEFT UNATTENDED BY A QUALIFIED PERSON.
10. ANY SWITCHING UNIT INSTALLED IN AN AREA EXPOSED TO VEHICULAR TRAFFIC, WHERE DAMAGE TO EQUIPMENT IS PROBABLE, SHALL BE PROTECTED AGAINST IMPACT. THE PROTECTION BARRIER USED SHALL BE INSTALLED IN A WAY THAT ALLOWS DOOR OPENING AND EQUIPMENT OPERATION. FOR EQUIPMENT PROTECTION, USE CONCRETE FILLED PIPES OR BOLLARDS. THEY SHALL BE RIGID GALVANIZED STEEL PIPES WITH 6" DIAMETER AND MINIMUM 42" HEIGHT ABOVE FINISHED GROUND LEVEL. THE RIGID GALVANIZED STEEL PIPES SHALL BE EMBEDDED 42" BELOW FINAL GROUND LEVEL. THE AMOUNT OF BOLLARDS TO BE INSTALLED DEPENDS ON THE SWITCHING UNIT LOCATION. BOLLARDS ARE NOT REQUIRED ON SIDES WHERE SWITCHING UNIT FACES A STRUCTURE OR BARRIER WHICH RESTRICT VEHICULAR TRAFFIC. CAUTION MUST BE TAKEN WHEN INSTALLING BOLLARDS, SO THAT THEY DO NOT MAKE CONTACT WITH ANY UNDERGROUND INFRASTRUCTURE. FOR TYPICAL LOCATION OF BOLLARDS AROUND A SWITCHING UNIT, SEE FIGURE F. FOR BOLLARD INSTALLATION DETAIL, SEE FIGURE H.
11. ONCE THE CONCRETE BASE AND PVC DUCTS ARE INSTALLED, MAKE SURE THE CRUSHED STONE OR GRAVEL AT THE BOTTOM OF THE CONCRETE BASE DOES NOT COVER THE DUCTS. THE DUCTS AND PVC END BELLS SHALL BE 2" ABOVE THE CRUSHED STONE OR GRAVEL.
12. ALL PVC DUCTS IN THE CONCRETE BASE AND MANHOLE WALLS SHALL HAVE A PVC END BELL TO PROVIDE A SMOOTH AND SAFE CABLE ENTRY.
13. AFTER INSTALLATION OF ALL CABLES IS COMPLETED, THE DUCTS IN USE SHALL BE SEALED WITH A NONHARDENING SEALING COMPOUND (ITEM 2014), AND INSTALL A DUCT SEALING PLUG (ITEM 2056) SHALL BE INSTALLED IN EACH SPARE DUCT TO PREVENT WATER OR FOREIGN OBJECTS INTRUSION.
14. A 10' X 7' X 8' MANHOLE SHALL BE INSTALLED IN FRONT OF EVERY SWITCHING UNIT FOR CABLES ENTERING AND LEAVING THE SWITCHING UNIT IF IT IS TO BE TRANSFERRED TO LUMA. STANDARD NO. URD-31 SHOWS THE MANHOLE INSTALLATION. LOCATION OF THE SWITCHING UNIT AND MANHOLE WILL BE ACCORDING TO THE DESIGN OF THE UNDERGROUND SYSTEM. (SEE FIGURE D)
15. THE MANHOLE COVER SHALL BE INSTALLED FLUSH WITH THE FINISH GRADE. THE MANHOLE COVER FRAME AND THE MANHOLE ROOF WILL BE BELOW GROUND. THE PREFERRED LOCATION FOR THE MANHOLE COVER IS ON THE SIDEWALK, BUT IT CAN BE INSTALLED ON THE STREET OR PLANTING AREA. IF THE MANHOLE COVER IS INSTALLED IN A PLANTING AREA, IT SHALL BE PROTECTED WITH A REINFORCED CONCRETE SLAB WITH MINIMUM THICKNESS OF 6" AND EXTENDING 12" AROUND THE MANHOLE COVER (REFER TO FIGURE G). 6" x 6" TYPE WELDED WIRE MESH CAN BE USED FOR THE CONSTRUCTION OF THE CONCRETE SLAB.
16. ELBOW ARRESTERS SHALL BE INSTALLED AT NORMALLY OPEN AND NORMALLY CLOSE POINTS OF THE THREE PHASE MAIN FEEDER. SELECTION OF THE ELBOW ARRESTER RATING SHALL BE BASED ON THE SYSTEM VOLTAGE.
17. THE PHASE LOCATION ILLUSTRATED IN THE CONNECTION DIAGRAM IS THE ONLY PERMITTED CONNECTION, AND NO VARIATION WILL BE ALLOWED.
18. ALL CABLES SHALL BE TIED TO THE CABLE SUPPORT USING WEATHER RESISTANT CABLE TIES (ITEM 2026).
19. FIGURES D AND E ARE REPRESENTATIONS OF THE POSSIBLE CABLE ROUTES ENTERING AND LEAVING THE SWITCHING UNIT THROUGH THE MANHOLE. NOT ALL CABLES THAT MAY EXIST IN THE SWITCHING UNIT ARE ILLUSTRATED.

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT FOR SINGLE PHASE LOADS MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV NOTES

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DIGITIZED EMILIO CUADRADO LIC. 3000

NOTES:

20. 600 A DEADBREAK ELBOW CONNECTOR IS DESIGNED FOR OPERATIONS AS A DEENERGIZED DEVICE. DO NOT OPERATE IT ENERGIZED.
21. ENSURE TO IDENTIFY CABLES PHASES USING APPLICABLE COLOR CODE. REFER TO NEC'S LATEST EDITION.
22. REFER TO STANDARD NO. URD-54 FOR DUCT SIZING.
23. REFER TO ASSEMBLY NO. ASSY-2507, SEPARABLE INSULATED CONNECTORS AND CABLE TERMINATION ASSEMBLY.
24. DEAD FRONT SWITCHING UNIT AMPERAGE RATING IS 600 A AT SOURCE SIDE, AND 200 A AT LOAD SIDE. THE 15 KV UNDERGROUND CABLE MAXIMUM GAUGE ALLOWABLE SHALL BE 750 MCM FOR THE SOURCE SIDE, AND 4/0 OR #2 AWG, AS APPLICABLE, FOR THE LOAD SIDE.
25. THE GROUND RESISTANCE WILL NOT EXCEED 5 OHMS.
26. FOR MATERIAL DETAILS AND INSTRUCTIONS TO INSTALL THE CONCRETE BASE, REFER TO STANDARD NO. URD-53.
27. FOR JCN CABLES, ONE CONCENTRIC NEUTRAL STRAND CONNECTED TO THE ELBOW CONNECTOR GROUNDING EYE WILL BE USED AS DRAIN WIRE. (REFER TO ASSEMBLY NO. ASSY-2507)
28. ALL DRAIN WIRES ASSOCIATED WITH SEPARABLE CONNECTORS SHALL BE EFFECTIVELY CONNECTED TO THE GROUNDING SYSTEM USING A #12 AWG STRANDED COPPER CABLE, 600V, THHN, GREEN (ITEM 2086).
29. FOR GROUNDING CONNECTION, REFER TO STANDARD NO. URD-31.
30. NEUTRAL CABLE FROM EACH SINGLE LOAD SHALL BE CONNECTED DIRECTLY TO THE NEUTRAL SYSTEM USING A COMPRESSION CONNECTOR (ITEM 0006). DURING INSTALLATION OF THE NEUTRAL SYSTEM LINES EXTENSIONS AT LOAD COMPARTMENTS, ENSURE THAT THE FUSE MECHANISM AND SEPARABLE INSULATED CONNECTORS ARE FREE OF OBSTRUCTION FOR THEIR PROPER OPERATION.
31. CONCENTRIC NEUTRALS OF THE LOAD SIDE SHALL BE EFFECTIVELY CONNECTED TO THE GROUNDING SYSTEM.

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT FOR SINGLE PHASE LOADS MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV BILL OF MATERIAL

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MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION CONNECTORS AND SPLICES	VARIES	AS REQ.
0037	5/8" x 8' GROUND ROD	002-02465	AS REQ.
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
0087	15 KV UNDERGROUND CABLE	VARIES	AS REQ.
2004	FAULT CURRENT INDICATOR	VARIES	3
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	3
2011	ELBOW ARRESTER	VARIES	6
2014	DUCT SEALING COMPOUND	003-02935	AS REQ.
2015	PADLOCK	VARIES	6
2016	SMU-20 TYPE FUSE	VARIES	6
2017	WEDGE ANCHOR BOLT	038-83148	4
2018	ELASTOMERIC JOINT SEALANT	038-83149	AS REQ.
2024	MECHANICAL GROUNDING CONNECTOR	038-03620	AS REQ.
2026	CABLE TIE	038-83155	AS REQ.
2027	SME-20 FUSE UNIT END FITTING	VARIES	6
2031	DEAD FRONT SWITCHING UNIT	038-83414	1
2056	DUCT SEALING PLUG	VARIES	AS REQ.
2059	LOADBREAK ELBOW CONNECTOR	VARIES	6

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT SWITCHING UNIT FOR SINGLE PHASE LOADS MAXIMUM RATING: 600 A MAXIMUM VOLTAGE: 13.2 KV BILL OF MATERIAL

STANDARD NO. URD-11-C VERSION 1
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
2060	DEADBREAK ELBOW CONNECTOR	VARIES	6
2061	LOADBREAK BUSHING PLUG INSERT	038-00679	6
2075	10' x 7' x 8' MANHOLE WITH COVER	038-70153	1
2081	PARKING BUSHING	VARIES	AS REQ.
2084	LOADBREAK ELBOW TAP PLUG	072-79765	6
2086	STRANDED COPPER CABLE, 600 V, THHN	040-00774	AS REQ.
2503	UNDERGROUND NONMETALLIC CABLE RACK ASSEMBLY	ASSY-2503	AS REQ.
2507	SEPARABLE INSULATED CONNECTORS AND CABLE TERMINATION ASSEMBLY	ASSY-2507	AS REQ.
URD-54	DUCT SIZING STANDARD	URD-54	AS REQ.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

GAS INSULATED DISTRIBUTION SWITCHGEAR
4 WAYS, WET VAULT MOUNTED STYLE
REMOTE SUPERVISORY CAPABLE
SOURCE RATING: 600 A OR 900 A
MAXIMUM LOAD RATING: 600 A
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-D VERSION 1
DOCUMENT NO. 4325.024

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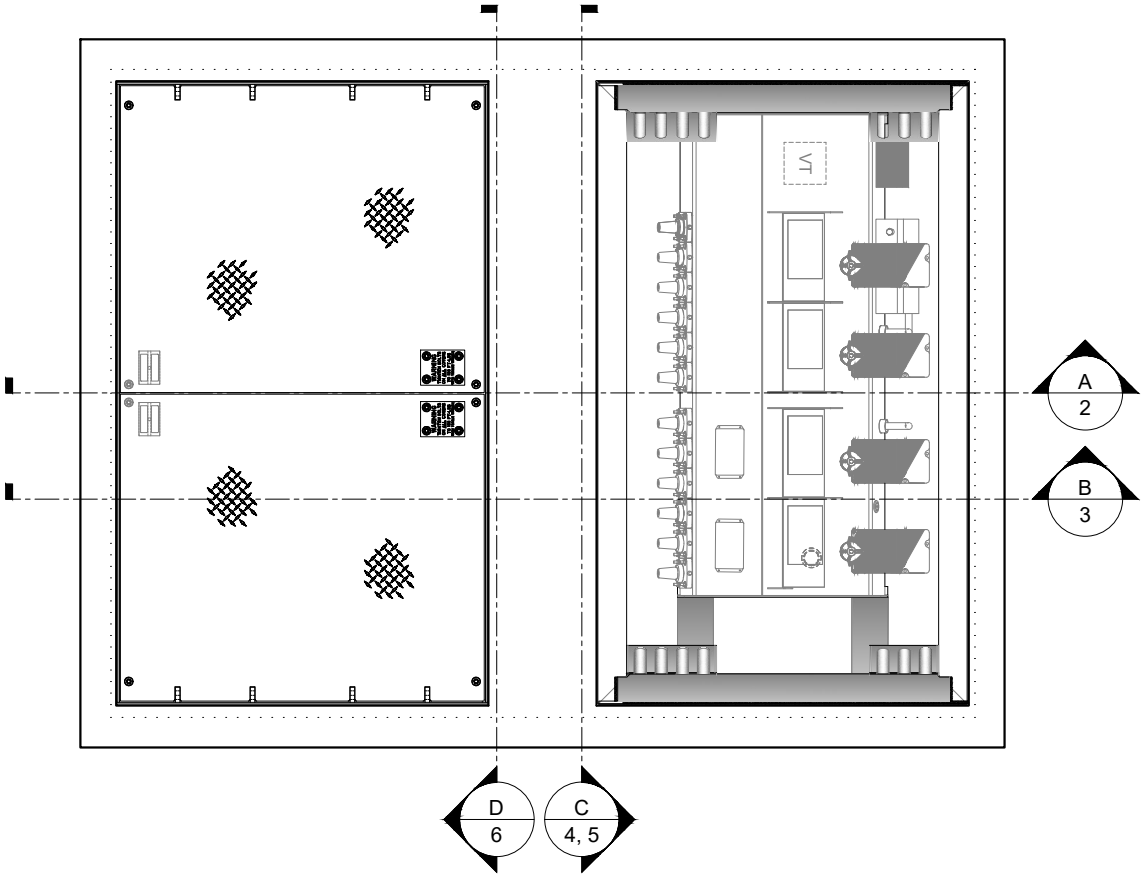
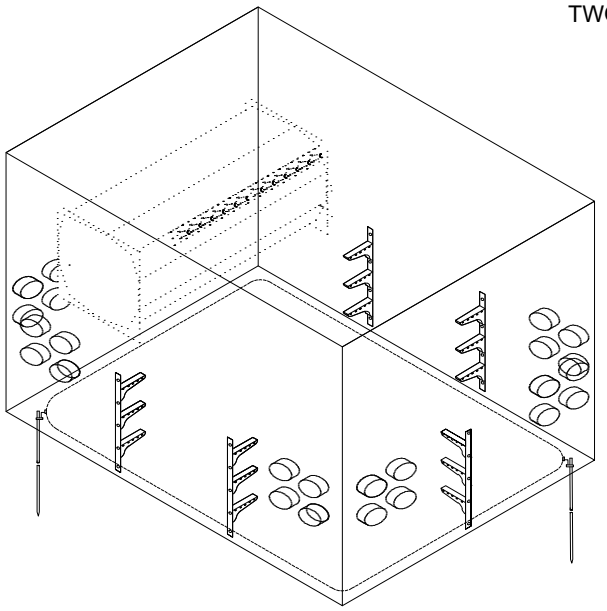
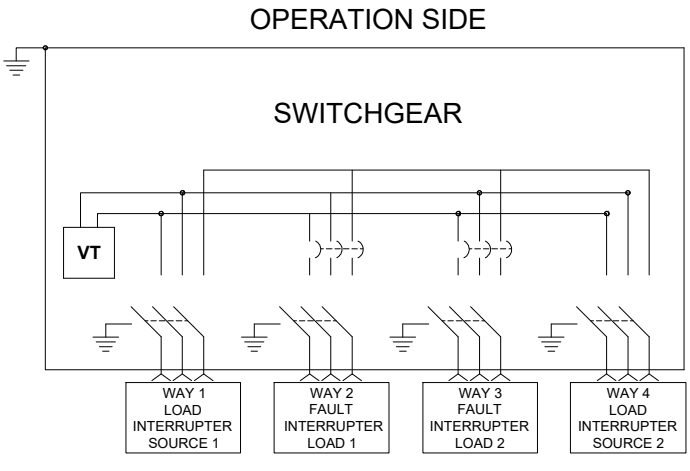
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED ALEX J. RODRIGUEZ LIC. 24174
EMILIO CUADRADO LIC. 3000



SWITCHGEAR PLAN VIEW
TWO SOURCES - TWO LOADS
(SEE NOTES 1 AND 2)



ISOMETRIC VIEW



ONE LINE DIAGRAM

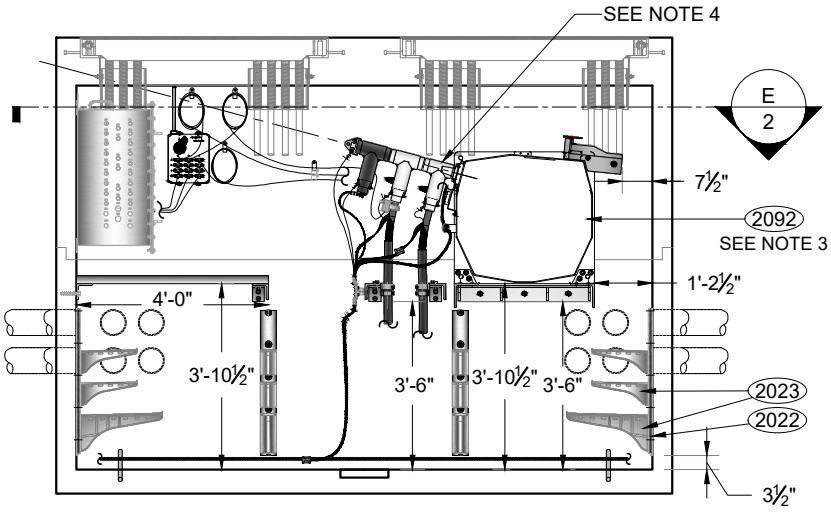
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

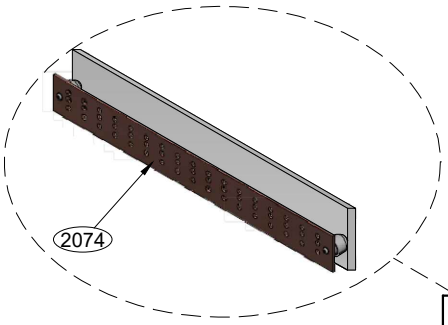
TITLE:

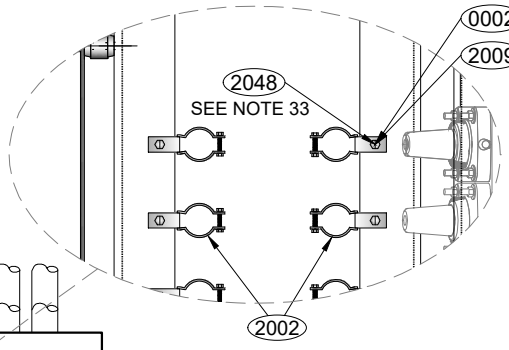
GAS INSULATED DISTRIBUTION SWITCHGEAR
4 WAYS, WET VAULT MOUNTED STYLE
REMOTE SUPERVISORY CAPABLE
MAXIMUM SOURCE RATING: 600 A OR 900 A
MAXIMUM LOAD RATING: 600 A
MAXIMUM VOLTAGE: 13.2 KV

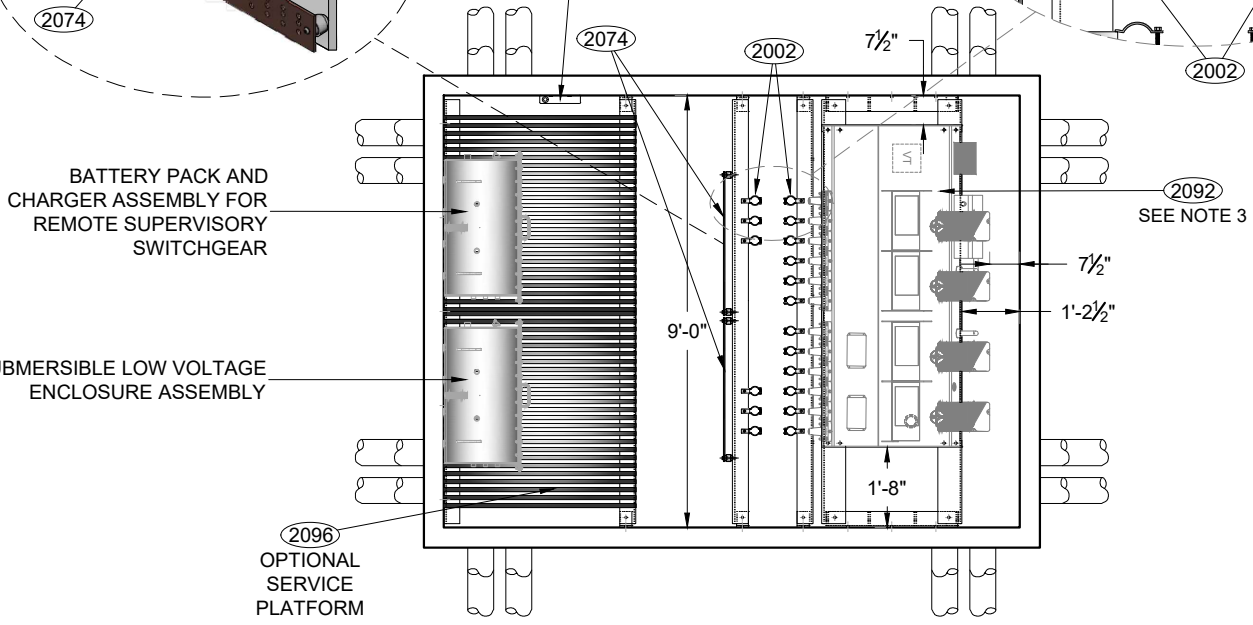
STANDARD NO. URD-11-D VERSION 1
DOCUMENT NO. 4325.024
PAGE 2 OF 14 DATE OCT 7, 2022
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED ALEX J. RODRIGUEZ LIC. 24174
EMILIO CUADRADO LIC. 3000



EQUIPMENT INSTALLATION DETAILS A







EQUIPMENT LOCATION E

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

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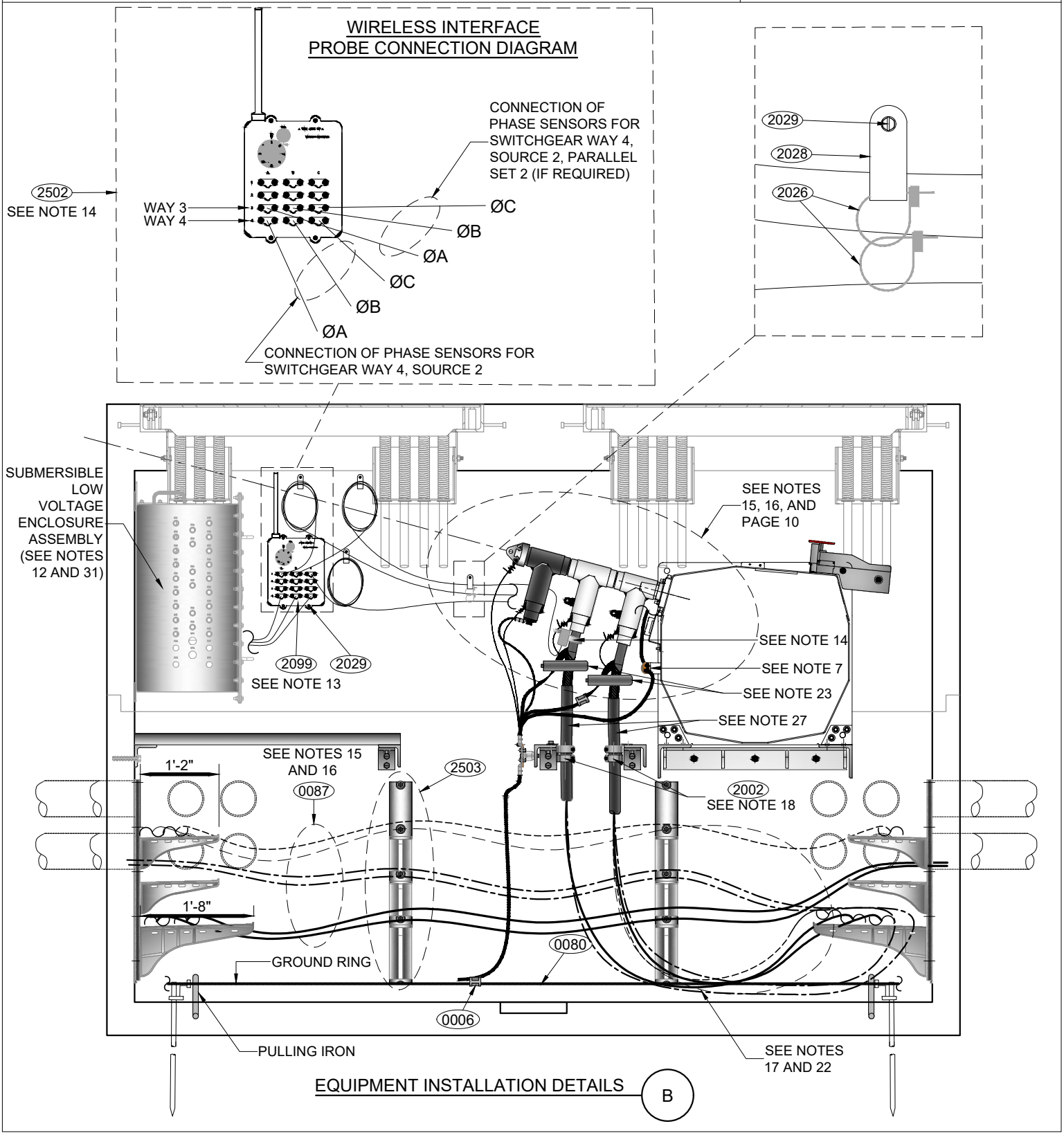

EQUIPMENT INSTALLATION DETAILS B

DISTRIBUTION ENGINEERING

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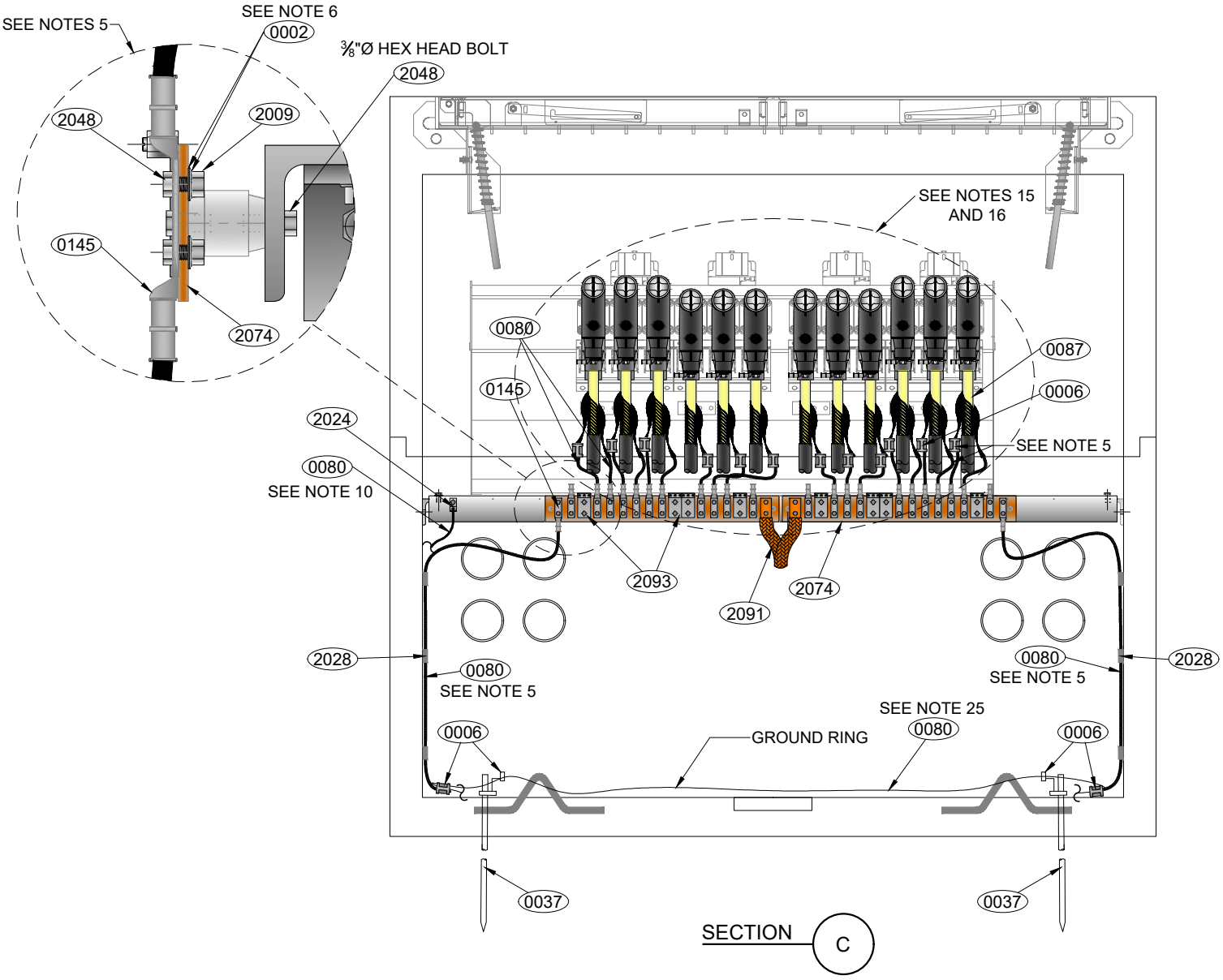

SECTION C

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

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GAS INSULATED DISTRIBUTION SWITCHGEAR
4 WAYS, WET VAULT MOUNTED STYLE
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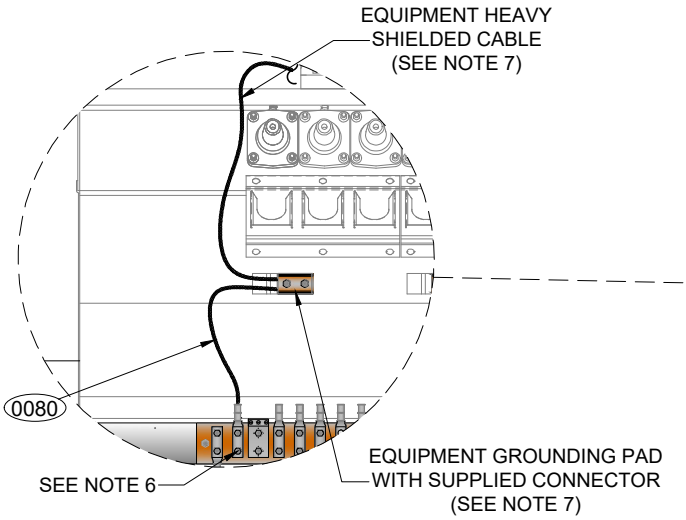
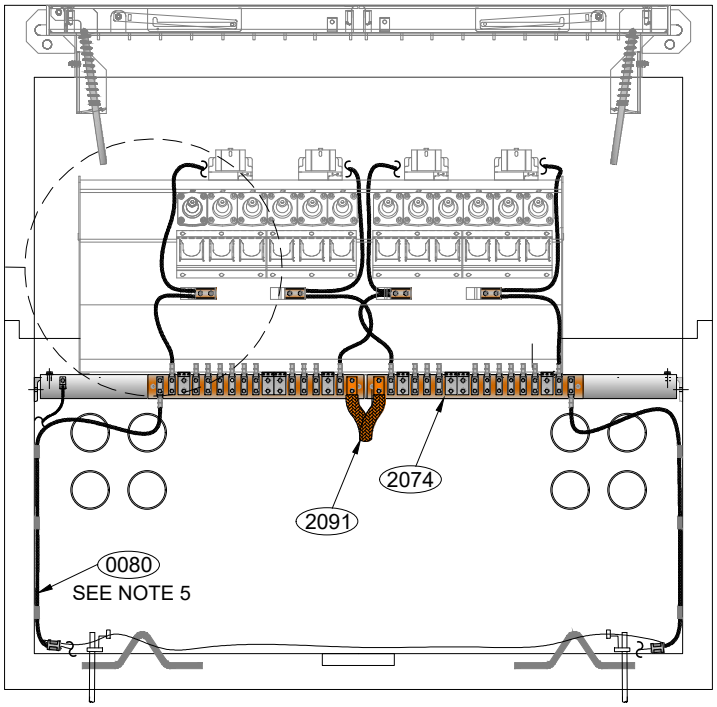
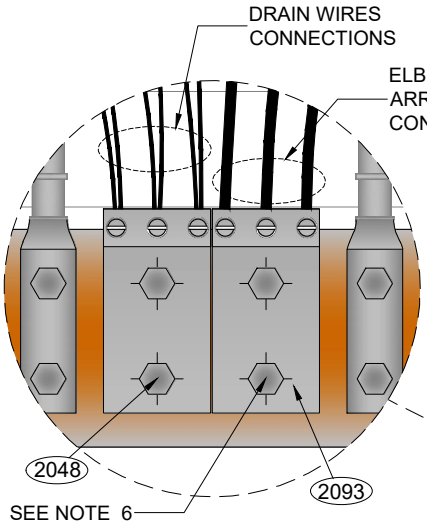
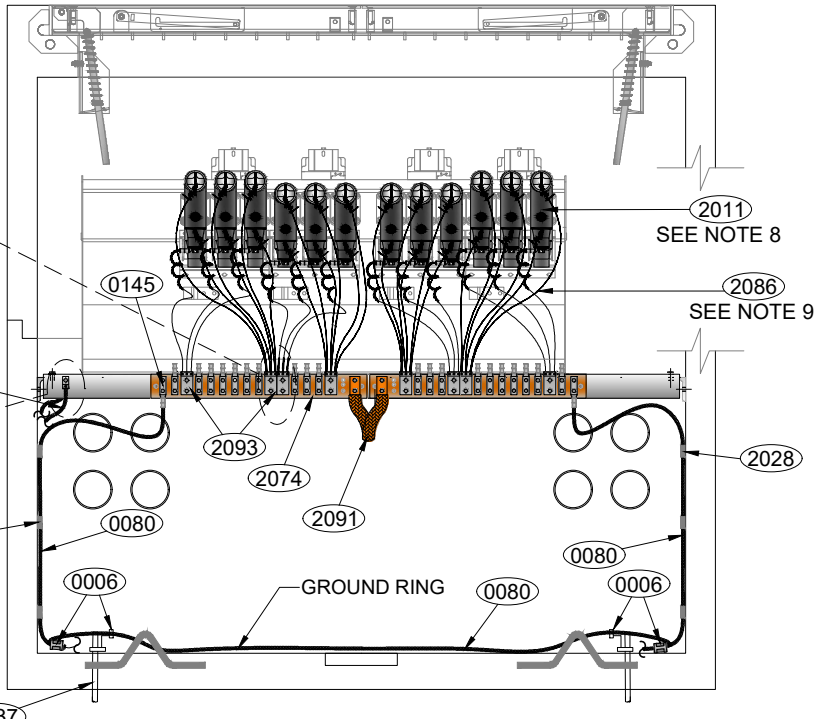
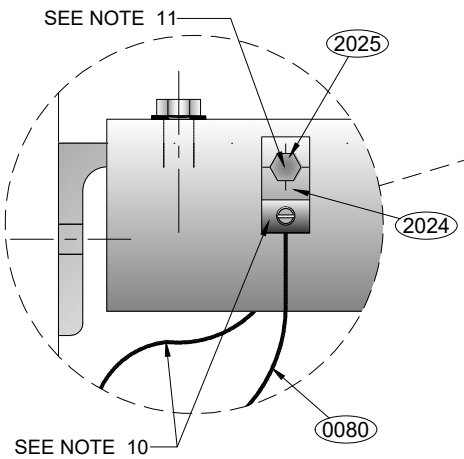




EQUIPMENT GROUNDING C







DRAIN WIRES AND ARRESTER LEAD CONNECTION C

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

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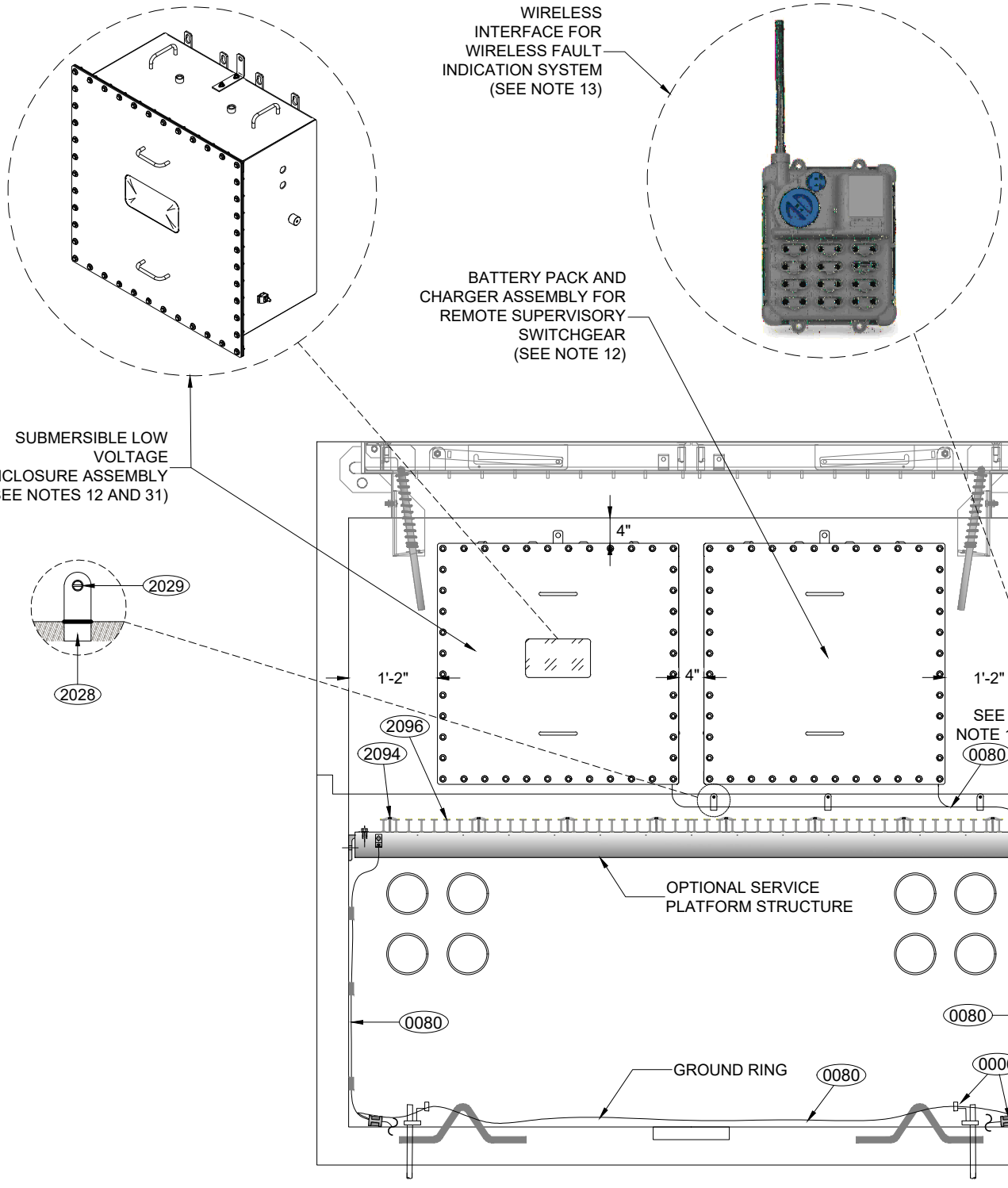

MONITORING AND CONTROL EQUIPMENT D

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

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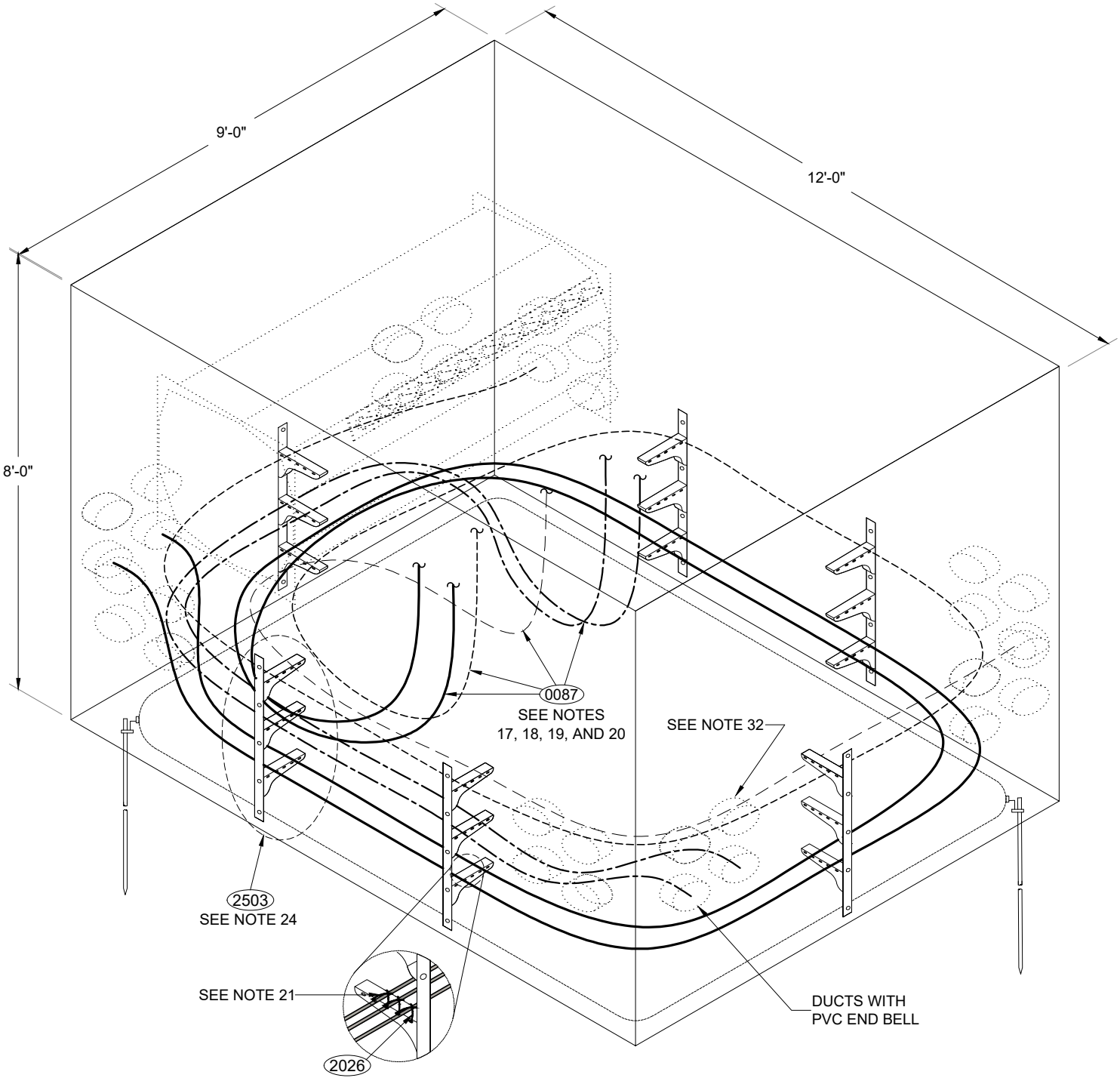

CABLE TYPICAL INSTALLATION
JACKETED CONCENTRIC NEUTRAL

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

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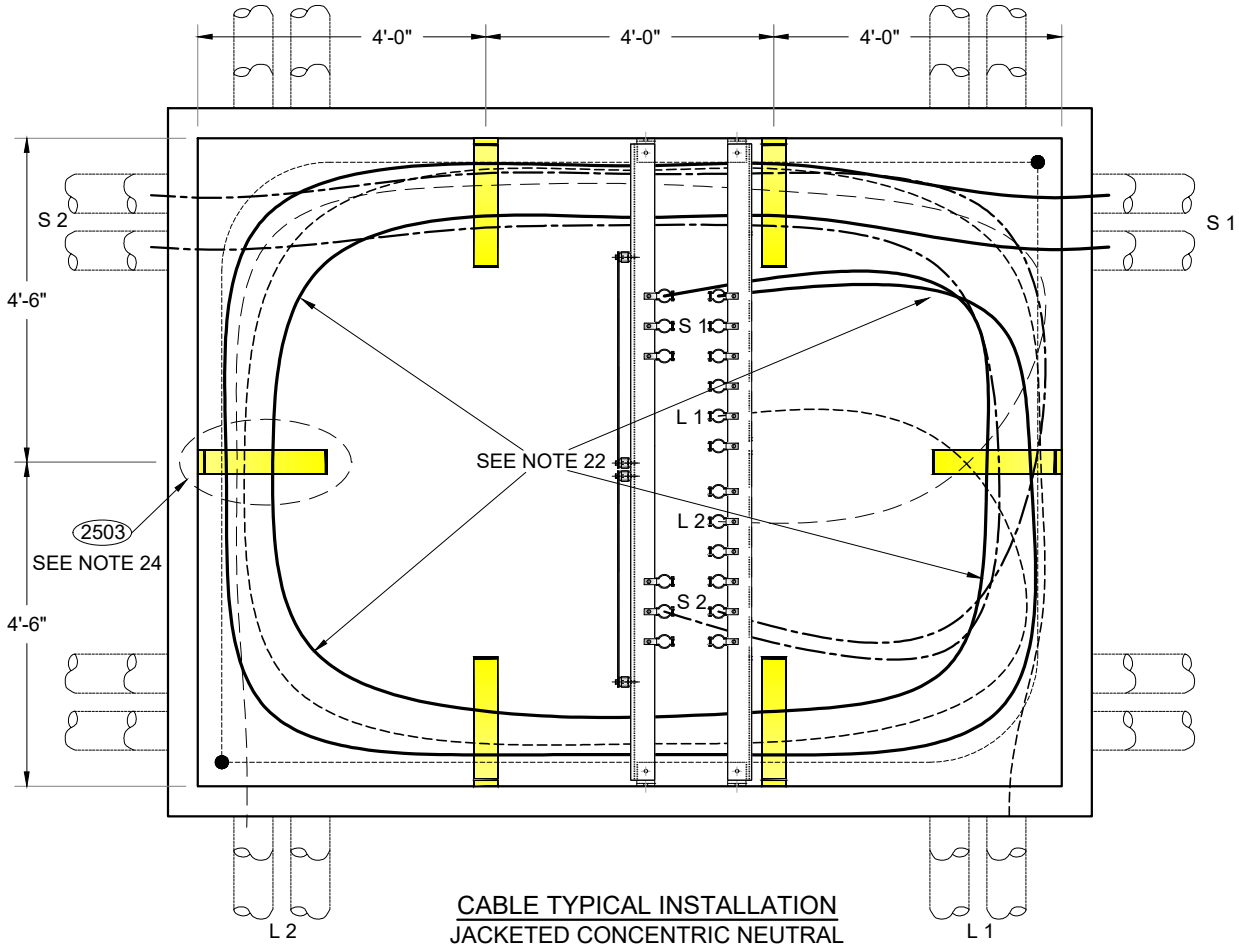

CABLE TYPICAL INSTALLATION
JACKETED CONCENTRIC NEUTRAL

DISTRIBUTION ENGINEERING

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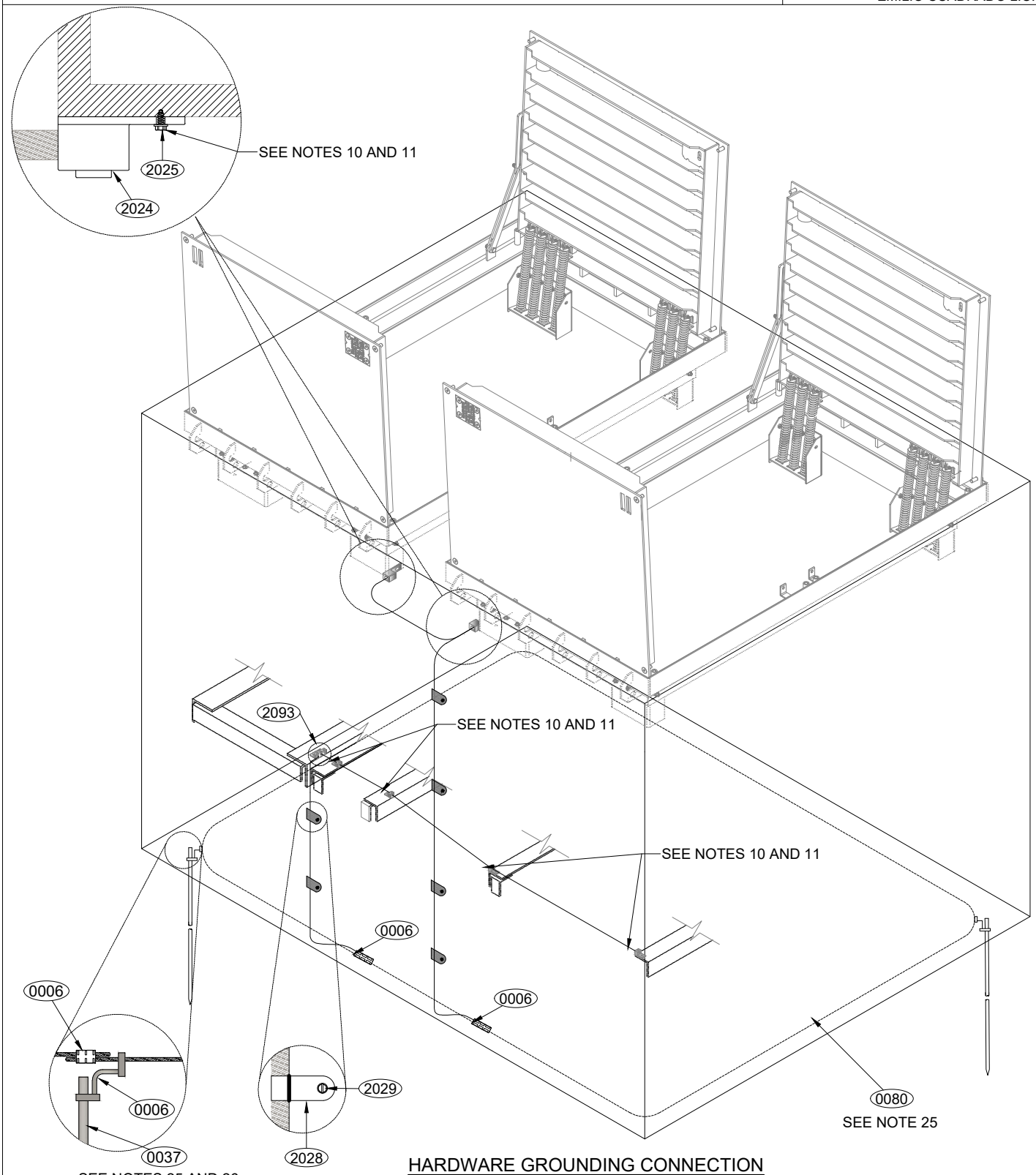

HARDWARE GROUNDING CONNECTION

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

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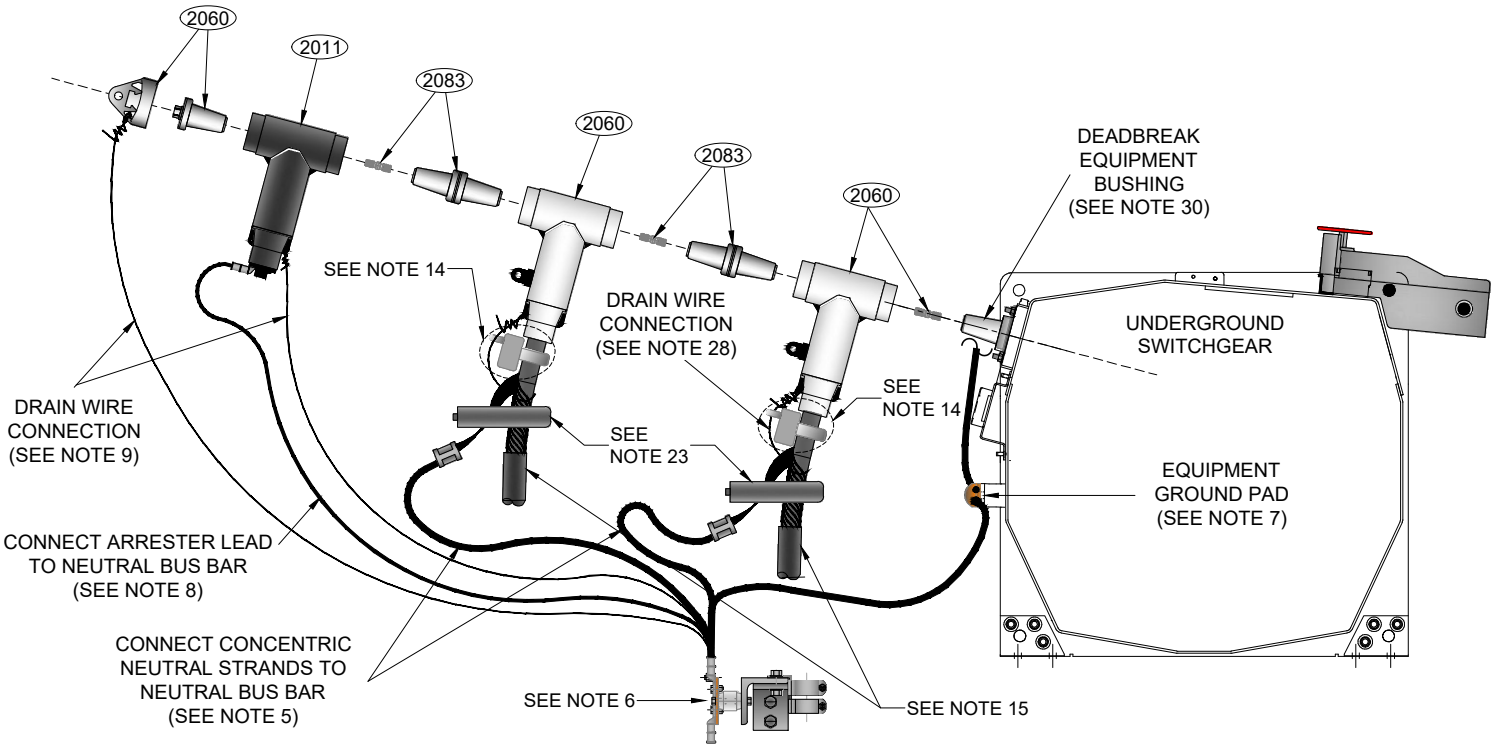
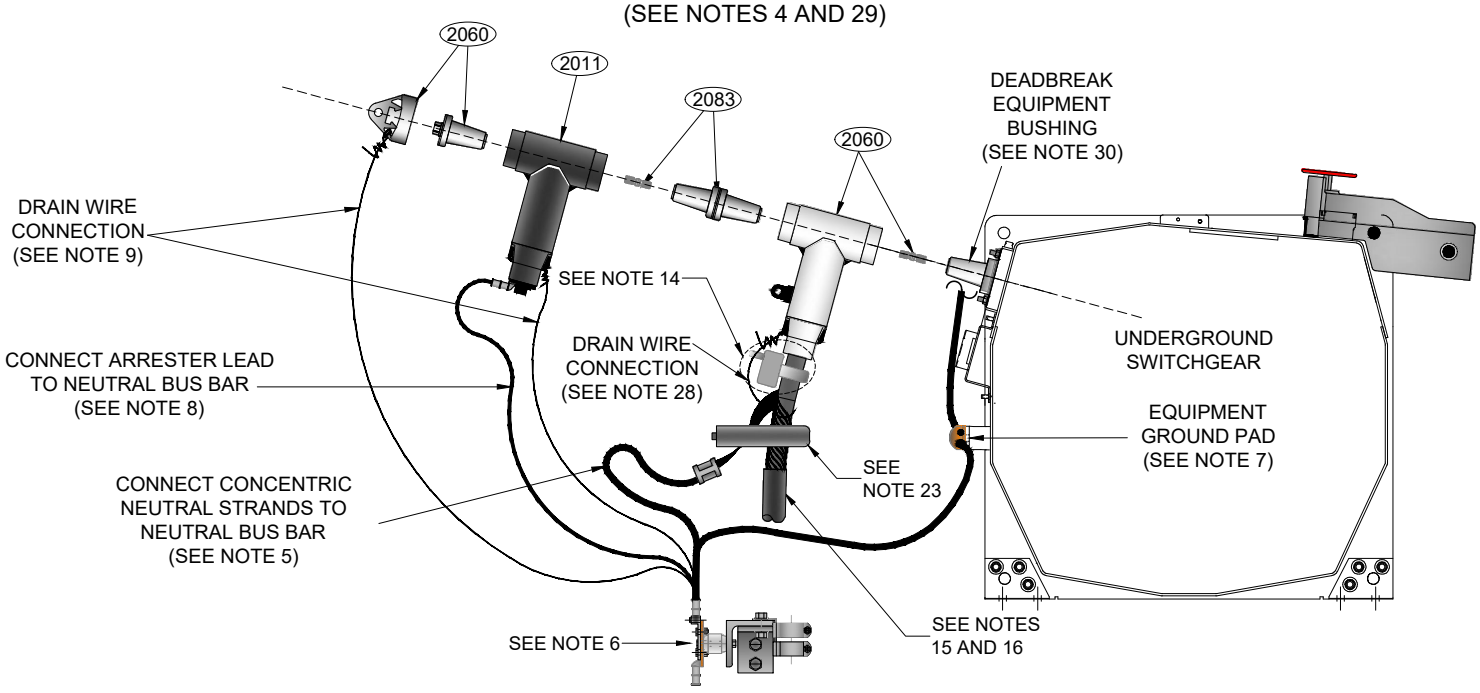


DEADBREAK SEPARABLE INSULATED CONNECTOR SYSTEM
FOR 900 A EQUIPMENT CONNECTION
(SEE NOTES 4 AND 29)



DEADBREAK SEPARABLE INSULATED CONNECTOR SYSTEM
FOR 600 A EQUIPMENT CONNECTION
(SEE NOTES 4 AND 29)

DISTRIBUTION ENGINEERING

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NOTES:

1. THIS STANDARD APPLIES TO INSTALLATION OF 15 KV GAS INSULATED SWITCHGEAR IN SUBMERSIBLE LOCATIONS SUBJECT TO DIRECT VEHICULAR TRAFFIC. THE INSTALLER ALSO MUST FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR WET VAULT MOUNTED STYLE (MANUFACTURER'S INSTRUCTION SHEET) AND ANY OTHER DOCUMENT SUPPLIED WITH THE EQUIPMENT. REFER TO STANDARD NO. URD-34-D FOR MANHOLE AND SUPPORT STRUCTURES DETAILS.
2. THE GAS INSULATED SWITCHGEAR MUST HAVE 4 WAYS. WAYS 1 AND 4 MUST HAVE LOAD INTERRUPTER SWITCHES FOR SOURCE CONNECTION. WAYS 2 AND 3 MUST FAULT LOAD INTERRUPTERS FOR LOAD CONNECTION. FOR PHASES AND WAYS ARRANGEMENT, SEE CONNECTION DIAGRAM ON PAGE 1.
3. THE SWITCHGEAR MUST BE INSTALLED IN A SUPPORT STRUCTURE ELEVATED FROM FLOOR 3'-10½" WITH A 1'-8" CLEARANCE ON THE RIGHT SIDE, 7½" IN THE LEFT SIDE, AND 10½" AT THE BACK.
4. DEADBREAK SEPARABLE INSULATED CONNECTORS SHALL BE USED ON UNDERGROUND CABLES FOR CONNECTION AT THE FAULT AND LOAD INTERRUPTERS IN THE SWITCHGEAR. WHEN SWITCHGEAR SOURCE ARE RATED 900 A, DEADBREAK ELBOW CONNECTORS (ITEM 2060) SHALL BE RATED 900 A. REFER TO PAGES 3 AND 10 FOR FURTHER DETAILS.
5. ALL CONCENTRIC NEUTRAL STRANDS AND EQUIPMENT GROUNDING CONDUCTOR MUST BE EFFECTIVELY CONNECTED TO THE NEUTRAL BUS BAR AND GROUNDING SYSTEM USING COPPER BARE CONDUCTOR (ITEM 0080) WITH DOUBLE EYE TERMINAL CONNECTOR (ITEM 0145). IT IS RECOMMENDED TO LEAVE THE CONCENTRIC NEUTRAL STRANDS LONG ENOUGH TO MAKE THE CONNECTION IN THE NEUTRAL BUS BAR WITHOUT HAVING TO SPLICE ADDITIONAL CONDUCTOR. IF STRANDS NEED TO BE SPLICED WITH ADDITIONAL CONDUCTOR, USE #2 AWG COPPER BARE CONDUCTOR WITH COPPER COMPRESSION TAP CONNECTOR (ITEM 0006). USE 4/0 AWG COPPER BARE CONDUCTOR FOR EQUIPMENT GROUNDING.
6. DOUBLE EYE TERMINAL CONNECTORS (ITEM 0145) AND UNIVERSAL TERMINAL LUGS (ITEM 2093) MUST BE ATTACHED TO THE NEUTRAL BUS BAR (ITEM 2074) USING TWO STAINLESS STEEL HEXAGONAL HEAD BOLTS ½" X 1" (ITEM 2048) WITH ONE FLAT WASHER (ITEM 0002), ONE SPLIT LOCK WASHER (ITEM 0002), AND ONE HEXAGONAL NUT (ITEM 2009).
7. THE SWITCHGEAR WILL BE PROVIDED WITH FOUR GROUND PADS WITH CLAM SHELL CONNECTORS, ONE FOR EACH WAY. THERE IS ONE HEAVY-SHIELDED CABLE TAIL PER MOTOR OPERATED WAY. CONNECT THE HEAVY-SHIELDED CABLE TAILS FROM EACH OF THE MAIN CABLES TO THE RESPECTIVE TANK GROUND PAD USING THE EQUIPMENT CLAMSHELL CONNECTOR. CONNECT THE FOUR GROUND PADS OF THE TANK TO THE GROUNDING SYSTEM USING A 4/0 AWG COPPER BARE CONDUCTOR (ITEM 0080) WITH DOUBLE EYE TERMINAL CONNECTOR (ITEM 0145). THE INSTALLER MUST USE THE SHORTEST POSSIBLE CONNECTION TO GROUND.
8. 600 A ELBOW ARRESTERS MUST BE INSTALLED IN ALL FAULT INTERRUPTERS, AND LOAD INTERRUPTERS WAYS. SELECTION OF THE ELBOW ARRESTER RATING SHALL BE BASED ON THE SYSTEM VOLTAGE. SEE DEADBREAK SEPARABLE INSULATED CONNECTOR SYSTEM DETAILS IN PAGE 10 FOR ARRESTER POSITION IN THE SEPARABLE CONNECTORS CONFIGURATION. SEE SECTION C ON PAGE 5 FOR ARRESTER GROUNDING LEAD CONNECTION TO THE GROUNDING SYSTEM. THE LEAD MUST BE CONNECTED TO A UNIVERSAL TERMINAL LUG (ITEM 2093).
9. DRAIN WIRE FOR ELBOW ARRESTERS AND INSULATING PLUG CAPS MUST BE CONNECTED TO THE GROUNDING SYSTEM THROUGH AN UNIVERSAL TERMINAL LUG (ITEM 2093) AS SHOWN ON PAGE 5. ALL DRAIN WIRE MUST BE OF MINIMUM GAUGE #10 AWG.
10. SWITCHGEAR SUPPORT STRUCTURES, CABLE SUPPORT ANGLES, BOTH STRUCTURAL ELEMENTS FOR SERVICE PLATFORM, AND HATCHES MUST BE CONNECTED TO THE GROUND RING USING A #2 AWG BARE COPPER CONDUCTOR (ITEM 0080). GROUNDING CABLE MUST BE BONDED TO STRUCTURAL ELEMENTS USING A MECHANICAL GROUNDING CONNECTOR (ITEM 2024).
11. IN HEAVY GAUGE METAL ELEMENTS 1/8" AND THICKER, THE INSTALLER MUST FIRST DRILL A PILOT HOLE BEFORE INSTALLING THE SELF DRILLING SCREW. THE PILOT HOLE SHOULD BE 1/32" LESS THAN THE SELF DRILLING SCREW DIAMETER.
12. SUBMERSIBLE LOW VOLTAGE ENCLOSURE ASSEMBLY, AND BATTERY PACK AND CHARGER ASSEMBLY MUST BE INSTALLED AT THE LOCATION SHOWN ON PAGE 6. THE ENCLOSURES SHALL BE FIXED TO THE WALL USING ANCHOR HEX WASHER HEAD CONCRETE SCREWS (ITEM 2029). BOTH ENCLOSURES MUST BE GROUNDED USING #2 AWG BARE COPPER CONDUCTOR (ITEM 0080). THE EQUIPMENT INSTALLATION MUST FOLLOW MANUFACTURER'S INSTRUCTIONS SHEET AND DOCUMENTATION.
13. WIRELESS INTERFACE FOR WIRELESS FAULT INDICATION SYSTEM MUST BE INSTALLED IN VERTICAL POSITION, LOCATED AS HIGH AS POSSIBLE ON THE INTERIOR MANHOLE WALL OVER THE SERVICE PLATFORM AREA. THE EQUIPMENT SHALL BE FIXED TO THE WALL USING ANCHOR HEX WASHER HEAD CONCRETE SCREWS (ITEM 2029). REFER TO ASSEMBLY NO. ASSY-2502 FOR INSTALLATION DETAILS.
14. FAULT CURRENT INDICATOR'S PHASE SENSORS MUST BE INSTALLED IN ALL SETS OF OUTGOING SOURCE FEEDERS (SWITCHGEAR'S WAY 4). PHASE SENSORS SHALL BE HOT STICK MOUNTING TYPE AND MUST BE CONNECTED TO A WIRELESS INTERFACE FOR WIRELESS FAULT INDICATION SYSTEM THROUGH INTERFACE PROBES. REFER TO WIRELESS INTERFACE PROBE CONNECTION DIAGRAM ON PAGE 3 FOR SYSTEM INTERCONNECTION. EQUIPMENT MUST BE INSTALLED AS PER MANUFACTURER'S INSTRUCTIONS. THIS UNDERGROUND WIRELESS FAULT INDICATION SYSTEM WILL ALLOW THE UTILITY PERSONNEL TO RETRIEVE SUBSURFACE FAULT CURRENT INDICATORS STATUS FROM STREET LEVEL.
15. THE UNDERGROUND SWITCHGEAR MUST BE CONNECTED TO THE SOURCES AND LOADS USING 15 KV, 133% INSULATION LEVEL, COPPER JACKETED CONCENTRIC NEUTRAL CABLE. FOR SWITCHGEAR WITH SOURCES RATED 900 A, TWO SETS OF 75O MCM CABLES WITH 900 A DEADBREAK ELBOW CONNECTOR (ITEM 2060), MUST BE USED PER SOURCE CONNECTION AT THE 900 A BUSHINGS IN THE LOAD INTERRUPTER SWITCHES WAYS OF THE SWITCHGEAR (WAYS 1 AND 4). FOR SWITCHGEAR WITH SOURCES RATED 600 A, ONE SET OF 75O MCM CABLE WITH 600 A DEADBREAK ELBOW CONNECTOR (ITEM 2060) MUST BE USED PER SOURCE CONNECTION AT THE 600 A BUSHINGS IN THE LOAD INTERRUPTER SWITCHES WAYS OF THE SWITCHGEAR (WAYS 1 AND 4).
16. LOAD CONNECTION MUST BE DONE THROUGH 600 A BUSHINGS IN THE FAULT INTERRUPTER WAYS (WAYS 2 AND 3) OF THE SWITCHGEAR USING ONE SET OF 75O MCM, 15 KV, 133% INSULATION LEVEL, COPPER JACKETED CONCENTRIC NEUTRAL CABLE WITH 600 A DEADBREAK ELBOW CONNECTOR (ITEM 2060). USE OF PARALLEL SETS OF CABLES IN LOAD INTERRUPTER WAYS MUST BE CONSULTED WITH LUMA.

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NOTES:

17. CABLES SHOULD BE ROUTED TO THE SWITCHGEAR IN SUCH MANNER AS TO MINIMIZE FORCES ON THE BUSHINGS FROM CABLE WEIGHT, EXPANSION OR MOVEMENT. A MINIMUM OF 90° RISE BEND SHALL BE PROVIDED IN THE CABLE BEFORE FIXING IT IN THE CABLE SUPPORT BRACKET, AS SHOWN ON DRAWINGS, TO MITIGATE THE EFFECTS OF CABLE EXPANSION.
18. ALL SOURCE AND LOAD CABLES MUST BE SUPPORTED FIRST BY THE CABLE SUPPORT BRACKET (ITEM 2002) BEFORE ITS CONNECTION TO THE EQUIPMENT BUSHING, TO RELIEVE THE STRESS ON BUSHINGS REDUCING THE PROBABILITY OF A SF6 GAS LEAK.
19. PAGE 7 SHOWS A REPRESENTATION OF THE POSSIBLE CABLE ROUTES ENTERING AND LEAVING THE MANHOLE. NOT ALL CABLES THAT MAY EXIST ARE ILLUSTRATED.
20. LENGTH OF EACH INDIVIDUAL CABLE INSIDE THE SWITCHGEAR MANHOLE SHOULD BE AT LEAST 50% OF THE INSIDE PERIMETER BEFORE ITS RISE FOR EQUIPMENT CONNECTION. IT'S IMPORTANT TO LEAVE AT LEAST ONE FULL CABLE TURN IN THE MANHOLE THAT PRECEDED THE SWITCHGEAR MANHOLE.
21. ALL CABLES SHALL BE TIED TO THE CABLE SUPPORT USING WEATHER RESISTANT CABLE TIE (ITEM 2026).
22. MINIMUM BENDING RADIUS FOR 750 MCM, 133% INSULATION LEVEL, JACKETED CONCENTRIC NEUTRAL CABLE IS 21".
23. EQUIPMENT CURRENT SENSORS MUST BE INSTALLED IN ALL PHASES OF SOURCES AND LOADS AS PER MANUFACTURER'S INSTRUCTIONS.
24. CABLE SUPPORT RACKS MUST BE SPACED USING THE DIMENSIONS SHOWN ON PAGES 2 AND 8 OF THIS STANDARD. REFER TO ASSEMBLY NO. ASSY-2503 FOR INSTALLATION DETAILS.
25. A 4/0 AWG COPPER BARE CONDUCTOR (ITEM 0080) SHALL BE USED FOR INSTALLATION OF A GROUND RING ON THE FLOOR INSIDE THE MANHOLE CONNECTED TO TWO GROUND RODS (ITEM 0037).
26. A COMPRESSION CROSS GROUND GRID CONNECTOR (ITEM 0006) SHALL BE USED FOR THE CONNECTION BETWEEN THE GROUND RING AND THE GROUND ROD (ITEM 0037).
27. ALL PRIMARY VOLTAGE CABLES SHALL BE LABELED TO IDENTIFY THE PHASES (A, B, C) AND TO INDICATE FROM WHICH EQUIPMENT THE CABLES COME AND TO WHICH EQUIPMENT THE CABLES GO OR TO WHOM THEY PROVIDE SERVICE.
28. ONE CONCENTRIC NEUTRAL STRAND WILL BE USED AS DRAIN WIRE FOR ELBOW CONNECTORS. TO ENSURE THE CONTINUITY OF THE DRAIN WIRE TO THE GROUNDING SYSTEM, THE DRAIN WIRE STRAND MUST MADE A FULL TURN AROUND ALL STRANDS OF THE CONCENTRIC NEUTRAL BEFORE CONNECT IT TO ELBOW GROUNDING EYE. (REFER TO ASSEMBLY NO. ASSY-2507)
29. FOR INSTALLATION DETAILS OF THE SEPARABLE INSULATED CONNECTORS, REFER TO ASSEMBLY NO. ASSY-2507.
30. UNUSED BUSHINGS MUST BE INSULATED AND SEALED. REFER TO ASSEMBLY ASSY-2507 FOR DETAILS.
31. TIME CURRENT CHARACTERISTICS OF PROTECTED WAYS ARE FIELD PROGRAMMABLE. CONTACT LUMA ENERGY TO COORDINATE THE FAULT INTERRUPTER DEVICES CLEARING TIMES WITH OTHER FAULT CLEARING DEVICES ON THE DISTRIBUTION SYSTEM.
32. ALL DUCTS, INCLUDING SPARE DUCTS, SHALL BE SEALED WITH AN APPROPRIATE DUCT SEALING PLUG (ITEM 2056) OR DUCT SEALING COMPOUND (ITEM 2014) TO PREVENT ENTRY OF WATER OR OTHER FOREIGN OBJECTS.
33. CABLE SUPPORT BRACKET (ITEM 2002) MUST BE ATTACHED TO SUPPORT ANGLES USING ONE STAINLESS STEEL HEXAGONAL HEAD BOLT ½" X 1 ½" (ITEM 2048) WITH ONE FLAT WASHER (ITEM 0002), ONE SPLIT LOCK WASHER (ITEM 0002), AND ONE HEXAGONAL NUT (ITEM 2009).
34. DUE TO THE LIMITED SPACE INSIDE THE MANHOLE, IT IS REQUIRED THE INSTALLATION OF ADDITIONAL MANHOLES ADJACENT TO THE MANHOLE CONTAINING THE UNDERGROUND SWITCHGEAR. ADJACENT MANHOLES MUST BE LOCATED BEFORE AND AFTER SWITCHGEAR'S MANHOLE AT A DISTANCE NOT GREATER THAN 150'. THESE ADJACENT MANHOLES SHALL COMPLY WITH THE STANDARD NO. URD-31. PRIMARY CABLES INSIDE THOSE MANHOLES MUST HAVE A FULL TURN WITH A LENGTH GREATER THAN THE MANHOLE INSIDE PERIMETER.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE: GAS INSULATED DISTRIBUTION SWITCHGEAR
4 WAYS, WET VAULT MOUNTED STYLE
REMOTE SUPERVISORY CAPABLE
SOURCE RATING: 600 A OR 900 A
MAXIMUM LOAD RATING: 600 A
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-D VERSION 1
DOCUMENT NO. 4325.024
PAGE 13 OF 14 DATE OCT 7, 2022

SUBMITTED ALEX J. RODRIGUEZ LIC. 24174
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED ALEX J. RODRIGUEZ LIC. 24174
EMILIO CUADRADO LIC. 3000

BILL OF MATERIAL

MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY. SINGLE / THREE PHASE
0002	FLAT ROUND WASHER	002-82041	AS REQ.
	SPLIT LOCK WASHER	002-82930	AS REQ.
0006	COMPRESSION SPLICES AND CONNECTORS	002-14460	2
		VARIES	AS REQ.
0037	⅝" X 8' GROUND ROD	002-02465	2
0080	COPPER BARE CONDUCTOR	006-82621	AS REQ.
		006-01526	AS REQ.
0087	15 KV UNDERGROUND CABLE	006-82628	AS REQ.
0145	DOUBLE EYE TERMINAL CONNECTOR	002-09833	18
		038-00786	6
2002	CABLE AND STRESS CONE SUPPORT BRACKET	038-77378	18
2009	½" HEXAGONAL NUT	002-82038	AS REQ.
2011	ELBOW ARRESTER	VARIES	12
2014	DUCT SEALING COMPOUND	003-02935	AS REQ.
2015	PADLOCK	066-07345	AS REQ.
2024	MECHANICAL GROUNDING CONNECTOR	038-83151	7
2025	SELF-DRILLING SCREW	002-83309	7
2026	CABLE TIE	038-83155	AS REQ.
2028	SINGLE HOLE CABLE STRAP FOR COPPER CONDUCTOR	038-83156	AS REQ.
2029	ANCHOR HEX WASHER HEAD CONCRETE SCREW	038-83157	AS REQ.
2045	PVC END BELL	038-01750	32

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE: GAS INSULATED DISTRIBUTION SWITCHGEAR
4 WAYS, WET VAULT MOUNTED STYLE
REMOTE SUPERVISORY CAPABLE
SOURCE RATING: 600 A OR 900 A
MAXIMUM LOAD RATING: 600 A
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-11-D VERSION 1
DOCUMENT NO. 4325.024
PAGE 14 OF 14 DATE OCT 7, 2022
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EMILIO CUADRADO LIC. 3000

BILL OF MATERIAL

MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY. SINGLE / THREE PHASE
2048	HEX HEAD BOLT	038-83212	AS REQ.
		038-83413	4
2056	DUCT SEALING PLUG	038-83313	AS REQ.
2060	DEADBREAK ELBOW CONNECTOR	038-83335	VARIES
		038-00919	VARIES
2074	NEUTRAL BUS BAR	038-83390	2
2083	DEADBREAK BUSHING INSERT	038-00752	VARIES
2086	STRANDED COPPER CABLE, 600 V, THHN	006-83458	AS REQ.
2091	BONDING JUMPER FLEXIBLE COPPER BRAID	038-83391	1
2092	DEAD FRONT GAS INSULATED SWITCHGEAR	VARIES	AS REQ.
2093	UNIVERSAL TERMINAL LUG	038-83452	8
(OPTIONAL) 2094	GRATING CLIP	038-83160	8
(OPTIONAL) 2096	GRATING PANEL	038-83047	8'
2502	WIRELESS FAULT CURRENT INDICATION SYSTEM ASSEMBLY	ASSY-2502	AS REQ.
2503	UNDERGROUND NONMETALLIC CABLE RACK ASSEMBLY	ASSY-2503	AS REQ.
2507	SEPARABLE INSULATED CONNECTORS AND CABLE TERMINATION ASSEMBLY	ASSY-2507	AS REQ.
URD-34-D	12' X 9' X 8' MANHOLE FOR UNDERGROUND DISTRIBUTION SWITCHGEAR WET VAULT MOUNTED STYLE STANDARD	URD-34-D	1

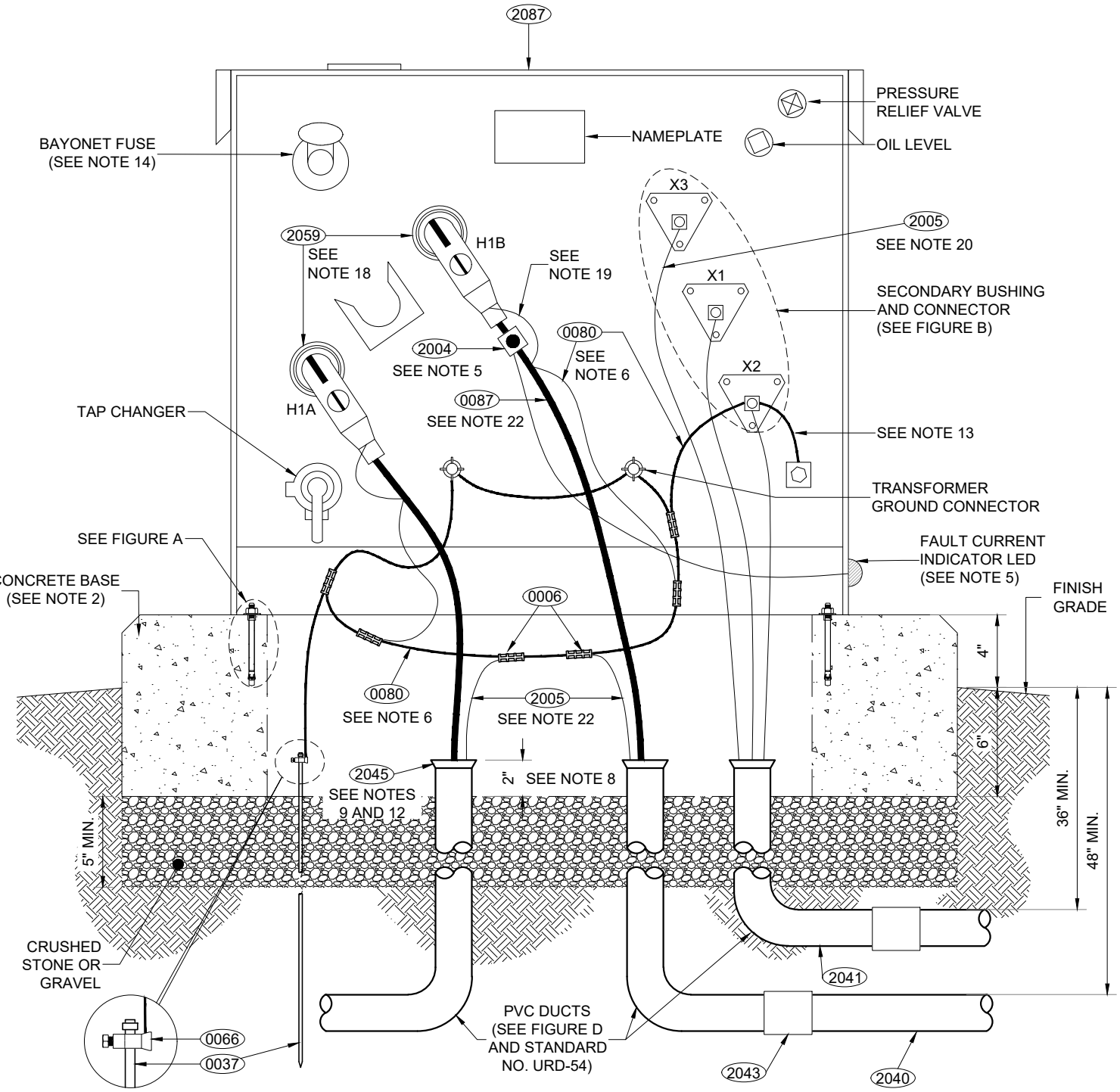
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

SINGLE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 75 KVA

STANDARD NO. URD-20 VERSION 3
DOCUMENT NO. 4325.025
PAGE 1 OF 10 DATE JAN 10, 2023
SUBMITTED LUIS R. SOTO LIC. 11658
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412



FRONT VIEW

TITLE:

SINGLE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 75 KVA

STANDARD NO. URD-20 VERSION 3
DOCUMENT NO. 4325.025
PAGE 2 OF 10 DATE JAN 10, 2023
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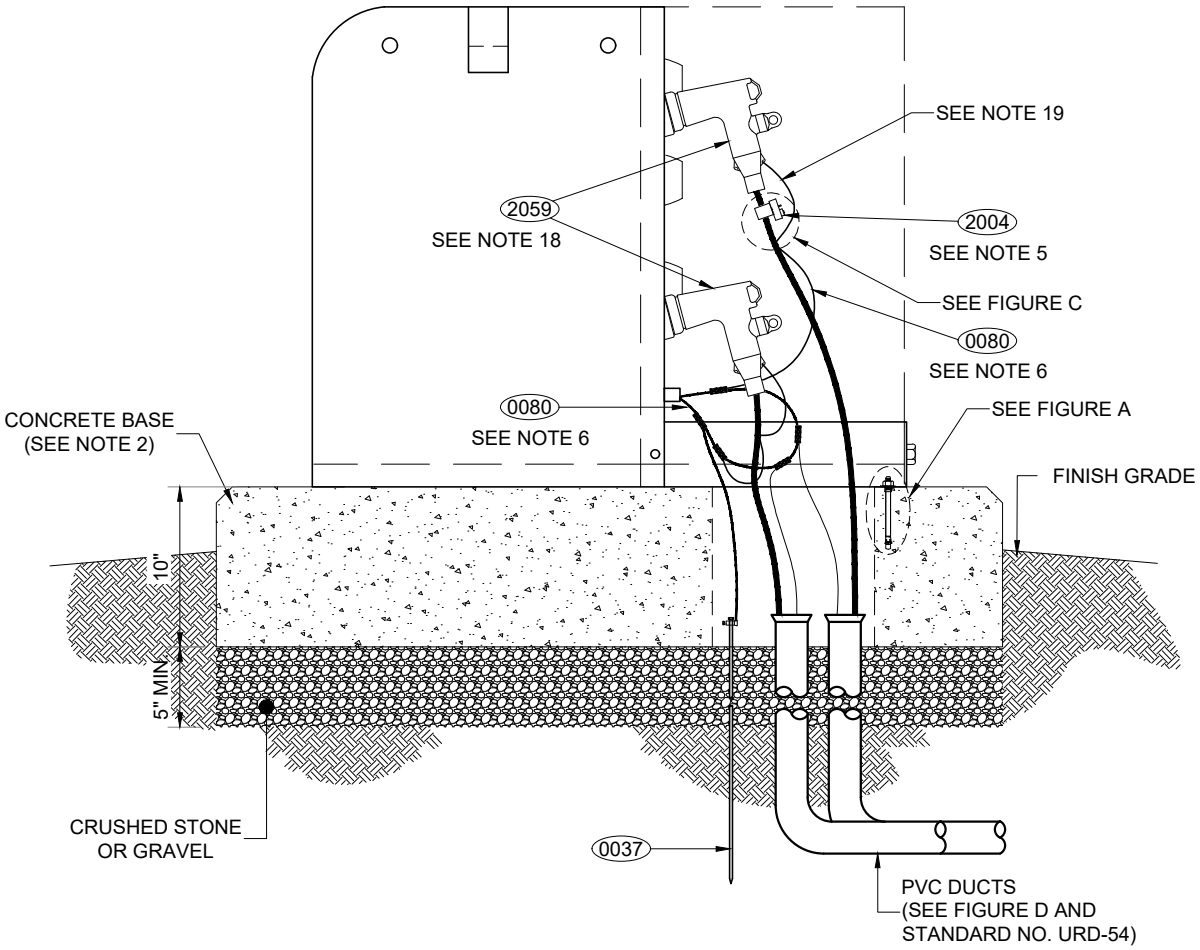

SIDE VIEW

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

SINGLE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 75 KVA

STANDARD NO. URD-20 VERSION 3
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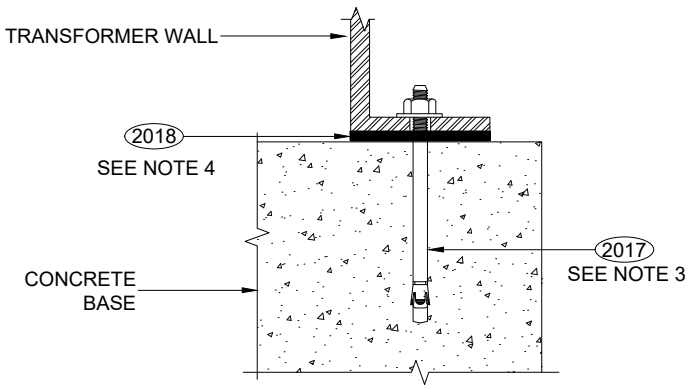

FIGURE A
TRANSFORMER MOUNTING

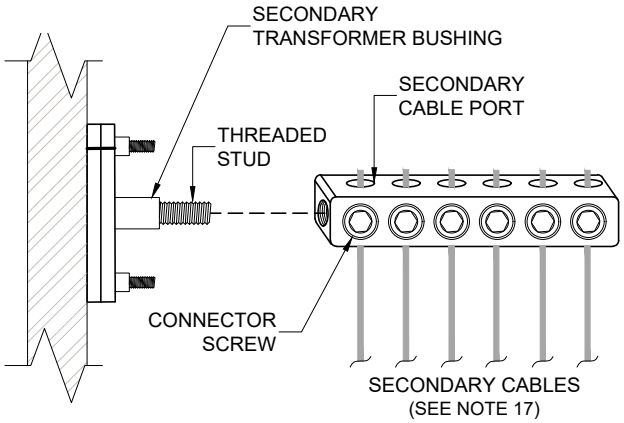

FIGURE B
SECONDARY CONNECTOR

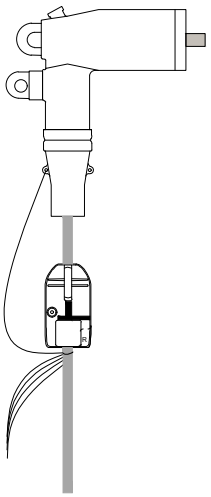

FIGURE C
FAULT CURRENT INDICATOR

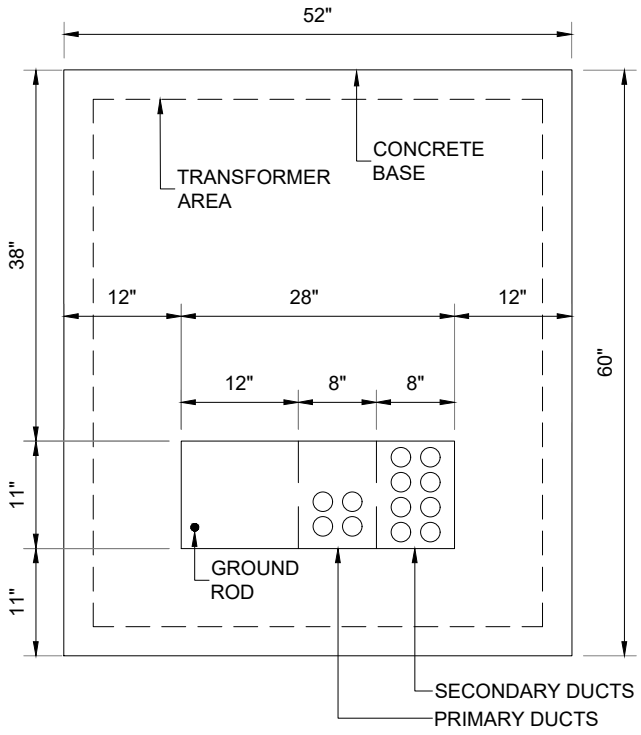

FIGURE D
DUCTS INSTALLATION AREA
(SEE NOTES 9 AND 10)

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

SINGLE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 75 KVA

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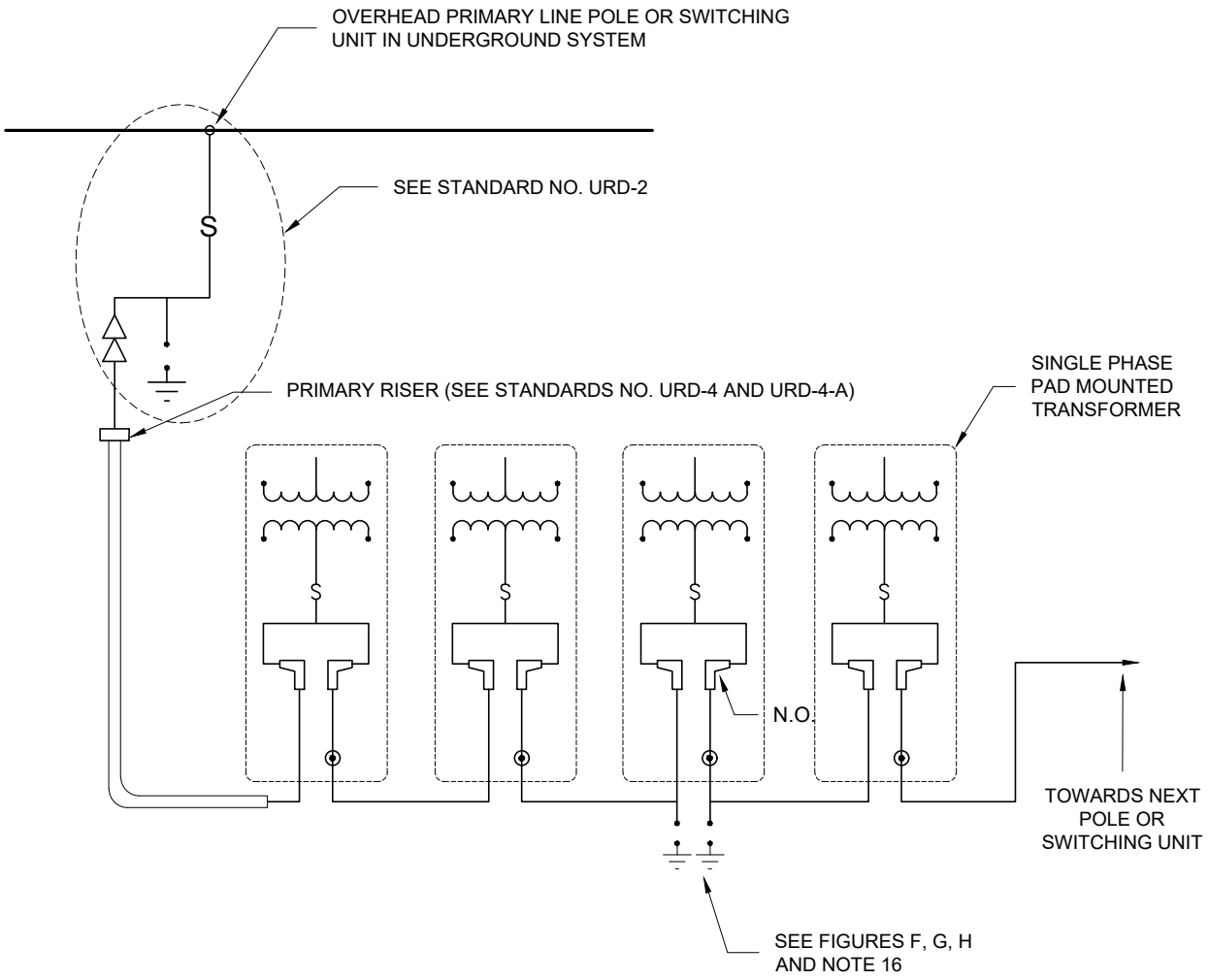

FIGURE E
SINGLE PHASE LOOP SYSTEM

LEGEND:

- CURRENT LIMITING FUSE
- FAULT CURRENT INDICATOR
- LIGHTNING ARRESTER
- LOADBREAK ELBOW CONNECTOR
- N.O. NORMALLY OPEN
- 15 KV UNDERGROUND CABLE

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

SINGLE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 75 KVA

STANDARD NO. URD-20 VERSION 3
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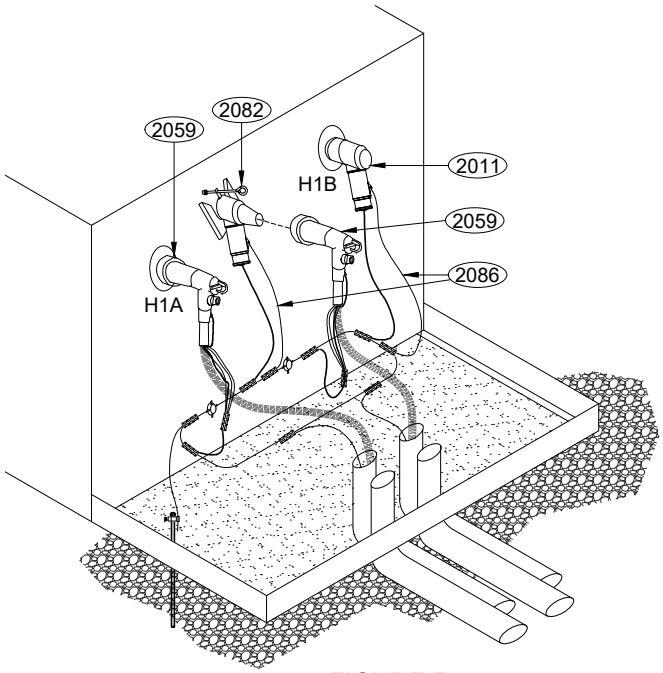
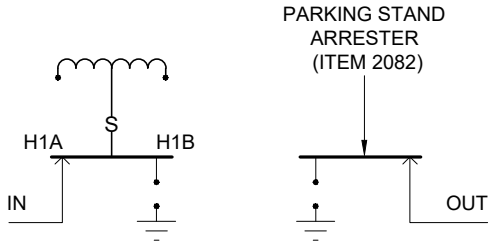


FIGURE F
ARRESTER CONNECTION DETAIL FOR H1B NORMALLY OPEN



ONE-LINE DIAGRAM

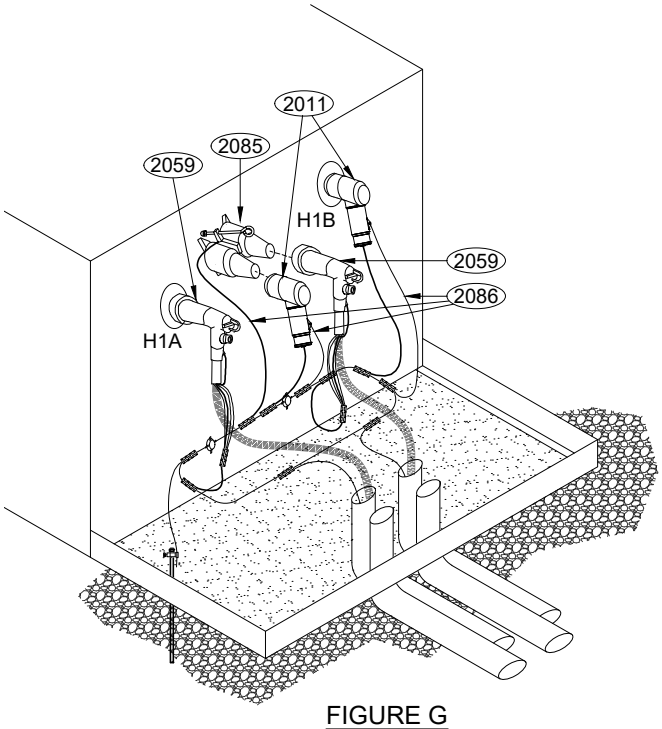
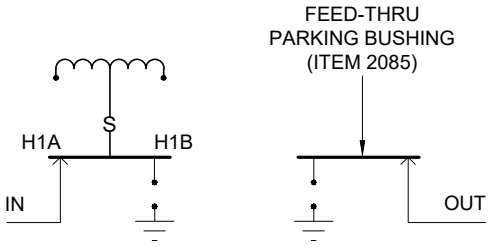


FIGURE G
ARRESTER CONNECTION DETAIL FOR H1B NORMALLY OPEN
WITH LOADBREAK FEED-THRU PARKING BUSHING



ONE-LINE DIAGRAM

TITLE:

SINGLE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 75 KVA

STANDARD NO. URD-20 VERSION 3
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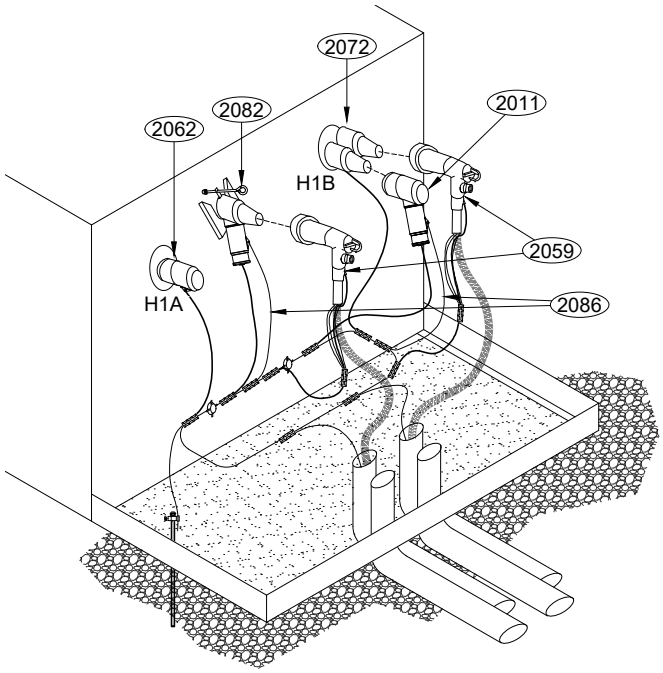

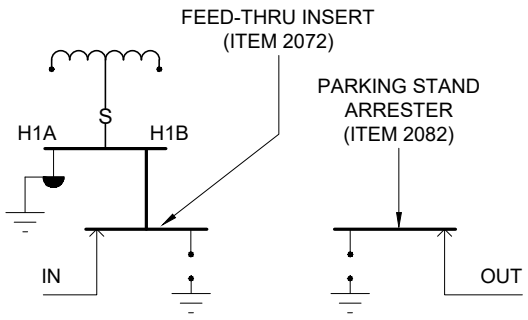

ONE-LINE DIAGRAM

FIGURE H
ARRESTER CONNECTION DETAIL FOR H1A NORMALLY OPEN

LEGEND:

- TRANSFORMER
- CIRCUIT LIMITING FUSE
- LOADBREAK ELBOW CONNECTOR
- PARKING STAND ARRESTER / ELBOW ARRESTER
- INSULATED CAP

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

SINGLE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 75 KVA

STANDARD NO. URD-20 VERSION 3
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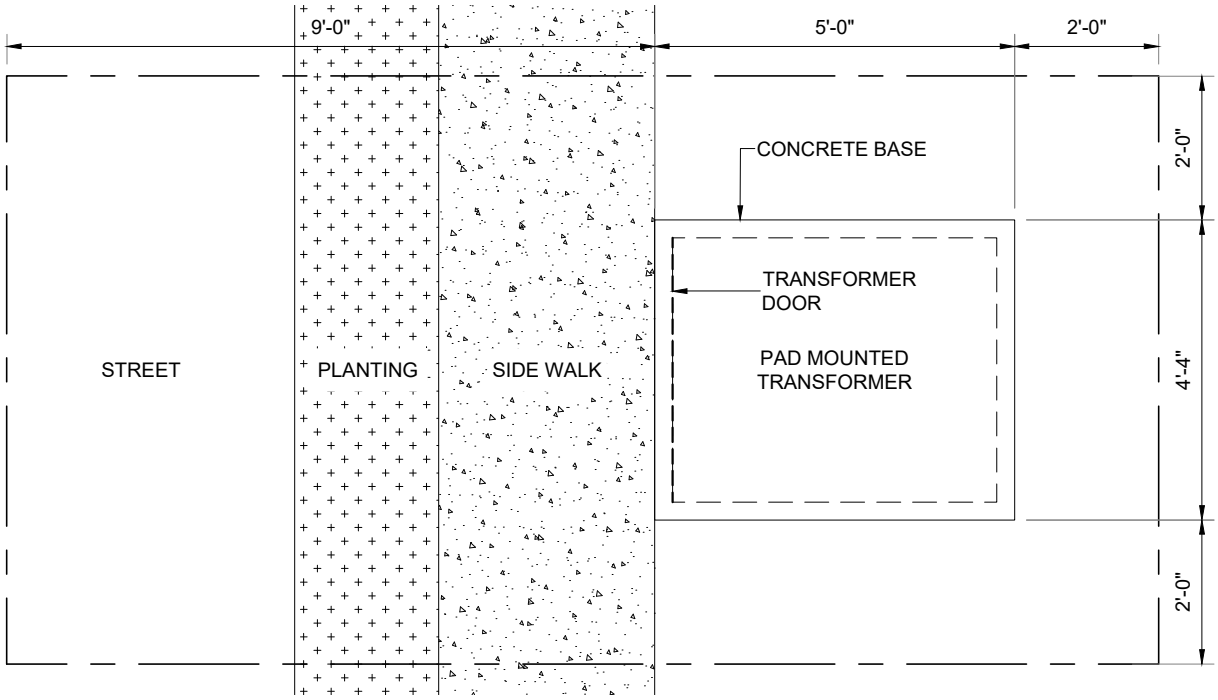

FIGURE I
CLEARANCES FOR SINGLE PHASE PAD MOUNTED TRANSFORMER
(SEE NOTE 12)

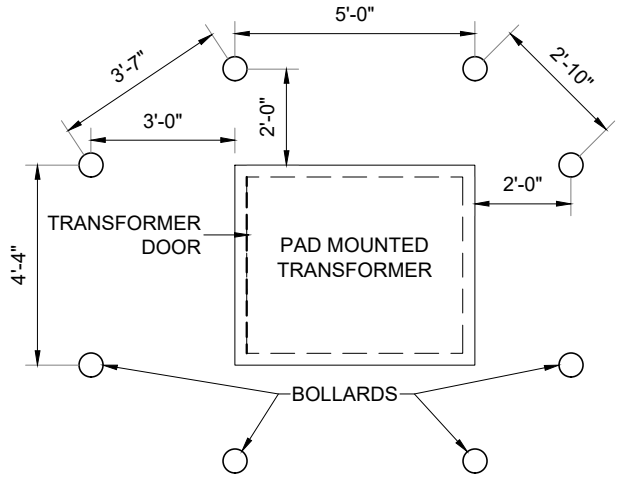

FIGURE J
BOLLARD CONFIGURATION
(SEE NOTE 21)

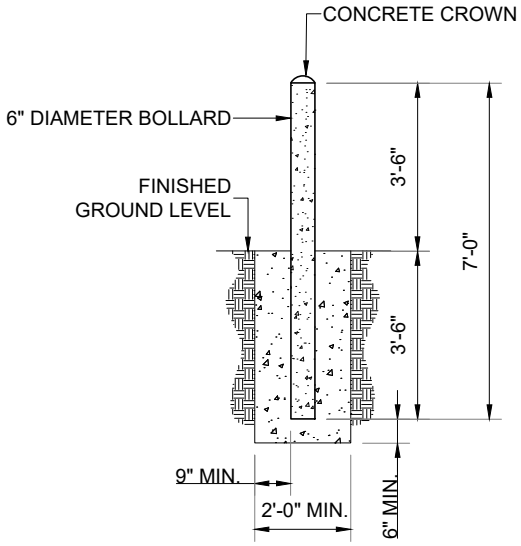

FIGURE K
BOLLARD DETAIL

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

SINGLE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 75 KVA
NOTES

STANDARD NO. URD-20 VERSION 3
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APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES:

1. THIS STANDARD APPLIES TO SINGLE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER INSTALLED BY LUMA OR TO BE TRANSFERRED TO LUMA.
2. SINGLE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER SHALL BE INSTALLED ON A PRECAST OR CAST IN PLACE CONCRETE BASE. THE STANDARD NO. URD-53 SHOW THE CONCRETE BASE TO BE USED AND THE SPECIFICATIONS FOR ITS CONSTRUCTION.
3. STAINLESS STEEL ANCHOR BOLTS SHALL BE USED TO INSTALL THE PAD MOUNTED TRANSFORMER ON THE CONCRETE BASE. ANCHOR BOLT'S HOLES SHALL BE DRILLED INTO THE CONCRETE BASE AFTER THE TRANSFORMER IS SET IN THE PLATE. USE A ½" DIAMETER WEDGE ANCHOR BOLT WITH AN EMBEDMENT DEPTH OF 4 ½". (SEE FIGURE A)
4. AN ELASTOMERIC JOINT SEALANT SHALL BE USED BETWEEN THE PAD MOUNTED TRANSFORMER AND THE CONCRETE BASE. THE SEALANT SHALL BE INSTALLED AROUND THE ENTIRE BOTTOM OF THE TRANSFORMER. (SEE FIGURE A)
5. FAULT CURRENT INDICATOR SHALL BE INSTALLED ON THE OUTGOING CABLE AND IT SHALL BE HOT STICK MOUNTING TYPE. THE FAULT CURRENT INDICATOR SHALL HAVE A VISIBLE FAULT INDICATION INSTALLED ON THE OUTSIDE OF THE PAD MOUNTED TRANSFORMER, AT THE LOWER PART OF THE DOOR FRAME ON THE LATERAL SIDE.
6. THE NEUTRAL CONDUCTOR, TRANSFORMER ENCLOSURE AND ARRESTERS GROUNDS SHALL BE EFFECTIVELY CONNECTED TO THE GROUND ROD USING #2 AWG COPPER BARE CONDUTOR (ITEM 0080).
7. ALL DRAIN WIRES ASSOCIATED WITH SEPARABLE INSULATED CONNECTORS SHALL BE EFFECTIVELY CONNECTED TO THE GROUNDING SYSTEM USING #12 AWG COPPER GREEN CABLE WITH 600 V INSULATION. (SEE ASSEMBLY NO. ASSY-2507)
8. ONCE THE CONCRETE BASE AND THE PVC DUCTS ARE INSTALLED, MAKE SURE THE CRUSHED STONE OR GRAVEL AT THE BOTTOM OF THE CONCRETE BASE DOES NOT COVER THE DUCTS. THE DUCTS AND PVC END BELLS SHALL BE 2" ABOVE THE CRUSHED STONE OR GRAVEL.
9. ALL PVC DUCTS IN A CONCRETE BASE SHALL HAVE A PVC END BELL (ITEM 2045) TO PROVIDE A SMOOTH AND SAFE CABLE ENTRY.
10. AFTER THE INSTALLATION OF ALL CABLES IS COMPLETED, THE DUCTS IN USE SHALL BE SEALED WITH A NONHARDENING SEALING COMPOUND (ITEM 2014). INSTALL A DUCT SEALING PLUG (ITEM 2056) IN EACH SPARE DUCT TO PREVENT WATER OR FOREIGN OBJECTS INTRUSION TO THE TRANSFORMER.
11. THE PAD MOUNTED TRANSFORMER SHALL BE PADLOCKED AT ALL TIMES, EXCEPT WHEN QUALIFIED PERSONNEL HAS TO PERFORM ANY OPERATION OR MAINTENANCE ON THE EQUIPMENT.
12. THE PAD MOUNTED TRANSFORMER SHALL HAVE A 9' LONG AREA, FROM THE EDGE OF THE CONCRETE BASE, CLEAR OF OBSTRUCTION IN FRONT OF ITS DOOR FOR OPERATION AND MAINTENANCE. IN ADDITION, THERE SHALL BE A 2' LONG AREA, FROM THE EDGE OF THE CONCRETE BASE, CLEAR OF OBSTRUCTIONS ON THE SIDES AND BACK OF THE PAD MOUNTED TRANSFORMER. THESE AREAS SHALL BE KEPT CLEAR AT ALL TIMES, INCLUDING FENCES, WALLS OR ANY VEGETATION. (SEE FIGURE I)
13. PAD MOUNTED TRANSFORMER SECONDARY VOLTAGE NEUTRAL TERMINAL SHALL BE INTERCONNECTED WITH THE TRANSFORMER ENCLOSURE GROUND CONNECTOR.
14. FOR BAYONET FUSE SIZES, REFER TO LUMA'S DISTRIBUTION EQUIPMENT AND PRIMARY LINE FUSING GUIDELINE.
15. GROUND CONNECTION OF PRIMARY VOLTAGE CABLE, ELBOW CONNECTORS AND ELBOW ARRESTERS SHALL HAVE SUFFICIENT SLACK TO ALLOW LOADBREAK ELBOW CONNECTORS TO MOVE FROM THEIR NORMAL POSITION TO THE PARKING STAND POSITION.
16. THE APPROPRIATE ELBOW ARRESTERS SHALL BE INSTALLED AT THE NORMALLY OPEN POINT OF THE LOOP. THE SELECTION OF THE ELBOW ARRESTERS' RATING SHALL BE BASED ON THE ELECTRICAL SYSTEM VOLTAGE.
17. ONLY ONE SECONDARY CABLE PER CONNECTOR PORT IS ALLOWED.
18. FOR INSTALLATION DETAILS OF THE LOADBREAK ELBOW CONNECTORS, ELBOW ARRESTERS AND ANY SEPARABLE INSULATED CONNECTORS, REFER TO ASSEMBLY NO. ASSY-2507.
19. ONE CONCENTRIC NEUTRAL STRAND CONNECTED TO THE ELBOW CONNECTOR GROUNDING EYE WILL BE USED AS DRAIN WIRE. (REFER TO ASSEMBLY NO. ASSY-2507)
20. THE MAXIMUM CABLE GAUGE ALLOWED FOR SECONDARY VOLTAGE FEEDER IS 4/0 AWG, STRANDED COPPER CABLE, 600 V, XHHW-2 TYPE.
21. ANY PAD MOUNTED EQUIPMENT INSTALLED IN AN AREA EXPOSED TO VEHICULAR TRAFFIC, WHERE DAMAGE TO EQUIPMENT IS PROBABLE, SHALL BE PROTECTED AGAINST IMPACT. THE PROTECTION BARRIER USED SHALL BE INSTALLED IN A WAY THAT ALLOWS DOOR OPENING AND EQUIPMENT OPERATION. FOR EQUIPMENT PROTECTION, USE CONCRETE FILLED PIPES OR BOLLARDS. THEY SHALL BE RIGID GALVANIZED STEEL PIPES WITH 6" DIAMETER AND MINIMUM 42" HEIGHT ABOVE FINISHED GROUND LEVEL. THE RIGID GALVANIZED STEEL PIPES SHALL BE EMBEDDED 42" BELOW FINAL GROUND LEVEL. THE AMOUNT OF BOLLARDS TO BE INSTALLED DEPENDS ON THE PAD MOUNTED EQUIPMENT LOCATION. BOLLARDS ARE NOT REQUIRED ON SIDES WHERE PAD MOUNTED EQUIPMENT FACES A STRUCTURE OR BARRIER WHICH RESTRICT VEHICULAR TRAFFIC. CAUTION MUST BE TAKEN WHEN INSTALLING BOLLARDS, SO THAT THEY DO NOT MAKE CONTACT WITH ANY UNDERGROUND INFRASTRUCTURE. FOR TYPICAL LOCATION OF BOLLARDS AROUND A PAD MOUNTED EQUIPMENT, SEE FIGURE J. FOR BOLLARD INSTALLATION DETAIL, SEE FIGURE K.
22. FOR 13.2 KV SYSTEMS, THE CABLE ON THE PRIMARY VOLTAGE SIDE OF THE PAD MOUNTED TRANSFORMER SHALL BE JACKETED CONCENTRIC NEUTRAL, #2 AWG, COPPER, 15 KV UNDERGROUND CABLE; AND THE CABLE TO BE USED AS NEUTRAL SHALL BE #2 AWG, COPPER, 600 V, XHHW-2 TYPE. FOR OTHER VOLTAGE LEVELS, THE DESIGNER WILL BE RESPONSIBLE TO DETERMINE THE GAUGE OF ALL CABLES AND THE AMOUNT OF TRANSFORMERS TO BE INSTALLED PER SINGLE PHASE LOOP, IN ORDER TO THE NOMINAL CAPACITY DO NOT EXCEED 100 A.
23. THE PAD MOUNTED TRANSFORMER SHALL BE LABELED TO INDICATE FROM WHICH EQUIPMENT THE PRIMARY VOLTAGE CABLE COME AND TO WHICH EQUIPMENT THE PRIMARY VOLTAGE CABLE GO. THE SECONDARY VOLTAGE CABLE SHALL BE LABELED TO INDICATE TO WHICH EQUIPMENT THE CABLE GO OR THE CUSTOMER THEY PROVIDE SERVICE.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

SINGLE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 75 KVA
BILL OF MATERIAL

STANDARD NO. URD-20 VERSION 3
DOCUMENT NO. 4325.025
PAGE 9 OF 10 DATE JAN 10, 2023
SUBMITTED LUIS R. SOTO LIC. 11658
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTOR	VARIES	AS REQ.
0037	5/8" X 8' GROUND ROD	002-02465	1
0066	CONNECTOR FOR 5/8" GROUND ROD	002-13595	1
0080	COPPER BARE CONDUCTOR	006-82621	AS REQ.
0087	15 KV UNDERGROUND CABLE	006-82624	AS REQ.
2004	FAULT CURRENT INDICATOR	038-01545	1
2005	STRANDED COPPER CABLE 600 V, XHHW-2	VARIES	AS REQ.
2011	ELBOW ARRESTER	VARIES	AS REQ.
2014	DUCT SEALING COMPOUND	003-02935	AS REQ.
2015	PADLOCK	VARIES	1
2017	WEDGE ANCHOR BOLT	038-83148	2
2018	ELASTOMERIC JOINT SEALANT	038-83149	AS REQ.
2040	PVC SCH-40 DUCT	VARIES	AS REQ.
2041	90° PVC ELBOW	VARIES	AS REQ.
2043	PVC COUPLING	VARIES	AS REQ.
2045	PVC END BELL	VARIES	AS REQ.
2056	DUCT SEALING PLUG	VARIES	AS REQ.
2059	LOADBREAK ELBOW CONNECTOR	038-00844	2
2062	INSULATED CAP WITH GROUND	038-01040	AS REQ.
2072	LOADBREAK FEED-THRU INSERT	038-01008	AS REQ.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

SINGLE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 75 KVA
BILL OF MATERIAL

STANDARD NO. URD-20 VERSION 3
DOCUMENT NO. 4325.025
PAGE 10 OF 10 DATE JAN 10, 2023
SUBMITTED LUIS R. SOTO LIC. 11658
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

MATERIALS			
2082	PARKING STAND ARRESTER	VARIES	AS REQ.
2085	LOADBREAK FEED-THRU PARKING BUSHING	072-79764	AS REQ.
2086	STRANDED COPPER CABLE, 600 V, THHN	040-00774	AS REQ.
2087	SINGLE PHASE PAD MOUNTED TRANSFORMER	VARIES	1
URD-54	DUCT SIZING STANDARD	URD-54	AS REQ.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

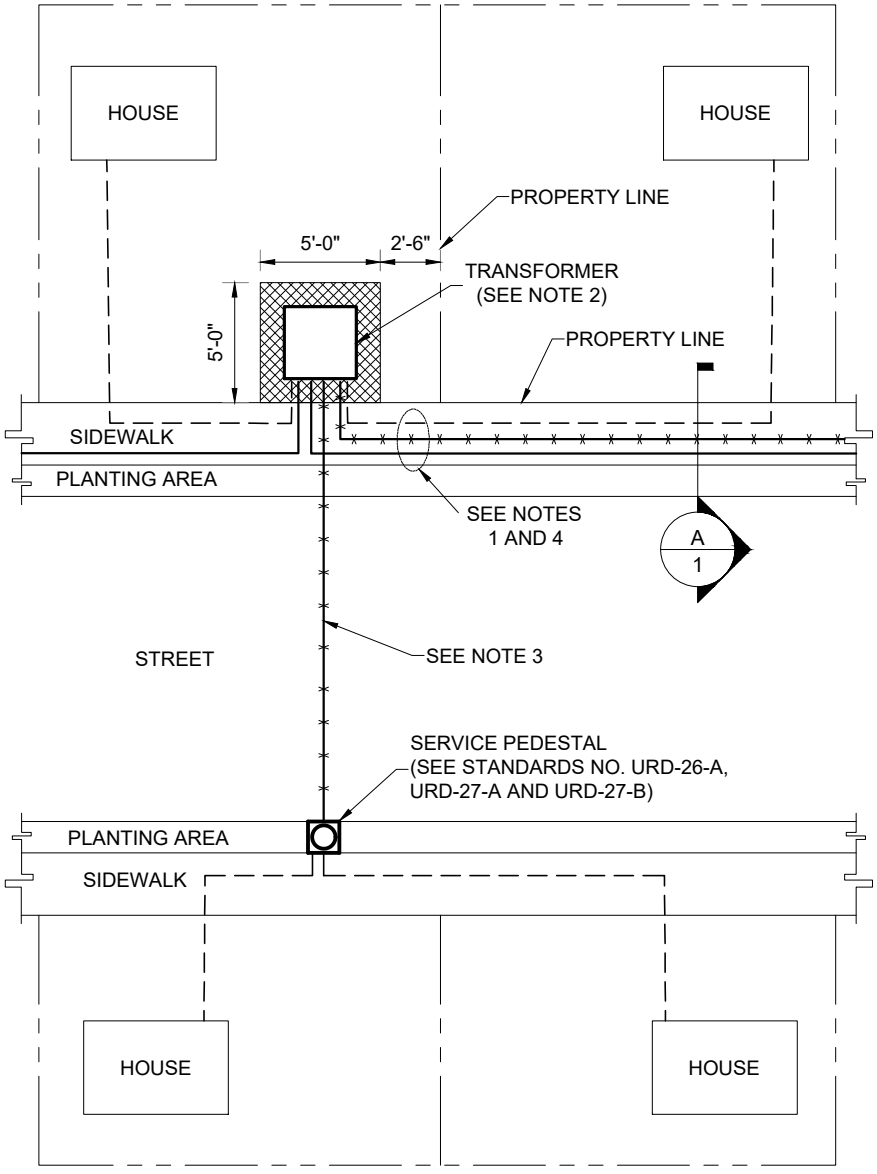
TITLE:

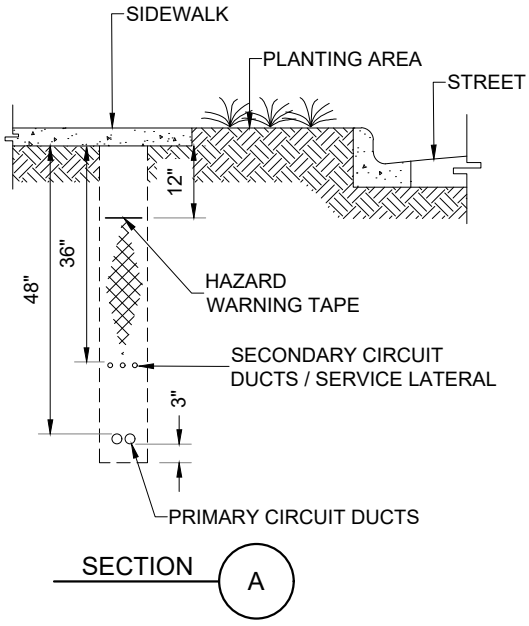
LOCATION DETAILS FOR TRANSFORMERS, SERVICE PEDESTALS AND CONDUIT TRENCH

STANDARD NO.	URD-24 VERSION 2
DOCUMENT NO.	4325.026
PAGE	1 OF 5 DATE JAN 10, 2023
SUBMITTED	YENISA M. SALVA LIC. 15901
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	VICTOR R. FEBRES LIC. 3412
	EMILIO CUADRADO LIC. 3000

LEGEND

- PRIMARY CIRCUITS DUCTS
- SECONDARY CIRCUITS DUCTS
- SERVICE LATERALS





SECTION A

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

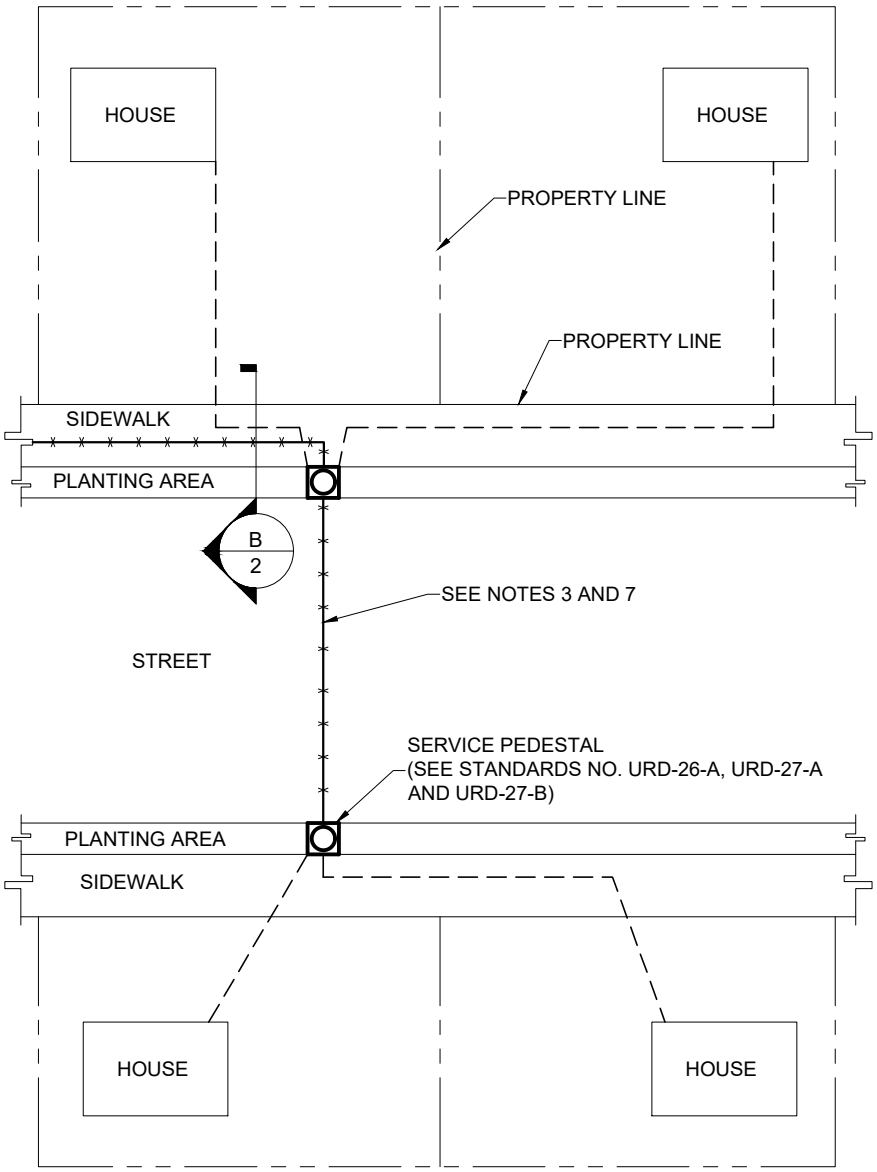
TITLE:

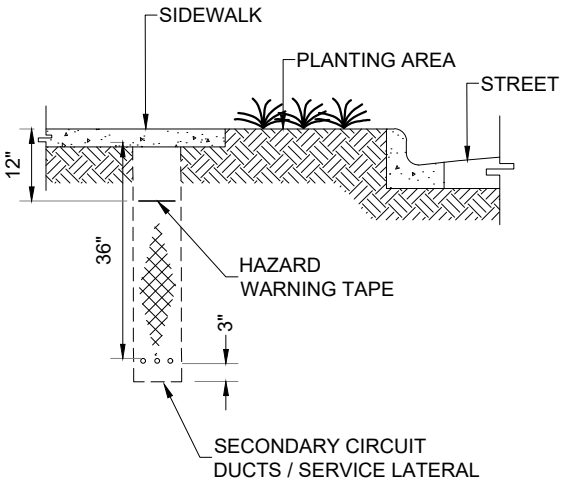
LOCATION DETAILS FOR TRANSFORMERS, SERVICE PEDESTALS AND CONDUIT TRENCH

STANDARD NO. URD-24 VERSION 2
DOCUMENT NO. 4325.026
PAGE 2 OF 5 DATE JAN 10, 2023
SUBMITTED YENISA M. SALVA LIC. 15901
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412
EMILIO CUADRADO LIC. 3000

LEGEND

SECONDARY CIRCUITS DUCTS
SERVICE LATERALS





SECTION B

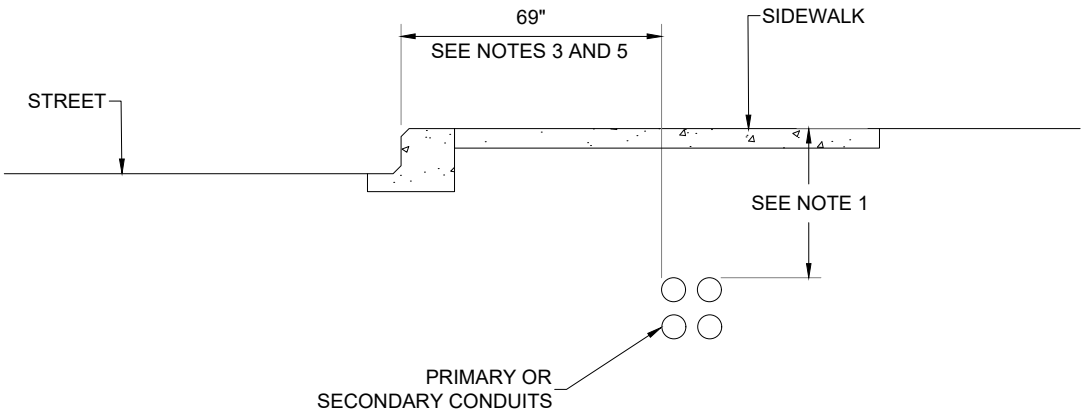
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

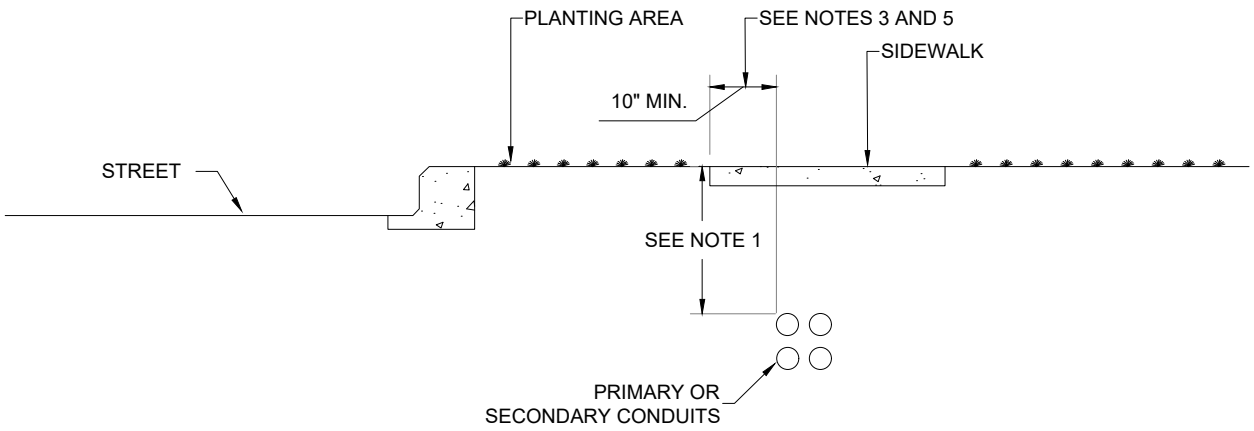
TITLE:

LOCATION DETAILS FOR TRANSFORMERS, SERVICE PEDESTALS AND CONDUIT TRENCH

STANDARD NO.	URD-24 VERSION 2
DOCUMENT NO.	4325.026
PAGE	3 OF 5 DATE JAN 10, 2023
SUBMITTED	YENISA M. SALVA LIC. 15901
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	VICTOR R. FEBRES LIC. 3412
	EMILIO CUADRADO LIC. 3000



INSTALLATION OF UNDERGROUND CABLES WHEN THERE IS NO PLANTING AREA



INSTALLATION OF UNDERGROUND CABLES WHEN THERE IS A PLANTING AREA

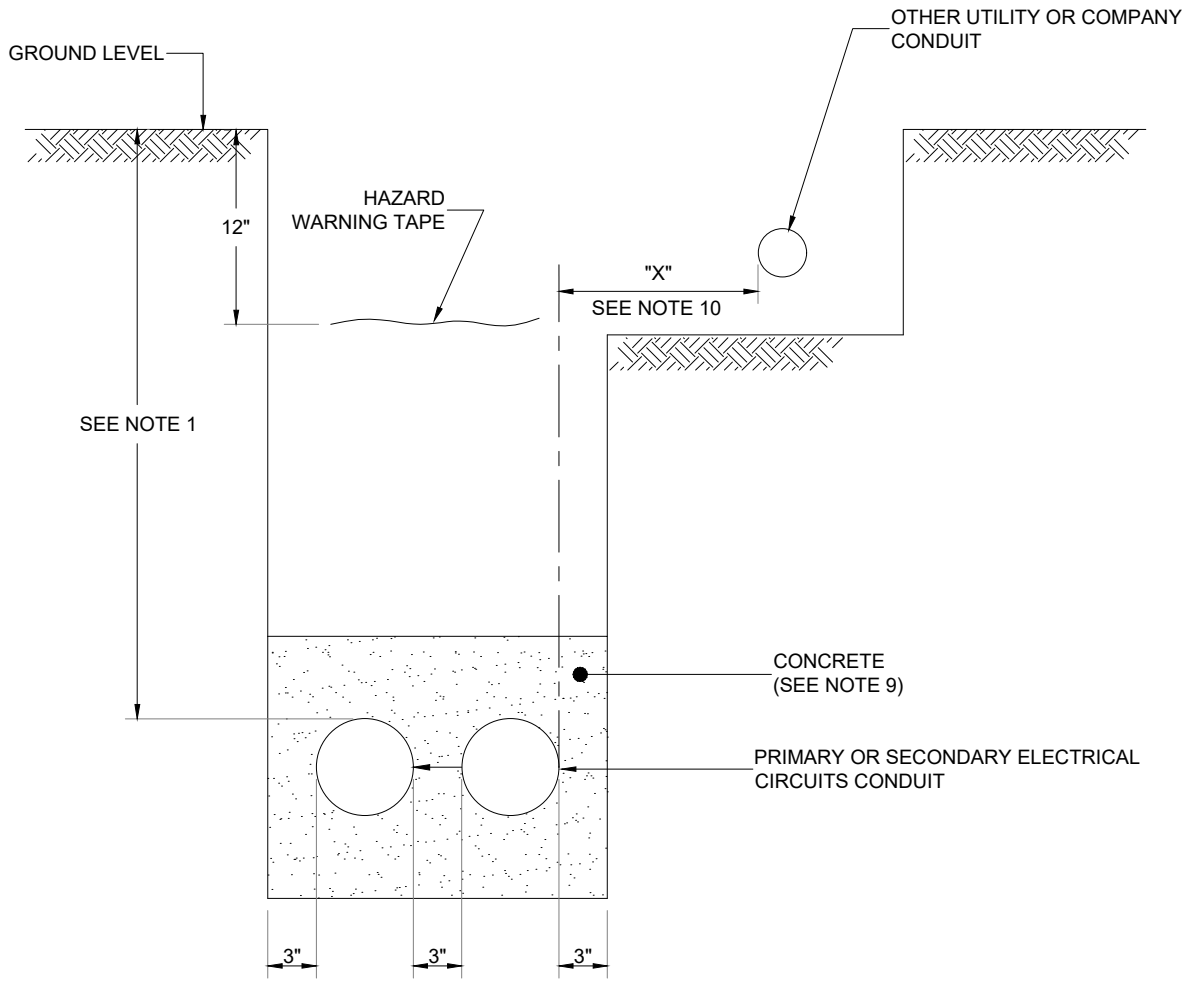
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

LOCATION DETAILS FOR TRANSFORMERS, SERVICE PEDESTALS AND DUCT TRENCH

STANDARD NO. URD-24 VERSION 2
DOCUMENT NO. 4325.026
PAGE 4 OF 5 DATE JAN 10, 2023
SUBMITTED YENISA M. SALVA LIC. 15901
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412
EMILIO CUADRADO LIC. 3000



INSTALLATION DETAILS FOR ELECTRICAL AND TELECOMMUNICATIONS TRENCHES

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

LOCATION DETAILS FOR TRANSFORMERS, SERVICE PEDESTALS AND DUCT TRENCH NOTES

STANDARD NO. URD-24 VERSION 2
DOCUMENT NO. 4325.026
PAGE 5 OF 5 DATE JAN 10, 2023
SUBMITTED YENISA M. SALVA LIC. 15901
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412
EMILIO CUADRADO LIC. 3000

NOTES:

1. THE SAME TRENCH CAN BE USED FOR PRIMARY, SECONDARY AND STREET LIGHTING CONDUIT. SEE APPLICABLE STANDARDS NO. URD-6, URD-7, URD-8 OR URD-9 FOR TRENCH DETAILS.
2. THE CONTRACTOR HAS TO COORDINATE THE LOCATION OF THE TRANSFORMERS AND SERVICE PEDESTALS WITH THE PROJECT DESIGNERS TO AVOID PROBLEMS WITH DRIVEWAYS.
3. CONDUITS INSTALLED IN STREET AREAS SHALL BE PROTECTED BY A CONCRETE ENCASEMENT.
4. THIS STANDARD IS FOR ILLUSTRATIVE PURPOSES ONLY. THE LINES WILL BE INSTALLED IN ACCORDANCE WITH PROVISIONS OF THE PUERTO RICO PLANNING BOARD'S REGULATION FOR INFRASTRUCTURE MANAGEMENT IN PUBLIC SPACE (*REGLAMENTO NÚM. 22*).
5. IF THE MINIMUM HORIZONTAL DISTANCE BETWEEN THE STREET AND THE CONDUIT TRENCH ESTABLISHED IN THE PUERTO RICO PLANNING BOARD'S REGULATION FOR INFRASTRUCTURE MANAGEMENT IN PUBLIC SPACE (*REGLAMENTO NÚM. 22*) IN FORCE CANNOT BE MET, CONDUITS SHALL BE INSTALLED IN THE STREET.
6. PAD MOUNTED TRANSFORMERS, PEDESTALS OR ANY OTHER ABOVEGROUND EQUIPMENT SHALL BE LOCATED AT A MINIMUM OF 4' AWAY FROM FIRE HYDRANTS.
7. SERVICE LATERALS ARE NOT ALLOWED TO CROSS STREETS. STREET CROSSINGS SHALL BE DONE INSTALLING A SECONDARY LINE FROM SERVICE PEDESTAL TO SERVICE PEDESTAL.
8. PEDESTALS AND POLES SHALL BE PLACED IN THE PLANTING AREA.
9. THE DUCTS SHALL BE PROTECTED WITH A 3" CONCRETE ENCASEMENT IN LOCATIONS WHERE ANOTHER UTILITY HAS PIPES.
10. DISTANCE "X" BETWEEN ELECTRICAL LINES' DUCTS AND TELECOMMUNICATIONS' DUCTS SHALL BE A MINIMUM OF 13". FOR WATER LINES, GAS AND FUEL PIPES THE DISTANCE "X" SHALL BE 24".

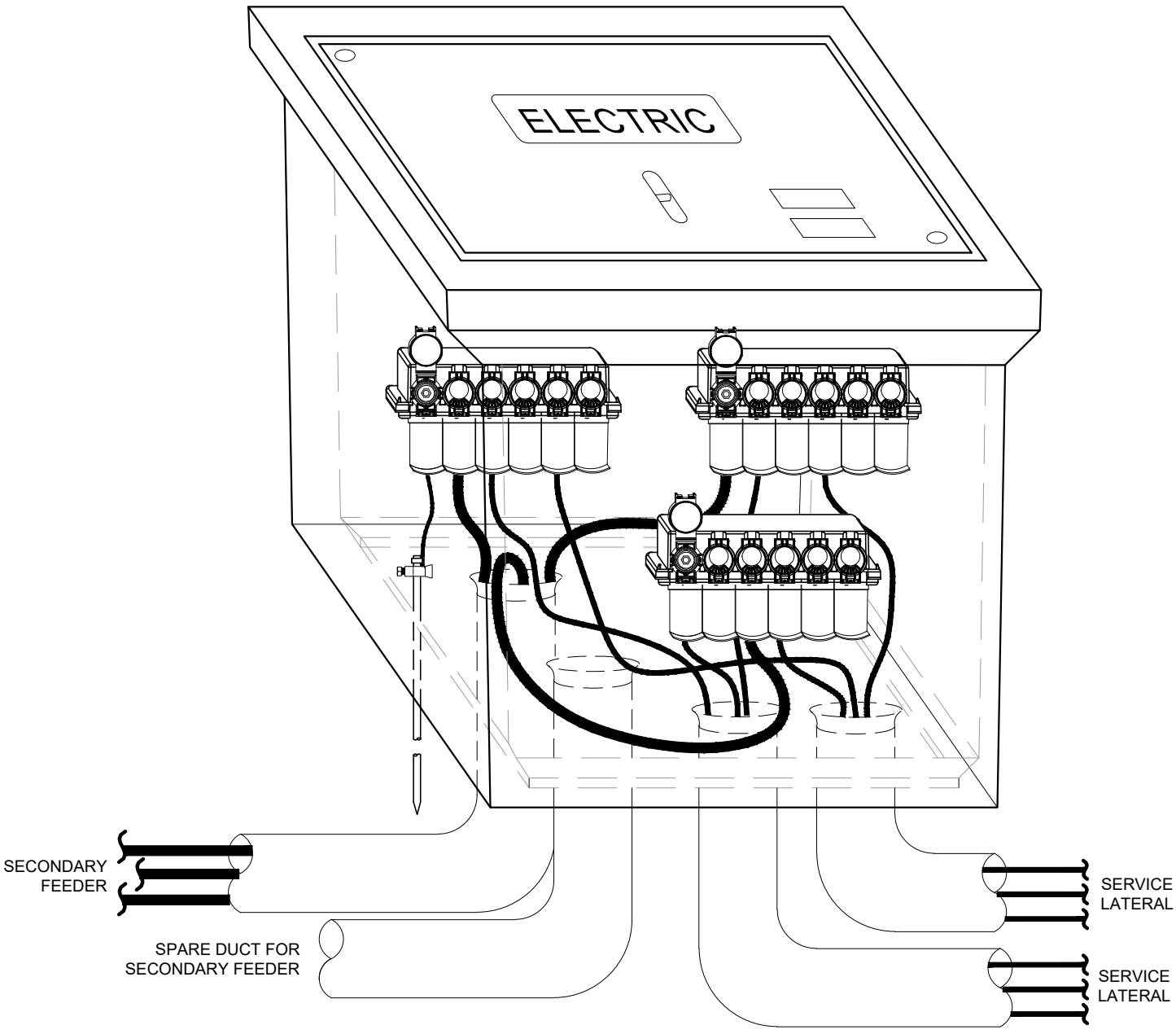
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

12" x 12" SERVICE PEDESTAL
MAXIMUM VOLTAGE: 240 V

STANDARD NO. URD-26-A VERSION 1
DOCUMENT NO. 4325.027
PAGE 1 OF 4 DATE SEPT 21, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412
EMILIO CUADRADO LIC. 3000



CABLES TYPICAL INSTALLATION

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

12" X 12" SERVICE PEDESTAL
MAXIMUM VOLTAGE: 240 V

STANDARD NO. URD-26-A VERSION 1
DOCUMENT NO. 4325.027
PAGE 2 OF 4 DATE SEPT 21, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
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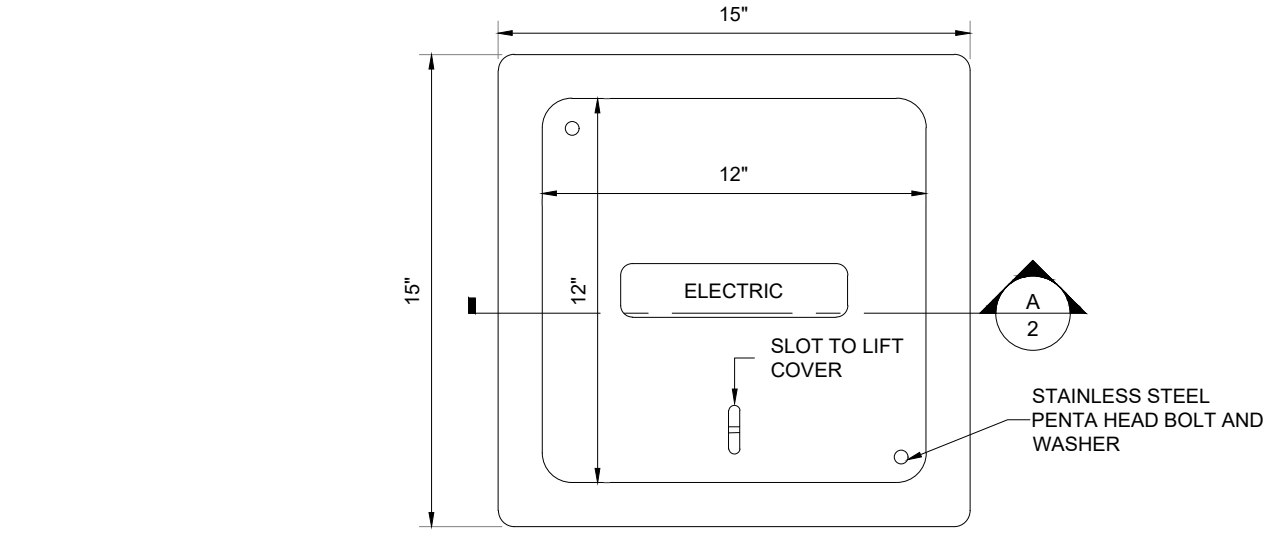
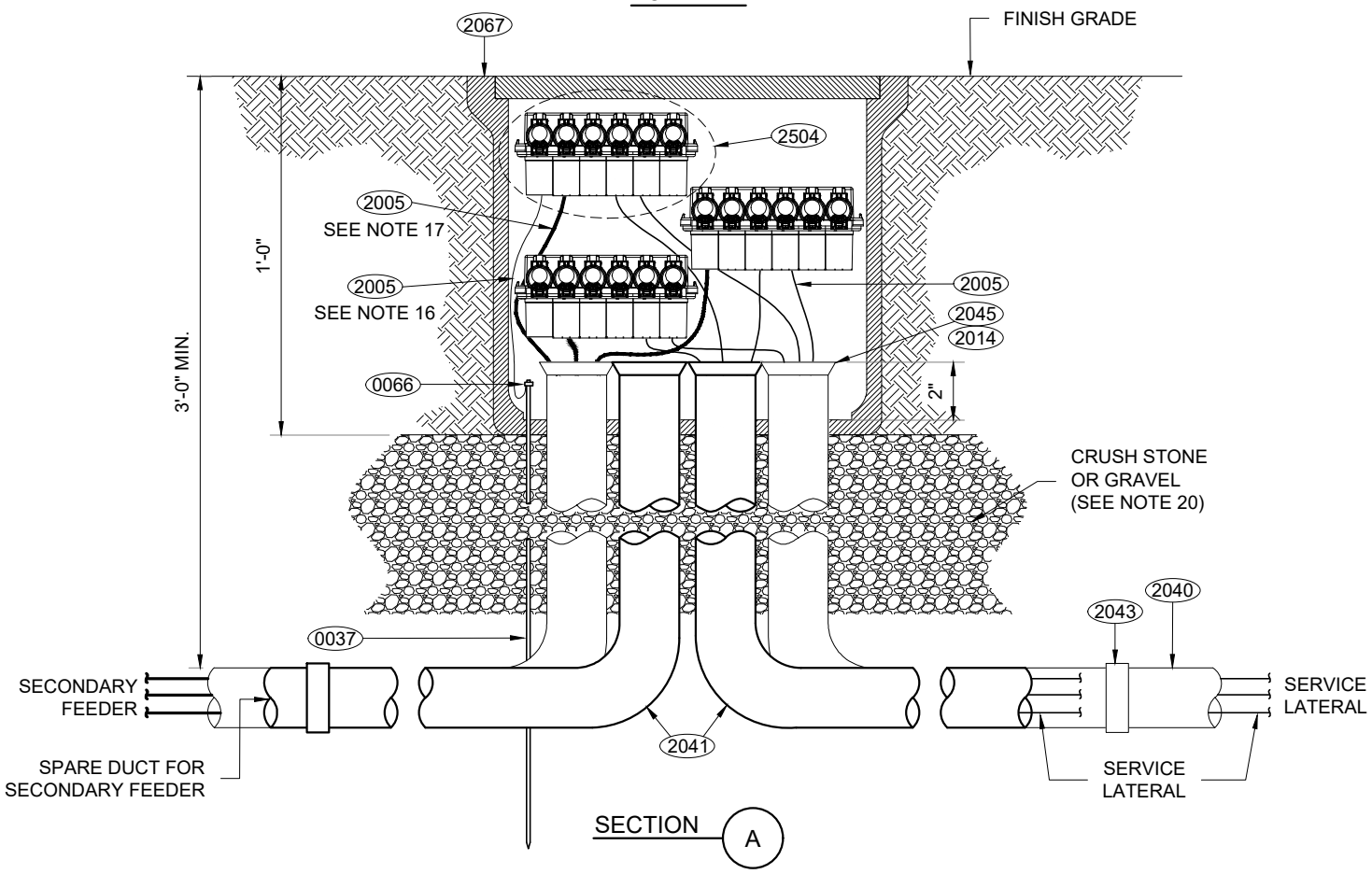
EMILIO CUADRADO LIC. 3000



TOP VIEW



SECTION A

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

12" X 12" SERVICE PEDESTAL
MAXIMUM VOLTAGE: 240 V
NOTES

STANDARD NO. URD-26-A VERSION 1
DOCUMENT NO. 4325.027
PAGE 3 OF 4 DATE SEPT 21, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES:

1. SERVICE PEDESTALS WILL BE USED TO PROVIDE A POINT OF CONNECTION AT SINGLE PHASE SECONDARY VOLTAGE FOR CUSTOMERS AND STREET LIGHTING.
2. SECONDARY PEDESTALS SHALL BE SUBMERSIBLE TYPE.
3. THE CUSTOMERS ARE RESPONSIBLE FOR THE CONSTRUCTION AND INSTALLATION OF UNDERGROUND SERVICE LATERALS FROM THE POINT OF CONNECTION, SERVICE PEDESTAL OR TRANSFORMER, TO THE PROPERTY.
4. CUSTOMERS WILL BE RESPONSIBLE FOR THE MAINTENANCE AND REPLACEMENT OF THE UNDERGROUND SERVICE LATERALS THAT SERVES THEIR PROPERTY.
5. THE SECONDARY SYSTEM WILL BE SINGLE PHASE, 120/240 V, WITH THREE WIRES. THE SECONDARY CABLES WILL BE COPPER, INSULATED WITH CROSSLINKED POLYETHYLENE, 600 V, XHHW-2 TYPE, ACCORDING TO THE LATEST APPLICABLE CODES AND REQUIREMENTS OF LUMA. ALUMINUM CABLES ARE NOT ALLOWED.
6. THE CABLES SIZE WILL BE ACCORDING TO THE DESIGN AND MINIMUM REQUIREMENTS OF LUMA. THE MINIMUM GAUGE FOR SECONDARY LINES BETWEEN TRANSFORMER AND PEDESTALS OR PULL BOXES SHALL BE 1/0 AWG COPPER.
7. DESIGNER WILL BE RESPONSIBLE TO DETERMINE THE CABLES SIZE REQUIRED FOR SERVICE LATERALS ACCORDING TO LATEST VERSION OF NEC. THE MINIMUM CABLE GAUGE ALLOWED FOR SERVICE LATERALS SHALL BE #2 AWG.
8. THE DISTANCE OF SERVICE LATERAL BETWEEN SERVICE PEDESTAL AND PROPERTY METER SHALL NOT EXCEED 150'.
9. NO FUSES WILL BE REQUIRED ON PEDESTALS, EXCEPT FOR STREET LIGHTING.
10. THE CONNECTORS ON THIS SERVICE PEDESTAL WILL ACCEPT COPPER CABLES FROM #12 AWG UP TO 4/0 AWG. FOR CABLES WITH GAUGES GREATER THAN 4/0 AWG, REFER TO STANDARD NO. URD-27-B.
11. THE TOTAL NUMBER OF CABLES CONNECTED TO THIS SERVICE PEDESTAL SHALL NOT EXCEED 18, EQUIVALENT TO 6 CABLES PER CONNECTOR, INCLUDING TAPS FOR STREET LIGHTING. THE CONNECTOR FOR THIS SERVICE PEDESTAL SHALL BE SEALED BUS BAR TYPE (ITEM 2038). REFER TO ASSEMBLY NO. ASSY-2504 FOR DETAILS.
12. SECONDARY PEDESTALS WILL BE INSTALLED IN THE PLANTING STRIP IN FRONT OF THE LOTS (SEE STANDARD NO. URD-24). INSTALLATION OF SERVICE PEDESTALS AT DRIVEWAYS IS NOT ALLOWED.
13. INSTALLATION OF PEDESTALS IN THE SIDEWALK AREA IS ALLOWED ONLY IN URBAN AREAS WHERE THERE IS NO PLANTING STRIP (SEE STANDARD NO. URD-24). THE PEDESTAL COVER SHALL BE INSTALLED AT THE SAME LEVEL AS THE SIDEWALK, IN SUCH WAY THAT IT DOES NOT REPRESENT AN OBSTACLE OR HAZARD TO PEDESTRIANS.
14. AT DESIGNATED POINT OF CONNECTION, TRANSFORMER OR SERVICE PEDESTAL, THE SERVICE LATERAL NEUTRAL SHALL BE EFFECTIVELY CONNECTED TO GROUND.
15. THE NEUTRAL CABLE AND MULTIPLE OUTLET CONNECTOR DESIGNATED AS NEUTRAL ON THE SERVICE PEDESTAL SHALL BE GROUNDED THROUGH A 5/8" X 8' GROUND ROD. GROUND RESISTANCE OF THE PEDESTAL WILL NOT EXCEED 5 OHMS.
16. THE GAUGE OF THE GROUNDING CONDUCTOR SHALL BE #2 AWG, COPPER, 600 V, XHHW-2 TYPE . THIS CABLE SHALL BE USED TO CONNECT THE MULTIPLE OUTLET CONNECTOR DESIGNATED AS NEUTRAL TO SERVICE PEDESTAL GROUND ROD.
17. THE NEUTRAL WILL CONSIST OF A STRANDED COPPER CABLE WITH THE SAME INSULATION AND GAUGE OF ENERGIZED CABLES.
18. ALL DUCTS SHALL HAVE A PVC END BELL TERMINATION TO PROVIDE A SMOOTH SAFE CABLE ENTRY. THE QUANTITY AND SIZE OF DUCTS WILL DEPEND ON THE UNDERGROUND SYSTEM DESIGN. REFER TO STANDARD NO. URD-54, TO SELECT DUCT DIAMETER THAT CORRESPONDS TO THE SECONDARY CABLE GAUGES.
19. AFTER INSTALLATION OF ALL CABLES IS COMPLETED, DUCTS IN USE SHALL BE SEALED WITH A NONHARDENING DUCT SEALING COMPOUND (ITEM 2014), AND A DUCT SEALING PLUG (ITEM 2056) SHALL BE INSTALLED IN EACH SPARE DUCT TO PREVENT WATER INTRUSION.
20. EXCAVATION SHALL BE APPROXIMATELY 6" DEEPER THAN THE DEPTH OF THE SERVICE PEDESTAL. #67 CLEAN CRUSHED STONE OR GRAVEL WITH A MINIMUM THICKNESS OF 6" SHALL BE PLACED FOR DRAINAGE. THIS MATERIAL SHALL BE UNIFORMLY GRADED AND SIZED FROM 3/4" DOWN TO FINE PARTICLES. IT SHALL BE FREE FROM SOFT AND DISINTEGRATED PIECES, CLAY, ORGANIC OR OTHER DELETERIOUS MATTER. THE PEDESTAL SHALL BE INSTALLED ENSURING THAT THE TOP COVER IS AT FINAL GRADE LEVEL. IT SHALL BE FILLED WITH SOIL AROUND THE SERVICE PEDESTAL AND COMPACTED.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

12" X 12" SERVICE PEDESTAL
MAXIMUM VOLTAGE: 240 V
BILL OF MATERIAL

STANDARD NO. URD-26-A VERSION 1
DOCUMENT NO. 4325.027
PAGE 4 OF 4 DATE SEPT 21, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

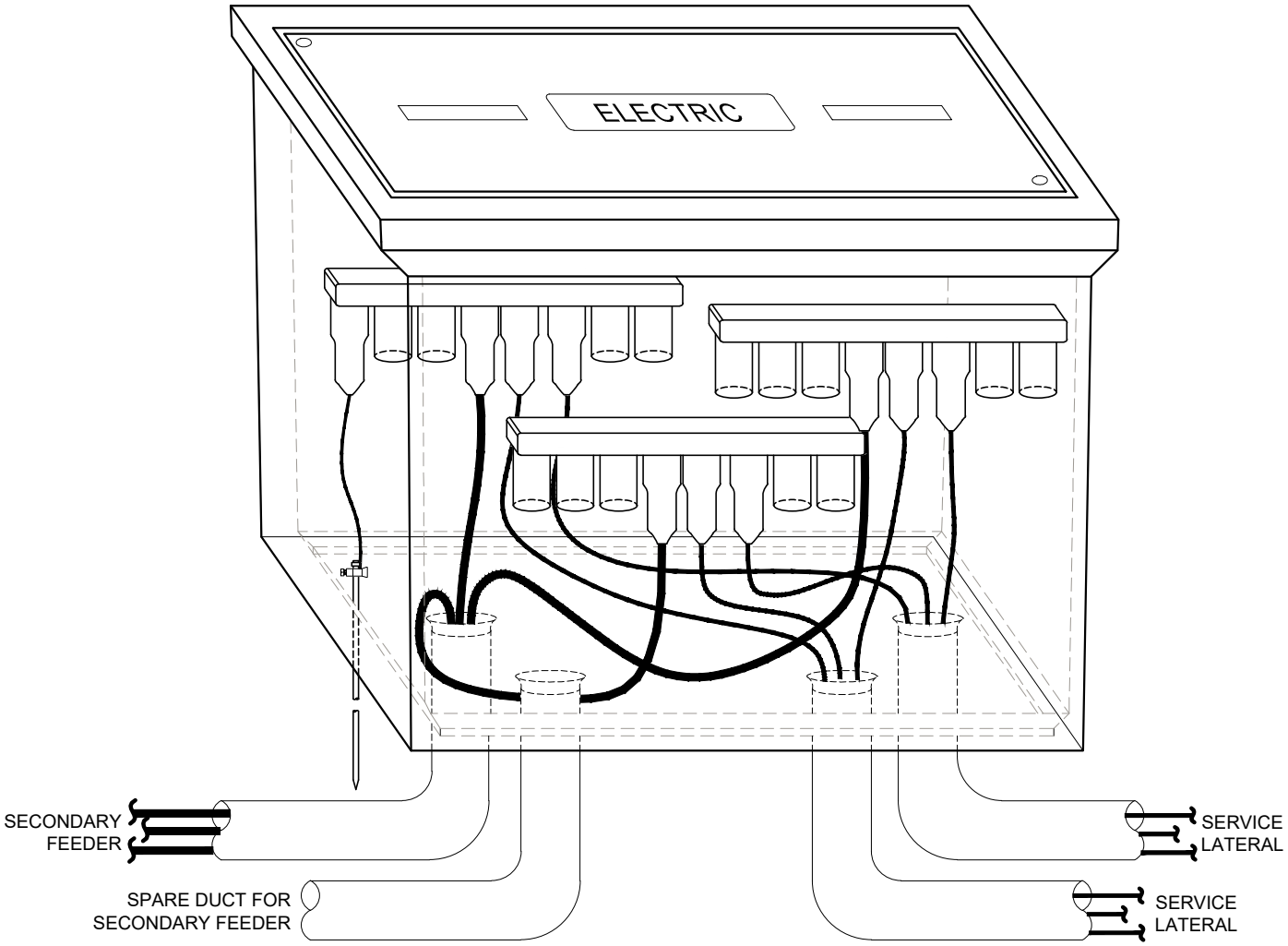
MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0037	5/8" X 8' GROUND ROD	002-02465	1
0066	CONNECTOR FOR 5/8" GROUND ROD	002-13595	1
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2014	DUCT SEALING COMPOUND	003-02935	AS REQ.
2040	PVC SCH-40 DUCT	VARIES	AS REQ.
2041	90° PVC ELBOW	VARIES	AS REQ.
2043	PVC COUPLING	VARIES	AS REQ.
2045	PVC END BELL	VARIES	AS REQ.
2056	DUCT SEALING PLUG	VARIES	AS REQ.
2067	12" X 12" SERVICE PEDESTAL	038-01984	1
2504	MULTIPLE OUTLET CONNECTOR ASSEMBLY	ASSY-2504	1

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

13" X 24" SERVICE PEDESTAL
MAXIMUM VOLTAGE: 240 V

STANDARD NO. URD-27-A VERSION 3
DOCUMENT NO. 4325.028
PAGE 1 OF 4 DATE SEPT 8, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412
EMILIO CUADRADO LIC. 3000



CABLES TYPICAL INSTALLATION

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

13" X 24" SERVICE PEDESTAL
MAXIMUM VOLTAGE: 240 V

STANDARD NO. URD-27-A VERSION 3
DOCUMENT NO. 4325.028
PAGE 2 OF 4 DATE SEPT 8, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
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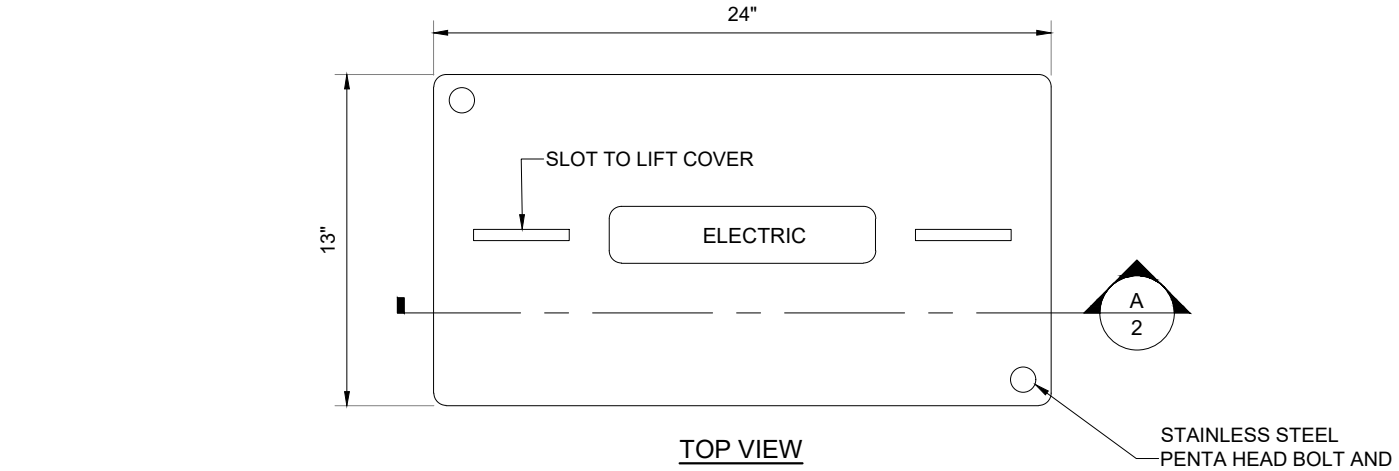
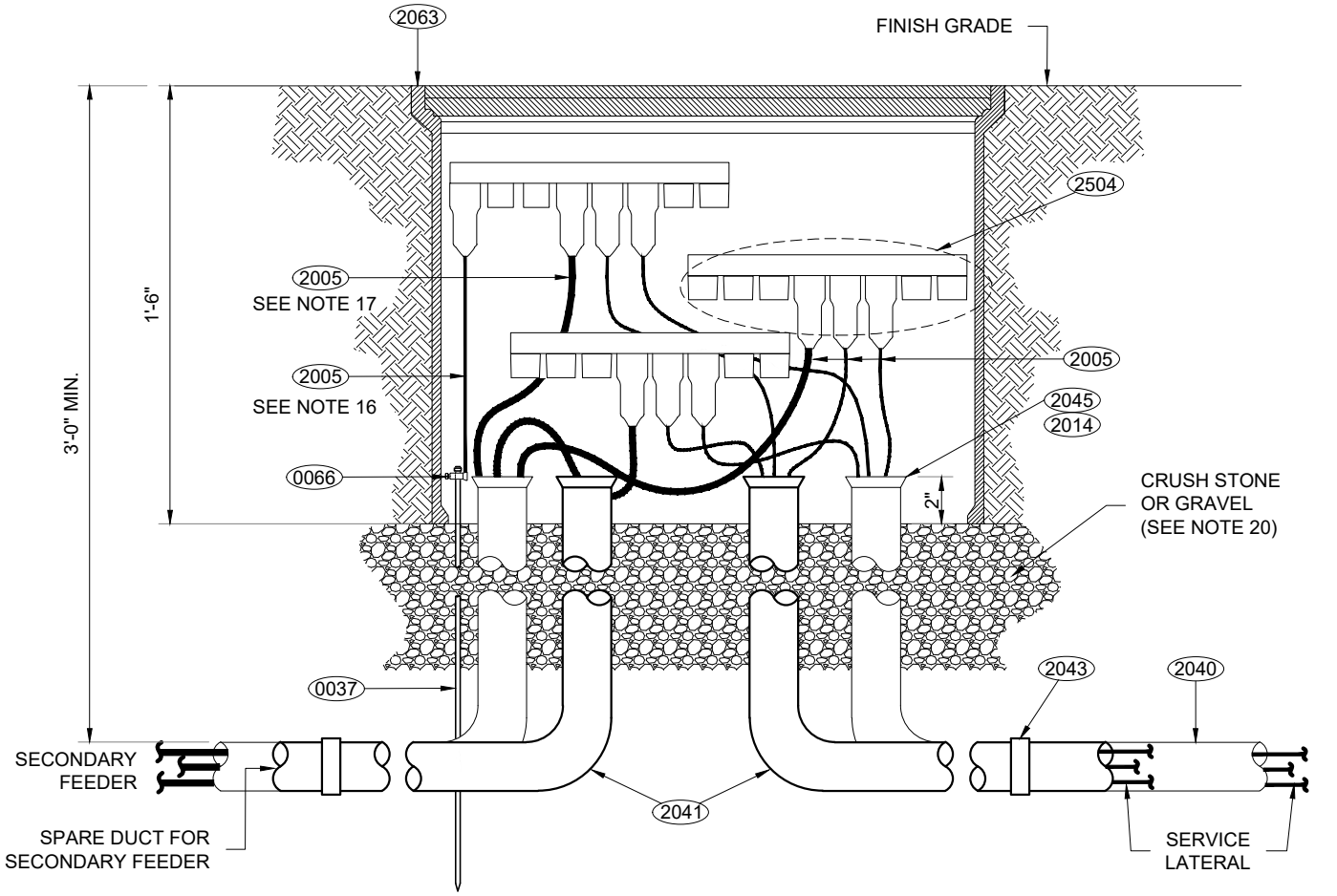


TOP VIEW



SECTION A

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

13" X 24" SERVICE PEDESTAL
MAXIMUM VOLTAGE: 240 V
NOTES

STANDARD NO. URD-27-A VERSION 3
DOCUMENT NO. 4325.028
PAGE 3 OF 4 DATE SEPT 21, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
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EMILIO CUADRADO LIC. 3000

NOTES:

1. SERVICE PEDESTALS WILL BE USED TO PROVIDE A POINT OF CONNECTION AT SINGLE PHASE SECONDARY VOLTAGE FOR CUSTOMERS AND STREET LIGHTING.
2. SECONDARY PEDESTALS SHALL BE SUBMERSIBLE TYPE.
3. THE CUSTOMERS ARE RESPONSIBLE FOR THE CONSTRUCTION AND INSTALLATION OF UNDERGROUND SERVICE LATERALS FROM THE POINT OF CONNECTION, SERVICE PEDESTAL OR TRANSFORMER, TO THE PROPERTY.
4. CUSTOMERS WILL BE RESPONSIBLE FOR THE MAINTENANCE AND REPLACEMENT OF THE UNDERGROUND SERVICE LATERALS THAT SERVES THEIR PROPERTY.
5. THE SECONDARY SYSTEM WILL BE SINGLE PHASE, 120/240 V, WITH THREE WIRES. THE SECONDARY CABLES WILL BE COPPER, INSULATED WITH CROSSLINKED POLYETHYLENE, 600 V, XHHW-2 TYPE, ACCORDING TO THE LATEST APPLICABLE CODES AND REQUIREMENTS OF LUMA. ALUMINUM CABLES ARE NOT ALLOWED.
6. THE CABLES SIZE WILL BE ACCORDING TO THE DESIGN AND MINIMUM REQUIREMENTS OF LUMA. THE MINIMUM GAUGE FOR SECONDARY LINES BETWEEN TRANSFORMER AND PEDESTALS OR PULL BOXES SHALL BE 1/0 AWG COPPER.
7. DESIGNER WILL BE RESPONSIBLE TO DETERMINE THE CABLES SIZE REQUIRED FOR SERVICE LATERALS ACCORDING TO LATEST VERSION OF NEC. THE MINIMUM CABLE GAUGE ALLOWED FOR SERVICE LATERALS SHALL BE #2 AWG.
8. THE DISTANCE OF SERVICE LATERAL BETWEEN SERVICE PEDESTAL AND PROPERTY METER SHALL NOT EXCEED 150'.
9. NO FUSES WILL BE REQUIRED ON PEDESTALS, EXCEPT FOR STREET LIGHTING.
10. THE CONNECTORS ON THIS SERVICE PEDESTAL WILL ACCEPT COPPER CABLES FROM #12 AWG UP TO 4/0 AWG. FOR CABLES WITH GAUGES GREATER THAN 4/0 AWG, REFER TO STANDARD NO. URD-27-B.
11. THE TOTAL NUMBER OF CABLES CONNECTED TO THIS SERVICE PEDESTAL SHALL NOT EXCEED 24, EQUIVALENT TO 8 CABLES PER CONNECTOR, INCLUDING TAPS FOR STREET LIGHTING. THE CONNECTOR FOR THIS SERVICE PEDESTAL SHALL BE BUS BAR MOLE TYPE (ITEM 2036). REFER TO ASSEMBLY NO. ASSY-2504 FOR DETAILS.
12. SECONDARY PEDESTALS WILL BE INSTALLED IN THE PLANTING STRIP IN FRONT OF THE LOTS (SEE STANDARD NO. URD-24). INSTALLATION OF SERVICE PEDESTALS AT DRIVEWAYS IS NOT ALLOWED.
13. INSTALLATION OF PEDESTALS IN THE SIDEWALK AREA IS ALLOWED ONLY IN URBAN AREAS WHERE THERE IS NO PLANTING STRIP (SEE STANDARD NO. URD-24). THE PEDESTAL COVER SHALL BE INSTALLED AT THE SAME LEVEL AS THE SIDEWALK, IN SUCH WAY THAT IT DOES NOT REPRESENT AN OBSTACLE OR HAZARD TO PEDESTRIANS.
14. AT DESIGNATED POINT OF CONNECTION, TRANSFORMER OR SERVICE PEDESTAL, THE SERVICE LATERAL NEUTRAL SHALL BE EFFECTIVELY CONNECTED TO GROUND.
15. THE NEUTRAL CABLE AND MULTIPLE OUTLET CONNECTOR DESIGNATED AS NEUTRAL ON THE SERVICE PEDESTAL SHALL BE GROUNDED THROUGH A 5/8" X 8' GROUND ROD. GROUND RESISTANCE OF THE PEDESTAL WILL NOT EXCEED 5 OHMS.
16. THE GAUGE OF THE GROUNDING CONDUCTOR SHALL BE #2 AWG, COPPER, 600 V, XHHW-2 TYPE . THIS CABLE SHALL BE USED TO CONNECT THE MULTIPLE OUTLET CONNECTOR DESIGNATED AS NEUTRAL TO SERVICE PEDESTAL GROUND ROD.
17. THE NEUTRAL WILL CONSIST OF A STRANDED COPPER CABLE WITH THE SAME INSULATION AND GAUGE OF ENERGIZED CABLES.
18. ALL DUCTS SHALL HAVE A PVC END BELL TERMINATION TO PROVIDE A SMOOTH SAFE CABLE ENTRY. THE QUANTITY AND SIZE OF DUCTS WILL DEPEND ON THE UNDERGROUND SYSTEM DESIGN. REFER TO STANDARD NO. URD-54, TO SELECT DUCT DIAMETER THAT CORRESPONDS TO THE SECONDARY CABLE GAUGES.
19. AFTER INSTALLATION OF ALL CABLES IS COMPLETED, DUCTS IN USE SHALL BE SEALED WITH A NONHARDENING DUCT SEALING COMPOUND (ITEM 2014), AND A DUCT SEALING PLUG (ITEM 2056) SHALL BE INSTALLED IN EACH SPARE DUCT TO PREVENT WATER INTRUSION.
20. EXCAVATION SHALL BE APPROXIMATELY 6" DEEPER THAN THE DEPTH OF THE SERVICE PEDESTAL. #67 CLEAN CRUSHED STONE OR GRAVEL WITH A MINIMUM THICKNESS OF 6" SHALL BE PLACED FOR DRAINAGE. THIS MATERIAL SHALL BE UNIFORMLY GRADED AND SIZED FROM 3/4" DOWN TO FINE PARTICLES. IT SHALL BE FREE FROM SOFT AND DISINTEGRATED PIECES, CLAY, ORGANIC OR OTHER DELETERIOUS MATTER. THE PEDESTAL SHALL BE INSTALLED ENSURING THAT THE TOP COVER IS AT FINAL GRADE LEVEL. IT SHALL BE FILLED WITH SOIL AROUND THE SERVICE PEDESTAL AND COMPACTED.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

13" X 24" SERVICE PEDESTAL
MAXIMUM VOLTAGE: 240 V
BILL OF MATERIAL

STANDARD NO. URD-27-A VERSION 3
DOCUMENT NO. 4325.028
PAGE 4 OF 4 DATE SEPT 8, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412
EMILIO CUADRADO LIC. 3000

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0037	5/8" X 8' GROUND ROD	002-02465	1
0066	CONNECTOR FOR 5/8" GROUND ROD	002-13595	1
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2014	DUCT SEALING COMPOUND	003-02935	AS REQ.
2040	PVC SCH-40 DUCT	VARIES	AS REQ.
2041	90° PVC ELBOW	VARIES	AS REQ.
2043	PVC COUPLING	VARIES	AS REQ.
2045	PVC END BELL	VARIES	AS REQ.
2056	DUCT SEALING PLUG	VARIES	AS REQ.
2063	13" X 24" SERVICE PEDESTAL	038-01962	1
2504	MULTIPLE OUTLET CONNECTOR ASSEMBLY	ASSY-2504	1

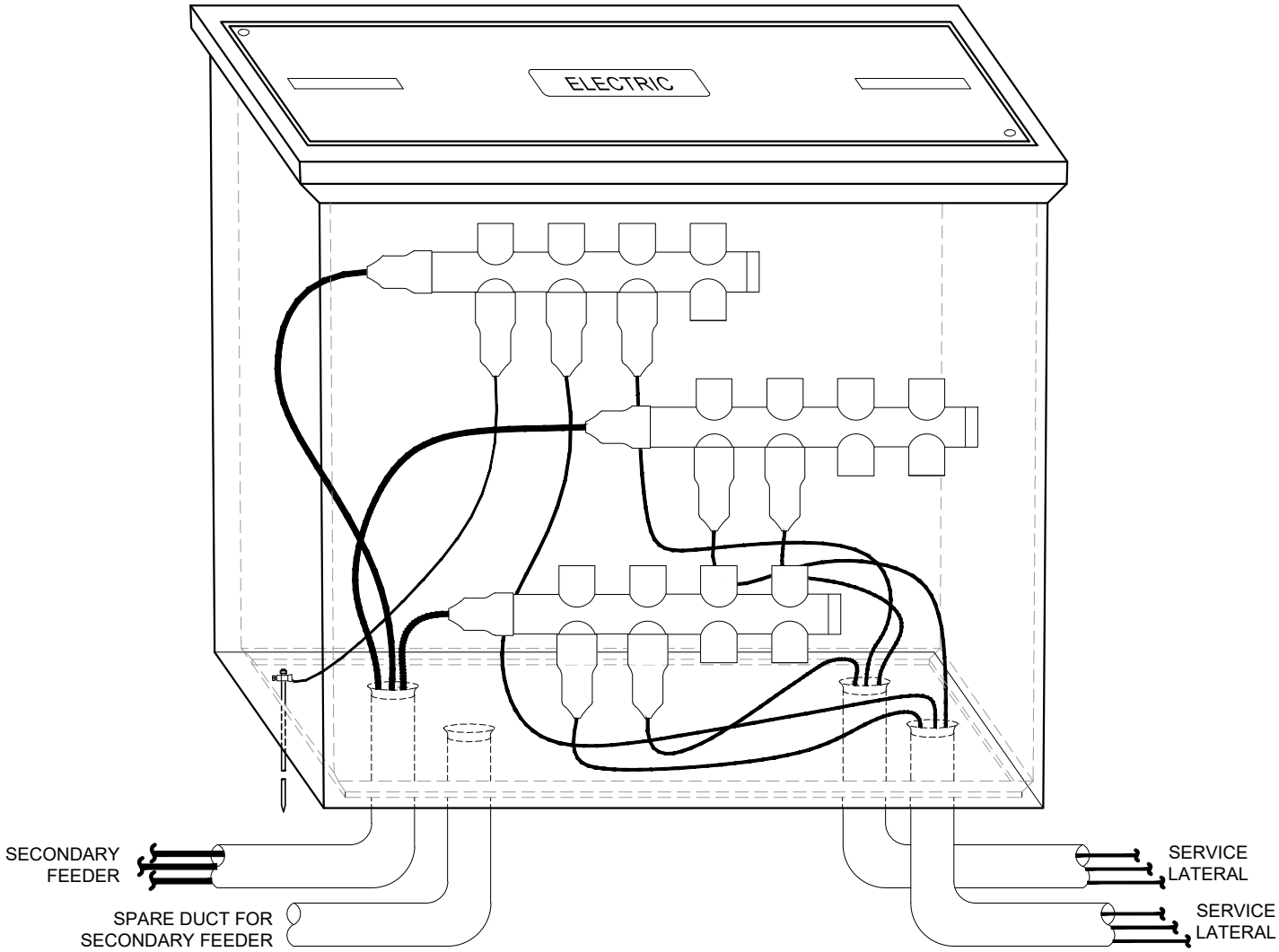
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

24" X 36" SERVICE PEDESTAL
MAXIMUM VOLTAGE: 240 V

STANDARD NO. URD-27-B VERSION 3
DOCUMENT NO. 4325.029
PAGE 1 OF 4 DATE SEP 09, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412



CABLES TYPICAL INSTALLATION

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

24" X 36" SERVICE PEDESTAL
MAXIMUM VOLTAGE: 240 V

STANDARD NO. URD-27-B VERSION 3
DOCUMENT NO. 4325.029
PAGE 2 OF 4 DATE SEP 09, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
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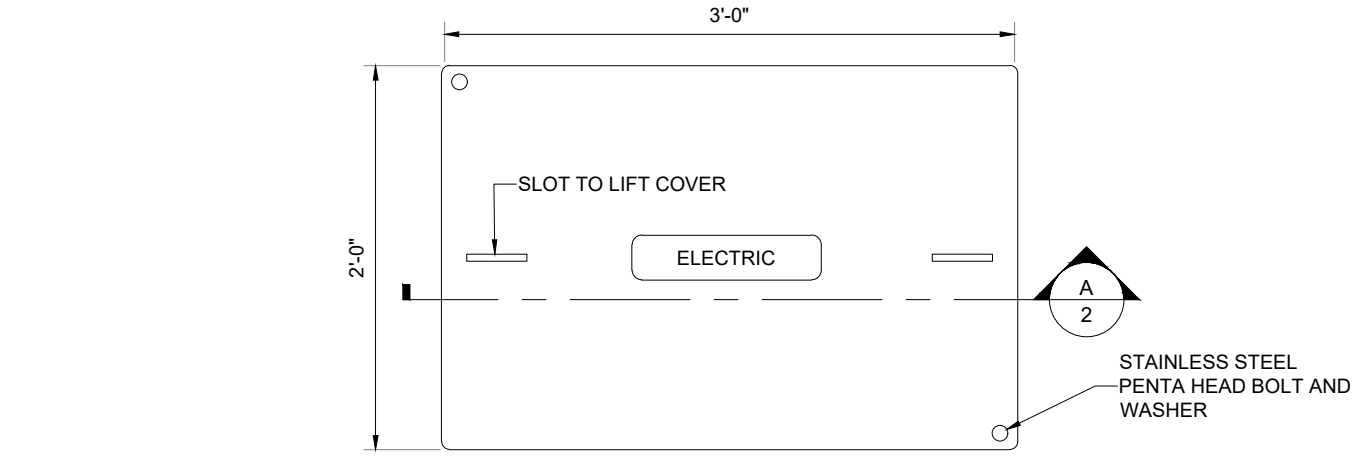
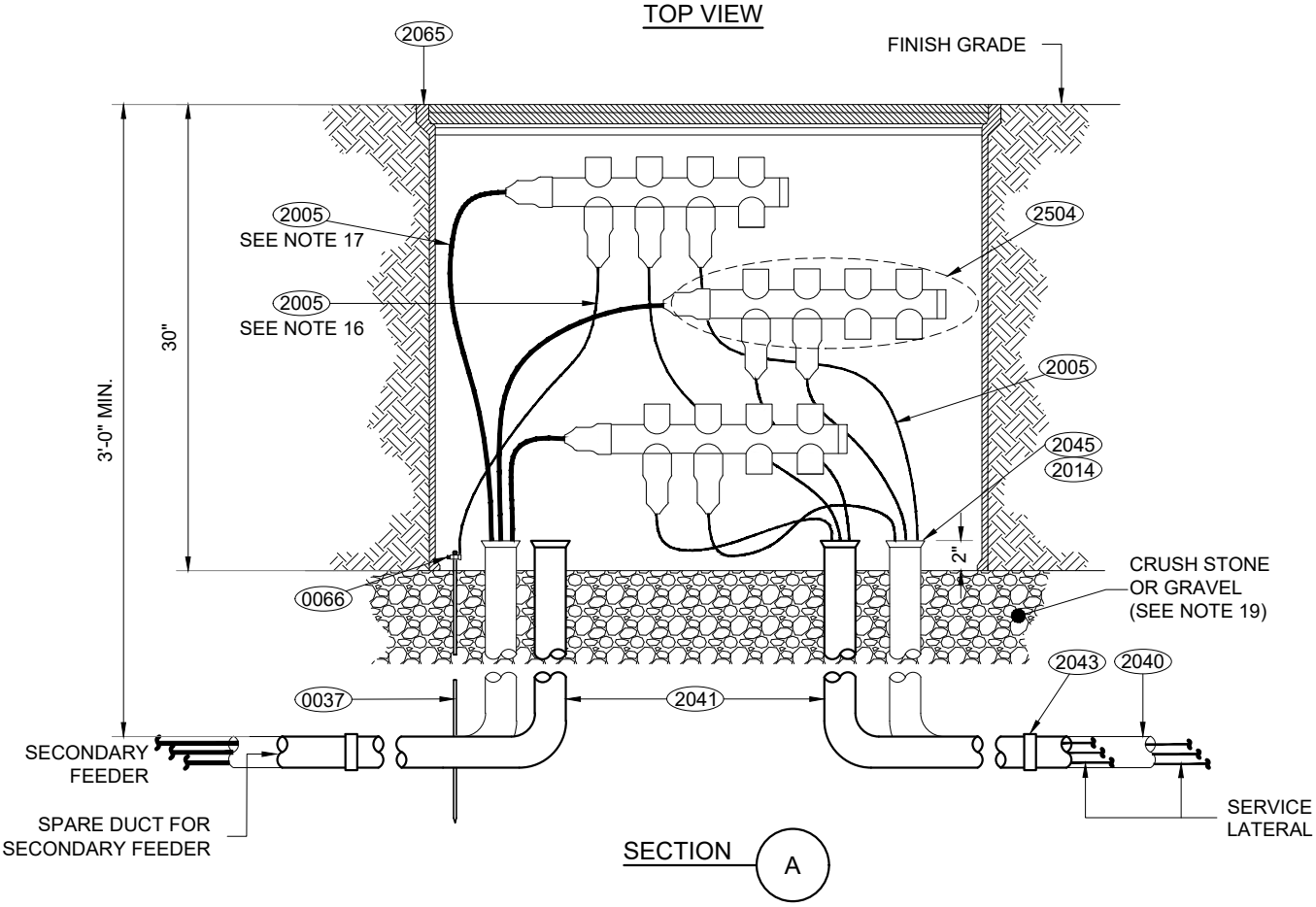


TOP VIEW



SECTION A

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

24" X 36" SERVICE PEDESTAL
MAXIMUM VOLTAGE: 240 V
NOTES

STANDARD NO. URD-27-B VERSION 3
DOCUMENT NO. 4325.029
PAGE 3 OF 4 DATE SEP 09, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES:

1. SERVICE PEDESTALS WILL BE USED TO PROVIDE A POINT OF CONNECTION AT SINGLE PHASE SECONDARY VOLTAGE FOR CUSTOMERS AND STREET LIGHTING.
2. SECONDARY PEDESTALS SHALL BE SUBMERSIBLE TYPE.
3. THE CUSTOMERS ARE RESPONSIBLE FOR THE CONSTRUCTION AND INSTALLATION OF UNDERGROUND SERVICE LATERALS FROM THE POINT OF CONNECTION, SERVICE PEDESTAL OR TRANSFORMER, TO THE PROPERTY.
4. CUSTOMERS WILL BE RESPONSIBLE FOR THE MAINTENANCE AND REPLACEMENT OF THE UNDERGROUND SERVICE LATERALS THAT SERVES THEIR PROPERTY.
5. THE SECONDARY SYSTEM WILL BE SINGLE PHASE, 120/240 V, WITH THREE WIRES. THE SECONDARY CABLES WILL BE COPPER, INSULATED WITH CROSSLINKED POLYETHYLENE, 600 V, XHHW-2 TYPE, ACCORDING TO THE LATEST APPLICABLE CODES AND REQUIREMENTS OF LUMA. ALUMINUM CABLES ARE NOT ALLOWED.
6. THE CABLES SIZE WILL BE ACCORDING TO THE DESIGN AND MINIMUM REQUIREMENTS OF LUMA. THE MINIMUM GAUGE FOR SECONDARY LINES BETWEEN TRANSFORMER AND PEDESTALS OR PULL BOXES SHALL BE 1/0 AWG COPPER.
7. DESIGNER WILL BE RESPONSIBLE TO DETERMINE THE CABLES SIZE REQUIRED FOR SERVICE LATERALS ACCORDING TO LATEST VERSION OF NEC. THE MINIMUM CABLE GAUGE ALLOWED FOR SERVICE LATERALS SHALL BE #2 AWG.
8. THE DISTANCE OF SERVICE LATERAL BETWEEN SERVICE PEDESTAL AND PROPERTY METER SHALL NOT EXCEED 150'.
9. NO FUSES WILL BE REQUIRED ON PEDESTALS, EXCEPT FOR STREET LIGHTING.
10. THE CONNECTORS ON THIS SERVICE PEDESTAL WILL ACCEPT COPPER CABLES UP TO 500 MCM IN ALL OUTLETS.
11. THE TOTAL NUMBER OF CABLES CONNECTED TO THIS SERVICE PEDESTAL SHALL NOT EXCEED 27, EQUIVALENT TO 9 CABLES PER CONNECTOR, INCLUDING TAPS FOR STREET LIGHTING. THE CONNECTOR FOR THIS SERVICE PEDESTAL SHALL BE TUBULAR MULTIPLE OUTLET MOLE CONNECTOR TYPE (ITEM 2030). REFER TO ASSEMBLY NO. ASSY-2504 FOR DETAILS.
12. SECONDARY PEDESTALS WILL BE INSTALLED IN THE PLANTING STRIP IN FRONT OF THE LOTS (SEE STANDARD NO. URD-24). INSTALLATION OF SERVICE PEDESTALS AT DRIVEWAYS IS NOT ALLOWED. INSTALLATION OF PEDESTALS IN THE SIDEWALK AREA IS ALLOWED ONLY IN URBAN AREAS WHERE THERE IS NO PLANTING STRIP (SEE STANDARD NO. URD-24). THE PEDESTAL COVER SHALL BE INSTALLED AT THE SAME LEVEL AS THE SIDEWALK, IN SUCH WAY THAT IT DOES NOT REPRESENT AN OBSTACLE OR HAZARD TO PEDESTRIANS.
13. AT DESIGNATED POINT OF CONNECTION, TRANSFORMER OR SERVICE PEDESTAL, THE SERVICE LATERAL NEUTRAL SHALL BE EFFECTIVELY CONNECTED TO GROUND.
14. THE NEUTRAL CABLE AND MULTIPLE OUTLET CONNECTOR DESIGNATED AS NEUTRAL ON THE SERVICE PEDESTAL SHALL BE GROUNDED THROUGH A 5/8" X 8' GROUND ROD. GROUND RESISTANCE OF THE PEDESTAL WILL NOT EXCEED 5 OHMS.
15. THE GAUGE OF THE GROUNDING CONDUCTOR SHALL BE #2 AWG, COPPER, 600 V, XHHW-2 TYPE . THIS CABLE SHALL BE USED TO CONNECT THE MULTIPLE OUTLET CONNECTOR DESIGNATED AS NEUTRAL TO SERVICE PEDESTAL GROUND ROD.
16. THE NEUTRAL WILL CONSIST OF A STRANDED COPPER CABLE WITH THE SAME INSULATION AND GAUGE OF ENERGIZED CABLES.
17. ALL DUCTS SHALL HAVE A PVC END BELL TERMINATION TO PROVIDE A SMOOTH SAFE CABLE ENTRY. THE QUANTITY AND SIZE OF DUCTS WILL DEPEND ON THE UNDERGROUND SYSTEM DESIGN. REFER TO STANDARD NO. URD-54, TO SELECT DUCT DIAMETER THAT CORRESPONDS TO THE SECONDARY CABLE GAUGES.
18. AFTER INSTALLATION OF ALL CABLES IS COMPLETED, DUCTS IN USE SHALL BE SEALED WITH A NONHARDENING DUCT SEALING COMPOUND (ITEM 2014), AND A DUCT SEALING PLUG (ITEM 2056) SHALL BE INSTALLED IN EACH SPARE DUCT TO PREVENT WATER INTRUSION.
19. EXCAVATION SHALL BE APPROXIMATELY 6" DEEPER THAN THE DEPTH OF THE SERVICE PEDESTAL. #67 CLEAN CRUSHED STONE OR GRAVEL WITH A MINIMUM THICKNESS OF 6" SHALL BE PLACED FOR DRAINAGE. THIS MATERIAL SHALL BE UNIFORMLY GRADED AND SIZED FROM 3/4" DOWN TO FINE PARTICLES. IT SHALL BE FREE FROM SOFT AND DISINTEGRATED PIECES, CLAY, ORGANIC OR OTHER DELETERIOUS MATTER. THE PEDESTAL SHALL BE INSTALLED ENSURING THAT THE TOP COVER IS AT FINAL GRADE LEVEL. IT SHALL BE FILLED WITH SOIL AROUND THE SERVICE PEDESTAL AND COMPACTED.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

24" X 36" SERVICE PEDESTAL
MAXIMUM VOLTAGE: 240 V
BILL OF MATERIAL

STANDARD NO. URD-27-B VERSION 3
DOCUMENT NO. 4325.029
PAGE 4 OF 4 DATE SEP 09, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0037	5/8" X 8' GROUND ROD	002-02465	1
0066	CONNECTOR FOR 5/8" GROUND ROD	002-13595	1
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	VARIES	AS REQ.
2014	DUCT SEALING COMPOUND	003-02935	AS REQ.
2040	PVC SCH-40 DUCT	VARIES	AS REQ.
2041	90° PVC ELBOW	VARIES	AS REQ.
2043	PVC COUPLING	VARIES	AS REQ.
2045	PVC END BELL	VARIES	AS REQ.
2056	DUCT SEALING PLUG	VARIES	AS REQ.
2065	24" X 36" SERVICE PEDESTAL	038-01947	1
2504	MULTIPLE OUTLET CONNECTOR ASSEMBLY	ASSY-2504	1

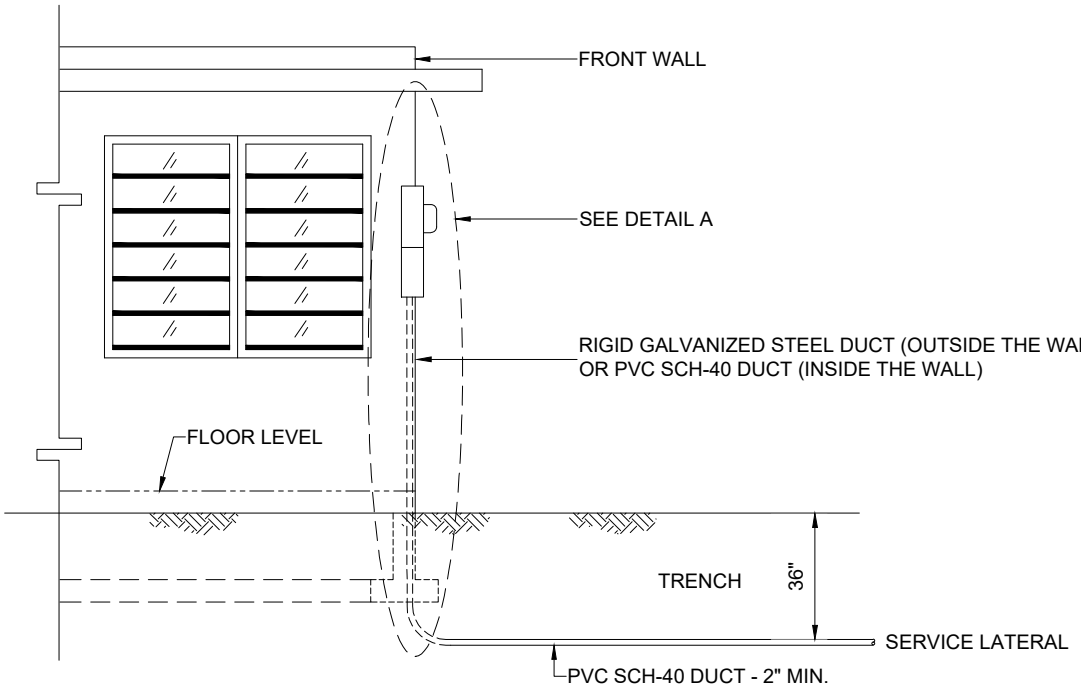
DISTRIBUTION ENGINEERING

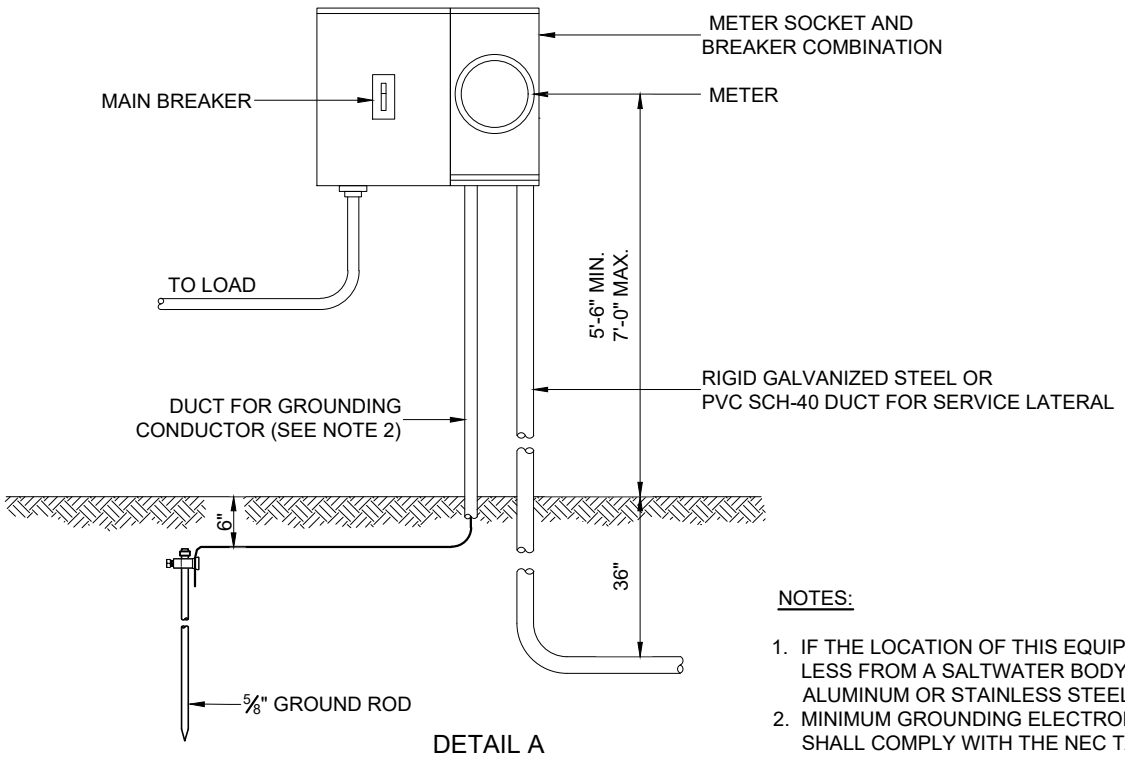
UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

SECONDARY SERVICE METER SOCKET INSTALLATION
MAXIMUM VOLTAGE: 240 V

STANDARD NO.	URD-29 VERSION 2
DOCUMENT NO.	4325.030
PAGE	1 OF 1 DATE JAN 10, 2023
SUBMITTED	ROBERTO A. TORRES LIC. 10414
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	EMILIO CUADRADO LIC. 3000
	VICTOR R. FEBRES LIC. 3412





DETAIL A

NOTES:

1. IF THE LOCATION OF THIS EQUIPMENT IS ONE MILE OR LESS FROM A SALTWATER BODY, IT IS REQUIRED TO BE ALUMINUM OR STAINLESS STEEL.
2. MINIMUM GROUNDING ELECTRODE CONDUCTOR SIZE SHALL COMPLY WITH THE NEC TABLE 250-66.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND PULL BOX FOR SECONDARY CABLES
7' X 4'-6" X 4'
MAXIMUM VOLTAGE: 240 V

STANDARD NO.	URD-30 VERSION 4
DOCUMENT NO.	4325.031
PAGE	1 OF 8 DATE JAN 10, 2023
SUBMITTED	ROBERTO A. TORRES LIC. 10414
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
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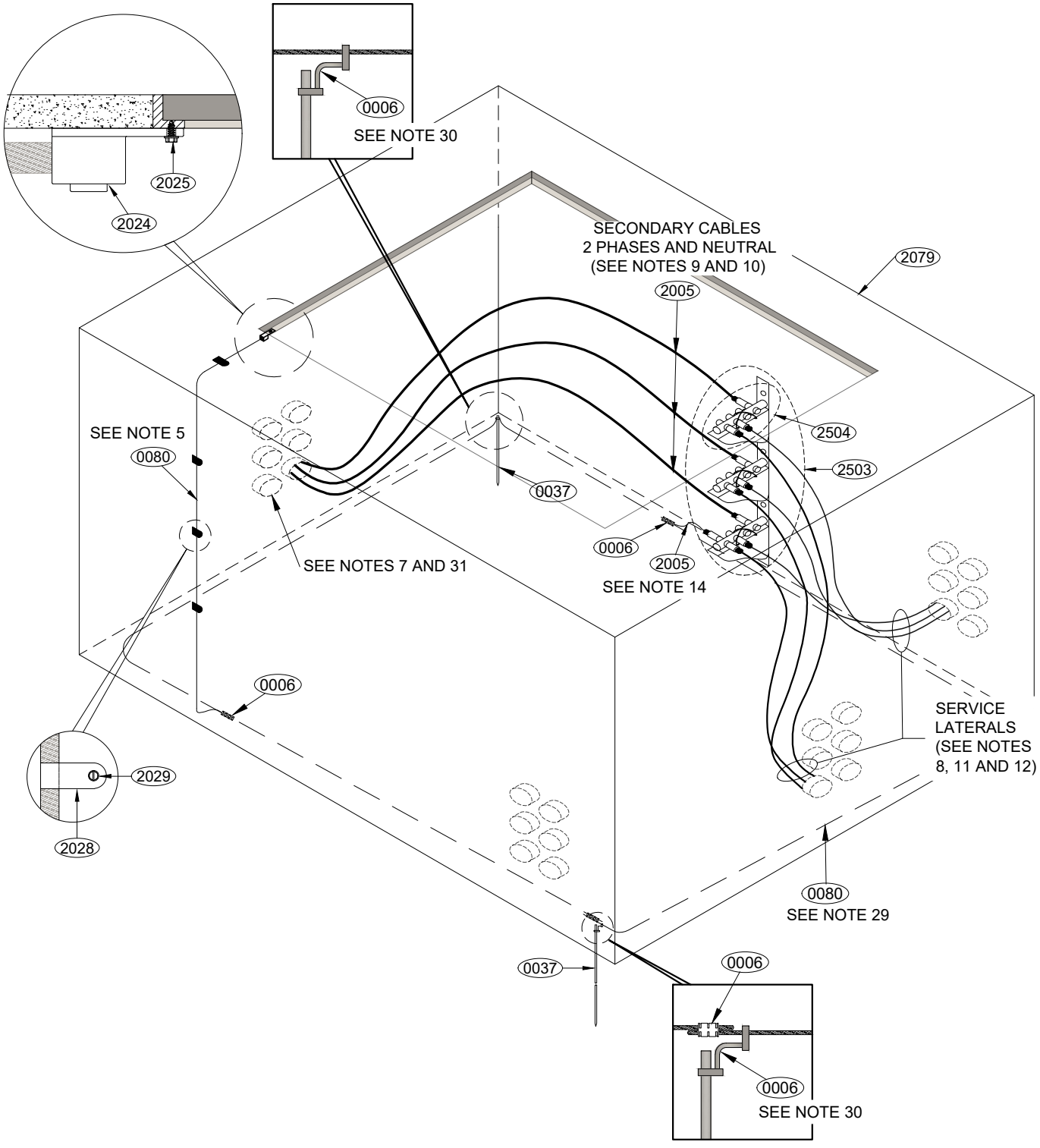

CABLES TYPICAL INSTALLATION

SINGLE PHASE SYSTEM

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND PULL BOX FOR SECONDARY CABLES
7' X 4'-6" X 4'
MAXIMUM VOLTAGE: 240 V

STANDARD NO.	URD-30 VERSION 4
DOCUMENT NO.	4325.031
PAGE	2 OF 8 DATE JAN 10, 2023
SUBMITTED	ROBERTO A. TORRES LIC. 10414
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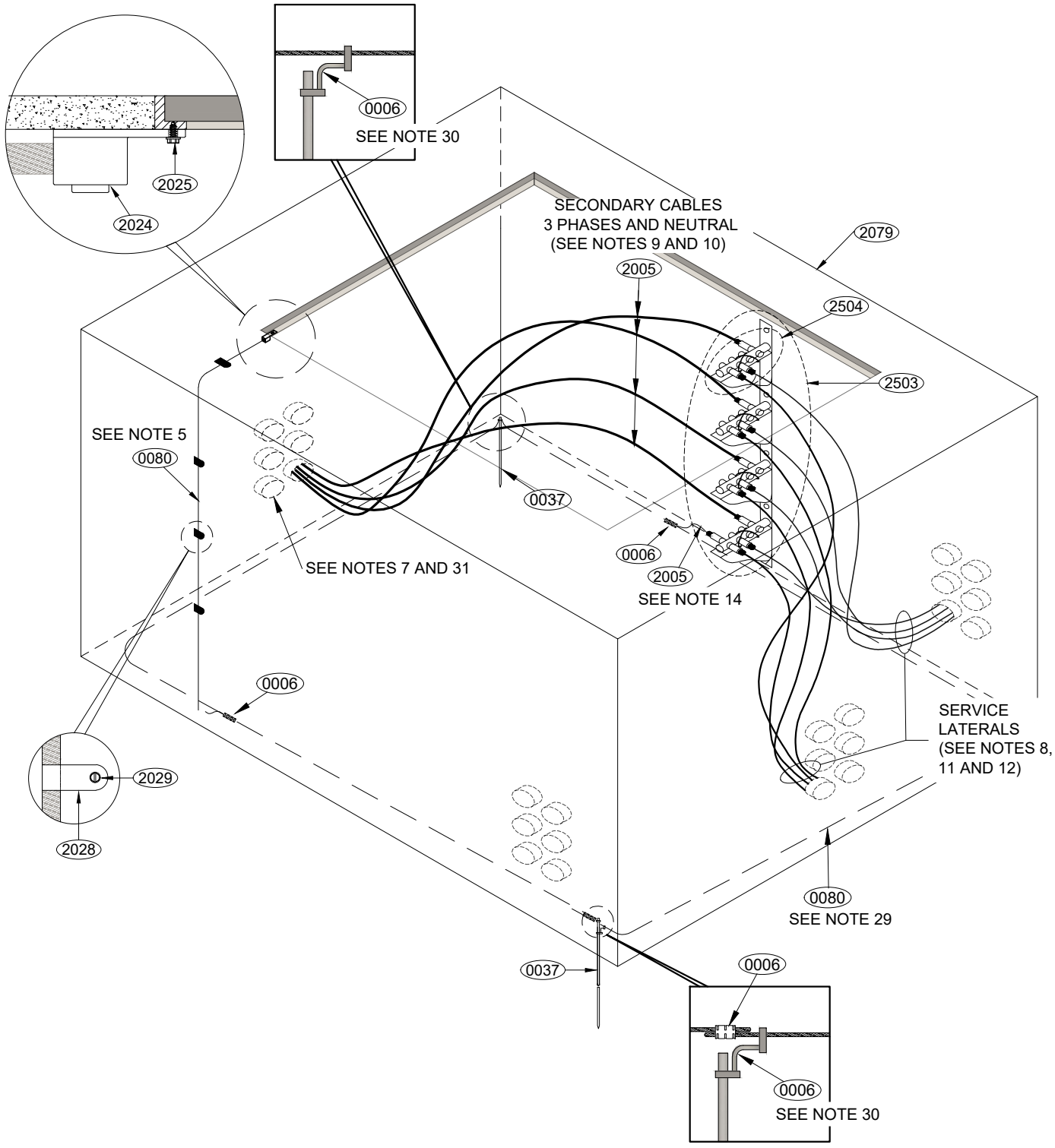

CABLES TYPICAL INSTALLATION

THREE PHASE SYSTEM

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND PULL BOX FOR SECONDARY CABLES
7' X 4'-6" X 4'
MAXIMUM VOLTAGE: 240 V

STANDARD NO. URD-30 VERSION 4
DOCUMENT NO. 4325.031
PAGE 3 OF 8 DATE JAN 10, 2023
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
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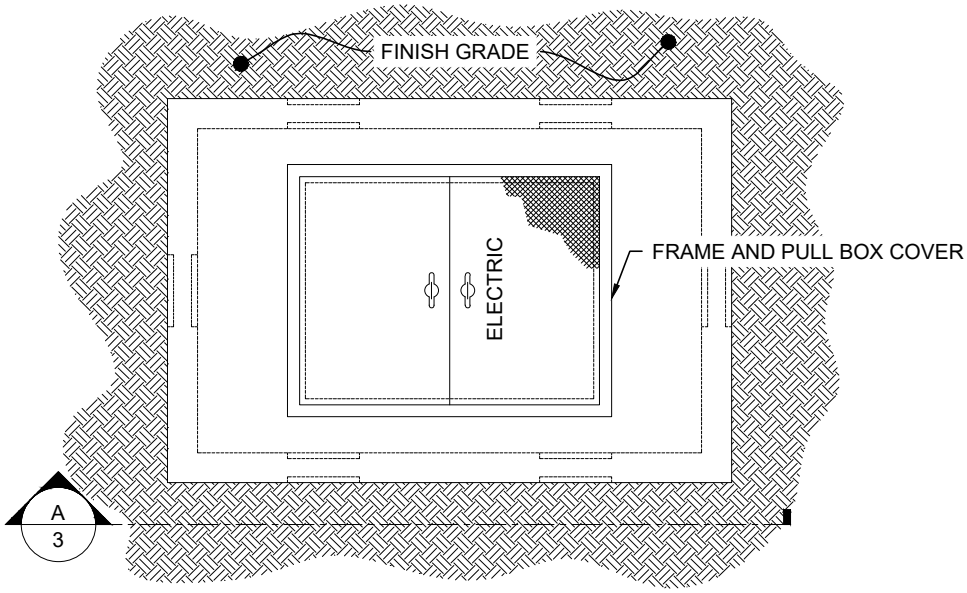
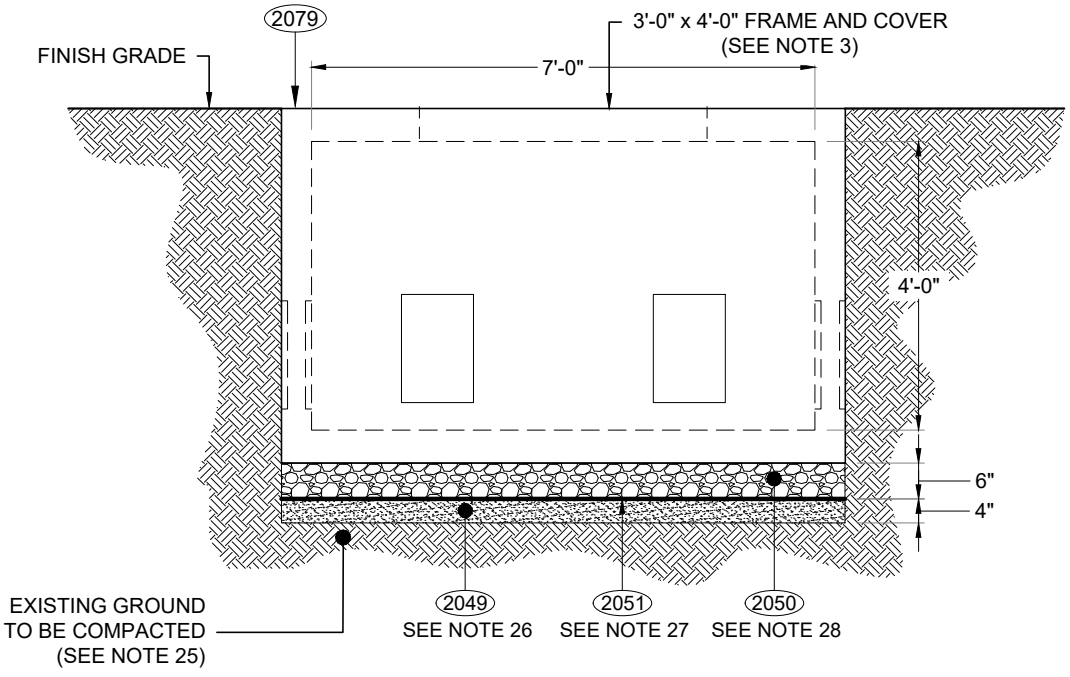


TOP VIEW



SECTION A

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND PULL BOX FOR SECONDARY CABLES
7' X 4'-6" X 4'
MAXIMUM VOLTAGE: 240 V

STANDARD NO. URD-30 VERSION 4
DOCUMENT NO. 4325.031
PAGE 4 OF 8 DATE JAN 10, 2023
SUBMITTED ROBERTO A. TORRES LIC. 10414
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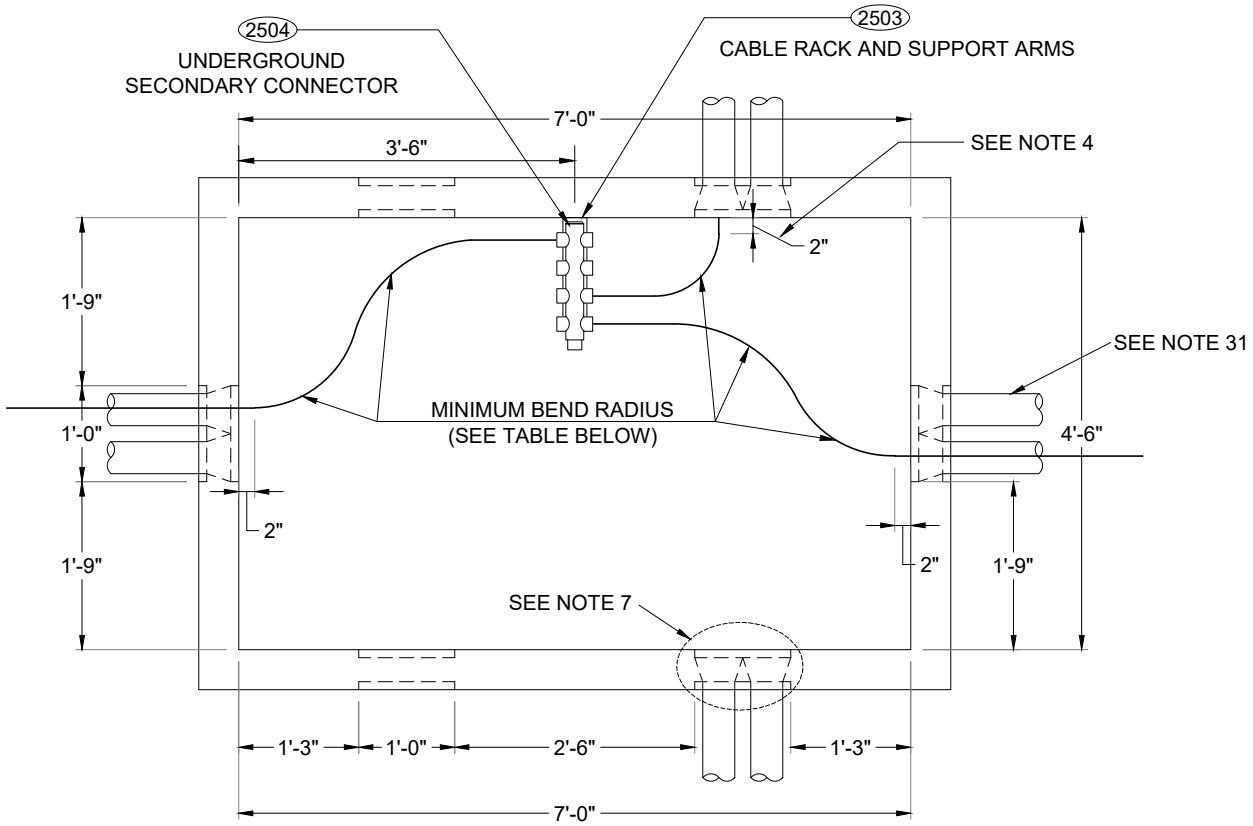

PROCEDURE FOR CABLES INSTALLATION

CABLE (600 V)		MINIMUM BEND RADIUS
SIZE	O.D.	
#2 AWG	0.390"	4"
1/0 AWG	0.490"	4"
2/0 AWG	0.535"	5"
3/0 AWG	0.590"	5"
4/0 AWG	0.645"	6"
250 MCM	0.715"	6"
350 MCM	0.820"	7"
500 MCM	0.955"	8"

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND PULL BOX FOR SECONDARY CABLES
7' X 4'-6" X 4'
MAXIMUM VOLTAGE: 240 V

STANDARD NO. URD-30 VERSION 4
DOCUMENT NO. 4325.031
PAGE 5 OF 8 DATE JAN 10, 2023
SUBMITTED ROBERTO A. TORRES LIC. 10414
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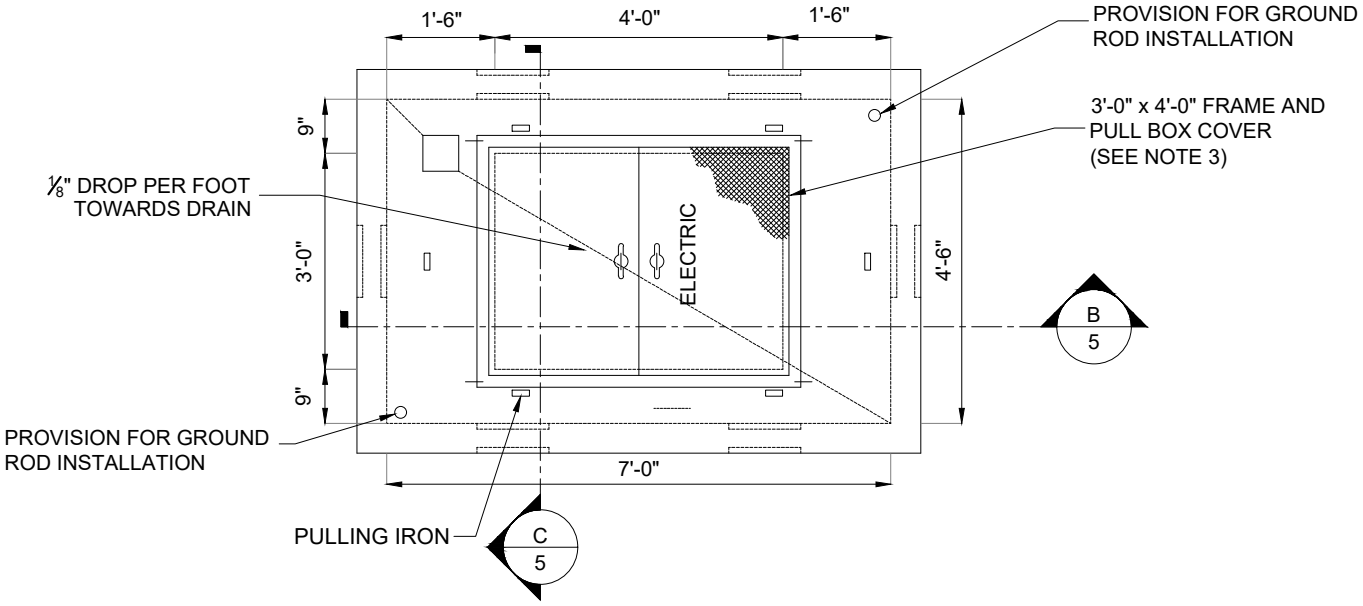
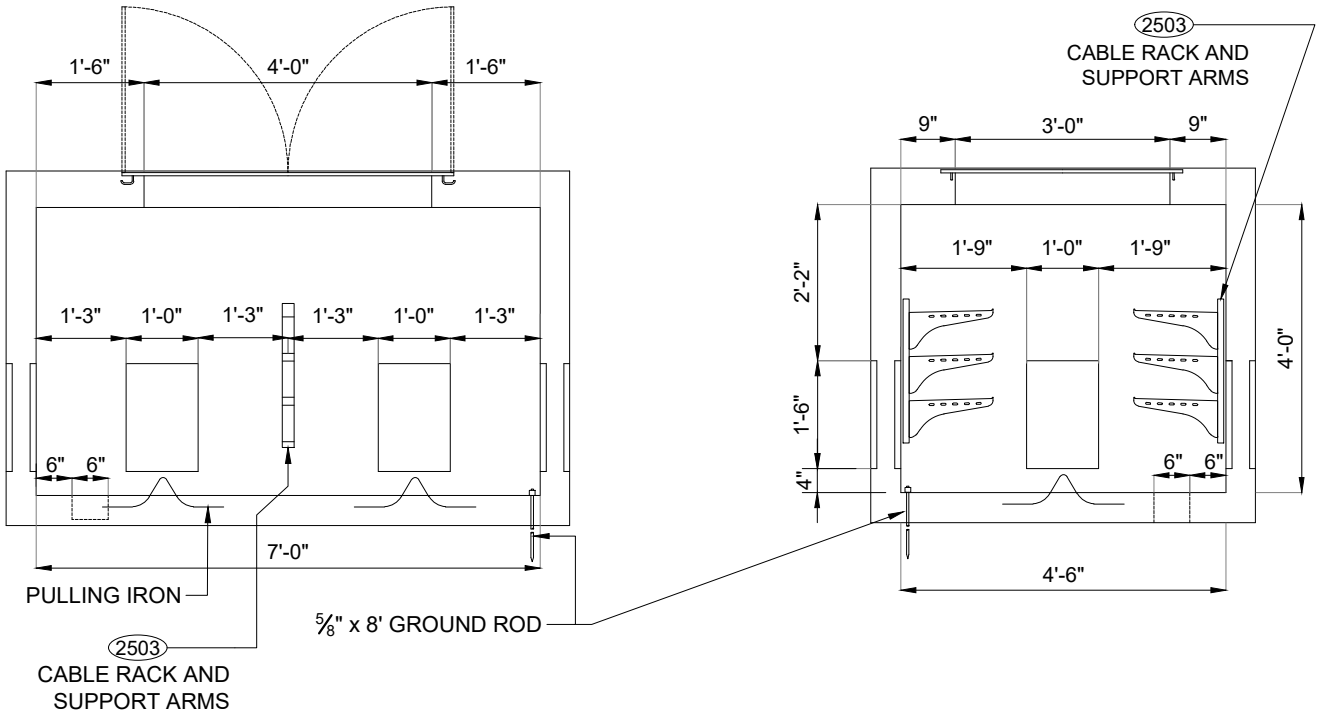


PLAN VIEW



SECTION B

SECTION C

TITLE:

UNDERGROUND PULL BOX FOR SECONDARY CABLES
7' X 4'-6" X 4'
MAXIMUM VOLTAGE: 240 V
NOTES

STANDARD NO. URD-30 VERSION 4
DOCUMENT NO. 4325.031
PAGE 6 OF 8 DATE JAN 10, 2023
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES:

1. THIS PULL BOX SHALL BE INSTALLED ONLY IN SIDEWALKS. IT IS NOT ALLOWED TO INSTALL THIS PULL BOX IN A PROPERTY DRIVEWAY.
2. THIS PULL BOX SHALL BE USED ONLY FOR SECONDARY CIRCUITS.
3. THE PULL BOX COVER HAVE TWO SPRING ASSISTED, DIAMOND PLATE, REINFORCED DOORS WITH FLUSH DROP HANDLES. THE DOOR SHALL MEET AASHTO SPECIFICATION H20-44 FOR TRAFFIC LOADING (1600 LB. WHEEL LOAD OVER 10" X 20" AREA WITH 30% ADDED FOR IMPACT). SHALL HAVE STAINLESS STEEL COMPRESSION SPRINGS TO PROVIDE LIFT ASSISTANCE AND PROVIDE A MECHANISM TO LOCK THE DOORS IN OPEN POSITION.
4. A MINIMUM OF 2" STRAIGHT CABLE LENGTH IS REQUIRED AT PVC END BELL EDGE. INSTALLATION OF ALL CABLES SHALL COMPLY WITH THE MINIMUM BEND RADIUS. (SEE PAGE 4)
5. THE PULL BOX COVER FRAME SHALL BE CONNECTED TO THE GROUND ROD INSTALLED INSIDE THE PULL BOX. THE GROUND CONDUCTOR (ITEM 0080) SHALL BE ATTACHED TO THE CEILING AND WALLS OF THE PULL BOX USING CABLE STRAP (ITEM 2028). A CABLE STRAP SHALL BE INSTALLED EVERY 30". A #2 AWG COPPER BARE CONDUCTOR (ITEM 0080) SHALL BE USED FOR THIS CONNECTION.
6. ENERGIZED CABLES SHALL NOT BE PLACED ON THE PULL BOX FLOOR. ALL ENERGIZED CABLES SHALL BE PLACED ON THE PULL BOX CABLES SUPPORT SYSTEM (SEE ASSEMBLY NO. ASSY-2503). A CABLE SUPPORT SYSTEM WILL BE INSTALLED AT 3'-6" MAXIMUM SEPARATION.
7. ALL DUCTS SHALL HAVE A PVC END BELL (ITEM 2045) TERMINATION TO PROVIDE A SMOOTH SAFE CABLE ENTRY.
8. ALL DUCTS, INCLUDING SPARE DUCTS, SHALL BE SEALED WITH AN APPROPRIATE DUCT SEALING PLUG (ITEM 2056) OR DUCT SEALING COMPOUND (ITEM 2014) TO PREVENT ENTRY OF WATER OR OTHER FOREIGN OBJECTS.
9. SECONDARY SYSTEMS WILL BE SINGLE PHASE WITH THREE WIRES OR THREE PHASE WITH FOUR WIRES. SECONDARY CABLES WILL BE COPPER INSULATED WITH CROSSLINKED POLYETHYLENE, TYPE XHHW-2, 600 V, 90°C MINIMUM, ACCORDING TO THE LATEST APPLICABLE CODES AND REQUIREMENTS OF LUMA. ALUMINUM CABLES ARE NOT ALLOWED.
10. THE NEUTRAL WILL CONSIST OF A STRANDED COPPER CABLE WITH THE SAME INSULATION AND GAUGE OF THE ENERGIZED CABLES. IT WILL BE EFFECTIVELY GROUNDED ON PEDESTALS, PULL BOXES AND TRANSFORMERS.
11. THE SIZE OF THE CABLES WILL BE ACCORDING TO THE DESIGN AND MINIMUM REQUIREMENTS OF LUMA. THE MINIMUM GAUGE FOR SECONDARY LINES BETWEEN THE TRANSFORMER AND THE PEDESTALS OR PULL BOXES WILL BE 1/0 AWG COPPER, AND THE MAXIMUM GAUGE WILL BE 500 MCM COPPER, FOR SYSTEMS TO BE TRANSFERRED TO LUMA.
12. THE DESIGNER IS RESPONSIBLE TO DETERMINE THE SIZE OF THE CABLES REQUIRED FOR SERVICE LATERALS ACCORDING TO THE LATEST VERSION OF THE NEC.
13. SERVICE LATERALS WILL NOT BE TRANSFERRED TO LUMA. THE CUSTOMER IS RESPONSIBLE FOR THE MAINTENANCE AND REPLACEMENT OF ALL SERVICE LATERALS.
14. THE SIZE OF THE GROUNDING ELECTRODE CONDUCTOR SHALL BE DETERMINED ACCORDING TO THE LATEST VERSION OF NEC TABLE 250.66 - GROUNDING ELECTRODE CONDUCTOR FOR ALTERNATING CURRENT SYSTEM. THIS CONDUCTOR SHALL BE CONNECTED TO THE PULL BOX GROUND RING.
15. THE SUPPLIER IS RESPONSIBLE FOR THE DESIGN OF THIS PRECAST MANHOLE COMPLYING WITH ALL STANDARDS AND CODES APPLICABLE FOR THIS TYPE OF PRODUCT AND THEIR CORRESPONDING INSTALLATION.
16. THE SUPPLIER SHALL SUBMIT THE SHOP DRAWINGS, CALCULATIONS AND ANY SUPPORTING DOCUMENT REQUIRED FOR THE CORRESPONDING LUMA EVALUATION AND APPROVAL, PRIOR TO SELL THIS PRODUCT. ALL DOCUMENTATION PROVIDED SHALL BE SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER, AS REQUIRED BY LAWS OF PUERTO RICO.
17. IF THE MANHOLE TO BE USED IS NOT A PRECAST ELEMENT AND WILL BE CONSTRUCTED ON SITE, THE CONTRACTOR WILL BE RESPONSIBLE TO DEVELOP AND SUBMIT THE CORRESPONDING DESIGN PLANS, CALCULATIONS AND SUPPORTING DOCUMENTS REQUIRED FOR EVALUATION AND APPROVAL OF LUMA, PRIOR TO START THE CONSTRUCTION.
18. THE MANHOLE DESIGN SHALL MEET THE REQUIREMENTS OF STANDARD NO. ASTM C857 - STANDARD PRACTICE FOR MINIMUM STRUCTURAL DESIGN LOADING FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES, AND STANDARD NO. ASTM C858 - STANDARD SPECIFICATION FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
19. THE CONCRETE MIX SHALL MEET THE REQUIREMENTS OF STANDARD NO. ASTM C94 - STANDARD SPECIFICATION FOR READY-MIXED CONCRETE. THE MINIMUM COMPRESSIVE STRENGTH FOR CONCRETE SHALL BE 4,000 PSI AT 28 DAYS, AS TESTED IN ACCORDANCE WITH STANDARD NO. ASTM C39 - STANDARD TEST METHOD FOR COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
20. THE REINFORCING STEEL SHALL BE FABRICATED AND PLACED IN CONFORMANCE WITH THE STANDARD NO. ACI 318 - SPECIFICATION OF BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE. THE REINFORCING STEEL SHALL BE DEFORMED BAR AND GRADE 60 (MINIMUM YIELD STRENGTH EQUAL TO 60,000 PSI), ACCORDING TO STANDARD NO. ASTM A615 - STANDARD SPECIFICATION FOR DEFORMED AND PLAIN CARBON-STEEL BARS FOR CONCRETE REINFORCEMENT, AND IT SHALL BE NEW BILLET-STEEL, AS REQUIRED. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
21. THE DETAILS AND PROPERTIES OF PULLING IRONS SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.

TITLE:

UNDERGROUND PULL BOX FOR SECONDARY CABLES
7' X 4'-6" X 4'
MAXIMUM VOLTAGE: 240 V
NOTES

STANDARD NO. URD-30 VERSION 4
DOCUMENT NO. 4325.031
PAGE 7 OF 8 DATE JAN 10, 2023
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES:

22. A SUMP PUMP PIT SHALL BE SHOWN IN THE SUPPLIER'S DRAWINGS, INCLUDING THE SIZE OR DIAMETER AND PROPERTIES.
23. THE DESIGN CRITERIA IN THE SUPPLIER'S DRAWINGS SHALL INCLUDE THE FOLLOWING:
    A. ANGLE OF INTERNAL FRICTION OF SOIL = 25 DEGREE
    B. UNIT WEIGHT OF SOIL = 110 LBS/CU FT (DRY), 170 LBS/CU FT (SATURATED)
    C. COEFFICIENT OF LATERAL EARTH PRESSURE, Ka = 0.5
    D. GROUND WATER LEVEL BELOW FINISH GRADE = ASSUME 3', UNLESS OTHER INFORMATION IS AVAILABLE
    E. IMPACT = 30%
    F. TRAFFIC LOAD = AASHTO HL-93 LOADING (AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS)
    G. LIVE LOAD = 300 LBS/SQ FT (MINIMUM)
24. THE BACKFILL AND #67 CRUSHED STONE OR GRAVEL USED FOR THIS INSTALLATION SHALL BE COMPACTED EVERY 6" OF THICKNESS TO A MINIMUM OF 95% OF THE STANDARD MAXIMUM DENSITY AT THE PROPER MOISTURE CONTENT, ACCORDING TO LATEST VERSION OF THE STANDARD NO. ASTM D698.
25. THE EXISTING GROUND AT THE BOTTOM OF THE EXCAVATION SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT OF THE UNDISTURBED SOIL.
26. PLACE THE BACKFILL OVER COMPACTED EXISTING GROUND TO MINIMUM THICKNESS OF 4". THE BACKFILL SHALL BE A-2-4 MATERIAL (STANDARD NO. ASTM D3282, LATEST EDITION), AND IT SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT.
27. INSTALL THE NONWOVEN GEOTEXTILE FILTER FABRIC (8 OUNCES PER SQUARE YARDS), SIMILAR OR EQUAL TO REGISTERED PRODUCT MIRAFI S800 OR SKAPS GT-180, OVER COMPACTED BACKFILL.
28. PLACE CLEAN #67 CRUSHED STONE OR GRAVEL OVER NONWOVEN GEOTEXTILE FILTER FABRIC TO A MINIMUM THICKNESS OF 6". THIS MATERIAL SHALL BE UNIFORMLY GRADED AND THE SIZES ARE FROM ¾" DOWN TO FINE PARTICLES. IT SHALL BE FREE FROM SOFT AND DISINTEGRATED PIECES, CLAY, ORGANIC OR OTHER DELETERIOUS MATTER. THE CRUSHED STONE OR GRAVEL SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT.
29. A 4/0 AWG COPPER BARE CONDUCTOR (ITEM 0080) SHALL BE USED FOR THE INSTALLATION OF A GROUND RING ON THE FLOOR INSIDE THE MANHOLE CONNECTED TO THE TWO GROUND RODS.
30. A COMPRESSION CROSS GROUND GRID CONNECTOR SHALL BE USED FOR THE CONNECTION BETWEEN THE GROUND RING AND THE GROUND ROD.
31. REFER TO STANDARD NO. URD-54 FOR DUCT SIZING.

TITLE:

UNDERGROUND VAULT FOR SECONDARY CABLES
7' X 4'-6" X 4'
MAXIMUM VOLTAGE: 240 V
BILL OF MATERIAL

STANDARD NO. URD-30 VERSION 4
DOCUMENT NO. 4325.031
PAGE 8 OF 8 DATE JAN 10, 2023
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	5
0037	⅝" X 8' GROUND ROD	002-02465	2
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
2005	STRANDED COPPER CABLE, 600V, XHHW-2	VARIES	AS REQ.
2014	DUCT SEALING COMPOUND	003-02935	AS REQ.
2024	MECHANICAL GROUNDING CONNECTOR	038-83151	1
2025	SELF-DRILLING SCREW	002-83309	1
2028	SINGLE HOLE CABLE STRAP FOR COPPER CONDUCTOR	038-83156	AS REQ.
2029	CONCRETE SCREW ANCHOR HEX WASHER HEAD	038-83157	AS REQ.
2049	A-2-4 BACKFILL MATERIAL	038-83207	AS REQ.
2050	#67 CRUSHED STONE OR GRAVEL	038-83208	AS REQ.
2051	NONWOVEN GEOTEXTILE FILTER FABRIC	038-83209	AS REQ.
2056	DUCT SEALING PLUG	038-70155	AS REQ.
2079	7' X 4.5' X 4' PULL BOX WITH COVER	038-70155	1
2503	NONMETALLIC CABLE RACK ASSEMBLY	ASSY-2503	AS REQ.
2504	MULTIPLE OUTLET CONNECTOR ASSEMBLY	ASSY-2504	AS REQ.
URD-54	DUCT SIZING STANDARD	URD-54	AS REQ.

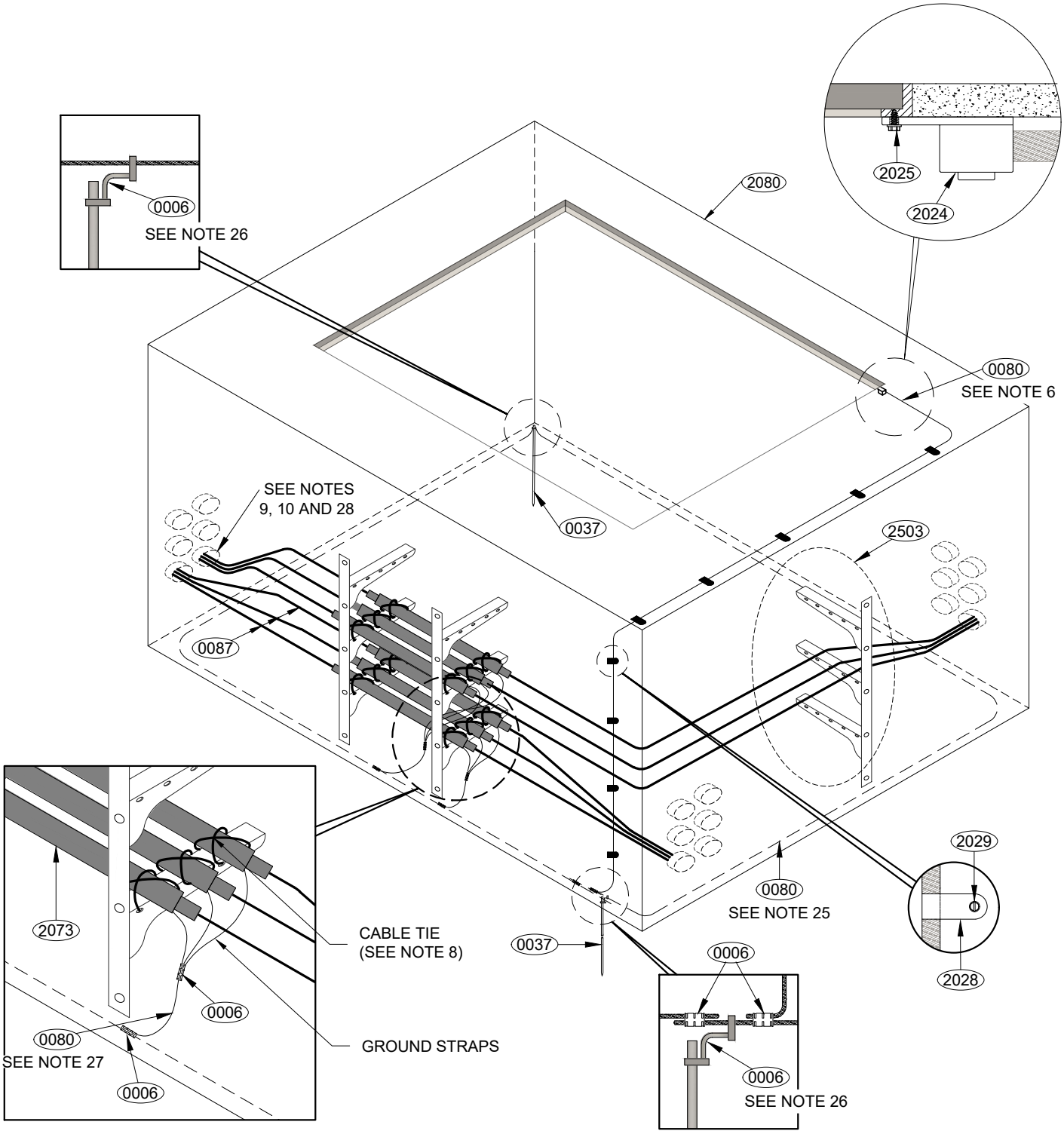
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND PULL BOX FOR PRIMARY CABLES
7' X 4'-6" X 5'
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	URD-30-B VERSION 3
DOCUMENT NO.	4325.032
PAGE	1 OF 8 DATE OCT 5, 2022
SUBMITTED	ROBERTO A. TORRES LIC. 10414
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	VICTOR R. FEBRES LIC. 3412



CABLES TYPICAL INSTALLATION

JACKETED CONCENTRIC NEUTRAL CABLE

DISTRIBUTION ENGINEERING

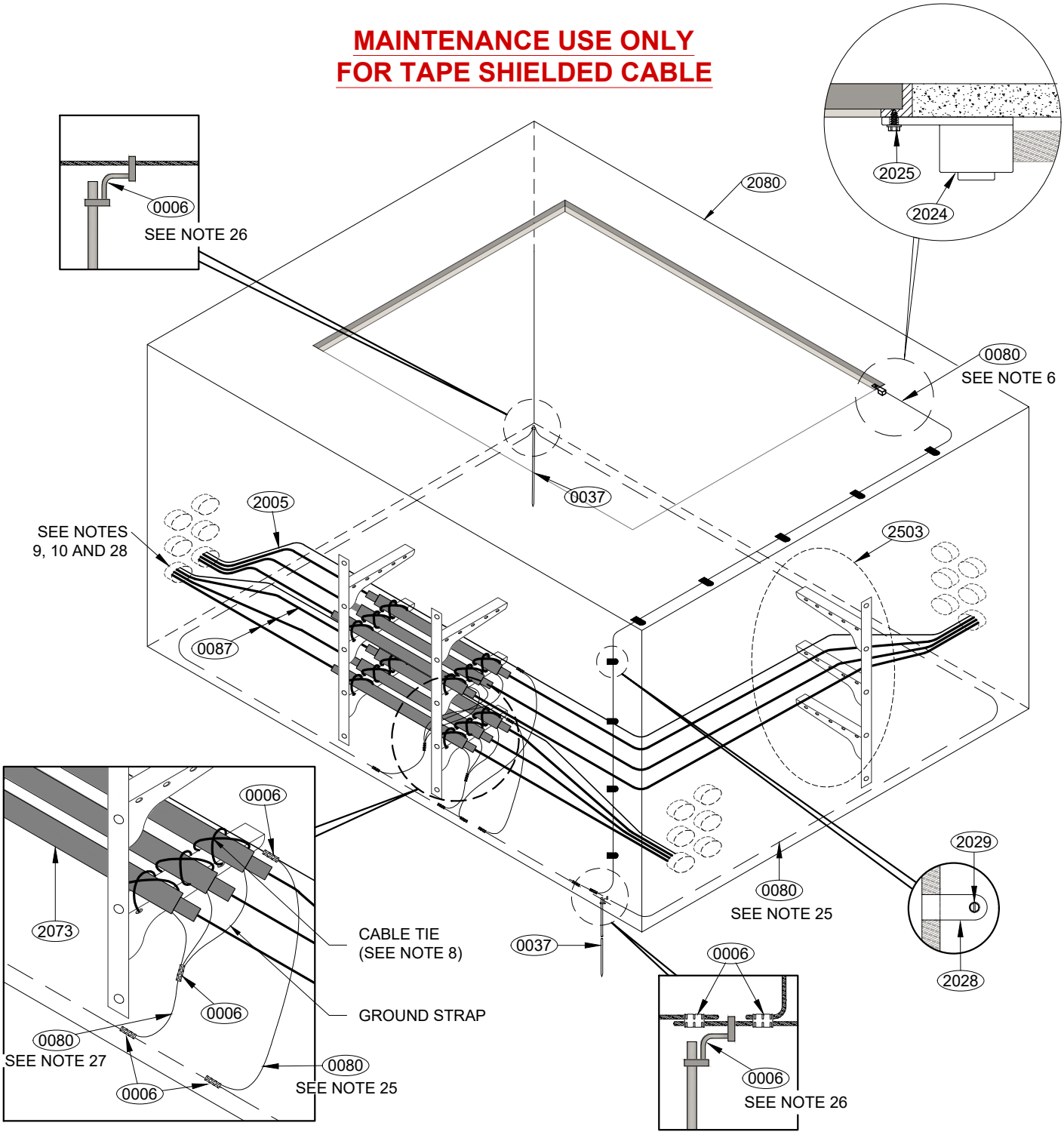
UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND PULL BOX FOR PRIMARY CABLES
7' X 4'-6" X 5'
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	URD-30-B VERSION 3
DOCUMENT NO.	4325.032
PAGE	2 OF 8 DATE OCT 5, 2022
SUBMITTED	ROBERTO A. TORRES LIC. 10414
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	VICTOR R. FEBRES LIC. 3412

MAINTENANCE USE ONLY
FOR TAPE SHIELDED CABLE



CABLES TYPICAL INSTALLATION
TAPE SHIELDED CABLE

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND PULL BOX FOR PRIMARY CABLES
7' X 4'-6" X 5'
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-30-B VERSION 3
DOCUMENT NO. 4325.032
PAGE 3 OF 8 DATE OCT 5, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
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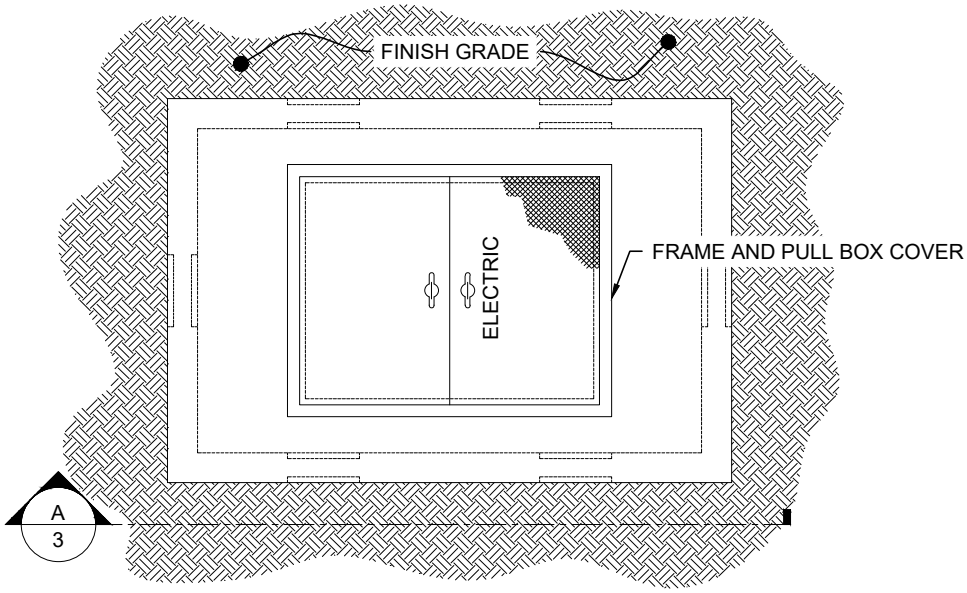
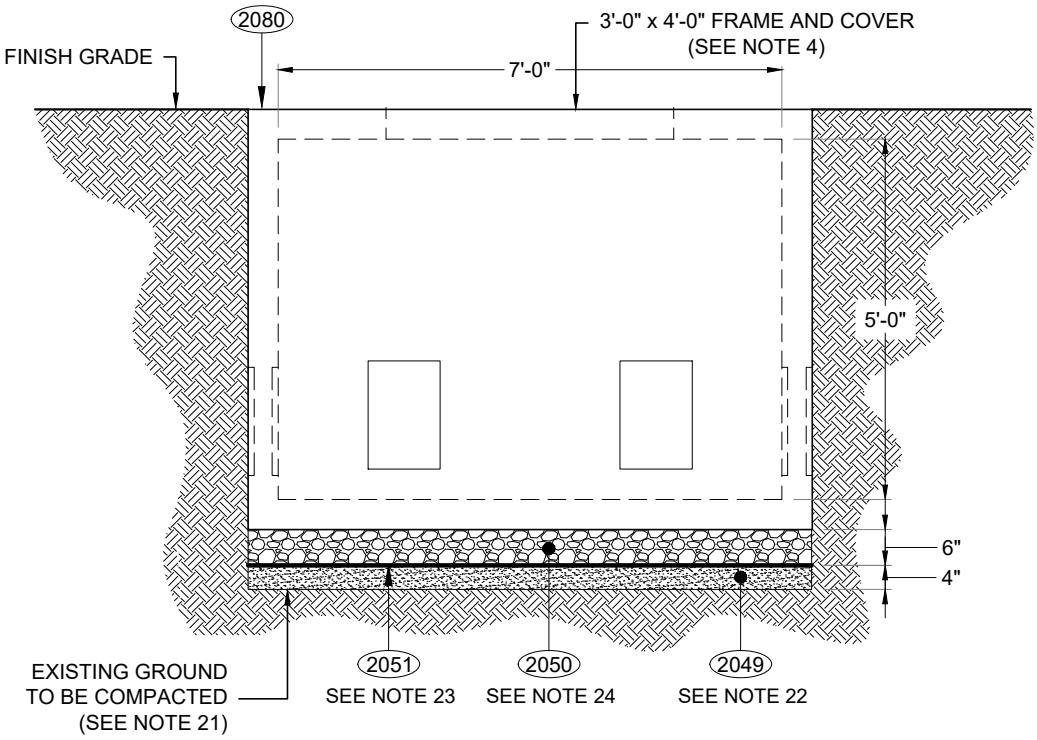


TOP VIEW



SECTION A

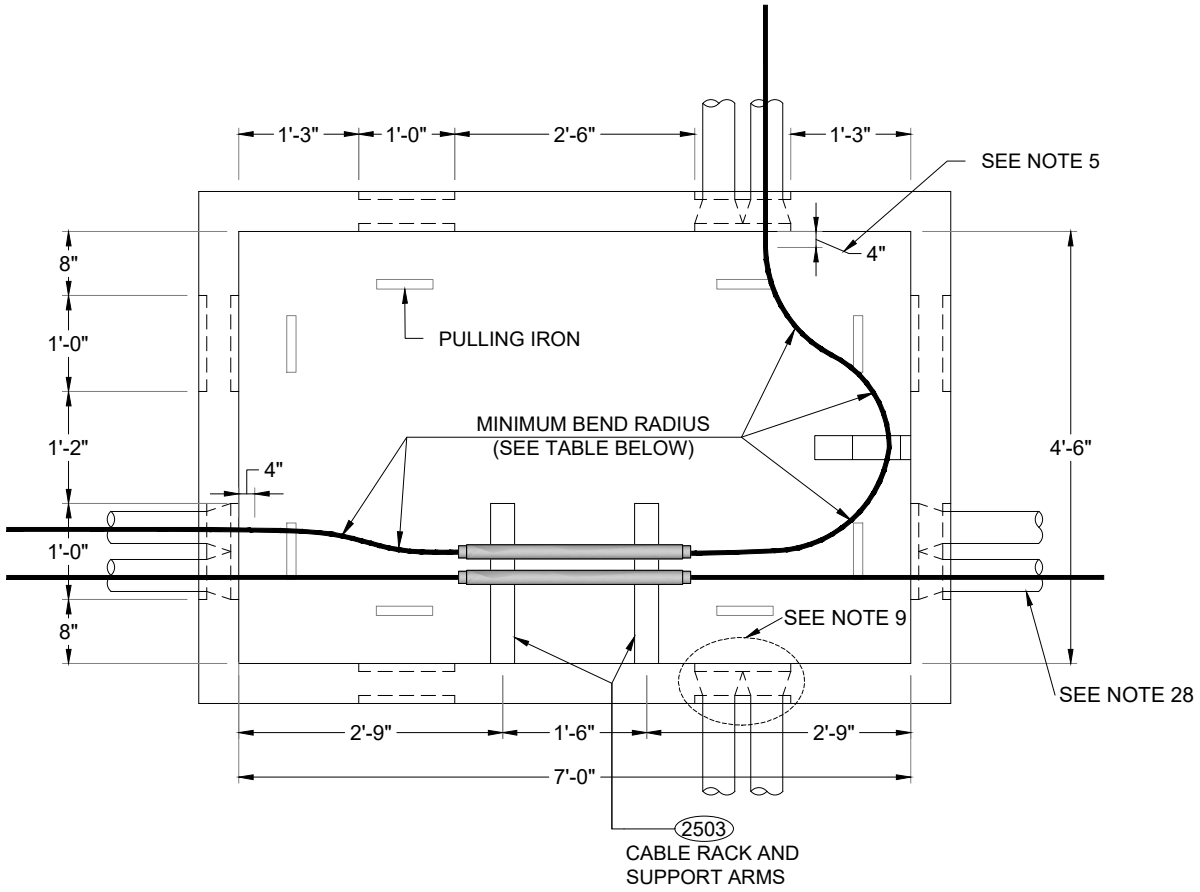
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND PULL BOX FOR PRIMARY CABLES
7' X 4'-6" X 5'
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-30-B VERSION 3
DOCUMENT NO. 4325.032
PAGE 4 OF 8 DATE OCT 5, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412
EMILIO CUADRADO LIC. 3000



PROCEDURE FOR CABLES INSTALLATION

CABLE (15KV)		MINIMUM BEND RADIUS
SIZE	O.D.	
#2 AWG	0.97"	12"
1/0 AWG	1.05"	13"
2/0 AWG	1.09"	13"
3/0 AWG	1.14"	14"
4/0 AWG	1.20"	15"

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND PULL BOX FOR PRIMARY CABLES
7' X 4'-6" X 5'
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-30-B VERSION 3
DOCUMENT NO. 4325.032
PAGE 5 OF 8 DATE OCT 5, 2022
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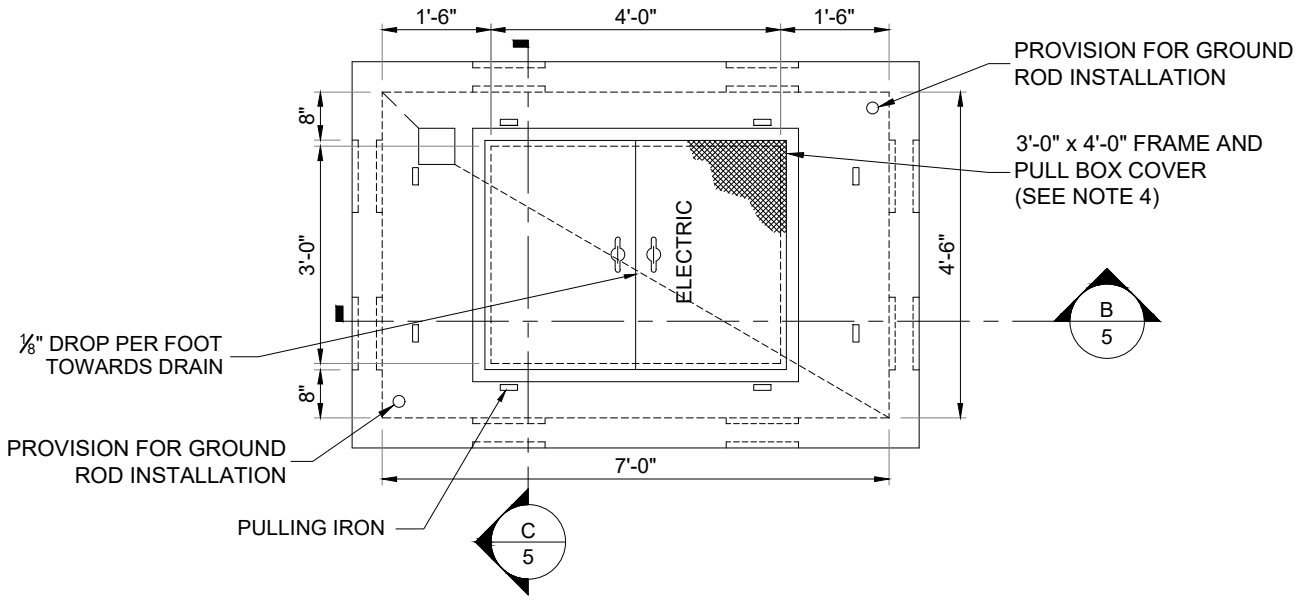
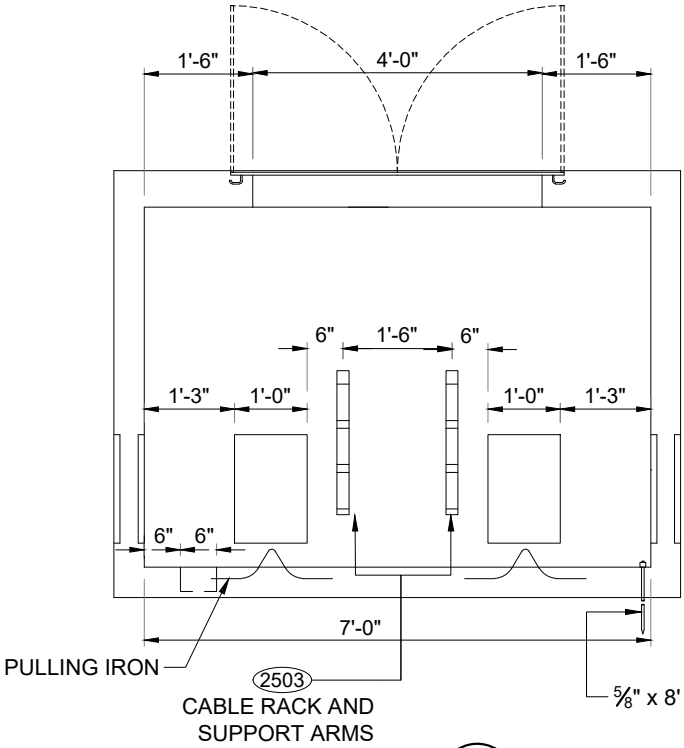
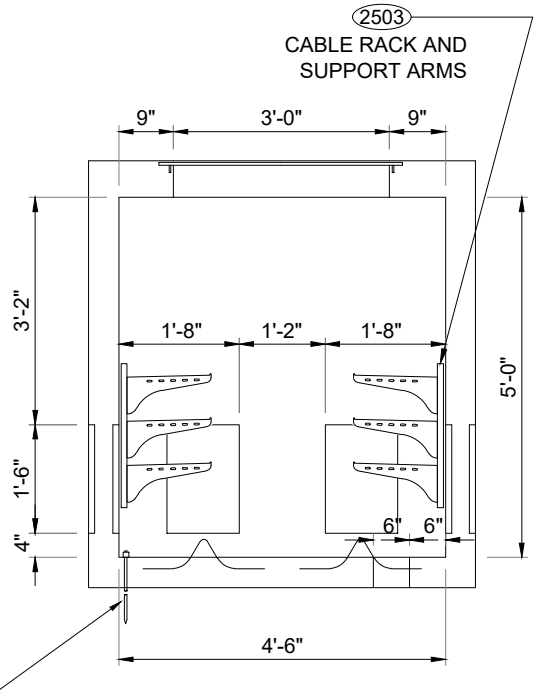
EMILIO CUADRADO LIC. 3000



PLAN VIEW



SECTION B



SECTION C

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND PULL BOX FOR PRIMARY CABLES
7' X 4'-6" X 5'
MAXIMUM VOLTAGE: 13.2 KV
NOTES

STANDARD NO. URD-30-B VERSION 3
DOCUMENT NO. 4325.032
PAGE 6 OF 8 DATE OCT 5, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES:

1. THIS PULL BOX SHALL BE INSTALLED ONLY IN SIDEWALKS. IT IS NOT ALLOWED TO INSTALL THIS PULL BOX IN A PROPERTY DRIVEWAY.
2. THIS PULL BOX SHALL BE USED FOR BRANCH FEEDER, LATERAL CIRCUITS OR PRIMARY SERVICES WITH CABLES UP TO 4/0 AWG-15KV.
3. FOR SECONDARY CIRCUITS, USE THE SIZE 7'-0" X 4'-6" X 4'-0" PULL BOX. (SEE STANDARD NO. URD-30)
4. THE PULL BOX COVER HAVE TWO SPRING ASSISTED, DIAMOND PLATE, REINFORCED DOORS WITH FLUSH DROP HANDLES. THE DOOR SHALL MEET AASHTO SPECIFICATION H20-44 FOR TRAFFIC LOADING (1600 LB. WHEEL LOAD OVER 10" X 20" AREA WITH 30% ADDED FOR IMPACT). SHALL HAVE STAINLESS STEEL COMPRESSION SPRINGS TO PROVIDE LIFT ASSISTANCE AND PROVIDE A MECHANISM TO LOCK THE DOORS IN OPEN POSITION.
5. A MINIMUM OF 4" STRAIGHT CABLE LENGTH IS REQUIRED AT PVC END BELL EDGE. INSTALLATION OF ALL CABLES SHALL COMPLY WITH THE MINIMUM BEND RADIUS. (SEE PAGE 4)
6. THE PULL BOX COVER FRAME SHALL BE CONNECTED TO THE GROUND ROD INSTALLED INSIDE THE PULL BOX. THE GROUND CONDUCTOR SHALL BE ATTACHED TO THE CEILING AND WALLS OF THE PULL BOX USING CABLE STRAP (ITEM 2028). A CABLE STRAP SHALL BE INSTALLED EVERY 30". A #2 AWG COPPER BARE CONDUCTOR (ITEM 0080) SHALL BE USED FOR THIS CONNECTION.
7. ENERGIZED CABLES SHALL NOT BE PLACED ON THE PULL BOX FLOOR. ALL ENERGIZED CABLES SHALL BE PLACED ON THE PULL BOX CABLES SUPPORT SYSTEM (SEE ASSEMBLY NO. ASSY-2503). A CABLE SUPPORT SYSTEM WILL BE INSTALLED AT 3'-6" MAXIMUM SEPARATION.
8. ALL CABLES SHALL BE TIED TO THE CABLE SUPPORT USING A CABLE TIE (ITEM 2026).
9. ALL DUCTS SHALL HAVE A PVC END BELL (ITEM 2045) TERMINATION TO PROVIDE A SMOOTH SAFE CABLE ENTRY.
10. ALL DUCTS, INCLUDING SPARE DUCTS, SHALL BE SEALED WITH AN APPROPRIATE DUCT SEALING PLUG (ITEM 2056) OR DUCT SEALING COMPOUND (ITEM 2014) TO PREVENT ENTRY OF WATER OR OTHER FOREIGN OBJECTS.
11. THE SUPPLIER IS RESPONSIBLE FOR THE DESIGN OF THIS PRECAST PULL BOX COMPLYING WITH ALL STANDARDS AND CODES APPLICABLE FOR THIS TYPE OF PRODUCT AND THEIR CORRESPONDING INSTALLATION.
12. THE SUPPLIER SHALL SUBMIT THE SHOP DRAWINGS, CALCULATIONS AND ANY SUPPORTING DOCUMENT REQUIRED FOR THE CORRESPONDING LUMA EVALUATION AND APPROVAL, PRIOR TO SELL THIS PRODUCT. ALL DOCUMENTATION PROVIDED SHALL BE SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER, AS REQUIRED BY LAWS OF PUERTO RICO.
13. IF THE PULL BOX TO BE USED IS NOT A PRECAST ELEMENT AND WILL BE CONSTRUCTED ON SITE, THE CONTRACTOR WILL BE RESPONSIBLE TO DEVELOP AND SUBMIT THE CORRESPONDING DESIGN PLANS, CALCULATIONS AND SUPPORTING DOCUMENTS REQUIRED FOR EVALUATION AND APPROVAL OF LUMA, PRIOR TO START THE CONSTRUCTION.
14. THE PULL BOX DESIGN SHALL MEET THE REQUIREMENTS OF STANDARD NO. ASTM C857 - STANDARD PRACTICE FOR MINIMUM STRUCTURAL DESIGN LOADING FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES, AND STANDARD NO. ASTM C858 - STANDARD SPECIFICATION FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
15. THE CONCRETE MIX SHALL MEET THE REQUIREMENTS OF STANDARD NO. ASTM C94 - STANDARD SPECIFICATION FOR READY-MIXED CONCRETE. THE MINIMUM COMPRESSIVE STRENGTH FOR CONCRETE SHALL BE 4,000 PSI AT 28 DAYS, AS TESTED IN ACCORDANCE WITH STANDARD NO. ASTM C39 - STANDARD TEST METHOD FOR COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
16. THE REINFORCING STEEL SHALL BE FABRICATED AND PLACED IN CONFORMANCE WITH THE STANDARD NO. ACI 318 - SPECIFICATION OF BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE. THE REINFORCING STEEL SHALL BE DEFORMED BAR AND GRADE 60 (MINIMUM YIELD STRENGTH EQUAL TO 60,000 PSI), ACCORDING TO STANDARD NO. ASTM A615 - STANDARD SPECIFICATION FOR DEFORMED AND PLAIN CARBON-STEEL BARS FOR CONCRETE REINFORCEMENT, AND IT SHALL BE NEW BILLET-STEEL, AS REQUIRED. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
17. THE DETAILS AND PROPERTIES OF PULLING IRONS SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
18. A SUMP PUMP PIT SHALL BE SHOWN IN THE SUPPLIER'S DRAWINGS, INCLUDING THE SIZE OR DIAMETER AND PROPERTIES.
19. THE DESIGN CRITERIA IN THE SUPPLIER'S DRAWINGS SHALL INCLUDE THE FOLLOWING:
    A. ANGLE OF INTERNAL FRICTION OF SOIL = 25 DEGREE
    B. UNIT WEIGHT OF SOIL = 110 LBS/CU FT (DRY), 170 LBS/CU FT (SATURATED)
    C. COEFFICIENT OF LATERAL EARTH PRESSURE, Ka = 0.5
    D. GROUND WATER LEVEL BELOW FINISH GRADE = ASSUME 3', UNLESS OTHER INFORMATION IS AVAILABLE
    E. IMPACT = 30%
    F. TRAFFIC LOAD = AASHTO HL-93 LOADING (AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS)
    G. LIVE LOAD = 300 LBS/SQ FT (MINIMUM)
20. THE BACKFILL AND #67 CRUSHED STONE OR GRAVEL USED FOR THIS INSTALLATION SHALL BE COMPACTED EVERY 6" OF THICKNESS TO A MINIMUM OF 95% OF THE STANDARD MAXIMUM DENSITY AT THE PROPER MOISTURE CONTENT, ACCORDING TO LATEST VERSION OF THE STANDARD NO. ASTM D698.
21. THE EXISTING GROUND AT THE BOTTOM OF THE EXCAVATION SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT OF THE UNDISTURBED SOIL.
22. PLACE THE BACKFILL OVER COMPACTED EXISTING GROUND TO MINIMUM THICKNESS OF 4". THE BACKFILL SHALL BE A-2-4 MATERIAL (STANDARD NO. ASTM D3282, LATEST EDITION), AND IT SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT.
23. INSTALL THE NONWOVEN GEOTEXTILE FILTER FABRIC (8 OUNCES PER SQUARE YARDS), SIMILAR OR EQUAL TO REGISTERED PRODUCT MIRAFI S800 OR SKAPS GT-180, OVER COMPACTED BACKFILL.

TITLE:

UNDERGROUND PULL BOX FOR PRIMARY CABLES
7' X 4'-6" X 5'
MAXIMUM VOLTAGE: 13.2 KV
NOTES

STANDARD NO. URD-30-B VERSION 3
DOCUMENT NO. 4325.032
PAGE 7 OF 8 DATE OCT 5, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES:

24. PLACE CLEAN #67 CRUSHED STONE OR GRAVEL OVER NONWOVEN GEOTEXTILE FILTER FABRIC TO A MINIMUM THICKNESS OF 6". THIS MATERIAL SHALL BE UNIFORMLY GRADED AND THE SIZES ARE FROM ¾" DOWN TO FINE PARTICLES. IT SHALL BE FREE FROM SOFT AND DISINTEGRATED PIECES, CLAY, ORGANIC OR OTHER DELETERIOUS MATTER. THE CRUSHED STONE OR GRAVEL SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT.
25. THE NEUTRAL CABLE OF THE BRANCH FEEDER, LATERAL CIRCUITS AND PRIMARY SERVICES, SHALL BE EFFECTIVELY CONNECTED TO GROUND. A 4/0 AWG COPPER BARE CONDUCTOR (ITEM 0080) SHALL BE USED FOR THE INSTALLATION OF A GROUND RING ON THE FLOOR INSIDE THE PULL BOX CONNECTED TO THE TWO GROUND RODS. THE GROUND CONDUCTOR FOR THE EQUIPMENT SHALL BE #2 AWG COPPER BARE AND SHALL BE CONNECTED TO THE GROUND RING.
26. A COMPRESSION CROSS GROUND GRID CONNECTOR SHALL BE USED FOR THE CONNECTION BETWEEN THE GROUND RING AND THE GROUND ROD.
27. A 4/0 AWG BARE COPPER CONDUCTOR SHALL BE USED TO CONNECT THE CABLE SPLICE GROUND STRAPS TO THE GROUND RING.
28. REFER TO STANDARD NO. URD-54 FOR DUCT SIZING.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

UNDERGROUND PULL BOX FOR PRIMARY CABLES
7' X 4'-6" X 5'
MAXIMUM VOLTAGE: 13.2 KV
BILL OF MATERIAL

STANDARD NO. URD-30-B VERSION 3
DOCUMENT NO. 4325.032
PAGE 8 OF 8 DATE OCT 5, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0037	5/8" X 8' GROUND ROD	002-02465	2
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
0087	15 KV UNDERGROUND CABLE	VARIES	AS REQ.
2005	STRANDED COPPER CABLE, 600V, XHHW-2	VARIES	AS REQ.
2014	DUCT SEALING COMPOUND	003-02935	AS REQ.
2024	MECANICAL GROUNDING CONNECTOR	038-83151	1
2025	SELF-DRILLING SCREW	002-83309	1
2028	SINGLE HOLE CABLE STRAP FOR COPPER CONDUCTOR	038-83156	AS REQ.
2029	CONCRETE SCREW ANCHOR HEX WASHER HEAD	038-83157	AS REQ.
2049	A-2-4 BACKFILL MATERIAL	038-83207	AS REQ.
2050	#67 CRUSHED STONE OR GRAVEL	038-83208	AS REQ.
2051	NONWOVEN GEOTEXTILE FILTER FABRIC	038-83209	AS REQ.
2056	DUCT SEALING PLUG	VARIES	AS REQ.
2073	15 KV UNDERGROUND CABLE SPLICE KIT	VARIES	3
2080	7' X 4.5' X 5' PULL BOX WITH COVER	038-70165	1
2503	NONMETALLIC CABLE RACK ASSEMBLY	ASSY-2503	AS REQ.
URD-54	DUCT SIZING STANDARD	URD-54	AS REQ.

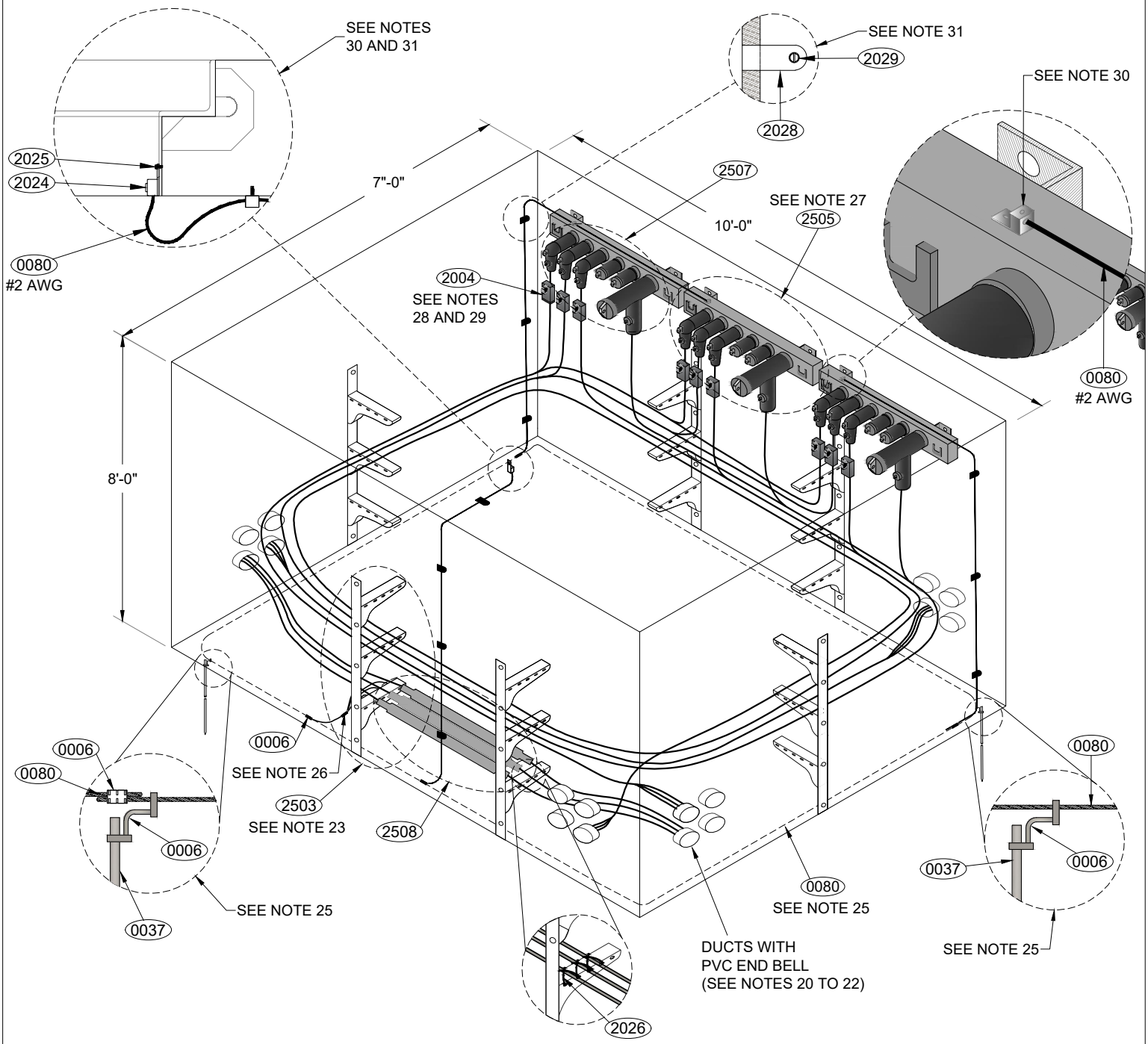
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

10' x 7' x 8' MANHOLE
WITH DOUBLE DOOR HATCH
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-31-B VERSION 1
DOCUMENT NO. 4325.033
PAGE 1 OF 8 DATE JAN 10, 2023
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000
ALEX J. RODRIGUEZ LIC. 24174



CABLE TYPICAL INSTALLATION
JACKETED CONCENTRIC NEUTRAL CABLE

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

10' x 7' x 8' MANHOLE
WITH DOUBLE DOOR HATCH
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-31-B VERSION 1
DOCUMENT NO. 4325.033
PAGE 2 OF 8 DATE JAN 10, 2023
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174
REVIEWED IVETTE D. SANCHEZ LIC. 13837
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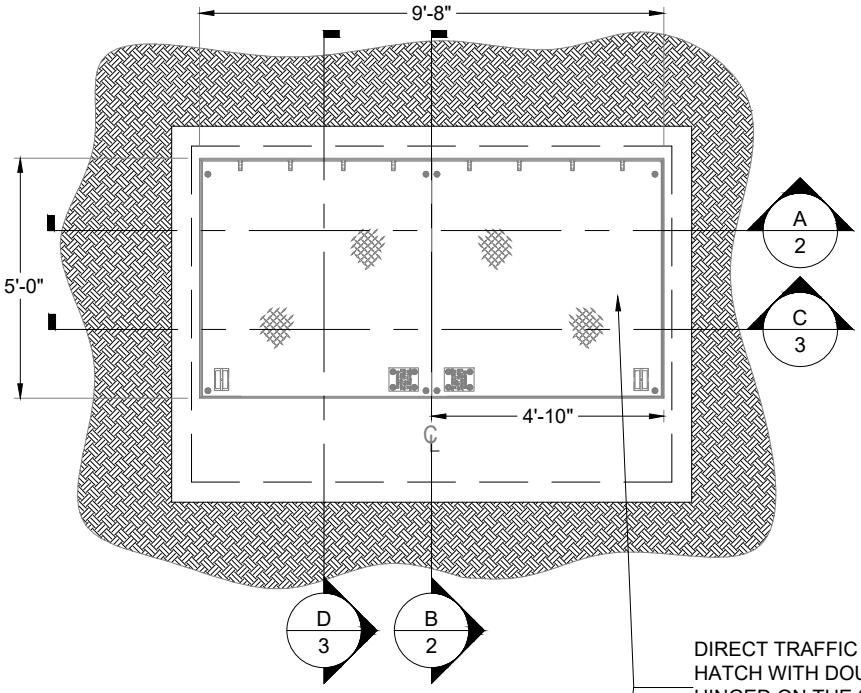
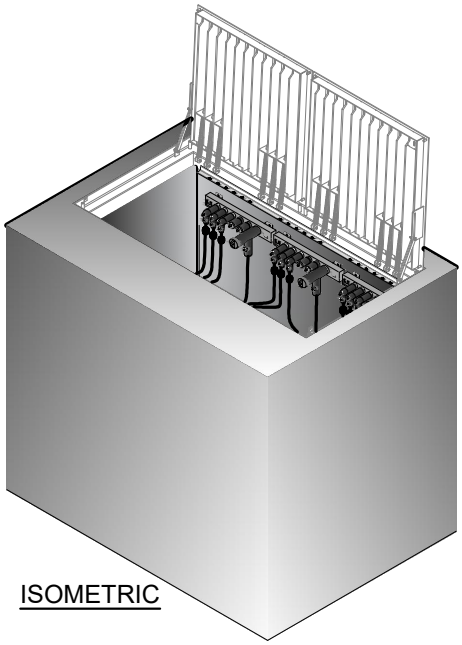
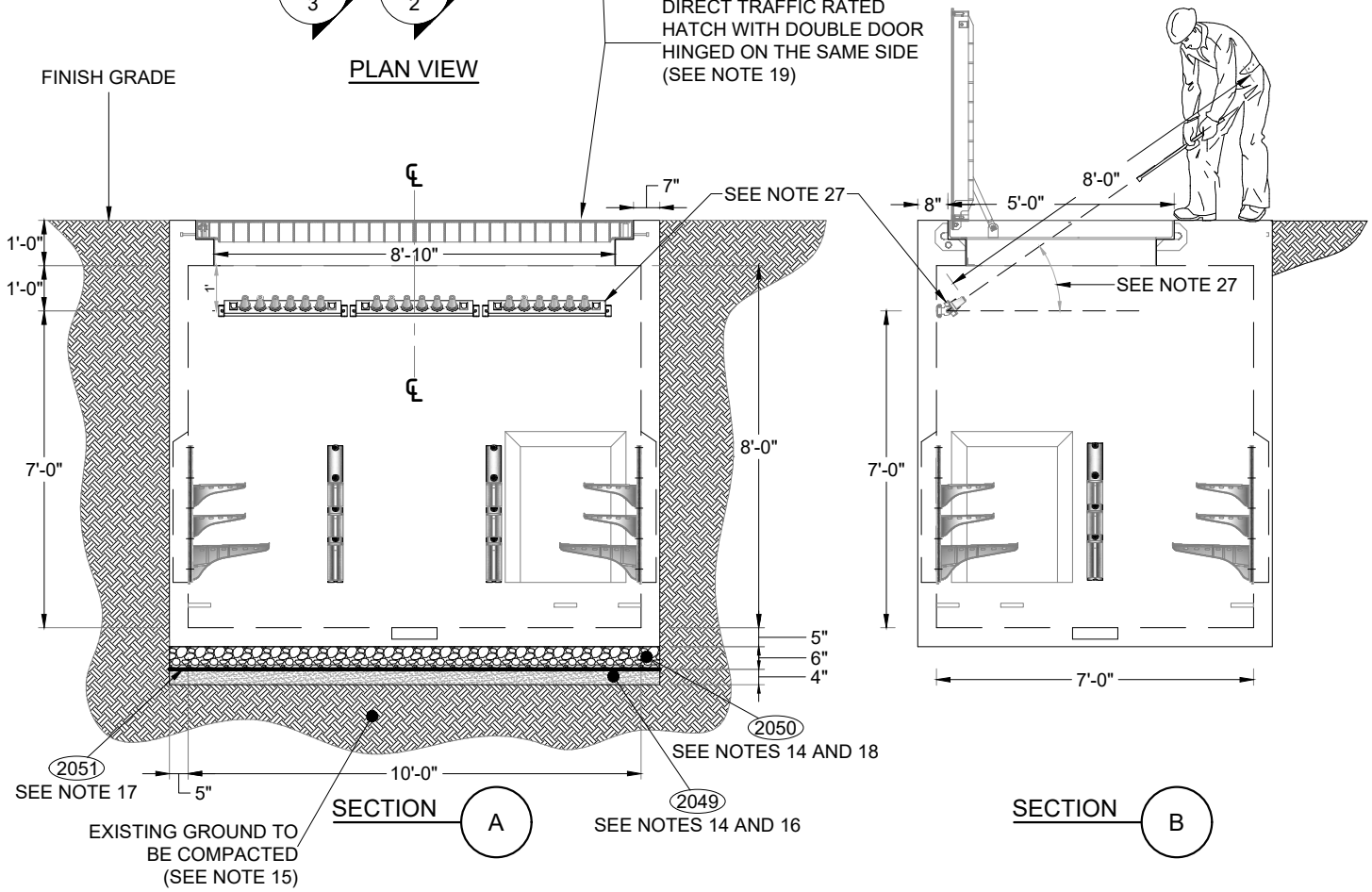
ALEX J. RODRIGUEZ LIC. 24174



PLAN VIEW



ISOMETRIC



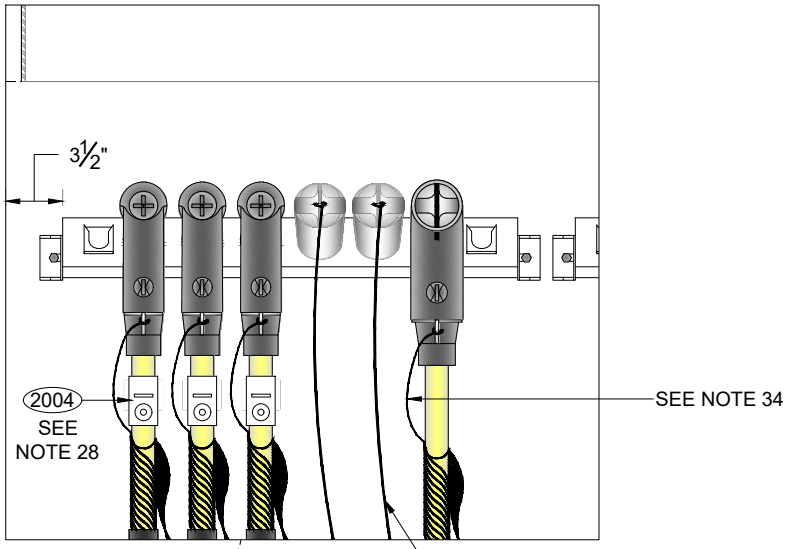
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

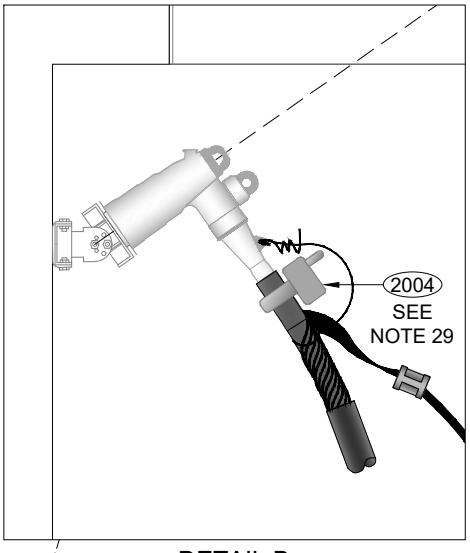
TITLE:

10' x 7' x 8' MANHOLE
WITH DOUBLE DOOR HATCH
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-31-B VERSION 1
DOCUMENT NO. 4325.033
PAGE 3 OF 8 DATE JAN 10, 2023
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000
ALEX J. RODRIGUEZ LIC. 24174



DETAIL A



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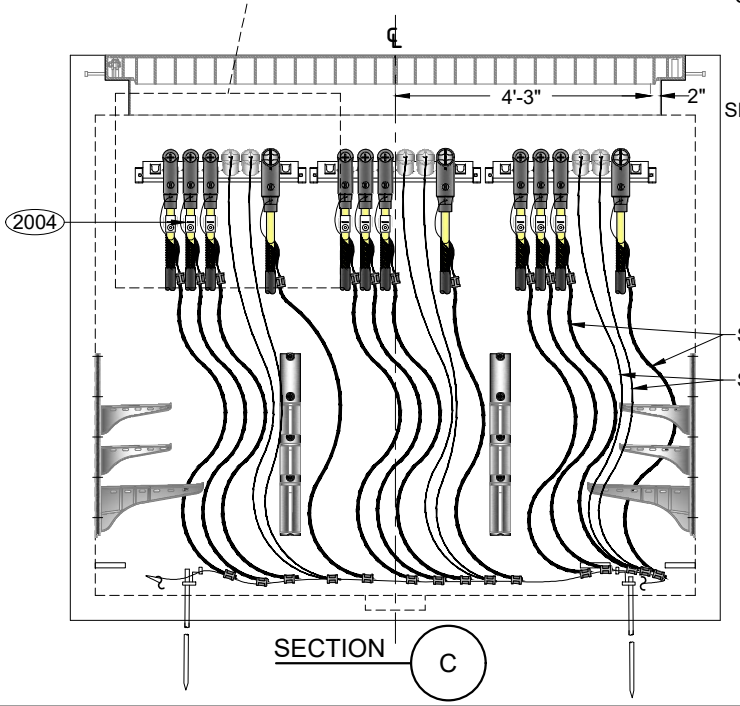
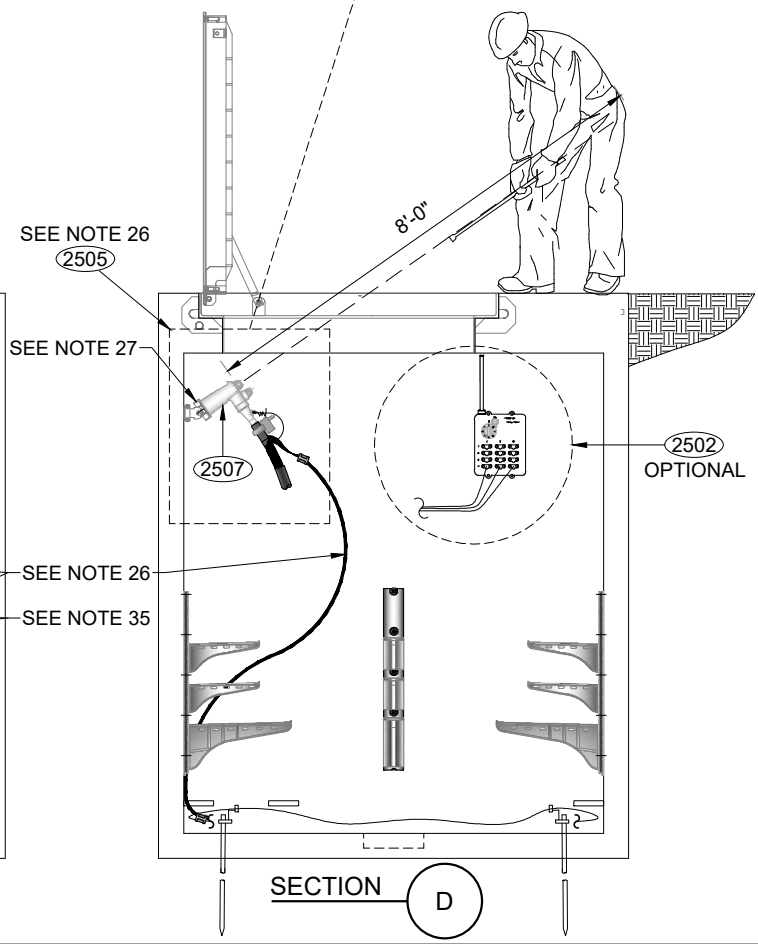


SECTION C



SECTION D

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

10' x 7' x 8' MANHOLE
WITH DOUBLE DOOR HATCH
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-31-B VERSION 1
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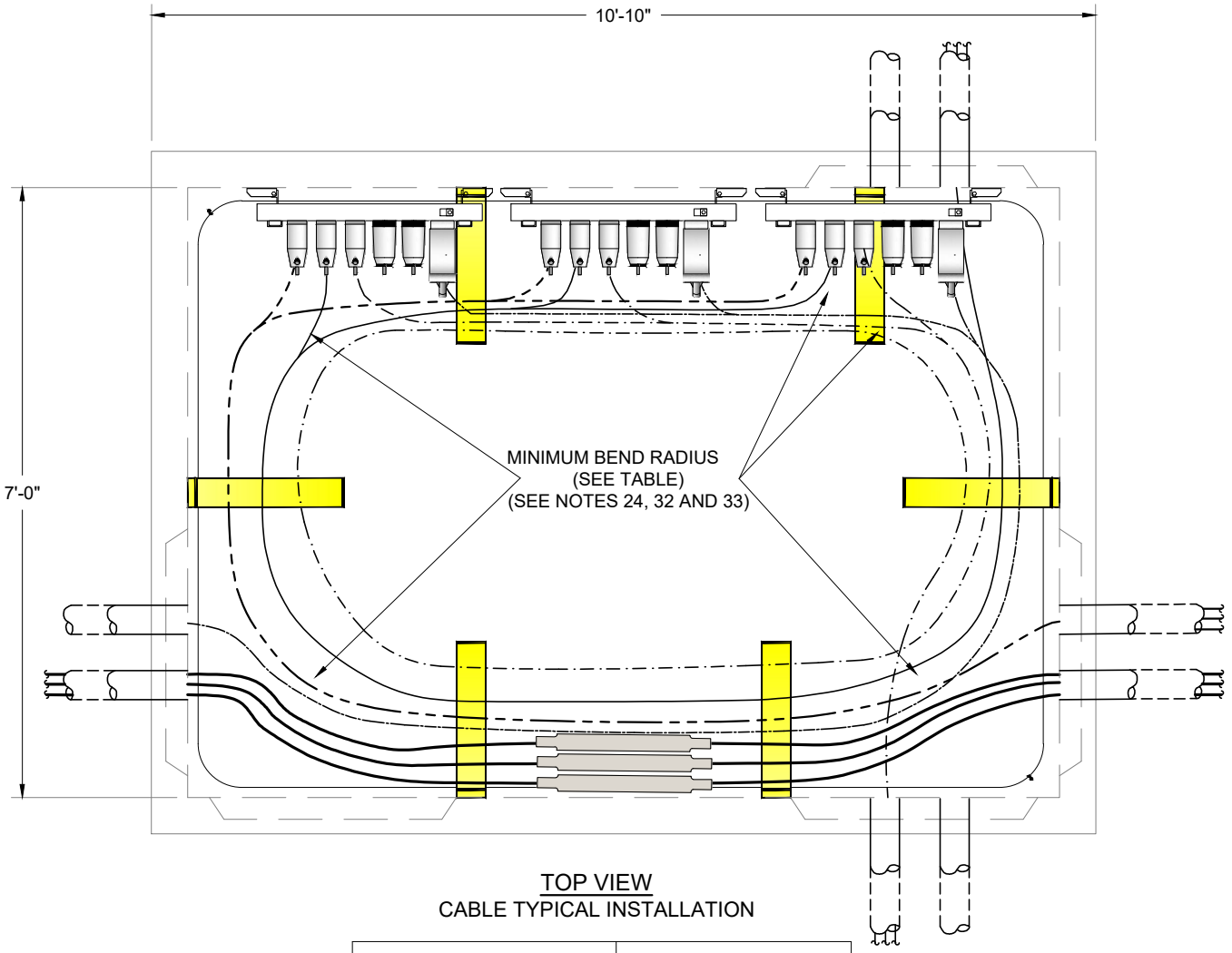

TOP VIEW
CABLE TYPICAL INSTALLATION

15 KV UG CABLE		MINIMUM BEND RADIUS
SIZE	O.D.	
#2 AWG	0.97	12"
1/0 AWG	1.05	13"
2/0 AWG	1.09	13"
3/0 AWG	1.14	14"
4/0 AWG	1.20	15"
500 MCM	1.51	19"
750 MCM	1.70	21"

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

10' x 7' x 8' MANHOLE
WITH DOUBLE DOOR HATCH
MAXIMUM VOLTAGE: 13.2 KV
NOTES

STANDARD NO. URD-31-B VERSION 1
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ALEX J. RODRIGUEZ LIC. 24174

NOTES:

1. THIS MANHOLE IS USED FOR PRIMARY VOLTAGE FEEDERS AND INSTALLATION OF PRIMARY JUNCTIONS.
2. THIS MANHOLE IS AVAILABLE PRECAST FOR SIDEWALKS OR VEHICULAR TRAFFIC AREAS. IT INCLUDES A 5' X 9'-8" DIRECT TRAFFIC HL-93 LOADING, DOUBLE DOOR HATCH WITH SPRING LIFT ASSIST MECHANISM.
3. THE SUPPLIER IS RESPONSIBLE FOR THE DESIGN OF THIS PRECAST MANHOLE COMPLYING WITH ALL STANDARDS AND CODES APPLICABLE FOR THIS TYPE OF PRODUCT AND THEIR CORRESPONDING INSTALLATION.
4. THE SUPPLIER SHALL SUBMIT THE SHOP DRAWINGS, CALCULATIONS AND ANY SUPPORTING DOCUMENT REQUIRED FOR THE CORRESPONDING LUMA EVALUATION AND APPROVAL, PRIOR TO SELL THIS PRODUCT. ALL DOCUMENTATION PROVIDED SHALL BE SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER, AS REQUIRED BY LAWS OF PUERTO RICO.
5. IF THE MANHOLE TO BE USED IS NOT A PRECAST ELEMENT AND WILL BE CONSTRUCTED ON SITE, THE CONTRACTOR WILL BE RESPONSIBLE TO DEVELOP AND SUBMIT THE CORRESPONDING DESIGN PLANS, CALCULATIONS AND SUPPORTING DOCUMENTS REQUIRED FOR EVALUATION AND APPROVAL OF LUMA, PRIOR TO START THE CONSTRUCTION.
6. THE MANHOLE DESIGN SHALL MEET THE REQUIREMENTS OF STANDARD NO. ASTM C857 - STANDARD PRACTICE FOR MINIMUM STRUCTURAL DESIGN LOADING FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES, AND STANDARD NO. ASTM C858 - STANDARD SPECIFICATION FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
7. THE CONCRETE MIX SHALL MEET THE REQUIREMENTS OF STANDARD NO. ASTM C94 - STANDARD SPECIFICATION FOR READY-MIXED CONCRETE. THE MINIMUM COMPRESSIVE STRENGTH FOR CONCRETE SHALL BE 4,000 PSI AT 28 DAYS, AS TESTED IN ACCORDANCE WITH STANDARD NO. ASTM C39 - STANDARD TEST METHOD FOR COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
8. THE REINFORCING STEEL SHALL BE FABRICATED AND PLACED IN CONFORMANCE WITH THE STANDARD NO. ACI 318 - SPECIFICATION OF BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE. THE REINFORCING STEEL SHALL BE DEFORMED BAR AND GRADE 60 (MINIMUM YIELD STRENGTH EQUAL TO 60,000 PSI), ACCORDING TO STANDARD NO. ASTM A615 - STANDARD SPECIFICATION FOR DEFORMED AND PLAIN CARBON-STEEL BARS FOR CONCRETE REINFORCEMENT, AND IT SHALL BE NEW BILLET-STEEL, AS REQUIRED. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
9. THE SUPPLIER'S DRAWINGS SHOULD INCLUDE A NOTE ABOUT THE RESPONSIBILITY OF THE CONTRACTOR TO SEAL THE JOINT BETWEEN SECTIONS OF THE MANHOLE WITH A CONTINUOUS LAYER OF BITUMINOUS MASTIC.
10. THE PROPERTIES OF THE SEALER SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
11. THE DETAILS AND PROPERTIES OF PULLING IRONS SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
12. A SUMP PUMP PIT SHALL BE SHOWN IN THE SUPPLIER'S DRAWINGS, INCLUDING THE SIZE OR DIAMETER AND PROPERTIES.
13. THE DESIGN CRITERIA IN THE SUPPLIER'S DRAWINGS SHALL INCLUDE THE FOLLOWING:
    A. ANGLE OF INTERNAL FRICTION OF SOIL = 25 DEGREE
    B. UNIT WEIGHT OF SOIL = 110 LBS/CU FT (DRY), 170 LBS/CU FT (SATURATED)
    C. COEFFICIENT OF LATERAL EARTH PRESSURE, Ka = 0.5
    D. GROUND WATER LEVEL BELOW FINISH GRADE = ASSUME 3', UNLESS OTHER INFORMATION IS AVAILABLE
    E. IMPACT = 30%
    F. TRAFFIC LOAD = AASHTO HL-93 LOADING (AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS)
    G. LIVE LOAD = 300 LBS/SQ FT (MINIMUM)
14. THE BACKFILL AND #67 CRUSHED STONE OR GRAVEL USED FOR THIS INSTALLATION SHALL BE COMPACTED EVERY 6" OF THICKNESS TO A MINIMUM OF 95% OF THE STANDARD MAXIMUM DENSITY AT THE PROPER MOISTURE CONTENT, ACCORDING TO LATEST VERSION OF THE STANDARD NO. ASTM D698.
15. THE EXISTING GROUND AT THE BOTTOM OF THE EXCAVATION SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT OF THE UNDISTURBED SOIL.
16. PLACE THE BACKFILL OVER COMPACTED EXISTING GROUND TO MINIMUM THICKNESS OF 4". THE BACKFILL SHALL BE A-2-4 MATERIAL (STANDARD NO. ASTM D3282, LATEST EDITION), AND IT SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT.
17. INSTALL THE NONWOVEN GEOTEXTILE FILTER FABRIC (8 OUNCES PER SQUARE YARDS), SIMILAR OR EQUAL TO REGISTERED PRODUCT MIRAFI S800 OR SKAPS GT-180, OVER COMPACTED BACKFILL.
18. PLACE CLEAN #67 CRUSHED STONE OR GRAVEL OVER NONWOVEN GEOTEXTILE FILTER FABRIC TO A MINIMUM THICKNESS OF 6". THIS MATERIAL SHALL BE UNIFORMLY GRADED AND THE SIZES ARE FROM ¾" DOWN TO FINE PARTICLES. IT SHALL BE FREE FROM SOFT AND DISINTEGRATED PIECES, CLAY, ORGANIC OR OTHER DELETERIOUS MATTER. THE CRUSHED STONE OR GRAVEL SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT.

TITLE:

10' x 7' x 8' MANHOLE WITH DOUBLE DOOR HATCH MAXIMUM VOLTAGE: 13.2 KV NOTES

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SUBMITTED ALEX J. RODRIGUEZ LIC. 24174
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ALEX J. RODRIGUEZ LIC. 24174

NOTES:

19. THE MANHOLE CAN BE INSTALLED ON THE SIDEWALK OR STREET. THE COVER SHALL BE INSTALLED FLUSH WITH THE FINISH GRADE. THE MANHOLE SHALL BE INSTALLED IN SUCH A WAY THAT WHEN THE HATCHES ARE OPENED THE PRIMARY JUNCTIONS CAN BE OPERATED FROM THE OUTSIDE OF MANHOLE AT FINISH GRADE LEVEL WITHOUT ANYTHING OBSTRUCTING THEIR OPERATION.
20. ALL PVC DUCTS ENTERING THE MANHOLE SHALL HAVE A PVC END BELL (ITEM 2045) FLUSH WITH INSIDE WALLS TO PROVIDE A SMOOTH AND SAFE CABLE ENTRY. THE QUANTITY AND SIZE OF DUCTS WILL DEPEND ON THE DESIGN OF THE UNDERGROUND SYSTEM.
21. THE LOWEST DUCTS IN THE MANHOLE SHALL NOT BE LESS THAN 12" FROM THE FLOOR.
22. ALL DUCTS, INCLUDING SPARE DUCTS, SHALL BE SEALED WITH AN APPROPRIATE DUCT SEALING PLUG (ITEM 2056) OR DUCT SEALING COMPOUND (ITEM 2014) TO PREVENT ENTRY OF WATER OR OTHER FOREIGN OBJECTS.
23. A NONMETALLIC CABLE RACK WITH ARMS SHALL BE INSTALLED ON THE MANHOLE WALLS TO SUPPORT THE CABLES INSIDE THE MANHOLE. ALL CABLES SHALL BE TIED TO THE ARMS OF THE CABLE RACK USING 24" WEATHER RESISTANT CABLE TIES (ITEM 2026). (REFER TO ASSEMBLY NO. ASSY-2503)
24. A MINIMUM OF 4" STRAIGHT CABLE LENGTH IS REQUIRED AT END BELL EDGE. THE INSTALLATION OF THE CABLES SHALL COMPLY WITH THE MINIMUM BEND RADIUS.
25. A 4/0 AWG COPPER BARE CONDUCTOR (ITEM 0080) SHALL BE USED FOR THE INSTALLATION OF A GROUND RING ON THE FLOOR INSIDE THE MANHOLE CONNECTING THE TWO GROUND RODS (ITEM 0037). A COMPRESSION CROSS GROUND GRID CONNECTOR (ITEM 0006) SHALL BE USED FOR THE CONNECTION BETWEEN THE GROUND RING AND THE GROUND ROD.
26. THE BONDING JUMPER OF SPLICES AND THE NEUTRAL CONDUCTOR OF MAIN FEEDERS AND BRANCHES SHALL BE EFFECTIVELY CONNECTED TO THE GROUND RING USING #2 AWG COPPER BARE CONDUCTOR (ITEM 0080) AND COMPRESSION CONNECTORS (ITEM 0006). (SEE SECTIONS C AND D)
27. PRIMARY JUNCTIONS SHALL BE LOCATED ON THE 10' LONG MANHOLE WALL. THEY SHALL BE INSTALLED 12” BELOW THE COVER AT AN UPWARD INCLINATION SO THAT THEY CAN BE OPERATED FROM OUTSIDE THE MANHOLE WITH THE HATCHES OPEN. FOR DETAILS ON THE PRIMARY JUNCTION, REFER TO ASSEMBLY NO. ASSY-2505.
28. FAULT CURRENT INDICATORS (FCI) SHALL BE INSTALLED ON THE PRIMARY VOLTAGE SERVICE LATERAL.
29. FCI MUST HAVE INTEGRATED STATUS DISPLAYS AND SHALL BE INSTALLED ACCORDING TO DETAILS IN PAGE 3 OF THIS STANDARD. POSITION OF THE FCI MUST ALLOW THE VIEW OF THE STATUS DISPLAY FROM OUTSIDE MANHOLE WHEN DOORS ARE OPEN.
30. THE MANHOLE COVER FRAME AND PRIMARY JUNCTION ENCLOSURE SHALL BE CONNECTED TO THE GROUND RING INSIDE THE MANHOLE. A #2 AWG COPPER BARE CONDUCTOR (ITEM 0080) SHALL BE USED FOR THIS CONNECTION. GROUNDING CONDUCTOR MUST BE BONDED TO EQUIPMENT USING A MECHANICAL GROUNDING CONNECTOR (ITEM 2024) OR EQUIPMENT GROUNDING PROVISION. IF MECHANICAL GROUNDING CONNECTOR (ITEM 2024) NEED TO BE USED, THEN FIX THE CONNECTOR TO THE METAL USING SELF-DRILLING SCREWS (ITEM 2025). IN HEAVY GAUGE METAL ELEMENTS $\frac{1}{8}$" AND THICKER, THE INSTALLER MUST FIRST DRILL A PILOT HOLE BEFORE INSTALLING THE SELF DRILLING SCREW. THE PILOT HOLE SHOULD BE $\frac{1}{32}$" LESS THAN THE SELF DRILLING SCREW DIAMETER.
31. THE GROUND CONDUCTOR SHALL BE ATTACHED TO THE CEILING AND WALL OF THE MANHOLE USING CABLE STRAPS (ITEM 2028) AND CONCRETE SCREW ANCHOR (ITEM 2029). CABLE STRAPS SHALL BE INSTALLED EVERY 30".
32. THE LENGTH OF EACH INDIVIDUAL CABLE INSIDE THE MANHOLE SHOULD BE AT LEAST 50% OF THE INSIDE PERIMETER BEFORE RISE TO PRIMARY JUNCTION CONNECTION.
33. ALL PRIMARY VOLTAGE CABLES SHALL BE LABELED TO IDENTIFY THE PHASES (A, B, C) AND TO INDICATE FROM WHICH EQUIPMENT THE CABLES COME AND TO WHICH EQUIPMENT THE CABLE GO.
34. ONE CONCENTRIC NEUTRAL STRAND WILL BE USED AS DRAIN WIRE FOR ELBOW CONNECTORS. TO ENSURE THE CONTINUITY OF THE DRAIN WIRE TO THE GROUNDING SYSTEM, THE DRAIN WIRE STRAND MUST MADE A FULL TURN AROUND ALL STRANDS OF THE CONCENTRIC NEUTRAL BEFORE CONNECT IT TO THE ELBOW GROUNDING EYE. (SEE DETAIL A)
35. DRAIN WIRE FOR INSULATED CAP MUST BE CONNECTED TO THE MANHOLE GROUND RING. ALL DRAIN WIRE MUST BE #10 AWG MINIMUM GAUGE. (SEE SECTION C)

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

10' x 7' x 8' MANHOLE
WITH DOUBLE DOOR HATCH
MAXIMUM VOLTAGE: 13.2 KV
BILL OF MATERIAL

STANDARD NO. URD-31-B VERSION 1
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ALEX J. RODRIGUEZ LIC. 24174

MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0037	5/8" x 8' GROUND ROD	002-02465	2
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
0087	15 KV UNDERGROUND CABLE	VARIES	AS REQ.
2004	FAULT CURRENT INDICATOR - TARGET DISPLAY	032-83874	AS REQ.
2014	DUCT SEALING COMPOUND	003-02935	AS REQ.
2024	MECHANICAL GROUNDING CONNECTOR	038-83151	1
2025	SELF-DRILLING SCREW	002-83309	1
2026	CABLE TIE	038-83155	AS REQ.
2028	SINGLE HOLE CABLE STRAP FOR COPPER CONDUCTOR	038-83156	AS REQ.
2029	CONCRETE SCREW ANCHOR HEX WASHER HEAD	038-83157	AS REQ.
2045	PVC END BELL	VARIES	AS REQ.
2049	A-2-4 BACKFILL MATERIAL	038-83207	AS REQ.
2050	#67 CRUSHED STONE OR GRAVEL	038-83208	AS REQ.
2051	NONWOVEN GEOTEXTILE FILTER FABRIC	038-83209	AS REQ.
2056	DUCT SEALING PLUG	VARIES	AS REQ.
2075	10' x 7' x 8' MANHOLE WITH DOUBLE DOOR HATCH	038-70153	1
2086	STRANDED COPPER CABLE, 600 V, THHN, #10 AWG	006-83458	AS REQ.
2502	WIRELESS FAULT CURRENT INDICATION SYSTEM ASSEMBLY	ASSY-2502	OPTIONAL
2503	UNDERGROUD NONMETALLIC CABLE RACK ASSEMBLY	ASSY-2503	6
2505	PRIMARY JUNCTION ASSEMBLY	ASSY-2505	3
2507	SEPARABLE INSULATED CONNECTORS AND CABLE TERMINATION ASSEMBLY	ASSY-2507	AS REQ.
2508	15 KV CABLE SPLICE ASSEMBLY	ASSY-2508	AS REQ.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE SUBMERSIBLE TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA

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EMANUEL SANTANA
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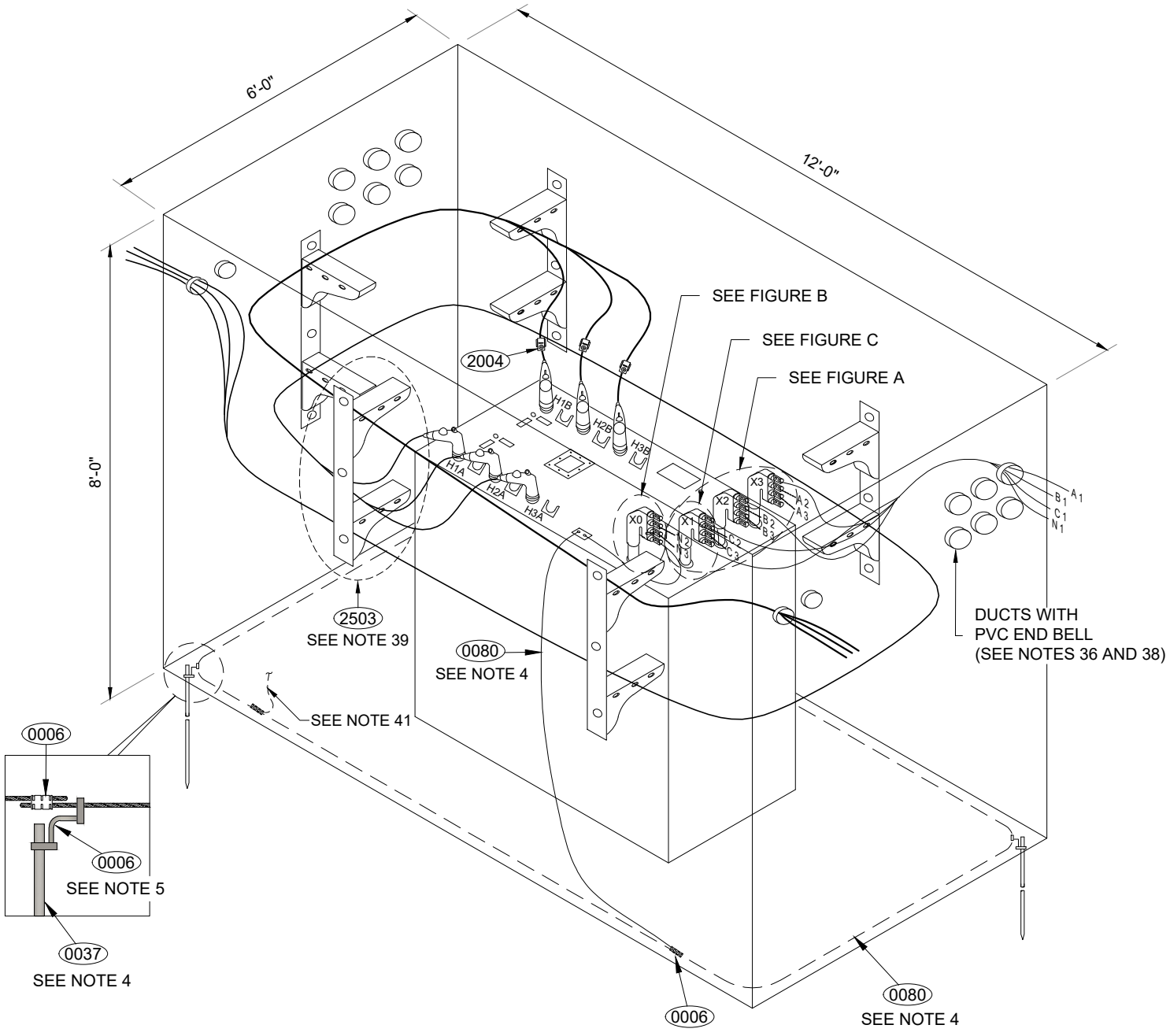

CABLE TYPICAL INSTALLATION

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE SUBMERSIBLE TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA

STANDARD NO.	URD-33 VERSION 3
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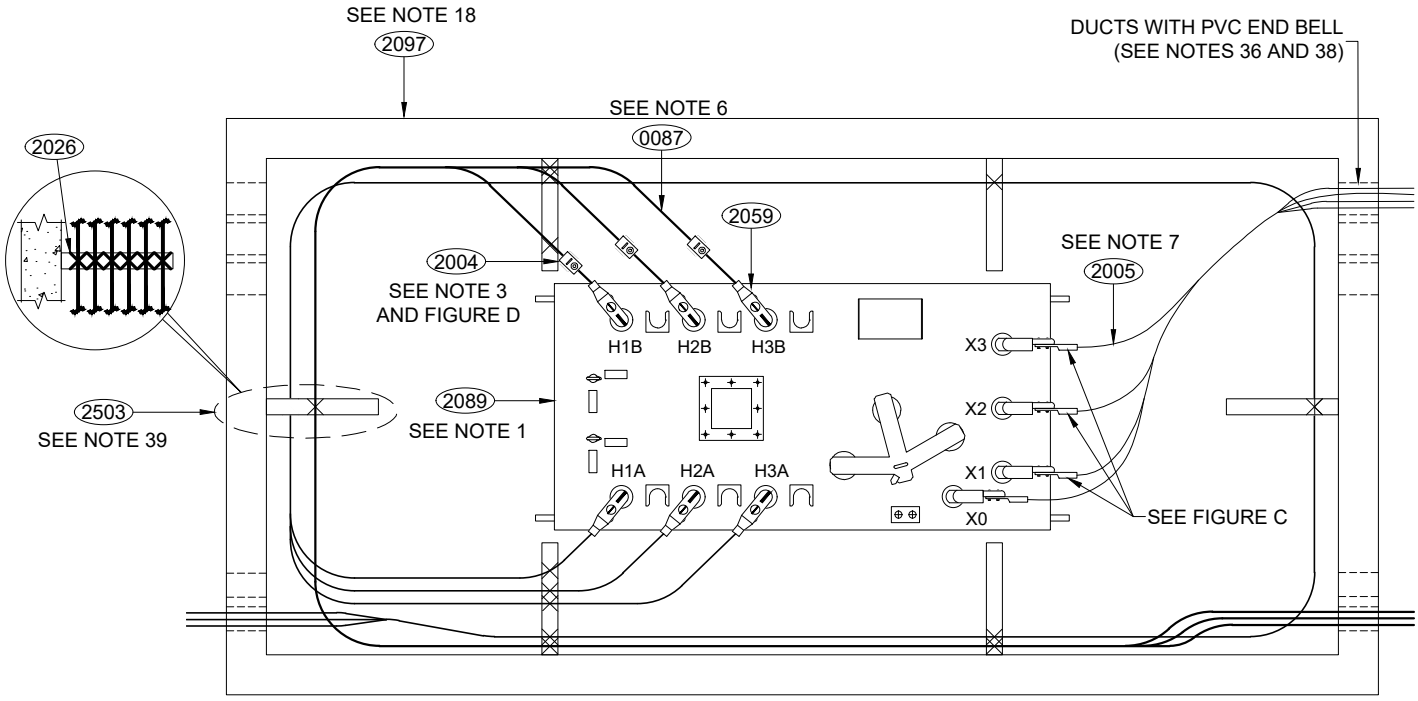
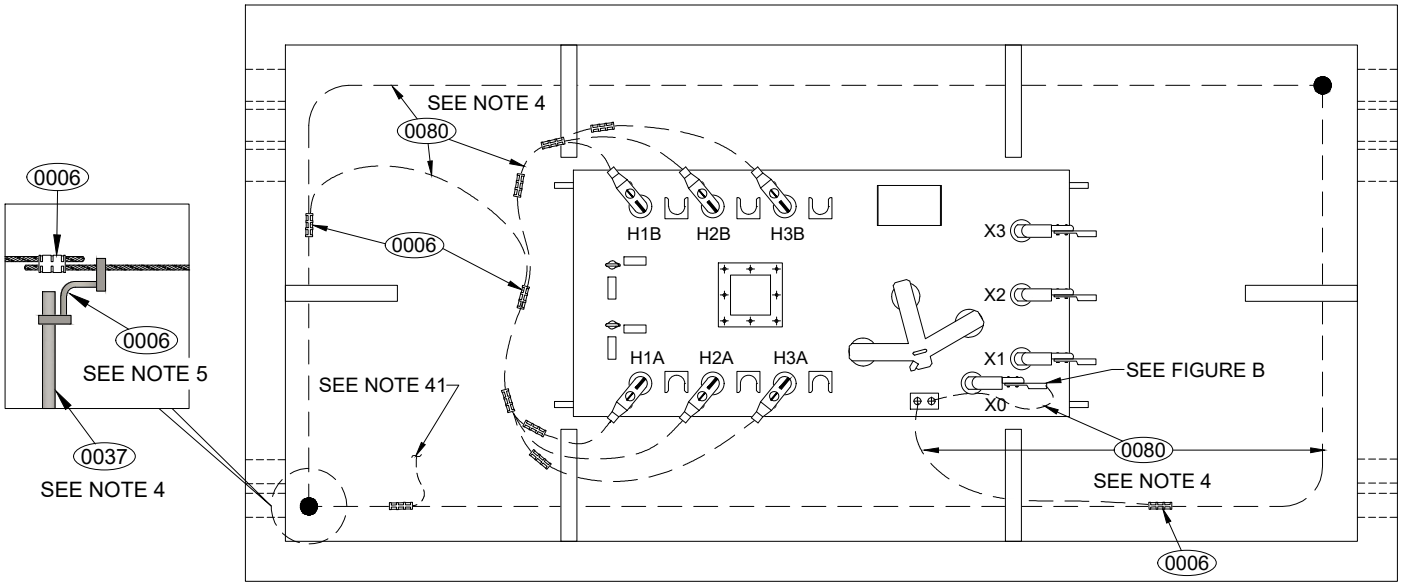


TOP VIEW

PRIMARY AND SECONDARY CABLES CONNECTION



TOP VIEW

NEUTRAL AND GROUNDING CONNECTION

TITLE:

THREE PHASE SUBMERSIBLE TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA

STANDARD NO. URD-33 VERSION 3
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TRANSFORMER SECONDARY CONNECTORS

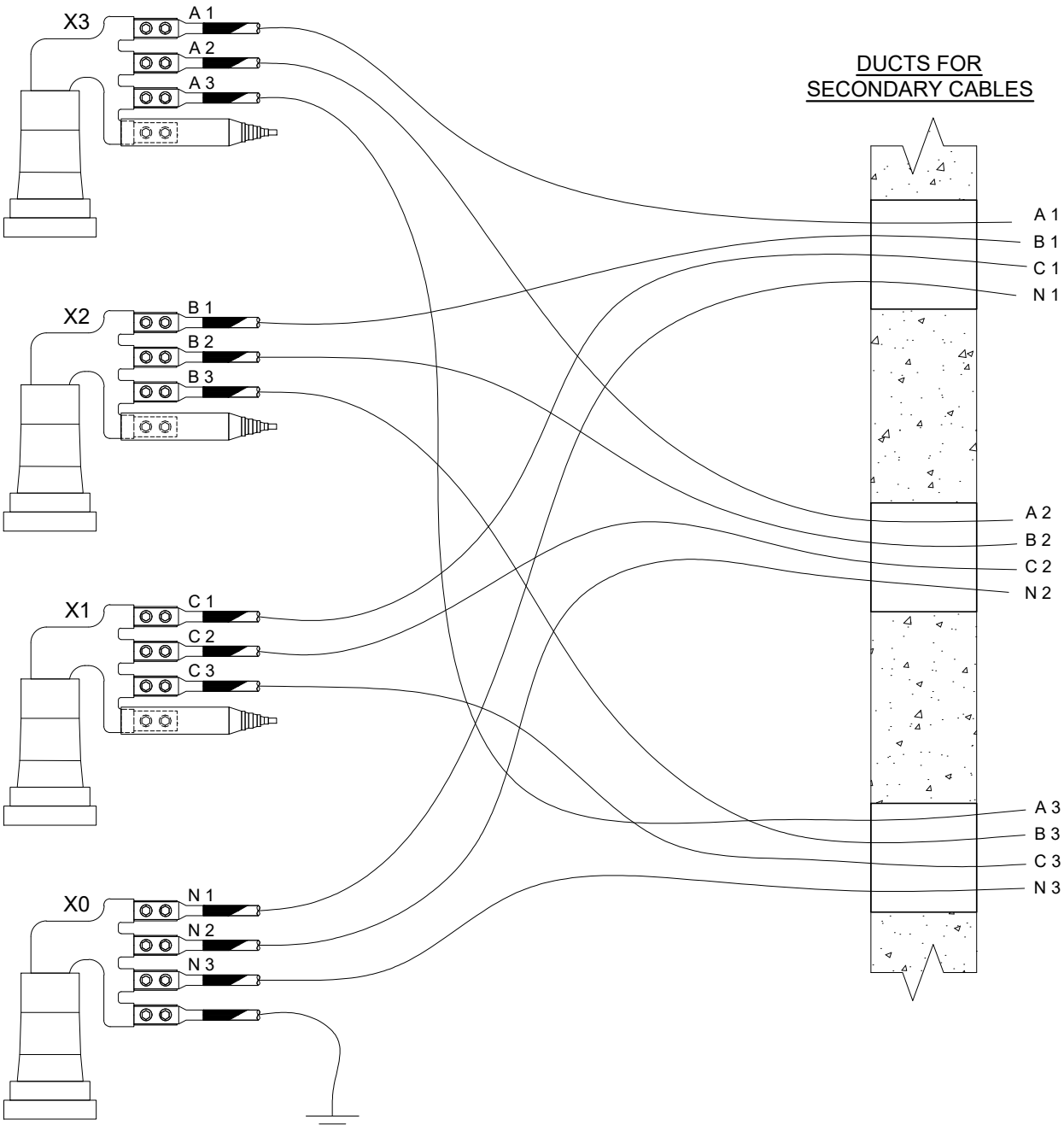

FIGURE A
SECONDARY CABLES TYPICAL INSTALLATION DIAGRAM
(SEE NOTES 7 AND 13)

TITLE:

THREE PHASE SUBMERSIBLE TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA

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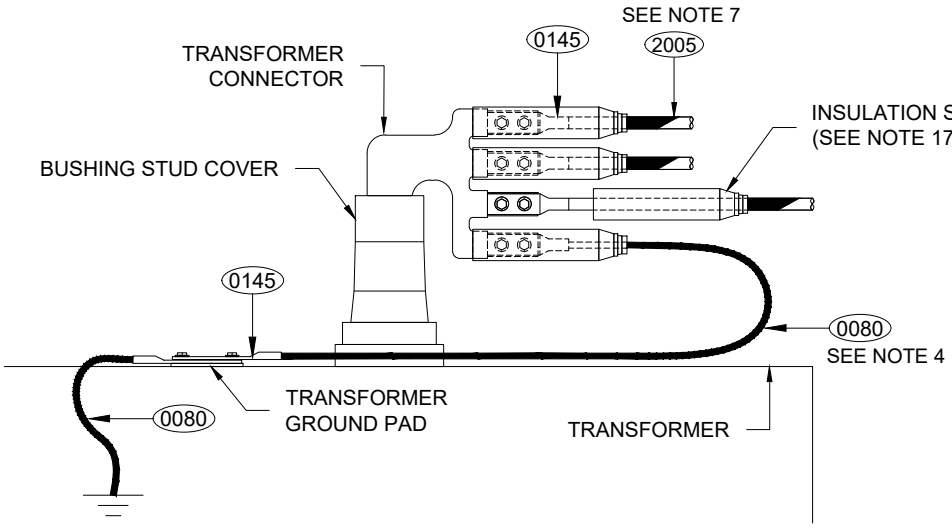

FIGURE B
NEUTRAL SECONDARY CONNECTOR X0
(SEE NOTES 7 AND 13)

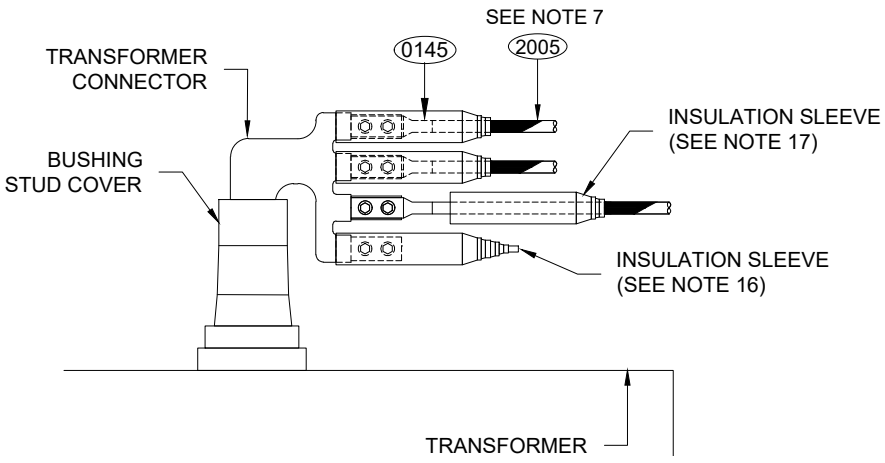

FIGURE C
SECONDARY CONNECTORS X1, X2, X3
(SEE NOTES 7 AND 13)

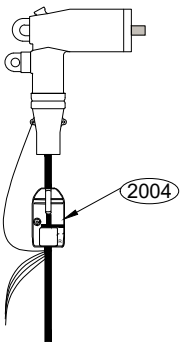

FIGURE D
FAULT CURRENT INDICATOR

TITLE:

THREE PHASE SUBMERSIBLE TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA

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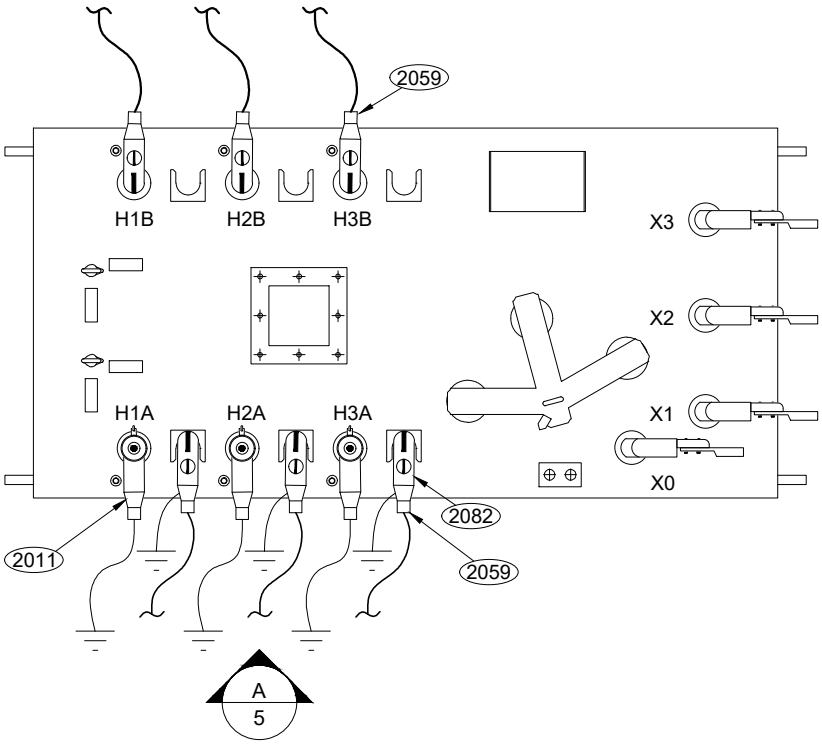
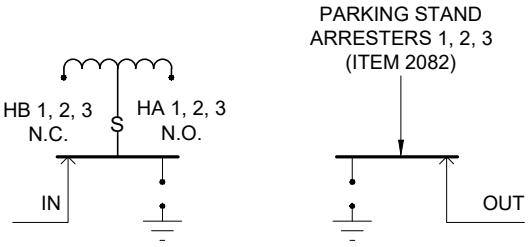
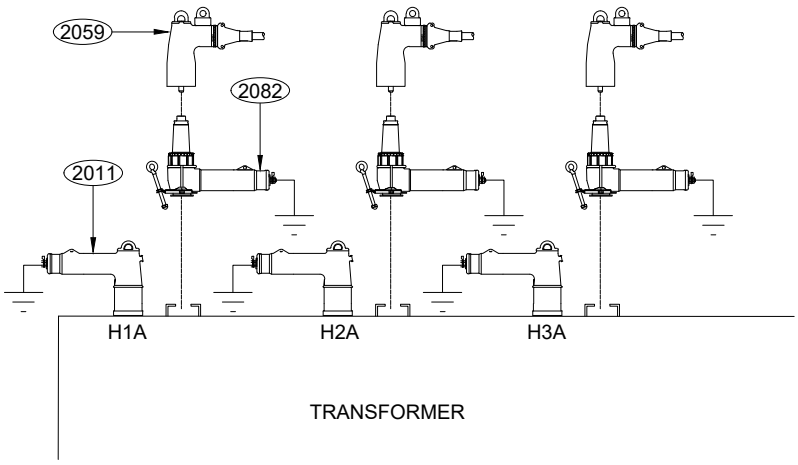


FIGURE E
ARRESTER CONNECTION DETAILS FOR NORMALLY OPEN POINT



ONE-LINE DIAGRAM
(NORMALLY OPEN - HA 1, 2, 3)



A PARTIAL FRONT VIEW

LEGEND:

- TRANSFORMER
- CIRCUIT LIMITING FUSE
- LOADBREAK ELBOW CONNECTOR
- PARKING STAND ARRESTER / ELBOW ARRESTER

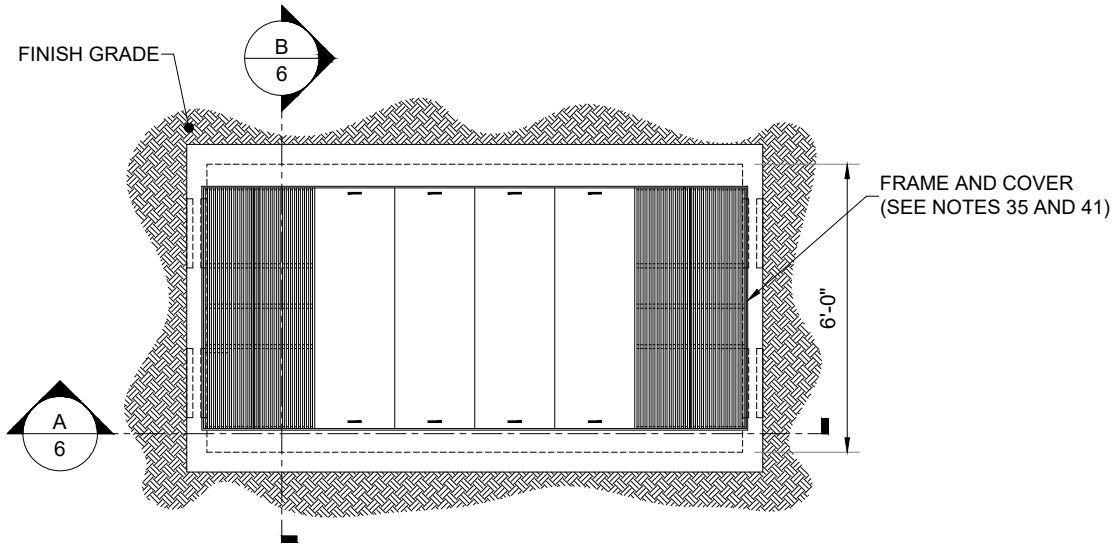
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

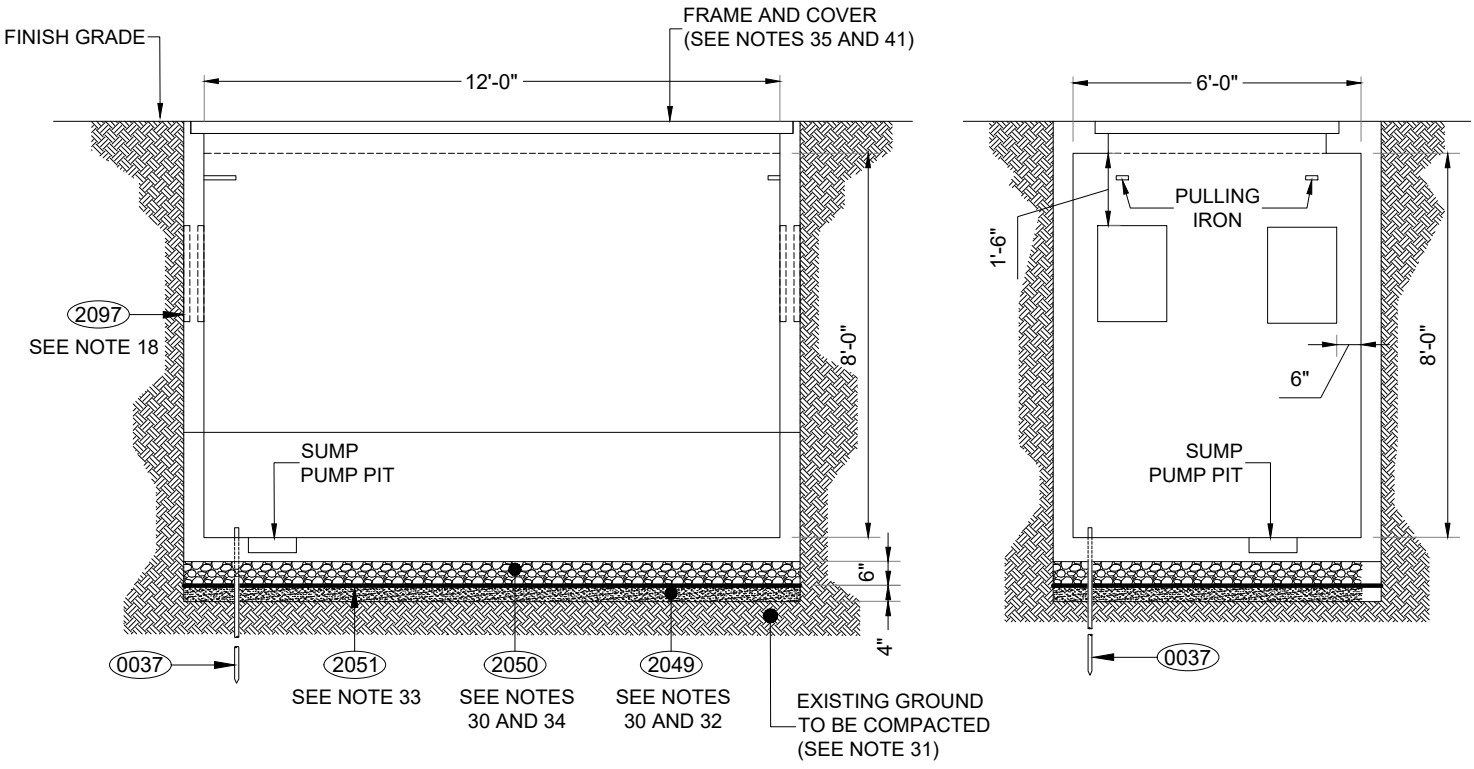
THREE PHASE SUBMERSIBLE TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA

STANDARD NO.	URD-33 VERSION 3
DOCUMENT NO.	4325.034
PAGE	6 OF 10 DATE JAN 10, 2023
SUBMITTED	LUIS R. SOTO LIC. 11658
	EMANUEL SANTANA
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	VICTOR R. FEBRES LIC. 3412



PLAN VIEW

12' X 6' X 8' MANHOLE WITH COVER



SECTION A

SECTION B

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE SUBMERSIBLE TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA
NOTES

STANDARD NO. URD-33 VERSION 3
DOCUMENT NO. 4325.034
PAGE 7 OF 10 DATE JAN 10, 2023
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REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES:

1. THIS STANDARD APPLIES TO THREE PHASE SUBMERSIBLE TRANSFORMER. THE ALLOWED CAPACITIES FOR THE TRANSFORMER ARE 150 KVA AND 300 KVA, WITH SECONDARY VOLTAGE OF 120 / 240 V. THE TRANSFORMER SHALL BE LOOP-FEED TYPE.
2. TRANSFORMER MUST BE FIXED TO MANHOLE FLOOR WITH STAINLESS STEEL ANCHOR BOLTS. USE A ⅝" DIAMETER WEDGE ANCHOR BOLT WITH AN EMBEDMENT DEPTH OF 4 ¾". THE TRANSFORMER MUST BE PLACED ON A LEVELED SURFACE.
3. FAULT CURRENT INDICATOR SHALL BE INSTALLED ON THE OUTGOING CABLE AND IT SHALL BE HOT STICK MOUNTING TYPE. (SEE FIGURE D)
4. THE CONCENTRIC NEUTRAL STRANDS AT LOADBREAK ELBOW CONNECTOR, SECONDARY VOLTAGE NEUTRAL FEEDER AND TRANSFORMER CASE SHALL BE EFFECTIVELY CONNECTED TO THE GROUND ROD USING #2 AWG COPPER BARE CONDUCTOR (ITEM 0080). A 4/0 AWG COPPER BARE CONDUCTOR (ITEM 0080) SHALL BE USED FOR THE INSTALLATION OF A GROUND RING ON THE FLOOR INSIDE THE MANHOLE CONNECTED TO THE TWO GROUND RODS. THE TRANSFORMER SECONDARY VOLTAGE NEUTRAL SHALL BE INTERCONNECTED WITH TRANSFORMER CASE GROUND.
5. A COMPRESSION CROSS GROUND GRID CONNECTOR SHALL BE USED FOR THE CONNECTION BETWEEN THE GROUND RING AND THE GROUND ROD.
6. THE CABLE TO BE USED ON THE PRIMARY VOLTAGE SIDE OF THE TRANSFORMER SHALL BE JACKETED CONCENTRIC NEUTRAL, #2 AWG, COPPER, 15 KV UNDERGROUND CABLE.
7. THE CABLE TO BE USED ON THE SECONDARY VOLTAGE SIDE OF THE TRANSFORMER SHALL BE 500 MCM, COPPER, 600 V INSULATION, XHHW-2 TYPE. FOR TRANSFORMERS WITH A CAPACITY OF 150 KVA, TWO 500 MCM, COPPER, 600 V INSULATION, XHHW-2 TYPE CABLES PER PHASE AND NEUTRAL SHALL BE USED. FOR A CAPACITY OF 300 KVA, THREE 500 MCM, COPPER, 600 V INSULATION, XHHW-2 TYPE CABLES PER PHASE AND NEUTRAL SHALL BE USED.
8. THE SUBMERSIBLE TRANSFORMER SHALL BE LABELED TO INDICATE FROM WHICH EQUIPMENT THE PRIMARY VOLTAGE CABLE COME AND TO WHICH EQUIPMENT THE PRIMARY VOLTAGE CABLE GO. THE SECONDARY VOLTAGE CABLE SHALL BE LABELED TO INDICATE TO WHICH PULL BOX PROVIDE SERVICE.
9. THE APPROPRIATE ELBOW ARRESTER SHALL BE INSTALLED AT THE OPEN POINT OF THE LOOP. THE SELECTION OF THE ELBOW ARRESTER RATING SHALL BE BASED ON THE ELECTRICAL SYSTEM VOLTAGE.
10. ONLY ONE SECONDARY CABLE IS ALLOWED PER TRANSFORMER CONNECTOR OUTLET. ANY ADDITIONAL SECONDARY SERVICE SHALL BE CONNECTED FROM NEAREST PULL BOX.
11. FOR INSTALLATION DETAILS OF THE LOADBREAK ELBOW CONNECTOR, ELBOW ARRESTER AND ANY SEPARABLE CONNECTOR, REFER TO ASSEMBLY NO. ASSY-2507.
12. ONE CONCENTRIC NEUTRAL STRAND CONNECTED TO THE ELBOW CONNECTOR GROUNDING EYE WILL BE USED AS DRAIN WIRE. (REFER TO ASSEMBLY NO. ASSY-2507)
13. USE RUBBER SPLICING TAPE (ITEM 2095) TO SEAL THE INPUT AND OUTPUTS OF THE SECONDARY VOLTAGE STUD MOUNT TRANSFORMER CONNECTOR.
14. IN THIS MANHOLE IS ONLY ALLOWED THE INSTALLATION OF THE SUBMERSIBLE TRANSFORMER, THE ENTRY AND EXIT OF THE PRIMARY VOLTAGE CABLES TO SERVE THE TRANSFORMER AND THE SECONDARY VOLTAGE CABLES COMING OUT FROM THE TRANSFORMER.
15. ADDITIONAL PULL BOXES HAS TO BE USED FOR THE INSTALLATION OF MULTIPLE OUTLET CONNECTORS TO EXTEND THE SECONDARY VOLTAGE DISTRIBUTION SYSTEM AND PROVIDE SECONDARY VOLTAGE SERVICES.
16. USE AN INSULATION SLEEVE TO COVER A VACANT OUTLET ON THE TRANSFORMER SECONDARY VOLTAGE CONNECTOR.
17. USE AN INSULATION SLEEVE TO COVER THE CABLES CONNECTION ON THE TRANSFORMER SECONDARY VOLTAGE CONNECTOR.
18. A 12'-0" X 6'-0" X 8'-0" MANHOLE SHALL BE USED FOR THE INSTALLATION OF THREE PHASE SUBMERSIBLE TRANSFORMER UP TO A CAPACITY OF 300 KVA. THIS MANHOLE IS AVAILABLE PRECAST FOR SIDEWALKS OR VEHICULAR TRAFFIC AREAS. IT INCLUDES THE FRAME AND COVER. TO REQUEST THE MANHOLE COVER ONLY, REFER TO (ITEM 2098) IN THE UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEM MATERIAL LIST.
19. THE SUPPLIER IS RESPONSIBLE FOR THE DESIGN OF THIS PRECAST MANHOLE COMPLYING WITH ALL STANDARDS AND CODES APPLICABLE FOR THIS TYPE OF PRODUCT AND THEIR CORRESPONDING INSTALLATION.
20. THE SUPPLIER SHALL SUBMIT THE SHOP DRAWINGS, CALCULATIONS AND ANY SUPPORTING DOCUMENT REQUIRED FOR THE CORRESPONDING LUMA EVALUATION AND APPROVAL, PRIOR TO SELL THIS PRODUCT. ALL DOCUMENTATION PROVIDED SHALL BE SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER, AS REQUIRED BY LAWS OF PUERTO RICO.
21. IF THE MANHOLE TO BE USED IS NOT A PRECAST ELEMENT AND WILL BE CONSTRUCTED ON SITE, THE CONTRACTOR WILL BE RESPONSIBLE TO DEVELOP AND SUBMIT THE CORRESPONDING DESIGN PLANS, CALCULATIONS AND SUPPORTING DOCUMENTS REQUIRED FOR EVALUATION AND APPROVAL OF LUMA, PRIOR TO START THE CONSTRUCTION.
22. THE MANHOLE DESIGN SHALL MEET THE REQUIREMENTS OF STANDARD NO. ASTM C857 - STANDARD PRACTICE FOR MINIMUM STRUCTURAL DESIGN LOADING FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES, AND STANDARD NO. ASTM C858 - STANDARD SPECIFICATION FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
23. THE CONCRETE MIX SHALL MEET THE REQUIREMENTS OF STANDARD NO. ASTM C94 - STANDARD SPECIFICATION FOR READY-MIXED CONCRETE. THE MINIMUM COMPRESSIVE STRENGTH FOR CONCRETE SHALL BE 4,000 PSI AT 28 DAYS, AS TESTED IN ACCORDANCE WITH STANDARD NO. ASTM C39 - STANDARD TEST METHOD FOR COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
24. THE REINFORCING STEEL SHALL BE FABRICATED AND PLACED IN CONFORMANCE WITH THE STANDARD NO. ACI 318 - SPECIFICATION OF BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE. THE REINFORCING STEEL SHALL BE DEFORMED BAR AND GRADE 60 (MINIMUM YIELD STRENGTH EQUAL TO 60,000 PSI), ACCORDING TO STANDARD NO. ASTM A615 - STANDARD SPECIFICATION FOR DEFORMED AND PLAIN CARBON-STEEL BARS FOR CONCRETE REINFORCEMENT, AND IT SHALL BE NEW BILLET-STEEL, AS REQUIRED. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
25. THE SUPPLIER'S DRAWINGS SHOULD INCLUDE A NOTE ABOUT THE RESPONSIBILITY OF THE CONTRACTOR TO SEAL THE JOINT BETWEEN SECTIONS OF THE MANHOLE WITH A CONTINUOUS LAYER OF BITUMINOUS MASTIC.

TITLE:

THREE PHASE SUBMERSIBLE TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA
NOTES

STANDARD NO. URD-33 VERSION 3
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PAGE 8 OF 10 DATE JAN 10, 2023
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DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES:

26. THE PROPERTIES OF THE SEALER SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
27. THE DETAILS AND PROPERTIES OF PULLING IRONS SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
28. A SUMP PUMP PIT SHALL BE SHOWN IN THE SUPPLIER'S DRAWINGS, INCLUDING THE SIZE OR DIAMETER AND PROPERTIES.
29. THE DESIGN CRITERIA IN THE SUPPLIER'S DRAWINGS SHALL INCLUDE THE FOLLOWING:
    A. ANGLE OF INTERNAL FRICTION OF SOIL = 25 DEGREE
    B. UNIT WEIGHT OF SOIL = 110 LBS/CU FT (DRY), 170 LBS/CU FT (SATURATED)
    C. COEFFICIENT OF LATERAL EARTH PRESSURE, Ka = 0.5
    D. GROUND WATER LEVEL BELOW FINISH GRADE = ASSUME 3', UNLESS OTHER INFORMATION IS AVAILABLE
    E. IMPACT = 30%
    F. TRAFFIC LOAD = AASHTO HL-93 LOADING (AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS)
    G. LIVE LOAD = 300 LBS/SQ FT (MINIMUM)
    H. SURCHARGE LOAD = ASSUME 3' OF EARTH COVER, UNLESS OTHER INFORMATION IS AVAILABLE.
30. THE BACKFILL AND #67 CRUSHED STONE OR GRAVEL USED FOR THIS INSTALLATION SHALL BE COMPACTED EVERY 6" OF THICKNESS TO A MINIMUM OF 95% OF THE STANDARD MAXIMUM DENSITY AT THE PROPER MOISTURE CONTENT, ACCORDING TO LATEST VERSION OF THE STANDARD NO. ASTM D698.
31. THE EXISTING GROUND AT THE BOTTOM OF THE EXCAVATION SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT OF THE UNDISTURBED SOIL.
32. PLACE THE BACKFILL OVER COMPACTED EXISTING GROUND TO MINIMUM THICKNESS OF 4". THE BACKFILL SHALL BE A-2-4 MATERIAL (STANDARD NO. ASTM D3282, LATEST EDITION), AND IT SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT.
33. INSTALL THE NONWOVEN GEOTEXTILE FILTER FABRIC (8 OUNCES PER SQUARE YARDS), SIMILAR OR EQUAL TO REGISTERED PRODUCT MIRAFI S800 OR SKAPS GT-180, OVER COMPACTED BACKFILL.
34. PLACE CLEAN #67 CRUSHED STONE OR GRAVEL OVER NONWOVEN GEOTEXTILE FILTER FABRIC TO A MINIMUM THICKNESS OF 6". THIS MATERIAL SHALL BE UNIFORMLY GRADED AND THE SIZES ARE FROM ¾" DOWN TO FINE PARTICLES. IT SHALL BE FREE FROM SOFT AND DISINTEGRATED PIECES, CLAY, ORGANIC OR OTHER DELETERIOUS MATTER. THE CRUSHED STONE OR GRAVEL SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT.
35. THE MANHOLE MUST BE INSTALLED PARALLEL TO THE SIDEWALK AND THE COVER SHALL BE INSTALLED FLUSH WITH THE FINISH GRADE.
36. ALL PVC DUCTS ENTERING THE MANHOLE SHALL HAVE A PVC END BELL (ITEM 2045) FLUSH WITH INSIDE WALLS TO PROVIDE A SMOOTH AND SAFE CABLE ENTRY. THE QUANTITY AND SIZE OF DUCTS WILL DEPEND ON THE DESIGN OF THE UNDERGROUND SYSTEM.
37. THE LOWEST DUCTS IN THE MANHOLE SHALL NOT BE LESS THAN 12" FROM THE FLOOR.
38. ALL DUCTS, INCLUDING SPARE DUCTS, SHALL BE SEALED WITH AN APPROPRIATE DUCT SEALING PLUG (ITEM 2056) OR DUCT SEALING COMPOUND (ITEM 2014) TO PREVENT ENTRY OF WATER OR OTHER FOREIGN OBJECTS.
39. A NONMETALLIC CABLE RACK WITH ARMS SHALL BE INSTALLED ON THE MANHOLE WALLS TO SUPPORT THE CABLES INSIDE THE MANHOLE. ALL CABLES SHALL BE TIED TO THE ARMS OF THE CABLE RACK USING 24" WEATHER RESISTANT CABLE TIES (ITEM 2026). (REFER TO ASSEMBLY NO. ASSY-2503)
40. A MINIMUM OF 4" STRAIGHT CABLE LENGTH IS REQUIRED AT END BELL EDGE. THE INSTALLATION OF THE CABLES SHALL COMPLY WITH THE MINIMUM BEND RADIUS.
41. THE MANHOLE SHALL HAVE A PROVISION TO CONNECT THE COVER FRAME TO THE GROUND RING INSIDE THE MANHOLE. THIS CONNECTION SHALL BE MADE WITH #2 AWG COPPER BARE CONDUCTOR (ITEM 0080). THE GROUND CONDUCTOR SHALL BE ATTACHED TO THE MANHOLE WALL USING CABLE STRAPS (ITEM 2028). A CABLE STRAP SHALL BE INSTALLED EVERY 30".

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE SUBMERSIBLE TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
BILL OF MATERIAL

STANDARD NO. URD-33 VERSION 3
DOCUMENT NO. 4325.034
PAGE 9 OF 10 DATE JAN 10, 2023
SUBMITTED LUIS R. SOTO LIC. 11658
EMANUEL SANTANA
REVIEWED IVETTE D. SANCHEZ LIC. 13837
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DIGITIZED VICTOR R. FEBRES LIC. 3412

MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0006	COMPRESSION SPLICES AND CONNECTORS	VARIES	AS REQ.
0037	5/8" X 8' GROUND ROD	002-02465	2
0080	COPPER BARE CONDUCTOR	VARIES	AS REQ.
0087	15 KV UNDERGROUND CABLE	VARIES	AS REQ.
0145	DOUBLE EYE TERMINAL CONNECTOR	VARIES	AS REQ.
2004	FAULT CURRENT INDICATOR	038-01545	3
2005	STRANDED COPPER CABLE, 600V, XHHW-2	VARIES	AS REQ.
2011	ELBOW ARRESTER	VARIES	AS REQ.
2014	DUCT SEALING COMPOUND	003-02935	AS REQ.
2017	WEDGE ANCHOR BOLT	038-83148	2
2026	CABLE TIE	038-83155	AS REQ.
2049	A-2-4 BACKFILL MATERIAL	038-83207	AS REQ.
2050	#67 CRUSHED STONE OR GRAVEL	038-83208	AS REQ.
2051	NONWOVEN GEOTEXTILE FILTER FABRIC	038-83209	AS REQ.
2056	DUCT SEALING PLUG	VARIES	AS REQ.
2059	LOADBREAK ELBOW CONNECTOR	038-00844	6
2082	PARKING STAND ARRESTER	VARIES	AS REQ.
2089	THREE PHASE SUBMERSIBLE TRANSFORMER	VARIES	1

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE SUBMERSIBLE TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA
BILL OF MATERIAL

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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
2095	RUBBER SPLICING TAPE	038-83609	AS REQ.
2097	12' X 6' X 8' MANHOLE WITH COVER	038-52784	1
2503	NONMETALLIC CABLE RACK ASSEMBLY	ASSY-2503	AS REQ.
2507	SEPARABLE INSULATED CONNECTORS AND CABLE TERMINATION ASSEMBLY	ASSY-2507	AS REQ.
URD-54	DUCT SIZING STANDARD	URD-54	AS REQ.

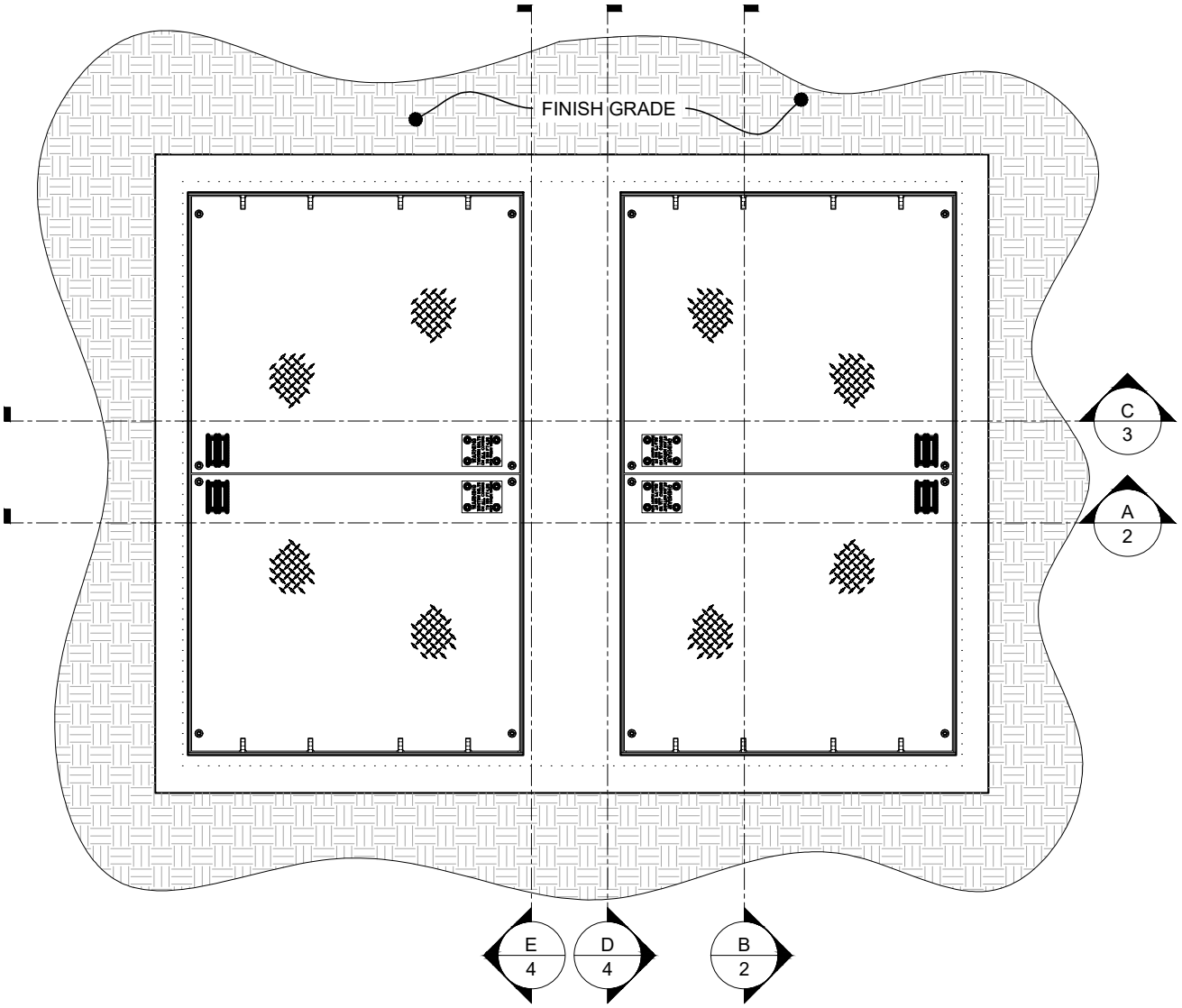
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

12' X 9' X 8' MANHOLE FOR UNDERGROUND DISTRIBUTION
SWITCHGEAR WET VAULT MOUNTED STYLE
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-34-D VERSION 1
DOCUMENT NO. 4325.035
PAGE 1 OF 11 DATE OCT 10, 2022
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED ALEX J. RODRIGUEZ LIC. 24174
EMILIO CUADRADO LIC. 3000



PLAN VIEW
(SEE NOTES 1 AND 2)

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

12' X 9' X 8' MANHOLE FOR UNDERGROUND DISTRIBUTION
SWITCHGEAR WET VAULT MOUNTED STYLE
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-34-D VERSION 1
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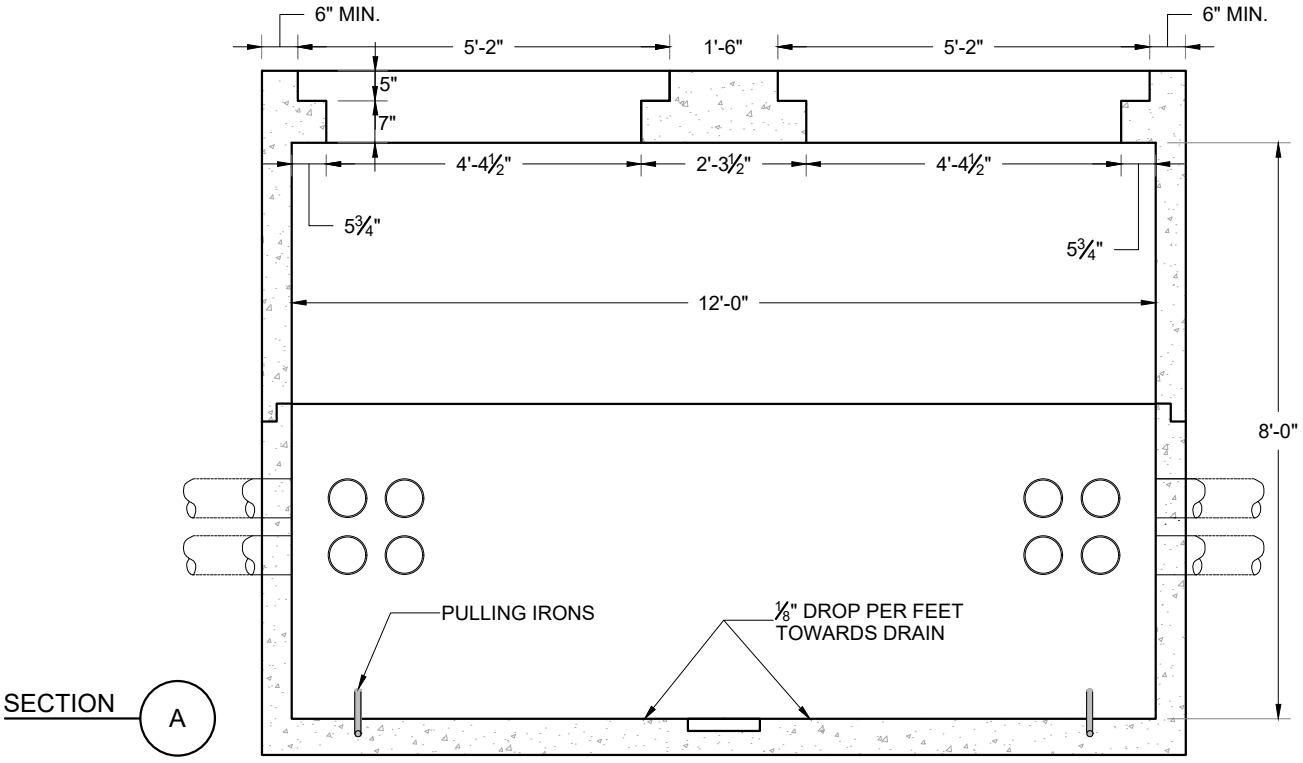
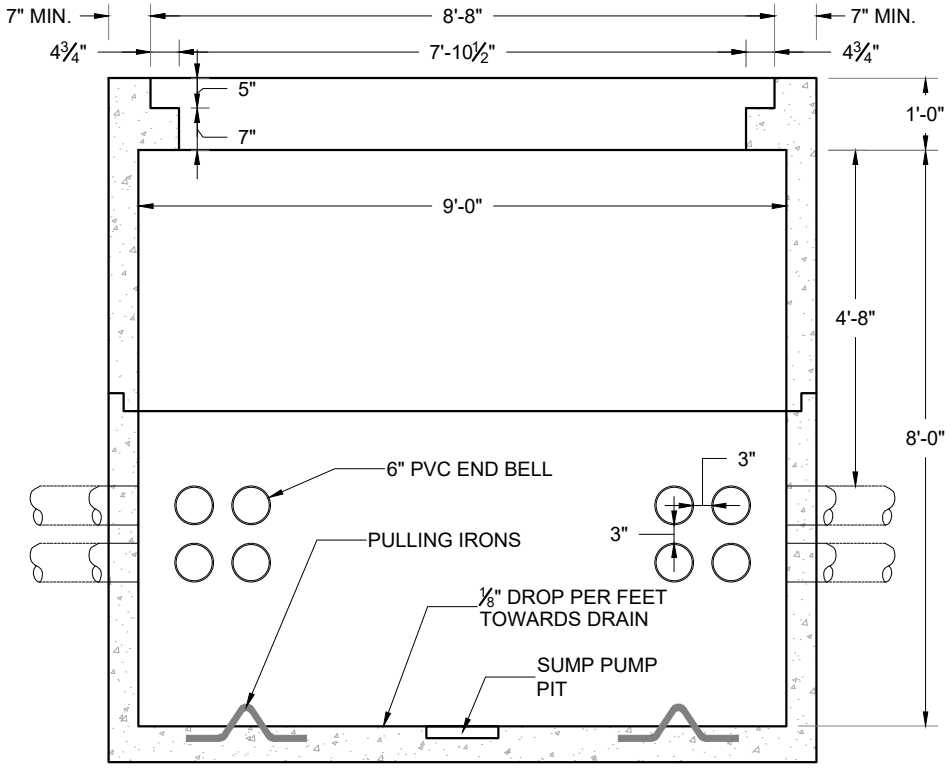


SECTION A



SECTION B

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

12' X 9' X 8' MANHOLE FOR UNDERGROUND DISTRIBUTION
SWITCHGEAR WET VAULT MOUNTED STYLE
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-34-D VERSION 1
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PAGE 3 OF 11 DATE OCT 10, 2022
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REVIEWED IVETTE D. SANCHEZ LIC. 13837
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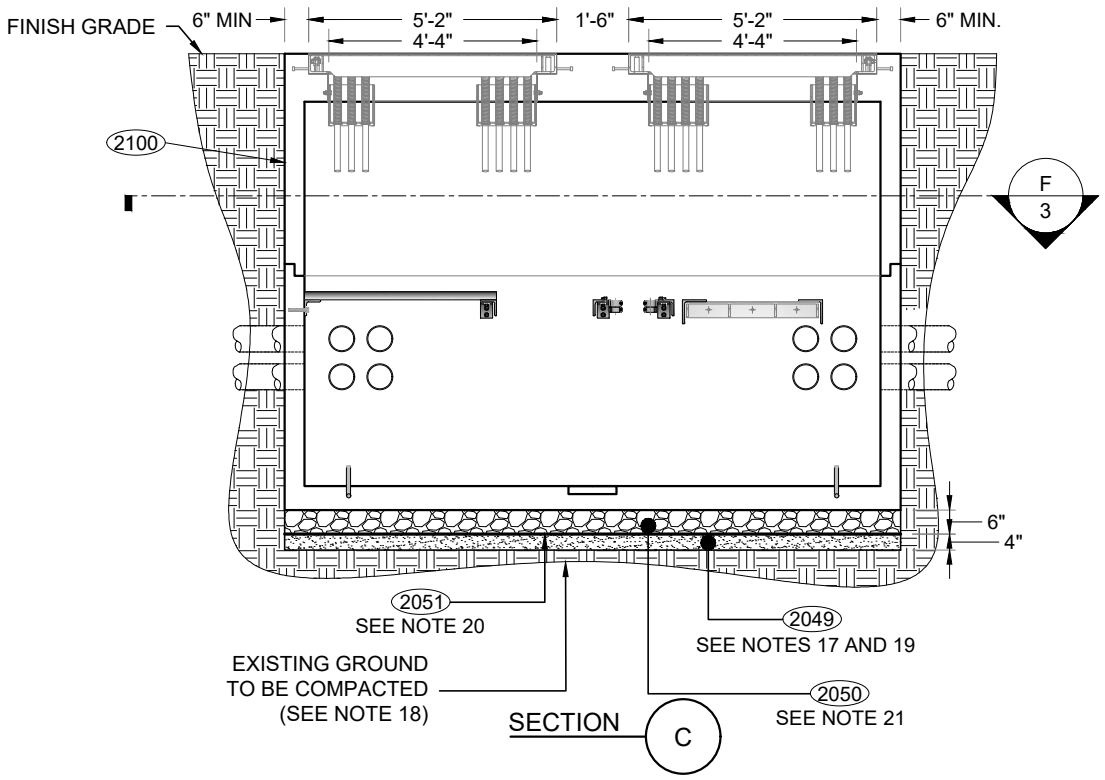

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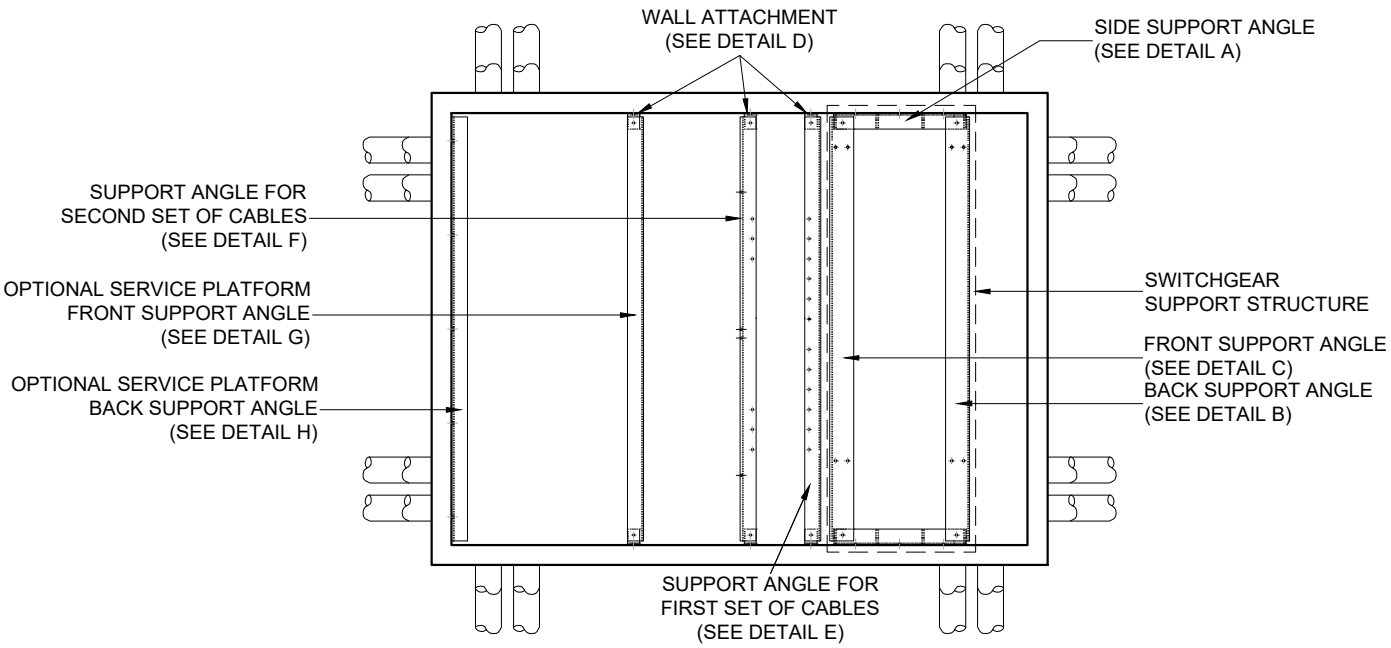

SECTION F

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

12' X 9' X 8' MANHOLE FOR UNDERGROUND DISTRIBUTION
SWITCHGEAR WET VAULT MOUNTED STYLE
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-34-D VERSION 1
DOCUMENT NO. 4325.035
PAGE 4 OF 11 DATE OCT 10, 2022
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174
REVIEWED IVETTE D. SANCHEZ LIC. 13837
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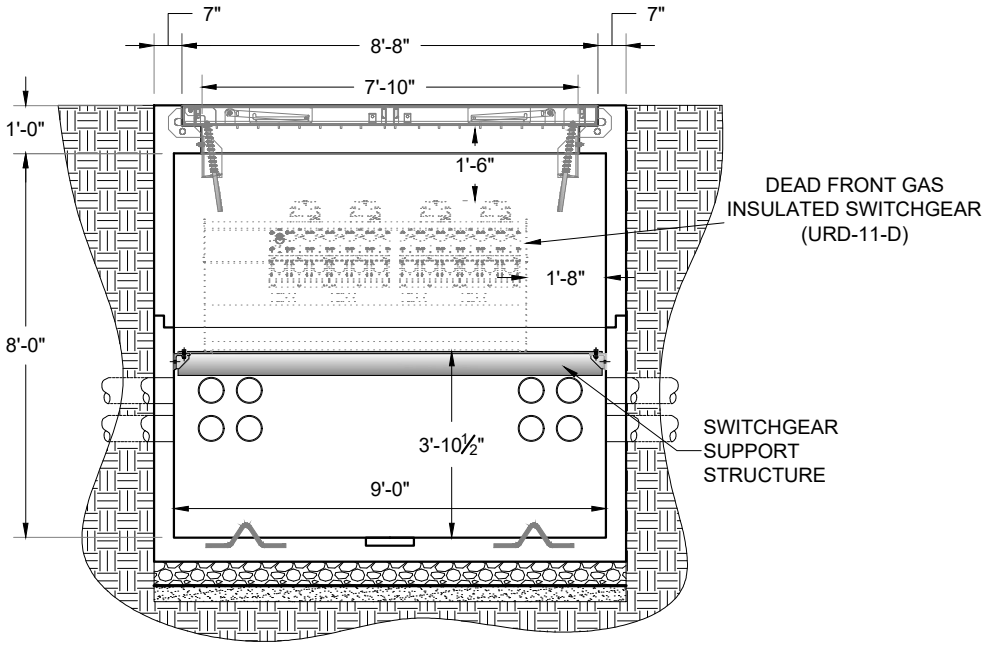
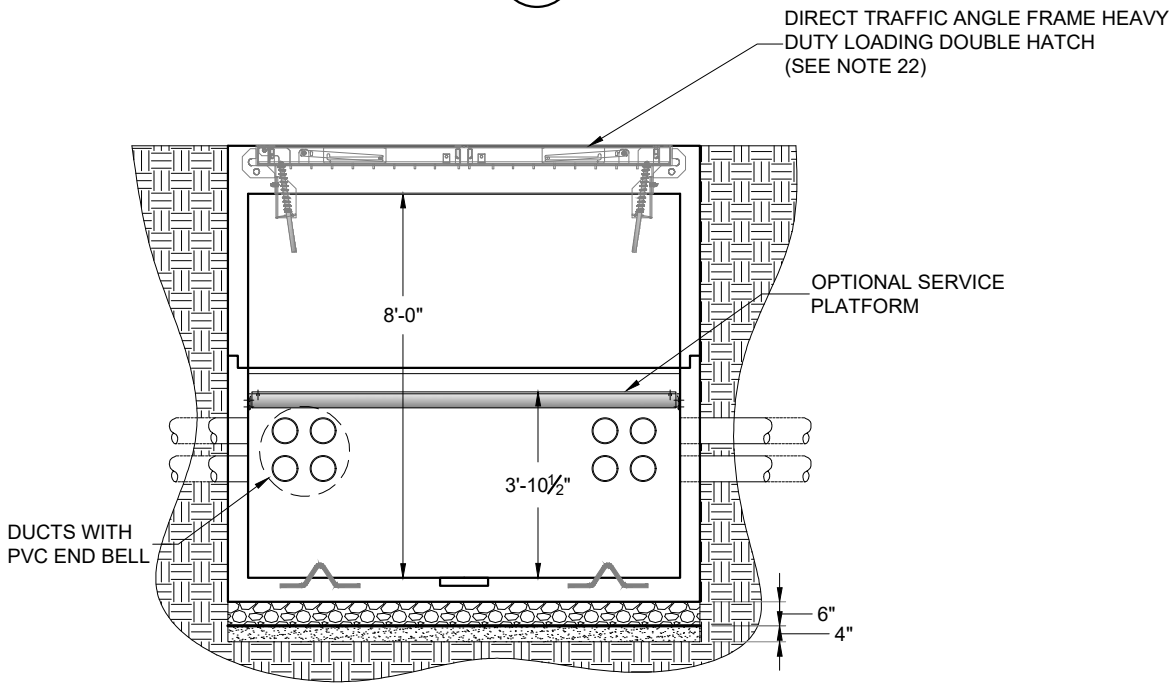


SECTION D



SECTION E

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

12' X 9' X 8' MANHOLE FOR UNDERGROUND DISTRIBUTION SWITCHGEAR WET VAULT MOUNTED STYLE MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-34-D VERSION 1
DOCUMENT NO. 4325.035
PAGE 5 OF 11 DATE OCT 10, 2022
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REVIEWED IVETTE D. SANCHEZ LIC. 13837
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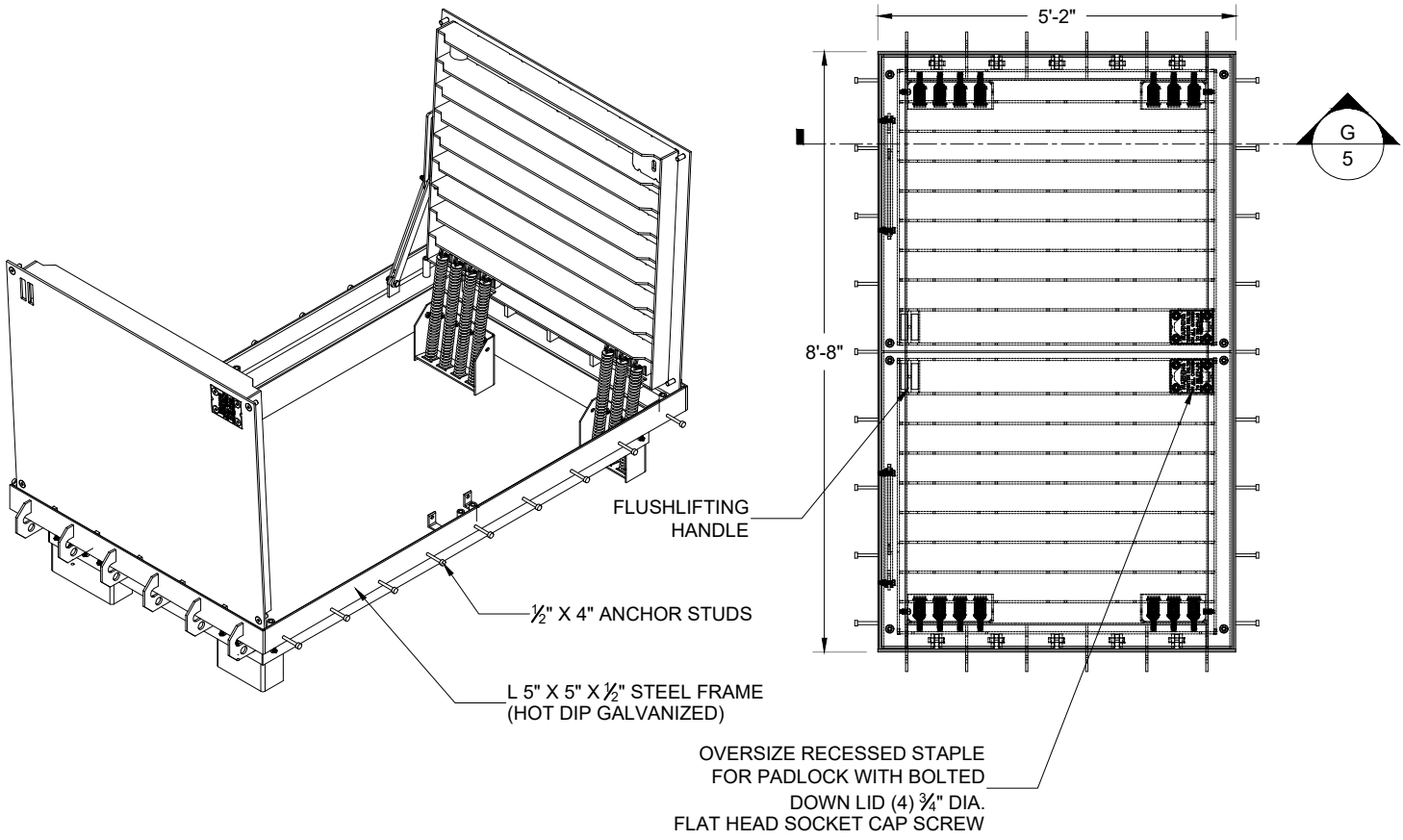

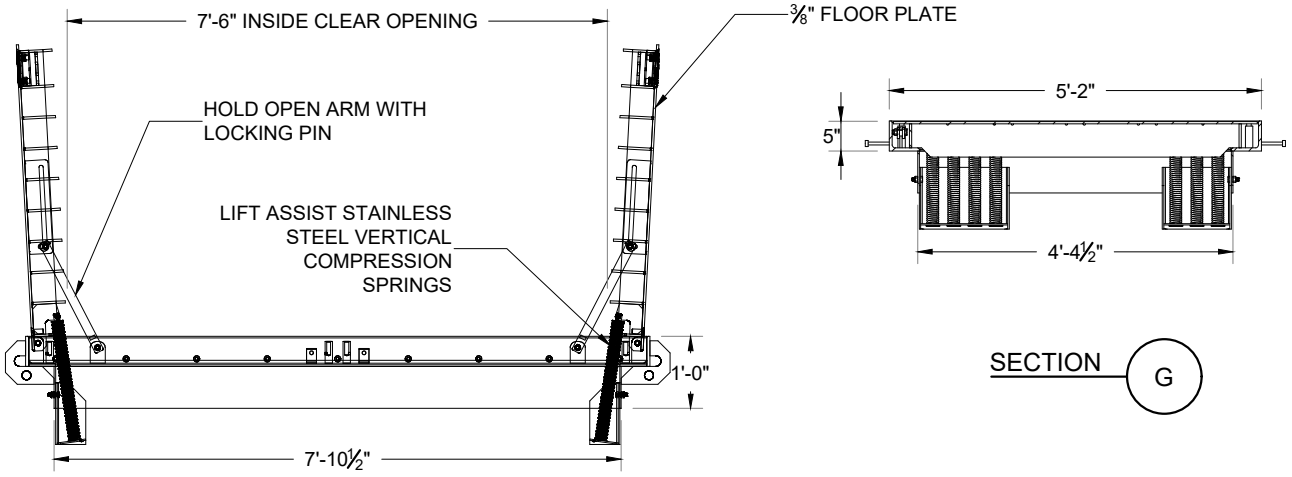

SECTION G

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

12' X 9' X 8' MANHOLE FOR UNDERGROUND DISTRIBUTION
SWITCHGEAR WET VAULT MOUNTED STYLE
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-34-D VERSION 1
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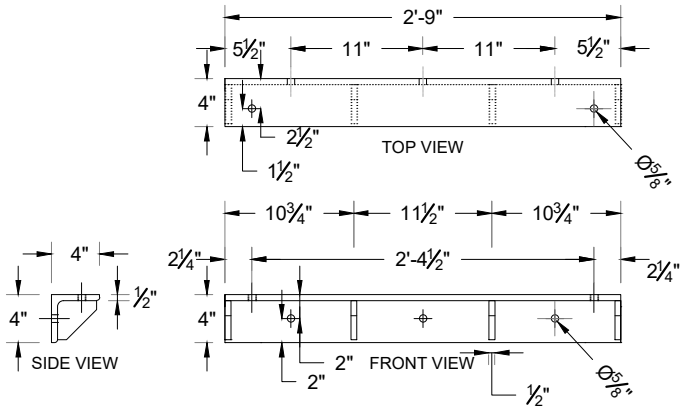
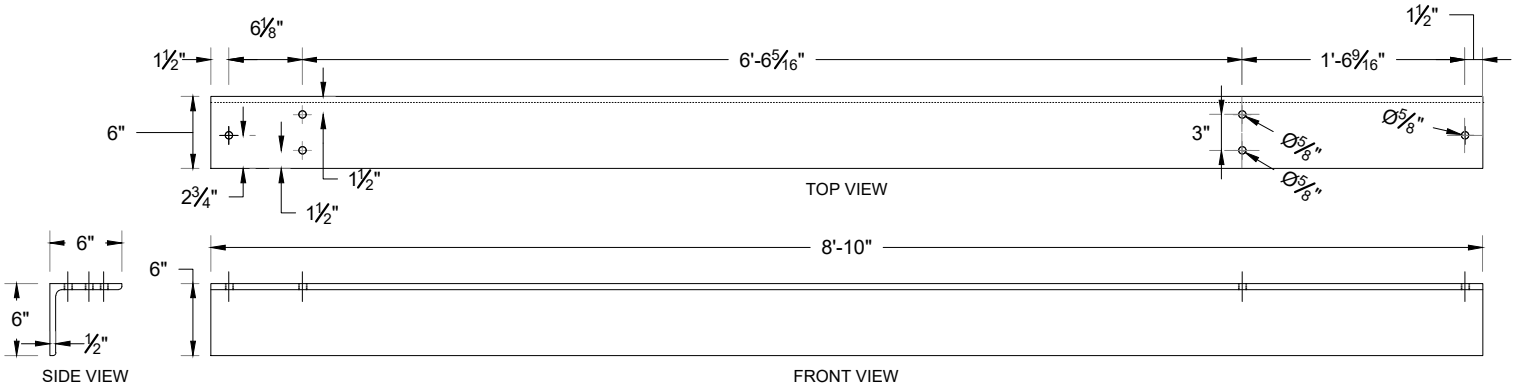


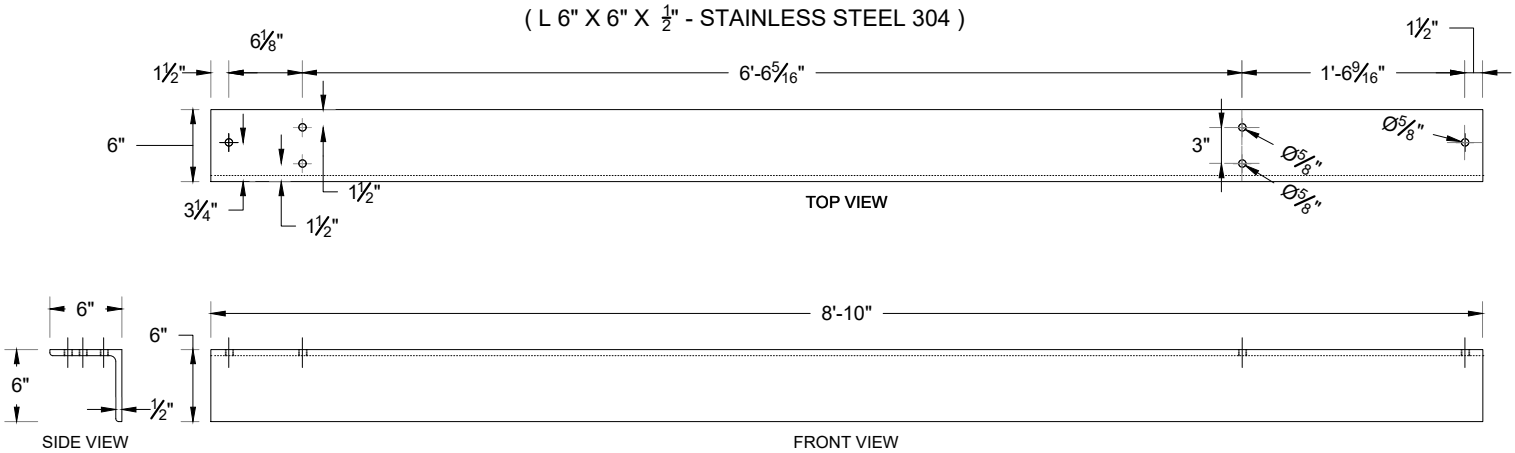
DETAIL A

SIDE SUPPORT ANGLE - QUANTITY: 2 EA
(L 4" X 4" X ½" - STAINLESS STEEL 304)



DETAIL B

BACK SUPPORT ANGLE - QUANTITY: 1 EA
(L 6" X 6" X ½" - STAINLESS STEEL 304)



DETAIL C

FRONT SUPPORT ANGLE - QUANTITY: 1 EA
(L 4" X 4" X ½" - STAINLESS STEEL 304)

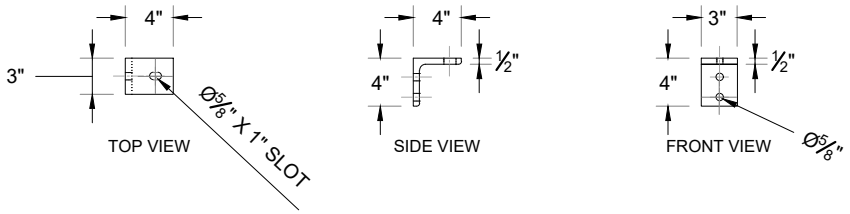
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

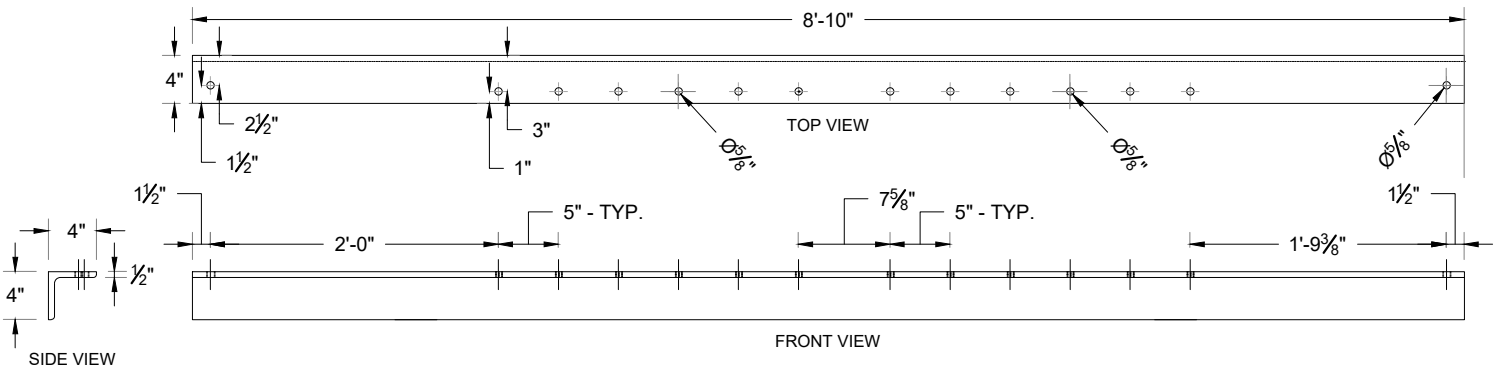
12' X 9' X 8' MANHOLE FOR UNDERGROUND DISTRIBUTION
SWITCHGEAR WET VAULT MOUNTED STYLE
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-34-D VERSION 1
DOCUMENT NO. 4325.035
PAGE 7 OF 11 DATE OCT 10, 2022
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED ALEX J. RODRIGUEZ LIC. 24174
EMILIO CUADRADO LIC. 3000



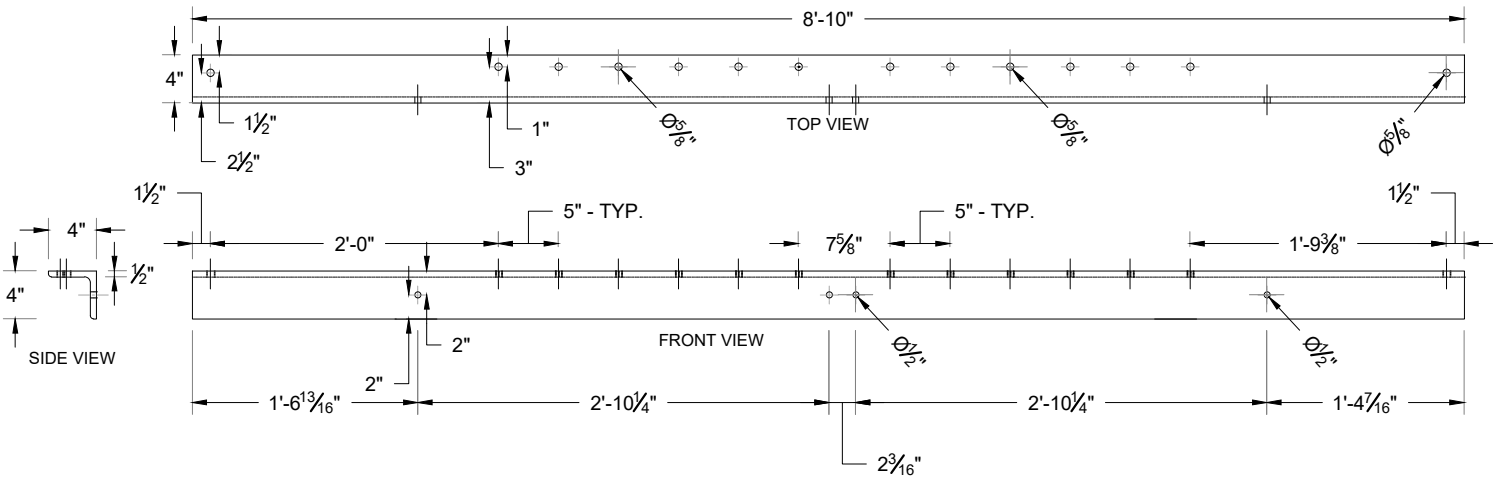
DETAIL D

WALL ATTACHMENT - QUANTITY: 6 EA
(L 4" X 4" X ½" - STAINLESS STEEL 304)



DETAIL E

CABLE SUPPORT ANGLE - FIRST SET OF CABLES
(L 4" X 4" X ½" - STAINLESS STEEL 304)



DETAIL F

CABLE SUPPORT ANGLE - SECOND SET OF CABLES AND NEUTRAL BUS BAR
(L 4" X 4" X ½" - STAINLESS STEEL 304)

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

12' X 9' X 8' MANHOLE FOR UNDERGROUND DISTRIBUTION
SWITCHGEAR WET VAULT MOUNTED STYLE
MAXIMUM VOLTAGE: 13.2 KV

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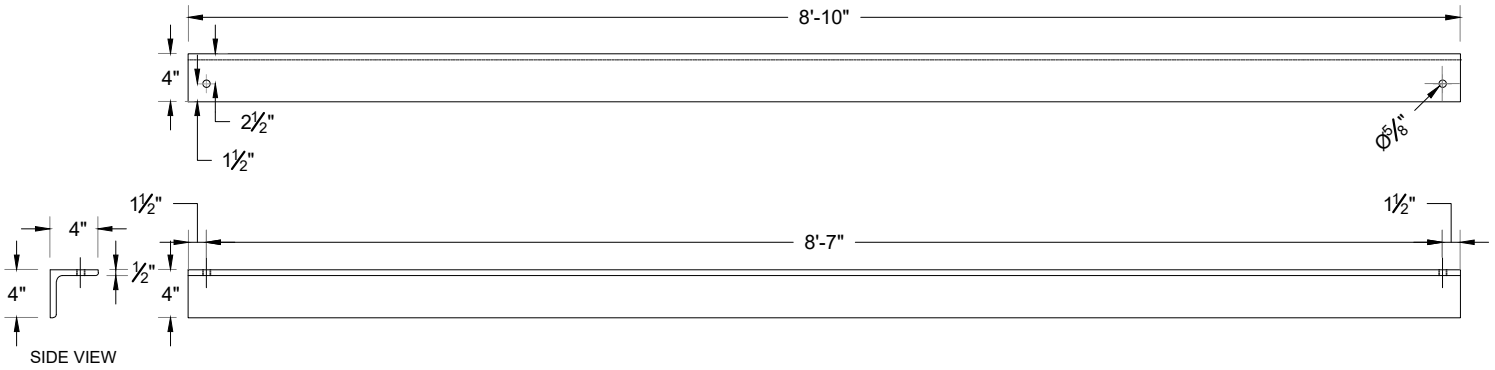
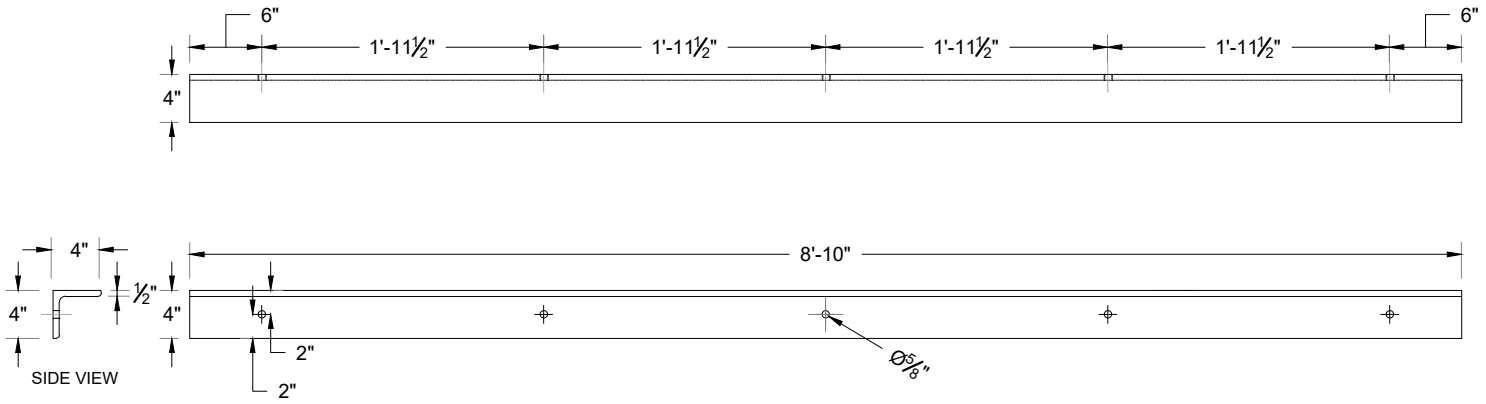


DETAIL G
OPTIONAL SERVICE PLATFORM
FRONT SUPPORT ANGLE - QUANTITY: 1 EA
(L 4" X 4" X ½" - STAINLESS STEEL 304)



DETAIL H
OPTIONAL SERVICE PLATFORM
BACK SUPPORT ANGLE - QUANTITY: 1 EA
(L 4" X 4" X ½" - STAINLESS STEEL 304)

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

12' X 9' X 8' MANHOLE FOR UNDERGROUND DISTRIBUTION SWITCHGEAR WET VAULT MOUNTED STYLE MAXIMUM VOLTAGE: 13.2 KV NOTES

STANDARD NO. URD-34-D VERSION 1
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EMILIO CUADRADO LIC. 3000

NOTES:

1. THE GAS INSULATED SWITCHGEAR SHALL BE INSTALLED IN A MANHOLE DESIGNED, DETAILED AND FABRICATED IN ACCORDANCE WITH THE REQUIREMENTS OF THIS STANDARD. REFER TO STANDARD NO. URD-11-D FOR INSTALLATION DETAILS AND MATERIALS.
2. THE MANHOLE DIMENSIONS SHOWN IN THIS STANDARD WERE DETERMINED TO ACCOMMODATE A 15 KV WET-VAULT MOUNTED STYLE SWITCHGEAR WITH 4 POWER OPERATED WAYS, INTERNAL CONTROL POWER, AND CONTROL EQUIPMENT.
3. THE MANHOLE SHALL BE DESIGNED AND CONSTRUCTED SO THAT THE INSIDE DIMENSIONS ARE MAINTAINED UNDER SPECIFIED LOADING CONDITIONS.
4. THE MANHOLE SHALL BE INSTALLED LEVELED WITH A MAXIMUM TOLERANCE OF SLOPE OF 1% IN ANY OF THE AXES. THE TOP OF THE MANHOLE SHALL BE FLUSH WITH THE FINAL GRADE. THIS IS PARTICULARLY IMPORTANT FOR THE LEVEL OF THE SUPPORT STRUCTURES AND THE EQUIPMENT INSIDE THE MANHOLE.
5. THE SUPPLIER IS RESPONSIBLE FOR THE DESIGN OF THIS PRECAST MANHOLE COMPLYING WITH ALL STANDARDS AND CODES APPLICABLE FOR THIS TYPE OF PRODUCT AND THEIR CORRESPONDING INSTALLATION.
6. THE SUPPLIER SHALL SUBMIT THE SHOP DRAWINGS, CALCULATIONS AND ANY SUPPORTING DOCUMENT REQUIRED FOR THE CORRESPONDING LUMA EVALUATION AND APPROVAL, PRIOR TO SELL THIS PRODUCT. ALL DOCUMENTATION PROVIDED SHALL BE SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER, AS REQUIRED BY LAWS OF PUERTO RICO.
7. IF THE MANHOLE TO BE USED IS NOT A PRECAST ELEMENT AND WILL BE CONSTRUCTED ON SITE, THE CONTRACTOR WILL BE RESPONSIBLE TO DEVELOP AND SUBMIT THE CORRESPONDING DESIGN PLANS, CALCULATIONS AND SUPPORTING DOCUMENTS REQUIRED FOR EVALUATION AND APPROVAL OF LUMA, PRIOR TO START THE CONSTRUCTION.
8. THE MANHOLE DESIGN SHALL MEET THE REQUIREMENTS OF STANDARD NO. ASTM C857 - STANDARD PRACTICE FOR MINIMUM STRUCTURAL DESIGN LOADING FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES, AND STANDARD NO. ASTM C858 - STANDARD SPECIFICATION FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
9. THE CONCRETE MIX SHALL MEET THE REQUIREMENTS OF STANDARD NO. ASTM C94 - STANDARD SPECIFICATION FOR READY-MIXED CONCRETE. THE MINIMUM COMPRESSIVE STRENGTH FOR CONCRETE SHALL BE 4,000 PSI AT 28 DAYS, AS TESTED IN ACCORDANCE WITH STANDARD NO. ASTM C39 - STANDARD TEST METHOD FOR COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
10. THE REINFORCING STEEL SHALL BE FABRICATED AND PLACED IN CONFORMANCE WITH THE SPECIFICATION OF STANDARD NO. ACI 318 - BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE. THE REINFORCING STEEL SHALL BE DEFORMED BAR AND GRADE 60 (MINIMUM YIELD STRENGTH EQUAL TO 60,000 PSI), ACCORDING TO STANDARD NO. ASTM A615 - STANDARD SPECIFICATION FOR DEFORMED AND PLAIN CARBON-STEEL BARS FOR CONCRETE REINFORCEMENT, AND IT SHALL BE NEW BILLET-STEEL, AS REQUIRED. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
11. THE SUPPLIER'S DRAWINGS SHOULD INCLUDE A NOTE ABOUT THE RESPONSIBILITY OF THE CONTRACTOR TO SEAL THE JOINT BETWEEN THE COVER AND BOX WITH A CONTINUOUS LAYER OF BITUMINOUS MASTIC.
12. THE PROPERTIES OF THE SEALER SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
13. EMBEDDED SLEEVES WITH END BELLS SHALL BE PROVIDED IN THE MANHOLE FOR CABLE ENTRY AND EXIT. END BELL LOCATION, DIAMETER, AND SPACING MUST BE AS SHOWN ON DRAWINGS. ANY DIFFERENT CONDUIT ENTRANCE LAYOUT MUST BE APPROVED BY LUMA PREVIOUS MANHOLE CONSTRUCTION.
14. THE DETAILS AND PROPERTIES OF PULLING IRONS SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
15. A SUMP PUMP PIT SHALL BE SHOWN IN THE SUPPLIER'S DRAWINGS, INCLUDING THE SIZE OR DIAMETER AND PROPERTIES.
16. THE DESIGN CRITERIA IN THE SUPPLIER'S DRAWINGS SHALL INCLUDE THE FOLLOWING:
    A. ANGLE OF INTERNAL FRICTION OF SOIL = 25 DEGREE
    B. UNIT WEIGHT OF SOIL = 110 LBS/CU FT (DRY), 170 LBS/CU FT (SATURATED)
    C. COEFFICIENT OF LATERAL EARTH PRESSURE, Ka = 0.5
    D. GROUND WATER LEVEL BELOW FINISH GRADE = ASSUME 3', UNLESS OTHER INFORMATION IS AVAILABLE
    E. IMPACT = 30%
    F. TRAFFIC LOAD = AASHTO HL-93 LOADING (AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS)
    G. LIVE LOAD = 300 LBS/SQ FT (MINIMUM)
17. THE BACKFILL AND #67 CRUSHED STONE OR GRAVEL USED FOR THIS INSTALLATION SHALL BE COMPACTED EVERY 6" OF THICKNESS TO A MINIMUM OF 95% OF THE STANDARD MAXIMUM DENSITY AT THE PROPER MOISTURE CONTENT, ACCORDING TO LATEST VERSION OF THE STANDARD NO. ASTM D698.
18. THE EXISTING GROUND AT THE BOTTOM OF THE EXCAVATION SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT OF THE UNDISTURBED SOIL.
19. PLACE THE BACKFILL OVER COMPACTED EXISTING GROUND TO MINIMUM THICKNESS OF 4". THE BACKFILL SHALL BE A-2-4 MATERIAL (STANDARD NO. ASTM D3282, LATEST EDITION), AND IT SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT.
20. INSTALL THE NONWOVEN GEOTEXTILE FILTER FABRIC (8 OUNCES PER SQUARE YARDS), SIMILAR OR EQUAL TO REGISTERED PRODUCT MIRAFI S800 OR SKAPS GT-180, OVER COMPACTED BACKFILL.
21. PLACE CLEAN #67 CRUSHED STONE OR GRAVEL OVER NONWOVEN GEOTEXTILE FILTER FABRIC TO A MINIMUM THICKNESS OF 6". THIS MATERIAL SHALL BE UNIFORMLY GRADED AND THE SIZES ARE FROM 3/4" DOWN TO FINE PARTICLES. IT SHALL BE FREE FROM SOFT AND DISINTEGRATED PIECES, CLAY, ORGANIC OR OTHER DELETERIOUS MATTER. THE CRUSHED STONE OR GRAVEL SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT.
22. THIS MANHOLE MUST INCLUDE ALREADY INSTALLED TWO (2) DUAL LEAF FLOOR ACCESS HATCHES DESIGNED TO WITHSTAND DIRECT VEHICULAR TRAFFIC AS PER AASHTO HL93 AND ASTM C1802-14 LOAD LEVEL 7.

TITLE:

12' X 9' X 8' MANHOLE FOR UNDERGROUND DISTRIBUTION SWITCHGEAR WET VAULT MOUNTED STYLE MAXIMUM VOLTAGE: 13.2 KV NOTES

STANDARD NO. URD-34-D VERSION 1
DOCUMENT NO. 4325.035
PAGE 10 OF 11 DATE OCT 11, 2022
SUBMITTED ALEX J. RODRIGUEZ LIC. 24174
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED ALEX J. RODRIGUEZ LIC. 24174
EMILIO CUADRADO LIC. 3000

NOTES:

SUPPORT STRUCTURES AND OPTIONAL SERVICE PLATFORM:

23. THE MANHOLE MUST INCLUDE ALREADY INSTALLED THE EQUIPMENT SUPPORT STRUCTURE, THE CABLE SUPPORT ANGLE, AND THE SERVICE PLATFORM. THIS ELEMENTS MUST BE FABRICATED AND INSTALLED AS SPECIFIED IN THIS STANDARD. ALL THIS SUPPORT ELEMENTS MUST BE MADE OF 304 STAINLESS STEEL ANGLE. 304 STAINLESS STEEL MUST CONFORM ASTM A276 - STANDARD SPECIFICATION FOR STAINLESS STEEL BARS AND SHAPES.
24. THE ASSEMBLY OF STRUCTURAL ELEMENTS THAT CONFORM THE EQUIPMENT SUPPORT STRUCTURE, THE CABLE SUPPORT ANGLE, AND THE SERVICE PLATFORM MUST BE MADE USING ½ X 2" STAINLESS STEEL HEX HEAD BOLTS (ITEM 2048) WITH 2 FLAT ROUND WASHERS (ITEM 0002), 1 SPLIT LOCK WASHER (ITEM 0002), AND 1 ½" HEXAGONAL NUT (ITEM 2009).
25. THE SIDE SUPPORT ANGLES, AND WALL ATTACHMENTS MUST BE FIXED TO THE MANHOLE WALLS USING ½" X 5" SCREW ANCHOR FOR CONCRETE (ITEM 2090).
26. SUPPORT STRUCTURES AND SERVICE PLATFORM MUST BE INSTALLED USING THE DIMENSIONS SHOWN ON DRAWINGS. THE HEIGHT OF THE STRUCTURES MUST BE DEFINED WITH THE DIMENSIONS FROM THE FINISHED FLOOR. LEVEL MUST NOT BE USED TO ADJUST THE HEIGHT OF THE SUPPORT STRUCTURE.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

12' X 9' X 8' MANHOLE FOR UNDERGROUND DISTRIBUTION
SWITCHGEAR WET VAULT MOUNTED STYLE
MAXIMUM VOLTAGE: 13.2 KV
BILL OF MATERIAL

STANDARD NO. URD-34-D VERSION 1
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SUBMITTED ALEX J. RODRIGUEZ LIC. 24174
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MATERIALS

NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY. SINGLE / THREE PHASE
2049	A-2-4 BACKFILL MATERIAL	038-83207	AS REQ.
2050	#67 CRUSHED STONE OR GRAVEL	038-83208	AS REQ.
2051	NONWOVEN GEOTEXTILE FILTER FABRIC	038-83209	AS REQ.
2100	12' X 9' X 8' MANHOLE WITH DUAL LIFT ASSIST HATCHES	038-46718	1

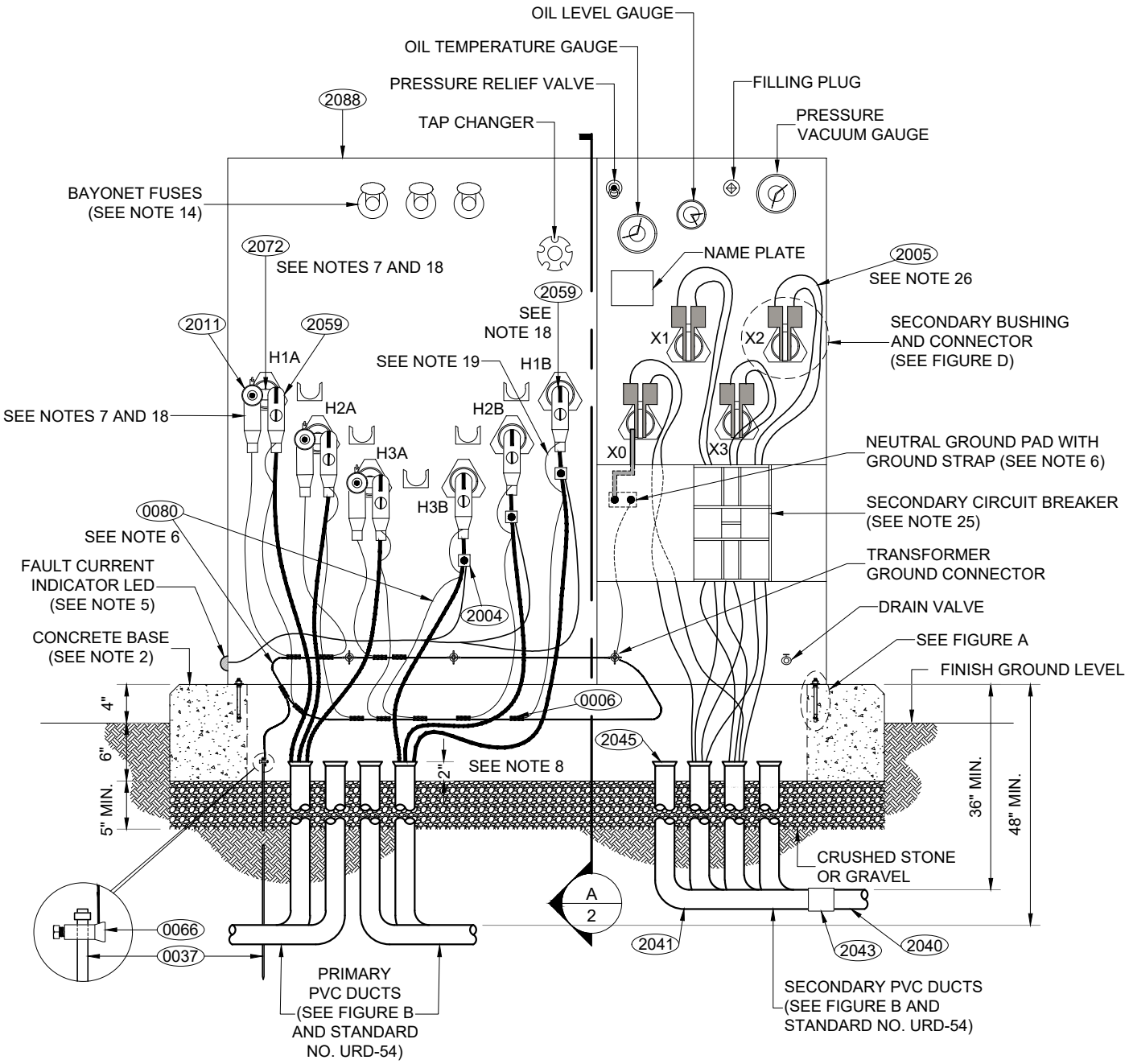
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA

STANDARD NO. URD-38 VERSION 3
DOCUMENT NO. 4325.036
PAGE 1 OF 11 DATE JAN 10, 2023
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412



FRONT VIEW

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA

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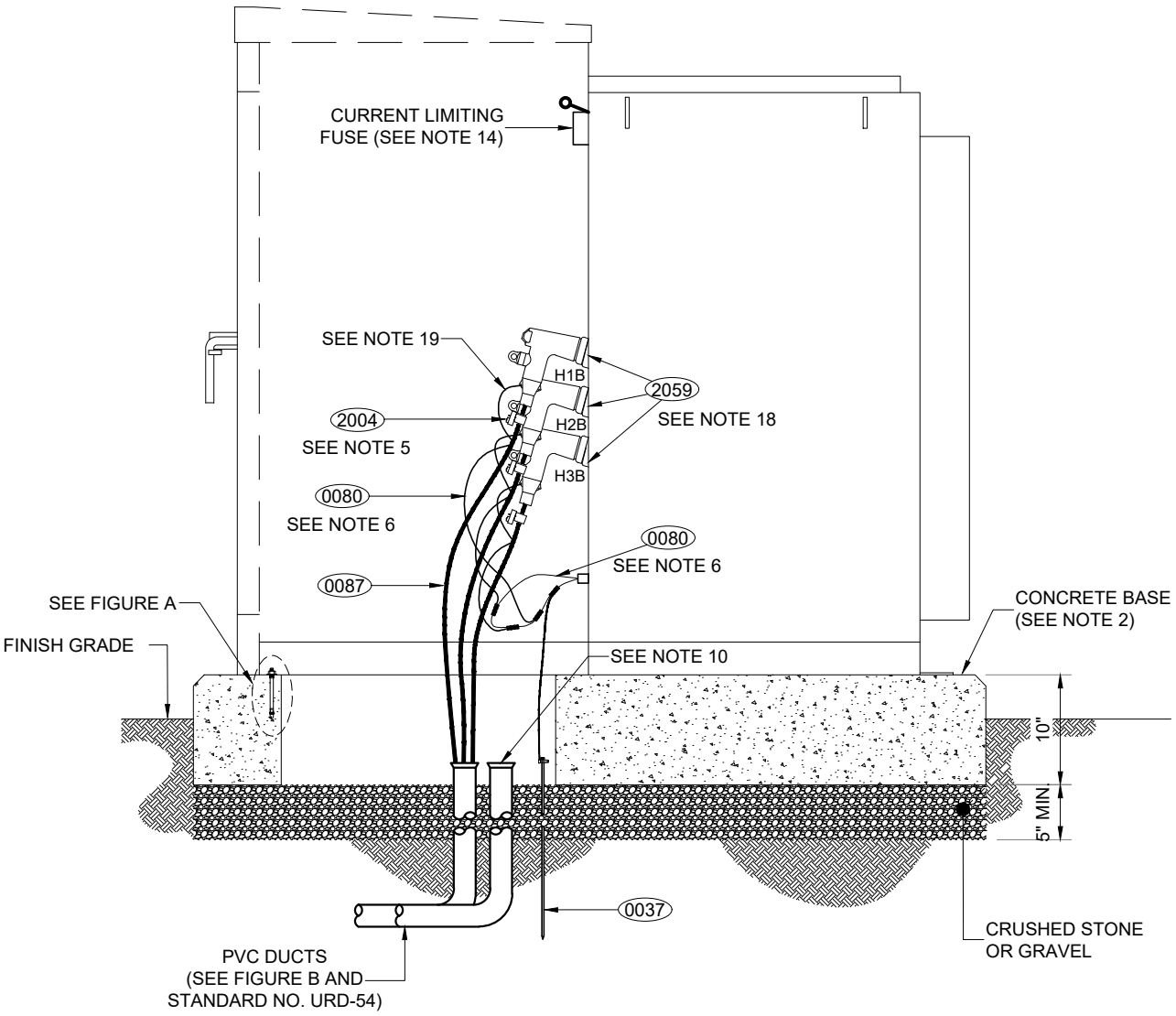

SIDE VIEW A

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA

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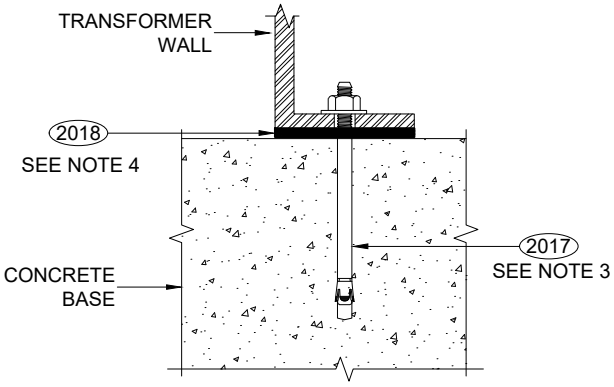

FIGURE A
TRANSFORMER MOUNTING

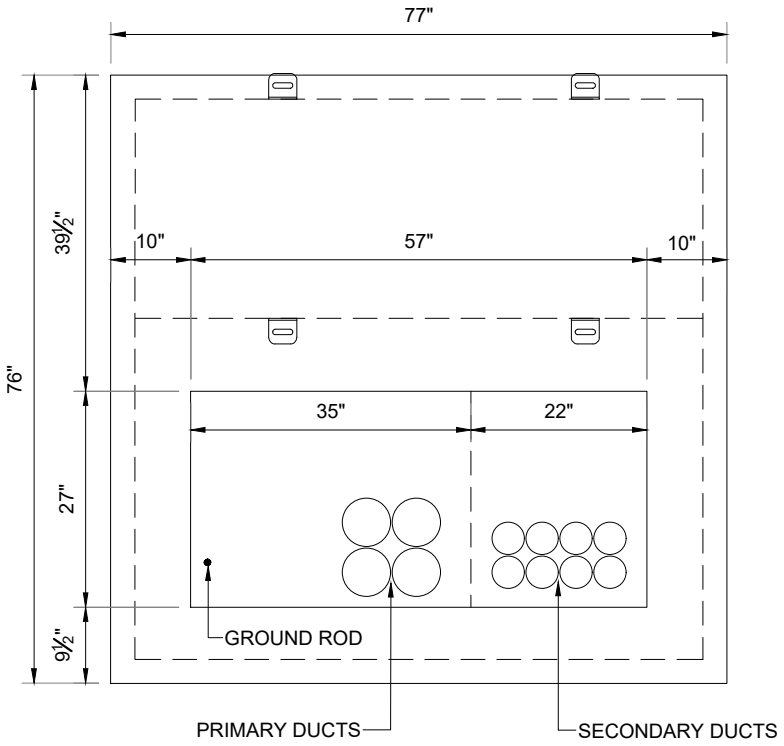

FIGURE B
DUCTS INSTALLATION AREA
(SEE NOTES 9 AND 10)

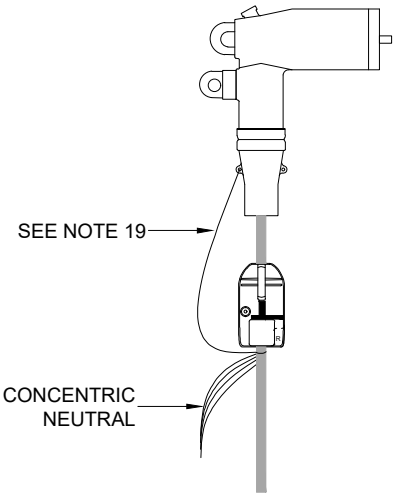

FIGURE C
FAULT CURRENT INDICATOR

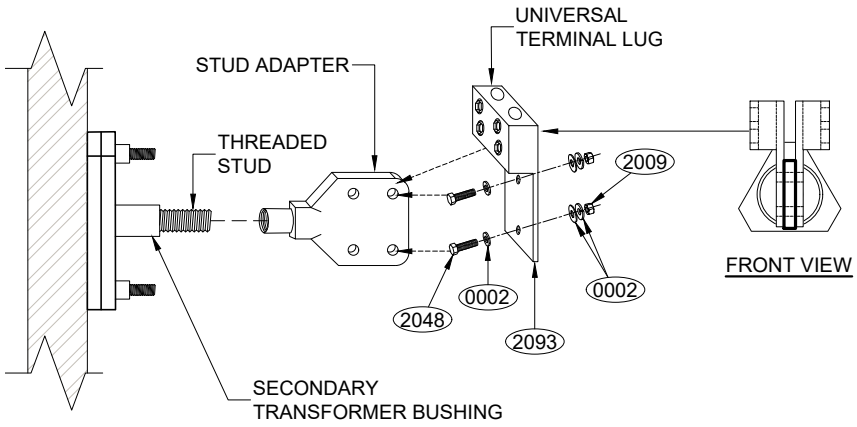

FIGURE D
SECONDARY CONNECTOR

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

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MAXIMUM VOLTAGE: 13.2 KV
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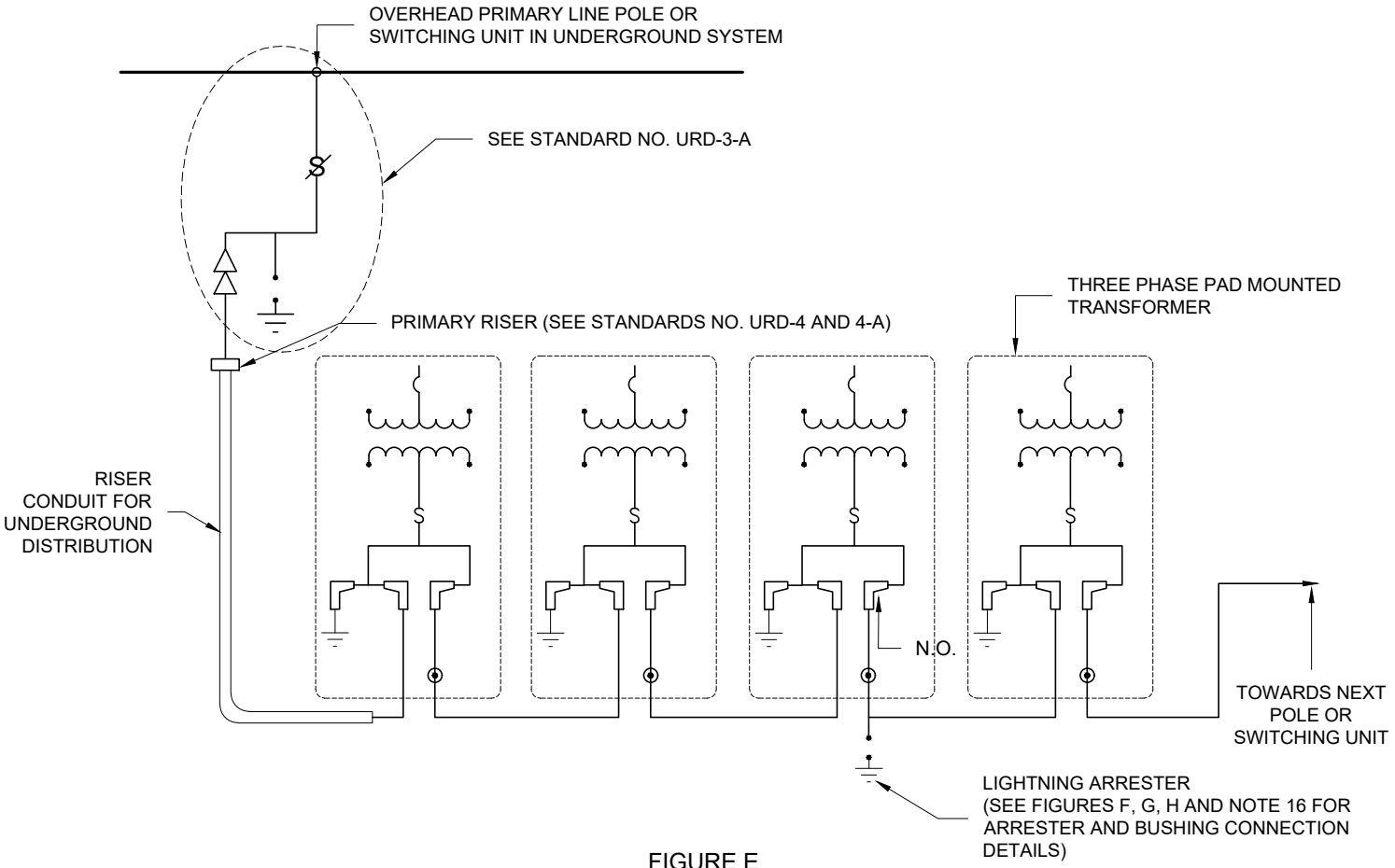

FIGURE E
THREE PHASE LOOP-FEED SYSTEM

LEGEND:

- CURRENT LIMITING FUSE
- ELBOW ARRESTER
- FAULT CURRENT INDICATOR
- FUSE CUTOUT
- LIGHTNING ARRESTER
- LOADBREAK ELBOW CONNECTOR
- N.C. NORMALLY CLOSE
- N.O. NORMALLY OPEN
- SECONDARY CIRCUIT BREAKER
- STRESS CONE OUTDOOR TERMINATION
- THREE PHASE TRANSFORMER
- 15 KV UNDERGROUND CABLE

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA

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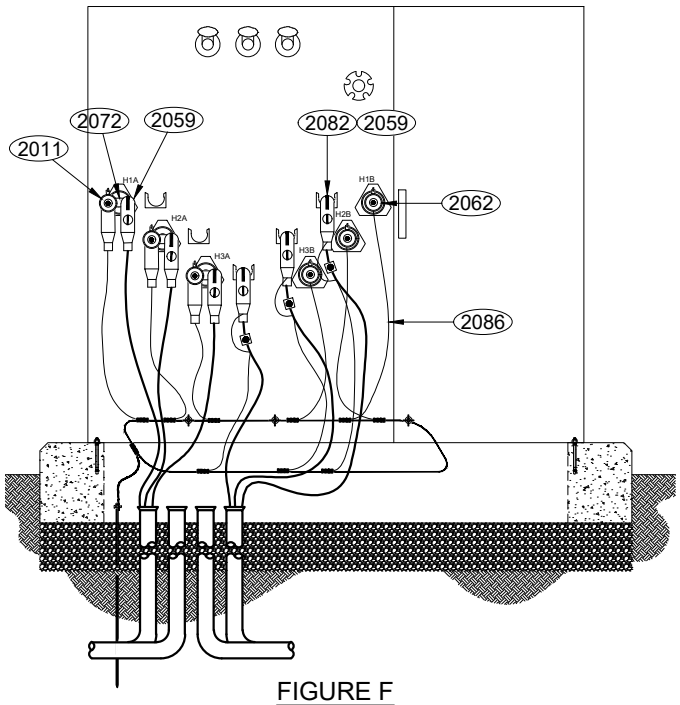


FIGURE F
ARRESTER CONNECTION DETAIL FOR
HB 1, 2, 3 NORMALLY OPEN

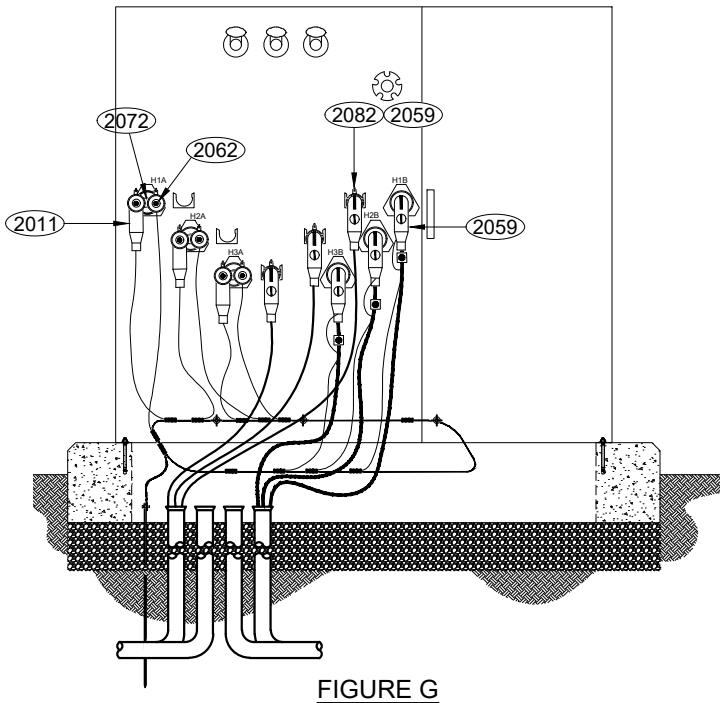
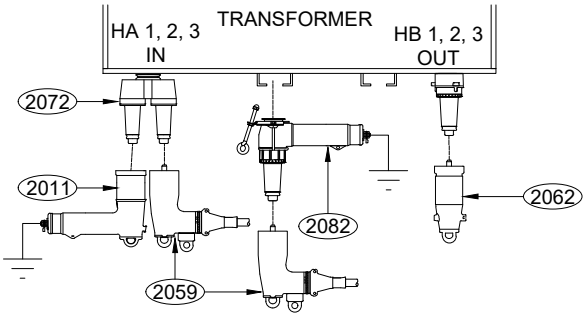
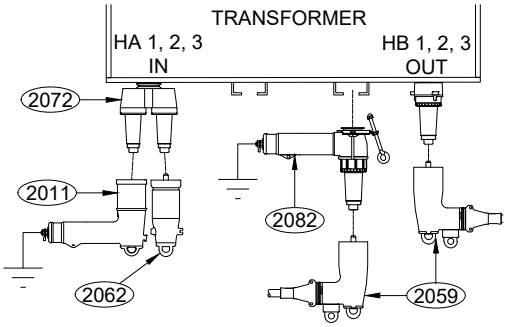


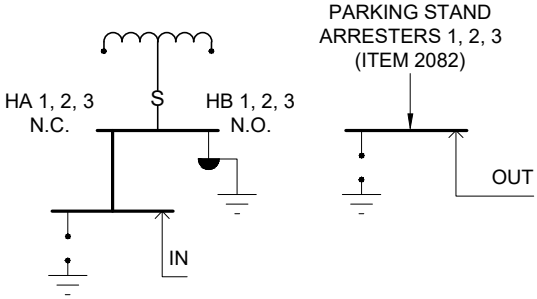
FIGURE G
ARRESTER CONNECTION DETAIL FOR
HA 1, 2, 3 NORMALLY OPEN



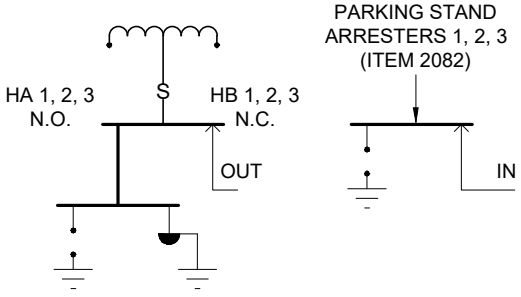
TOP VIEW



TOP VIEW



ONE-LINE DIAGRAM
(NORMALLY OPEN - HB 1, 2, 3)



ONE-LINE DIAGRAM
(NORMALLY OPEN - HA 1, 2, 3)

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA

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APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

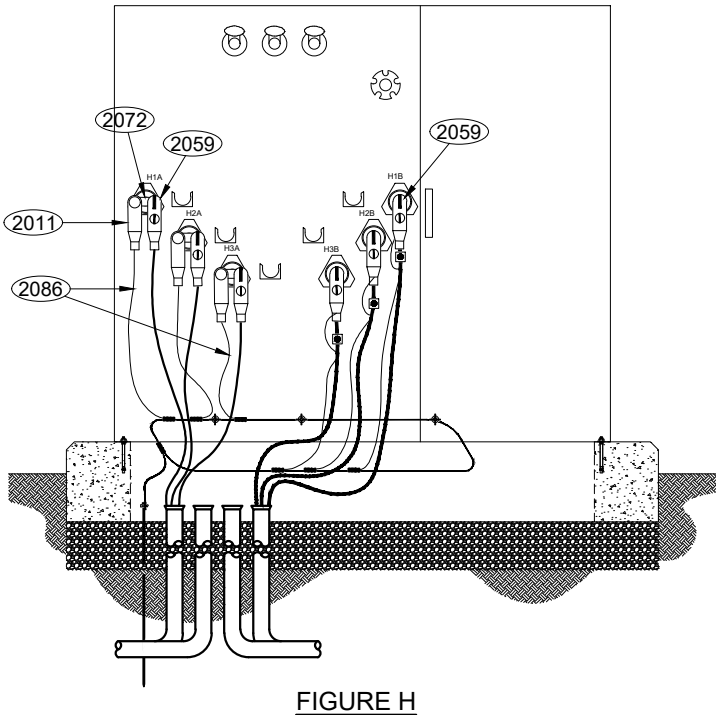
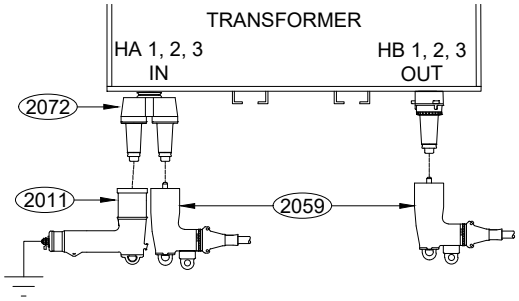
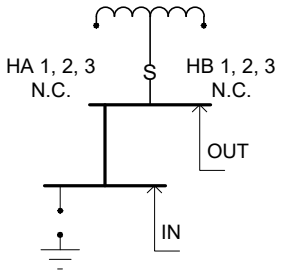


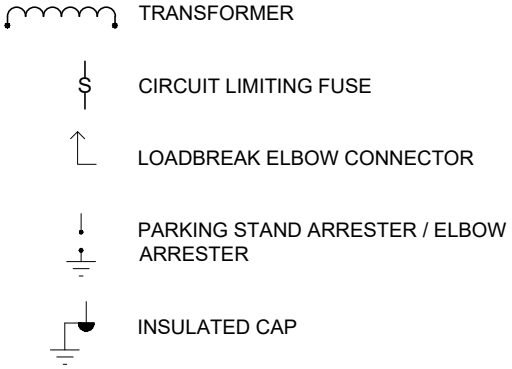
FIGURE H
ARRESTER CONNECTION DETAIL FOR NORMALLY CLOSE





ONE-LINE DIAGRAM
(NORMALLY CLOSE - HA AND HB 1, 2, 3)

LEGEND:



DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA

STANDARD NO. URD-38 VERSION 3
DOCUMENT NO. 4325.036
PAGE 7 OF 11 DATE JAN 10, 2023
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

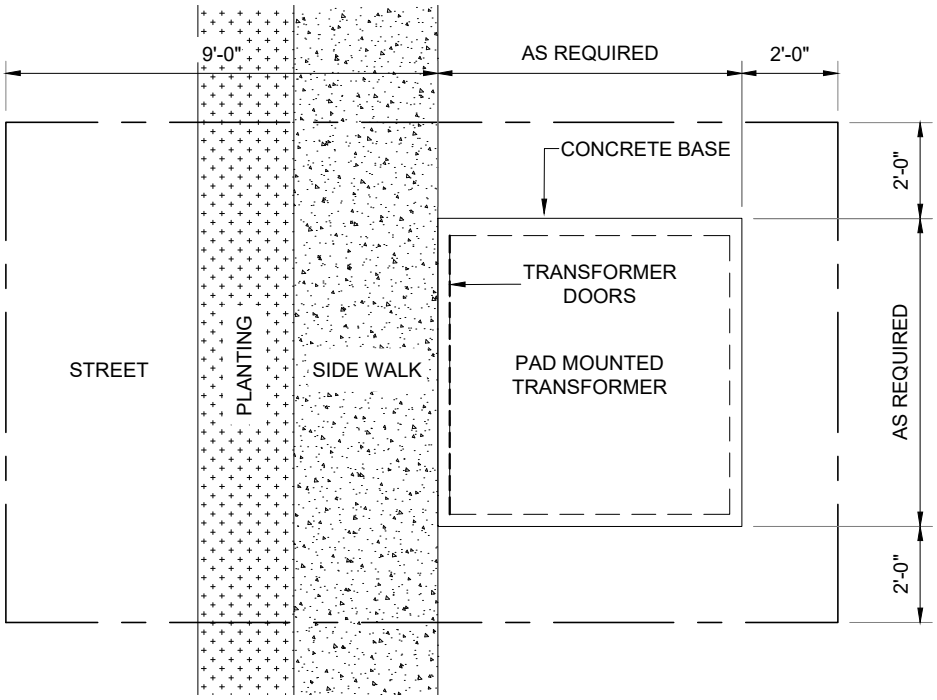


FIGURE I
CLEARANCES FOR THREE PHASE PAD MOUNTED TRANSFORMER
(SEE NOTE 12)

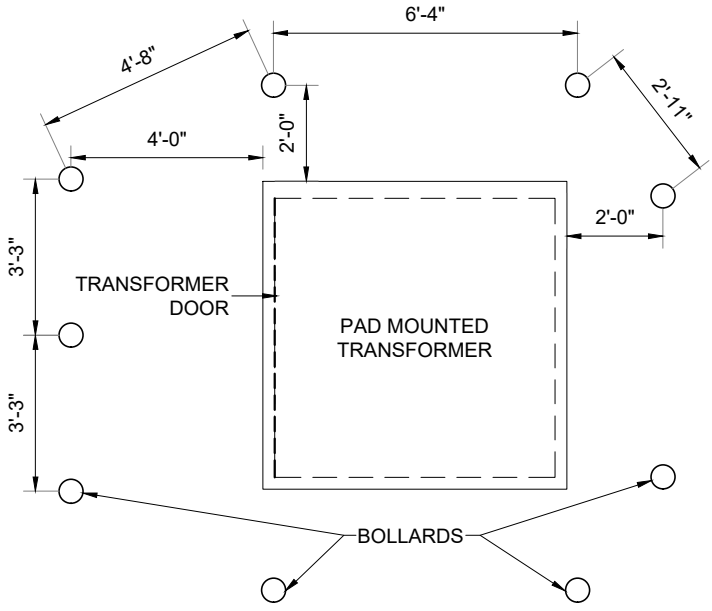


FIGURE J
BOLLARD CONFIGURATION
(SEE NOTE 21)

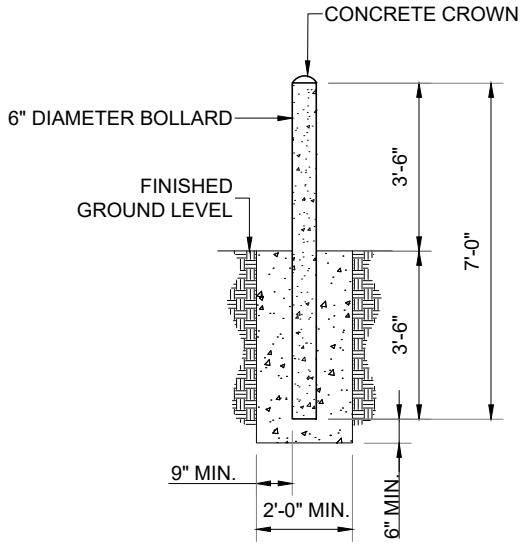


FIGURE K
BOLLARD DETAIL

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA
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DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES:

1. THIS STANDARD APPLIES TO THREE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER INSTALLED BY LUMA OR TO BE TRANSFERRED TO LUMA.
2. THREE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER SHALL BE INSTALLED ON A PRECAST OR CAST IN PLACE CONCRETE BASE. THE STANDARD NO. URD-53 SHOW THE CONCRETE BASE TO BE USED AND THE SPECIFICATIONS FOR ITS CONSTRUCTION.
3. STAINLESS STEEL ANCHOR BOLTS SHALL BE USED TO INSTALL THE PAD MOUNTED TRANSFORMER ON THE CONCRETE BASE. ANCHOR BOLT'S HOLES SHALL BE DRILLED INTO THE CONCRETE BASE AFTER THE TRANSFORMER IS SET IN THE PLATE. USE A ½" DIAMETER WEDGE ANCHOR BOLT WITH AN EMBEDMENT DEPTH OF 4 ½". (SEE FIGURE A)
4. AN ELASTOMERIC JOINT SEALANT SHALL BE USED BETWEEN THE PAD MOUNTED TRANSFORMER AND THE CONCRETE BASE. THE SEALANT SHALL BE INSTALLED AROUND THE ENTIRE BOTTOM OF THE TRANSFORMER. (SEE FIGURE A)
5. FAULT CURRENT INDICATOR SHALL BE INSTALLED ON THE OUTGOING CABLE AND IT SHALL BE HOT STICK MOUNTING TYPE. THE FAULT CURRENT INDICATOR SHALL HAVE A VISIBLE FAULT INDICATION INSTALLED ON THE OUTSIDE OF THE PAD MOUNTED TRANSFORMER, AT THE LOWER PART OF THE DOOR FRAME ON THE LATERAL SIDE.
6. THE NEUTRAL CONDUCTOR, TRANSFORMER ENCLOSURE AND ARRESTERS GROUNDS SHALL BE EFFECTIVELY CONNECTED TO THE GROUND ROD USING #2 AWG COPPER BARE CONDUCTOR (ITEM 0080).
7. ALL DRAIN WIRES ASSOCIATED WITH SEPARABLE INSULATED CONNECTORS SHALL BE EFFECTIVELY CONNECTED TO THE GROUNDING SYSTEM USING #12 AWG COPPER GREEN CABLE WITH 600 V INSULATION. (SEE ASSEMBLY NO. ASSY-2507)
8. ONCE THE CONCRETE BASE AND THE PVC DUCTS ARE INSTALLED, MAKE SURE THE CRUSHED STONE OR GRAVEL AT THE BOTTOM OF THE CONCRETE BASE DOES NOT COVER THE DUCTS. THE DUCTS AND PVC END BELLS SHALL BE 2" ABOVE THE CRUSHED STONE OR GRAVEL.
9. ALL PVC DUCTS IN A CONCRETE BASE SHALL HAVE A PVC END BELL (ITEM 2045) TO PROVIDE A SMOOTH AND SAFE CABLE ENTRY.
10. AFTER THE INSTALLATION OF ALL CABLES IS COMPLETED, THE DUCTS IN USE SHALL BE SEALED WITH A NONHARDENING SEALING COMPOUND (ITEM 2014). INSTALL A DUCT SEALING PLUG (ITEM 2056) IN EACH SPARE DUCT TO PREVENT WATER OR FOREIGN OBJECTS INTRUSION TO THE TRANSFORMER.
11. THE PAD MOUNTED TRANSFORMER SHALL BE PADLOCKED AT ALL TIMES, EXCEPT WHEN QUALIFIED PERSONNEL HAS TO PERFORM ANY OPERATION OR MAINTENANCE ON THE EQUIPMENT.
12. THE PAD MOUNTED TRANSFORMER SHALL HAVE A 9' LONG AREA, FROM THE EDGE OF THE CONCRETE BASE, CLEAR OF OBSTRUCTION IN FRONT OF ITS DOOR FOR OPERATION AND MAINTENANCE. IN ADDITION, THERE SHALL BE A 2' LONG AREA, FROM THE EDGE OF THE CONCRETE BASE, CLEAR OF OBSTRUCTIONS ON THE SIDES AND BACK OF THE PAD MOUNTED TRANSFORMER. THESE AREAS SHALL BE KEPT CLEAR AT ALL TIMES, INCLUDING FENCES, WALLS OR ANY VEGETATION. (SEE FIGURE I)
13. PAD MOUNTED TRANSFORMER SECONDARY VOLTAGE NEUTRAL TERMINAL SHALL BE INTERCONNECTED WITH THE TRANSFORMER ENCLOSURE GROUND CONNECTOR.
14. FOR BAYONET FUSES SIZE, REFER TO LUMA'S DISTRIBUTION EQUIPMENT AND PRIMARY LINE FUSING GUIDELINE.
15. GROUND CONNECTION OF PRIMARY VOLTAGE CABLE, ELBOW CONNECTORS AND ELBOW ARRESTERS SHALL HAVE SUFFICIENT SLACK TO ALLOW LOADBREAK ELBOW CONNECTORS TO MOVE FROM THEIR NORMAL POSITION TO THE PARKING STAND POSITION.
16. THE APPROPRIATE ELBOW ARRESTERS SHALL BE INSTALLED AT THE NORMALLY OPEN POINT OF THE LOOP. THE SELECTION OF THE ELBOW ARRESTERS' RATING SHALL BE BASED ON THE ELECTRICAL SYSTEM VOLTAGE.
17. ONLY ONE SECONDARY CABLE PER CONNECTOR PORT IS ALLOWED.
18. FOR INSTALLATION DETAILS OF THE LOADBREAK ELBOW CONNECTORS, ELBOW ARRESTERS AND ANY SEPARABLE INSULATED CONNECTORS, REFER TO ASSEMBLY NO. ASSY-2507.
19. ONE CONCENTRIC NEUTRAL STRAND CONNECTED TO THE ELBOW CONNECTOR GROUNDING EYE WILL BE USED AS DRAIN WIRE. (REFER TO ASSEMBLY NO. ASSY-2507)
20. THE INSTALLATION OF AN ELBOW ARRESTER IS REQUIRED IN ONE OF THE PRIMARY SIDE OF EVERY TRANSFORMER. PARKING STAND ARRESTERS SHALL BE USED TO INSTALL THE DISCONNECTED CABLES AT NORMALLY OPEN SEGMENT OF THE LOOP.
21. ANY PAD MOUNTED EQUIPMENT INSTALLED IN AN AREA EXPOSED TO VEHICULAR TRAFFIC, WHERE DAMAGE TO EQUIPMENT IS PROBABLE, SHALL BE PROTECTED AGAINST IMPACT. THE PROTECTION BARRIER USED SHALL BE INSTALLED IN A WAY THAT ALLOWS DOOR OPENING AND EQUIPMENT OPERATION. FOR EQUIPMENT PROTECTION, USE CONCRETE FILLED PIPES OR BOLLARDS. THEY SHALL BE RIGID GALVANIZED STEEL PIPES WITH 6" DIAMETER AND MINIMUM 42" HEIGHT ABOVE FINISHED GROUND LEVEL. THE RIGID GALVANIZED STEEL PIPES SHALL BE EMBEDDED 42" BELOW FINAL GROUND LEVEL. THE AMOUNT OF BOLLARDS TO BE INSTALLED DEPENDS ON THE PAD MOUNTED EQUIPMENT LOCATION. BOLLARDS ARE NOT REQUIRED ON SIDES WHERE PAD MOUNTED EQUIPMENT FACES A STRUCTURE OR BARRIER WHICH RESTRICT VEHICULAR TRAFFIC. CAUTION MUST BE TAKEN WHEN INSTALLING BOLLARDS, SO THAT THEY DO NOT MAKE CONTACT WITH ANY UNDERGROUND INFRASTRUCTURE. FOR TYPICAL LOCATION OF BOLLARDS AROUND A PAD MOUNTED EQUIPMENT, SEE FIGURE J. FOR BOLLARD INSTALLATION DETAIL, SEE FIGURE K.
22. THE PAD MOUNTED TRANSFORMER SHALL BE LABELED TO INDICATE FROM WHICH EQUIPMENT THE PRIMARY VOLTAGE CABLE COME AND TO WHICH EQUIPMENT THE PRIMARY VOLTAGE CABLE GO. THE SECONDARY VOLTAGE CABLE SHALL BE LABELED TO INDICATE TO WHICH EQUIPMENT THE CABLE GO OR THE CUSTOMER THEY PROVIDE SERVICE.
23. THREE PHASE PAD MOUNTED TRANSFORMERS SHALL BE LOOP-FEED TYPE WITH CAPACITY OF 150 KVA OR 300 KVA. THE PRIMARY VOLTAGE FOR THOSE TRANSFORMERS MUST BE 13.2 KV AND THE SECONDARY VOLTAGE 208 Y / 120 V.
24. THE MAXIMUM AMOUNT OF TRANSFORMERS ALLOWED TO BE INSTALLED IN A LOOP WILL BE 8. THE PRIMARY UNDERGROUND CABLE FOR THESE THREE PHASE LATERAL CIRCUITS SHALL BE JACKETED CONCENTRIC NEUTRAL, #2 AWG, COPPER, WITH 15 KV INSULATION.

TITLE:

THREE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA
NOTES

STANDARD NO. URD-38 VERSION 3
DOCUMENT NO. 4325.036
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SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES

25. THE OVERCURRENT PROTECTION ON THE PRIMARY SIDE OF THESE TRANSFORMERS SHALL BY CURRENT LIMITING FUSES. THE OVERCURRENT PROTECTION ON THE SECONDARY SIDE SHALL BE A CIRCUIT BREAKER. THIS CIRCUIT BREAKER SHALL BE ADJUSTABLE-TRIP TYPE WITH A CURRENT RANGE BETWEEN 600 A AND 1,200 A. THE CAPACITY OF CIRCUIT BREAKERS USED IN THIS STANDARD SHALL BE:
    - FOR 150 KVA: 600 A
    - FOR 300 KVA: 1,200 A
26. THE CABLES TO CONNECT THE SECONDARY BUSHINGS OF THE TRANSFORMER TO THE SOURCE SIDE OF THE CIRCUIT BREAKER AND ALSO IN THE LOAD SIDE OF THE BREAKER, SHALL BE 500 MCM, COPPER, WITH 600 V INSULATION, XHHW-2 TYPE:
    - FOR 150 KVA: 2 CABLES - 500 MCM PER PHASE
    - FOR 300 KVA: 4 CABLES - 500 MCM PER PHASE
27. THE CIRCUIT NEUTRAL SHALL HAVE THE SAME GAUGE AND AMOUNT OF CABLES ESTABLISHED FOR THE PHASES ACCORDING TO TRANSFORMER CAPACITY.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

THREE PHASE DEAD FRONT PAD MOUNTED TRANSFORMER
MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA
BILL OF MATERIAL

STANDARD NO. URD-38 VERSION 3
DOCUMENT NO. 4325.036
PAGE 10 OF 11 DATE JAN 10, 2023
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REVIEWED IVETTE D. SANCHEZ LIC. 13837
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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
0002	FLAT ROUND WASHER	002-82041	16
	SPLIT LOCK WASHER	002-82930	8
0006	COMPRESSION SPLICES AND CONNECTOR	VARIES	AS REQ.
0037	5/8" X 8' GROUND ROD	002-02465	1
0066	CONNECTOR FOR 5/8" GROUND ROD	002-13595	1
0080	COPPER BARE CONDUCTOR	006-82621	AS REQ.
0087	15 KV UNDERGROUND CABLE	006-82624	AS REQ.
2004	FAULT CURRENT INDICATOR	038-01545	3
2005	STRANDED COPPER CABLE, 600 V, XHHW-2	006-01575	AS REQ.
2009	1/2" HEXAGONAL NUT	002-82038	8
2011	ELBOW ARRESTER	004-0291	3
2014	DUCT SEALING COMPOUND	003-02935	AS REQ.
2015	PADLOCK	VARIES	1
2017	WEDGE ANCHOR BOLT	038-83148	4
2018	ELASTOMERIC JOINT SEALANT	038-83149	AS REQ.
2040	PVC SCH-40 DUCT	VARIES	AS REQ.
2041	90° PVC ELBOW	VARIES	AS REQ.
2043	PVC COUPLING	VARIES	AS REQ.
2045	PVC END BELL	VARIES	AS REQ.
2048	HEX HEAD BOLT	038-83218	8
2056	DUCT SEALING PLUG	VARIES	AS REQ.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

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MAXIMUM VOLTAGE: 13.2 KV
MAXIMUM CAPACITY: 300 KVA
BILL OF MATERIAL

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MATERIALS			
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.
2059	LOADBREAK ELBOW CONNECTOR	038-00844	6
2062	INSULATED CAP WITH GROUND	038-01040	AS REQ.
2072	LOADBREAK FEED-THRU INSERT	038-01008	3
2082	PARKING STAND ARRESTER	004-00333	AS REQ.
2086	STRANDED COPPER CABLE, 600 V, THHN	040-00774	AS REQ.
2088	THREE PHASE PAD MOUNTED TRANSFORMER	VARIES	1
2093	UNIVERSAL TERMINAL LUG	038-83451	AS REQ.
2507	SEPARABLE INSULATED CONNECTORS AND CABLE TERMINATION ASSEMBLY	ASSY-2507	AS REQ.
URD-54	DUCT SIZING STANDARD	URD-54	AS REQ.

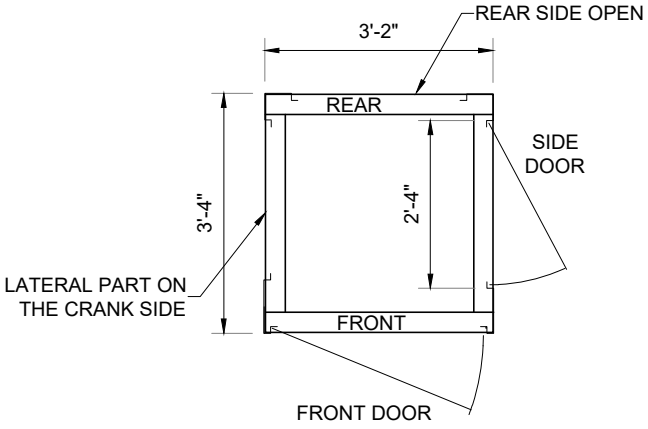
DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

GANG OPERATED DISCONNECTING SWITCH INSIDE A VAULT

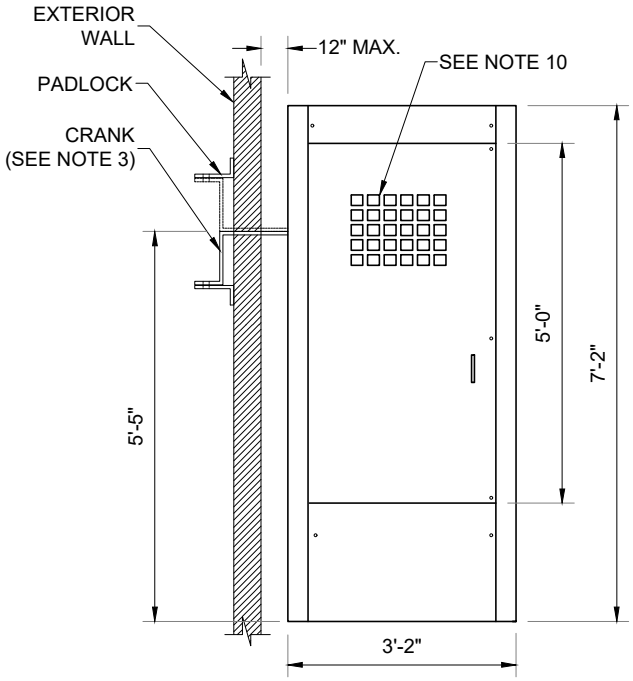
STANDARD NO.	URD-42 VERSION 1
DOCUMENT NO.	4325.037
PAGE	1 OF 1 DATE OCT 6, 2022
SUBMITTED	ROBERTO A. TORRES LIC. 10414
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	VICTOR R. FEBRES LIC. 3412
	EMILIO CUADRADO LIC. 3000



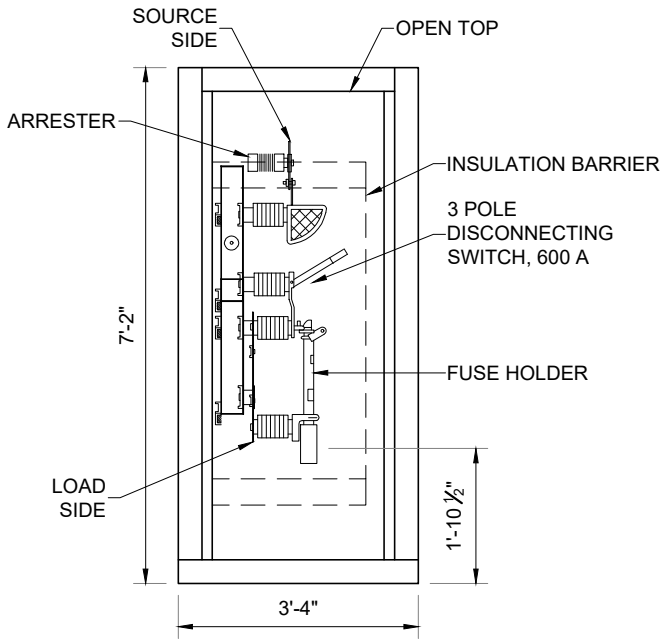
TOP VIEW

NOTES:

1. ALL GANG OPERATED DISCONNECTING SWITCH IN A VAULT TYPE SUBSTATION SHALL BE INSTALLED INSIDE AN ENCLOSURE.
2. THIS EQUIPMENT SHOULD BE OPERATED USING A CRANK OR HANDLE OUTSIDE THE VAULT. THE POSITION OF THE DISCONNECTING DEVICE, OPEN OR CLOSED, MUST BE IDENTIFIED ON THE OUTER WALL.
3. THE CRANK OR HANDLE SHOULD BE LOCATED ON THE RIGHT OR LEFT SIDE OF THE ENCLOSURE ACCORDING TO THE LOCATION OF THE DISCONNECTING SWITCH INSIDE THE ENCLOSURE. THE CRANK WILL HAVE A PADLOCK HOLDER ON THE OPEN AND CLOSED POSITIONS.
4. THE DOORS SHOULD HAVE PROVISIONS FOR A PADLOCK HOLDER FOR ACCESS.
5. THE MATERIAL OF THIS EQUIPMENT SHALL BE ALUMINUM 3003, GALVANIZED STEEL OR STAINLESS STEEL 304, #14 GAUGE. IF THIS EQUIPMENT IS INSTALLED WITHIN ONE MILE OR LESS OF ANY SALTWATER BODY, THE MATERIAL SHALL BE STAINLESS STEEL 304, #14 GAUGE. ANTIRUST PAINT IS RECOMMENDED.
6. THE INSULATION FOR THIS EQUIPMENT SHALL BE RATED FOR 15KV.
7. THE ARRESTERS AND FUSE HOLDER NEEDS TO BE APPROVED BY LUMA.
8. SELECTION OF THE LIGHTNING ARRESTERS RATING SHALL BE BASED ON THE SYSTEM VOLTAGE.
9. THE CONSTRUCTION OF THIS EQUIPMENT SHOULD BE ACCORDING TO NEMA, NEC AND LUMA STANDARDS.
10. THE ENCLOSURE DOOR SHOULD HAVE PERFORATIONS AT THE DISCONNECTING SWITCH LEVEL SO ITS POSITION IS VISIBLE FROM THE OUTSIDE OF THE ENCLOSURE. THESE DOORS SHALL BE BUILT AS ONE PIECE.



FRONT VIEW



SIDE VIEW

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UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

DETAIL FOR SUBSTATION METERING EQUIPMENT CABINET

STANDARD NO. URD-48 VERSION 1
DOCUMENT NO. 4325.038
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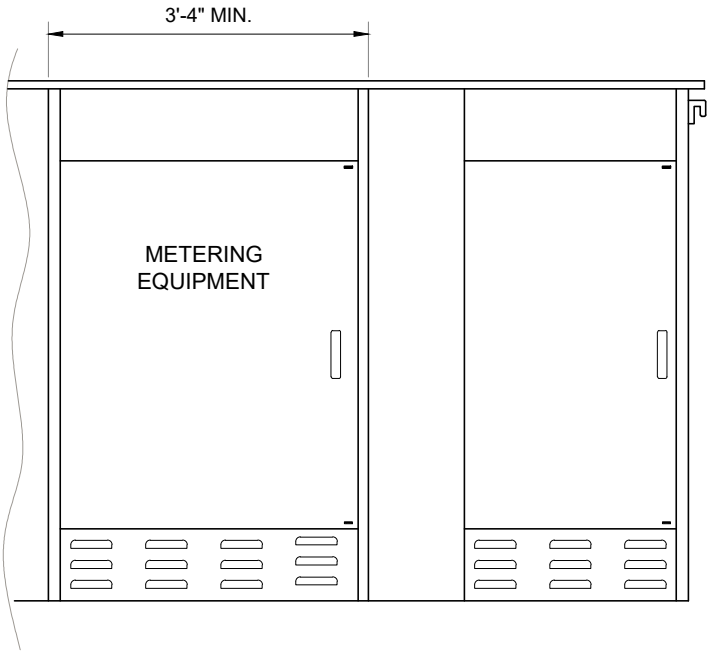
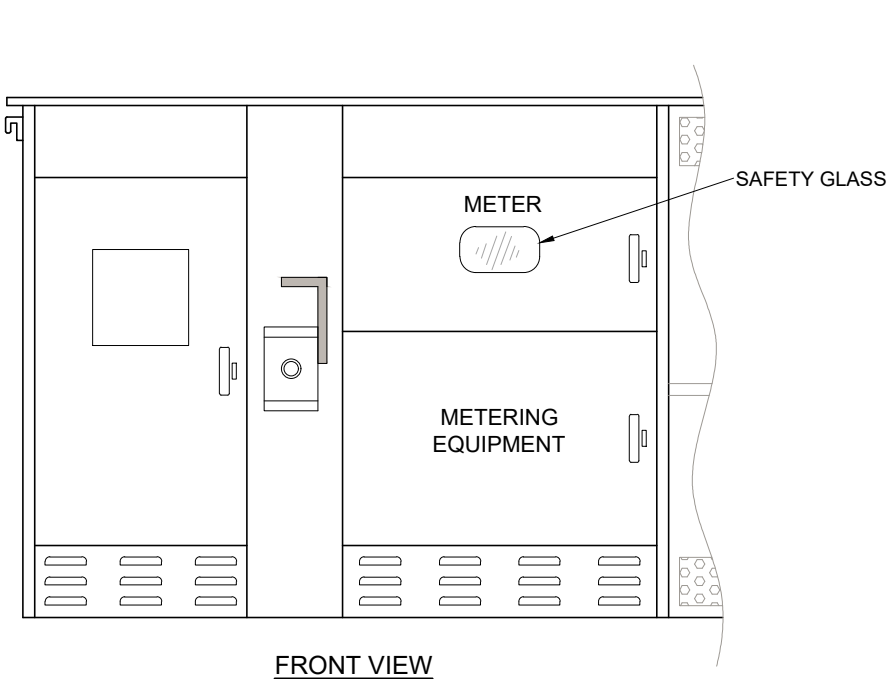
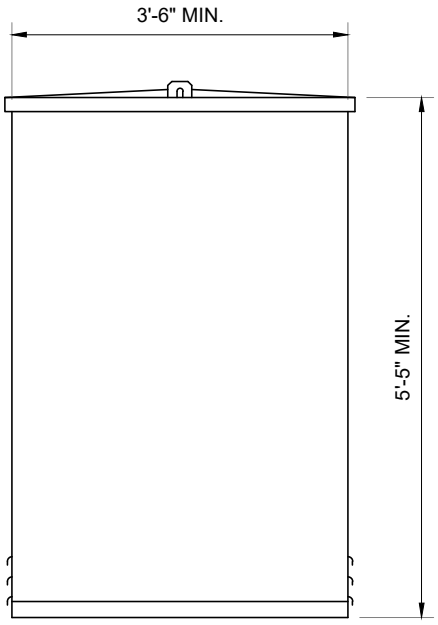
TRANSCLOSURE



BACK VIEW



FRONT VIEW



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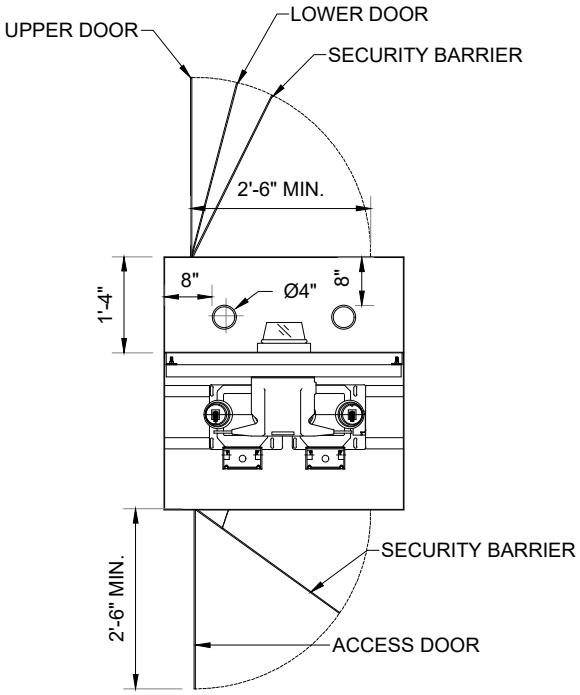
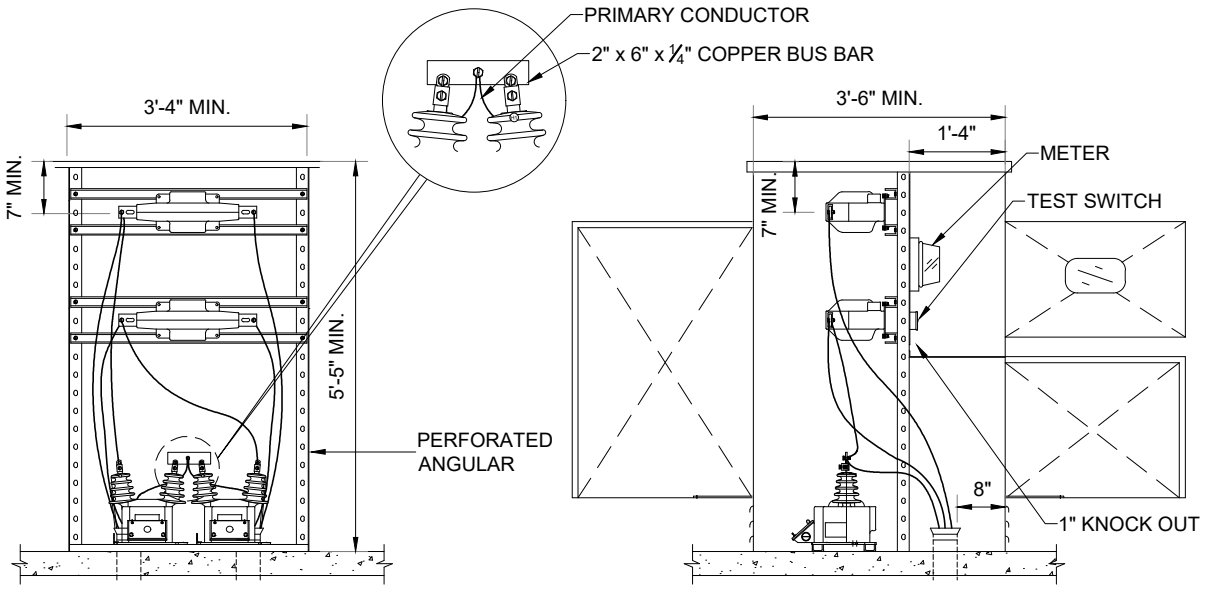


TOP VIEW



FRONT VIEW
REMOVED DOOR

SIDE VIEW

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

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DETAIL FOR SUBSTATION METERING EQUIPMENT CABINET

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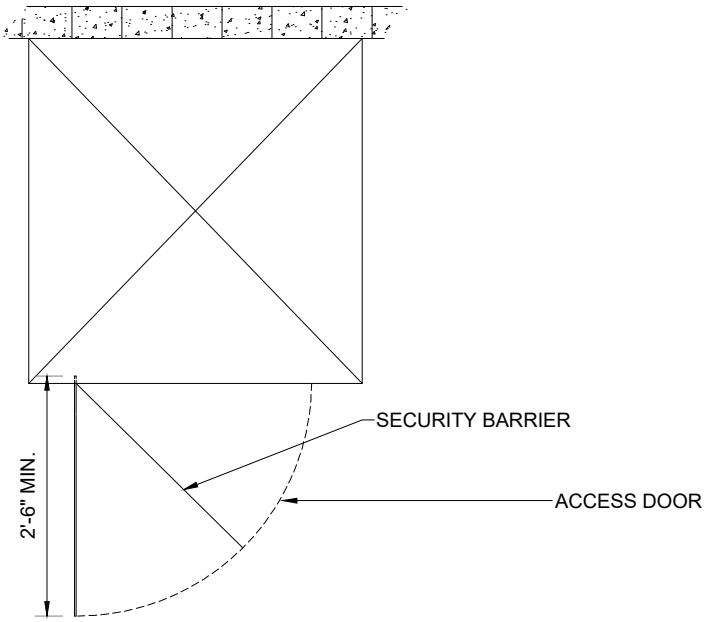
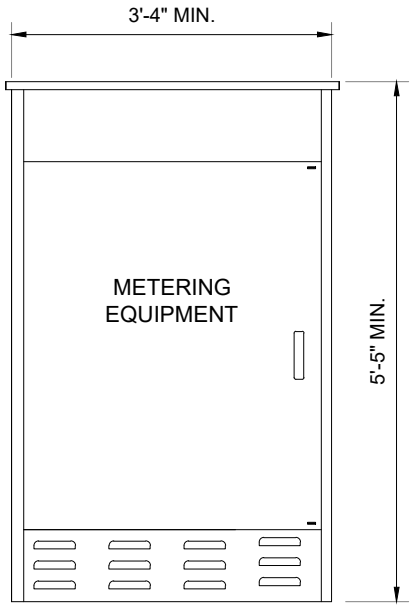
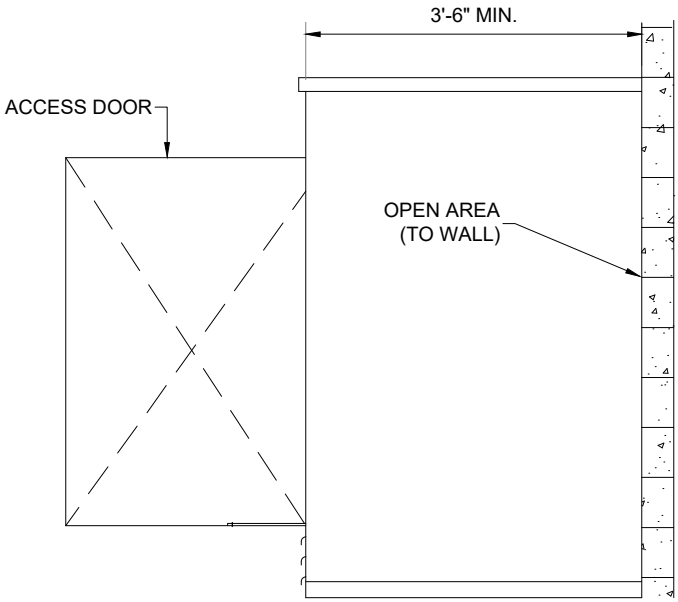
VAULT



TOP VIEW



FRONT VIEW



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UNDERGROUND DISTRIBUTION STANDARDS

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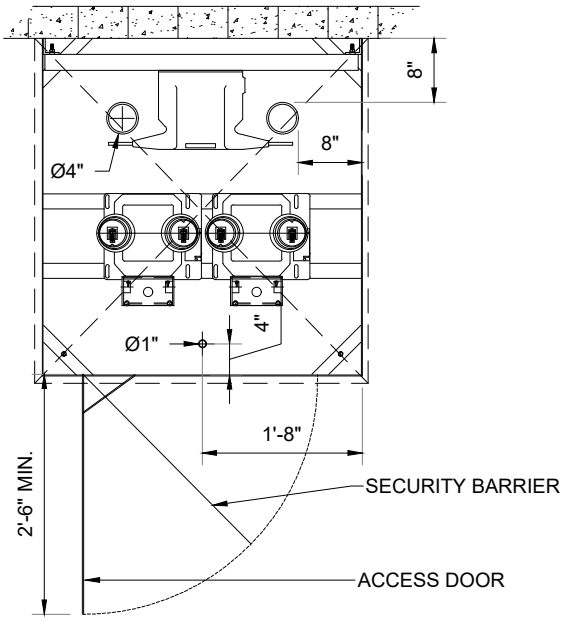
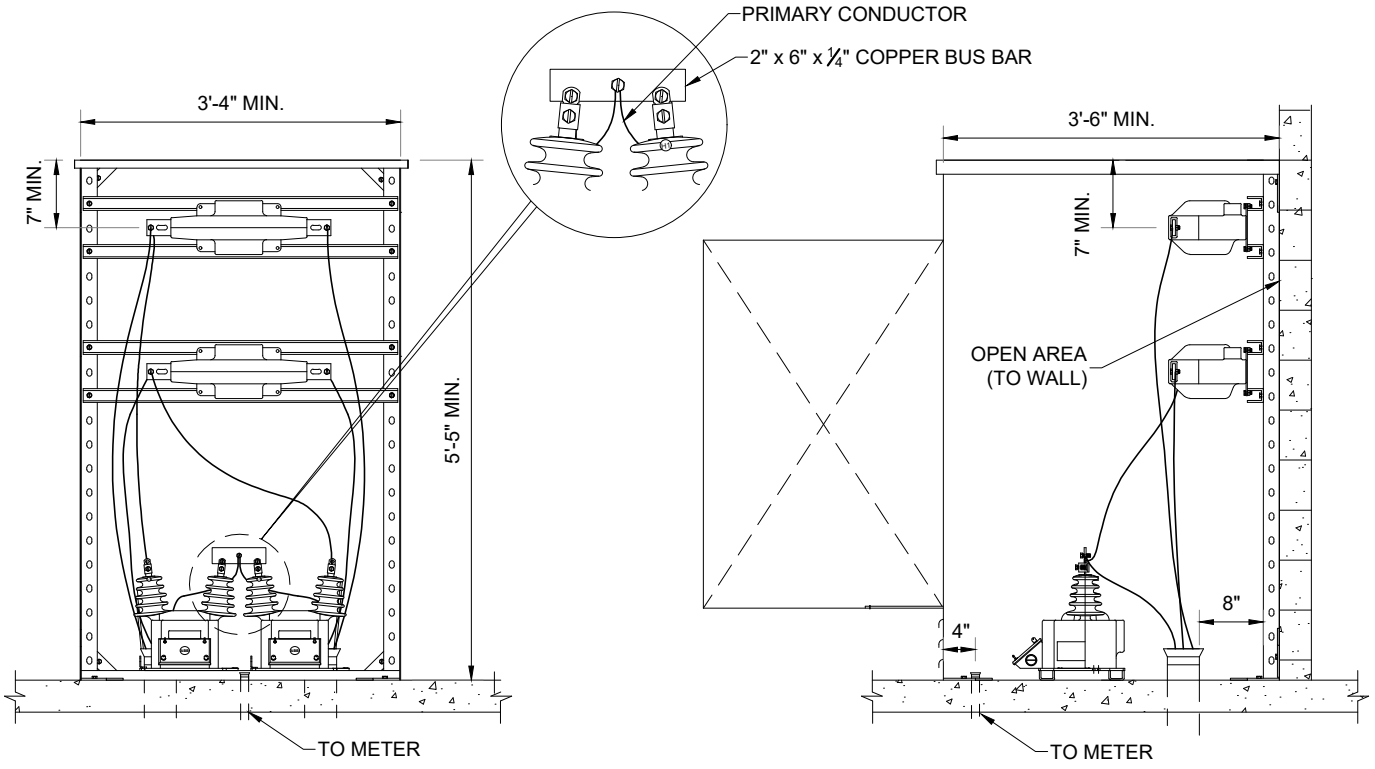
VAULT



TOP VIEW



FRONT VIEW
REMOVED DOOR

SIDE VIEW

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

DETAIL FOR SUBSTATION METERING EQUIPMENT CABINET NOTES

STANDARD NO. URD-48 VERSION 1
DOCUMENT NO. 4325.038
PAGE 5 OF 5 DATE OCT 6, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

NOTES:

1. DOORS MUST HAVE PROVISION TO INSTALL PADLOCKS.
2. THE MATERIAL OF THIS EQUIPMENT SHALL BE #12 GAUGE GALVANIZED STEEL OR #14 GAUGE STAINLESS STEEL 304. IF THIS EQUIPMENT IS INSTALLED WITHIN ONE MILE OR LESS OF ANY SALTWATER BODY, THE MATERIAL SHALL BE #14 GAUGE STAINLESS STEEL 304. ANTIRUST PAINT IS RECOMMENDED.
3. THE INSULATION FOR THIS EQUIPMENT WILL BE 15 KV.
4. THE APPLICATION OF THIS EQUIPMENT MUST BE APPROVED BY LUMA PRIOR TO PURCHASE AND INSTALLATION.
5. THE CONSTRUCTION OF THIS EQUIPMENT SHOULD BE ACCORDING TO NEMA, NEC AND LUMA STANDARDS.
6. THE PRESENTED DIMENSIONS OF THE EQUIPMENT ARE MINIMUM. VARIATIONS IN DIMENSIONS MUST COMPLY WITH LUMA STANDARDS AND REGULATIONS.
7. VAULT CUBICLES SHALL HAVE A SECOND SECURITY BARRIER ON BOTH SIDES WHERE PEOPLE HAVE ACCESS TO LIVE PARTS WITH A VOLTAGE GREATER THAN 600 VOLTS ARE EXPOSED. THIS SECOND SECURITY BARRIER SHALL BE MADE OF SAFETY GLASS, EXPANDED-METAL, FIBERGLASS-REINFORCED THERMOSET POLYESTER RESINS. IF EXPANDED-METAL IS USED, IT MUST BE OF THE SAME MATERIAL USED IN THE CABINET CONSTRUCTION, AND THE SECURITY DOOR SHALL ALLOW VISIBILITY TO INTERNAL COMPONENTS.

DISTRIBUTION ENGINEERING

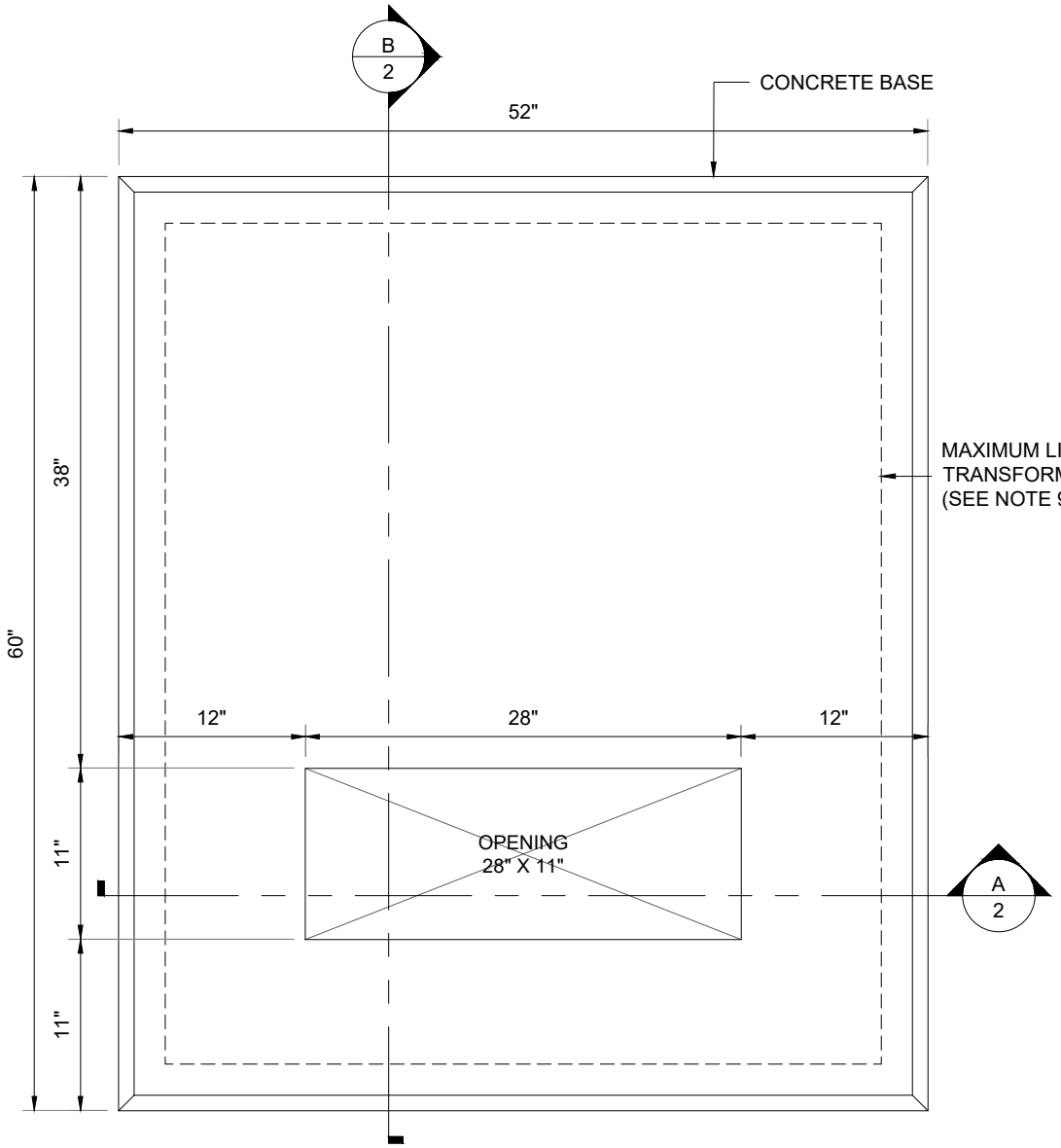
UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-53 VERSION 3
DOCUMENT NO. 4325.039
PAGE 1 OF 18 DATE OCT 4, 2022
SUBMITTED JOSE M. OROZCO LIC. 16380
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

SINGLE PHASE DEAD FRONT TRANSFORMER
(SEE STANDARD NO. URD-20)



PLAN VIEW
CONCRETE BASE DETAILS

DISTRIBUTION ENGINEERING

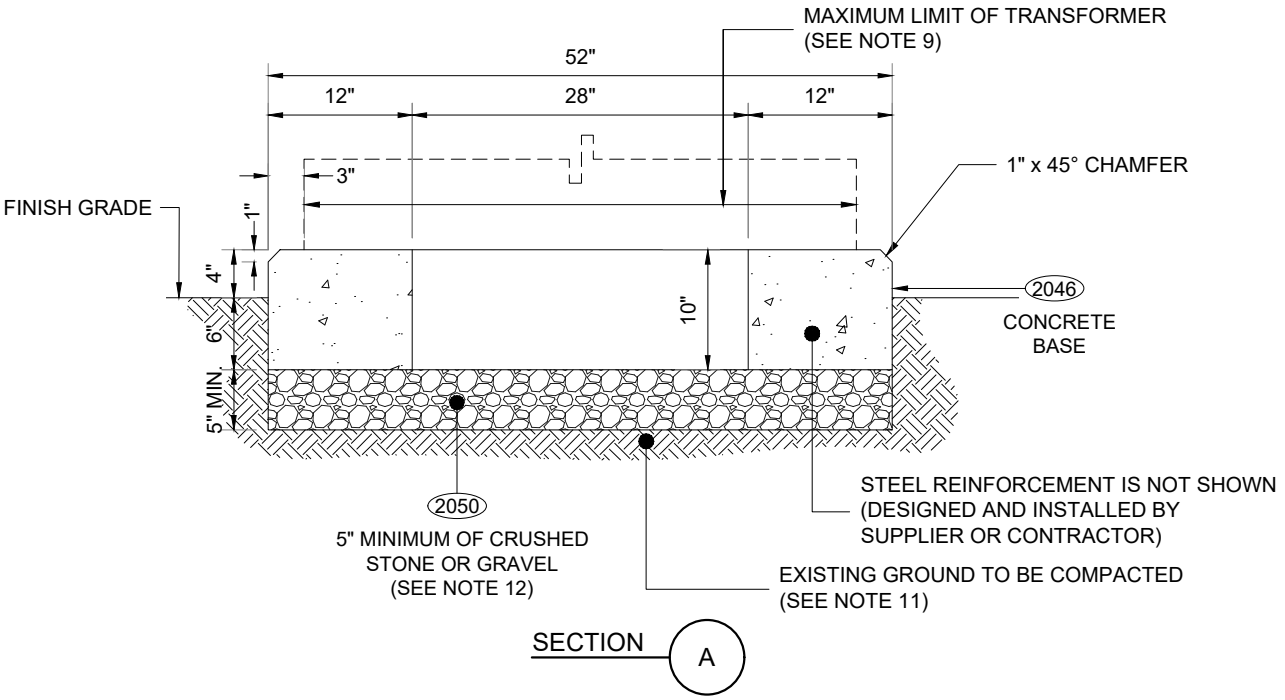
UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

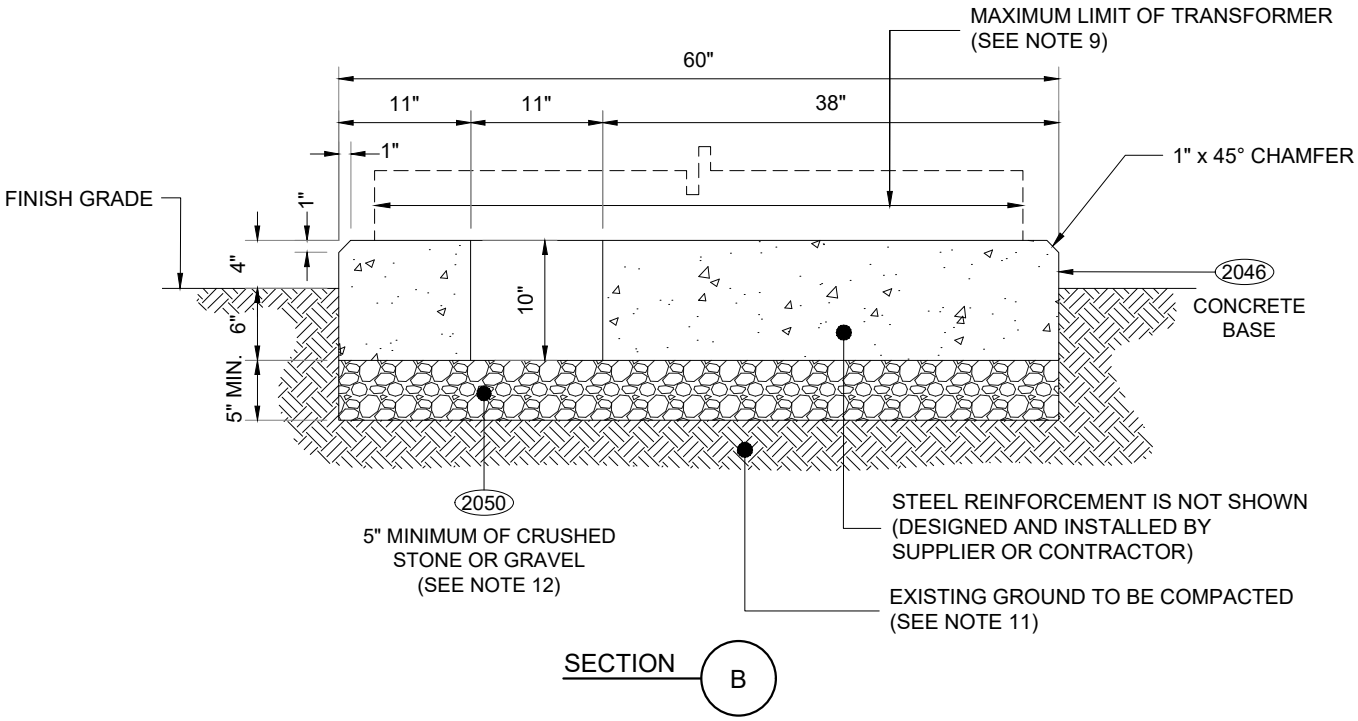
CONCRETE BASES FOR PAD MOUNTED EQUIPMENT
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-53 VERSION 3
DOCUMENT NO. 4325.039
PAGE 2 OF 18 DATE OCT 4, 2022
SUBMITTED JOSE M. OROZCO LIC. 16380
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

SINGLE PHASE DEAD FRONT TRANSFORMER
(SEE STANDARD NO. URD-20)



SECTION A



SECTION B

DISTRIBUTION ENGINEERING

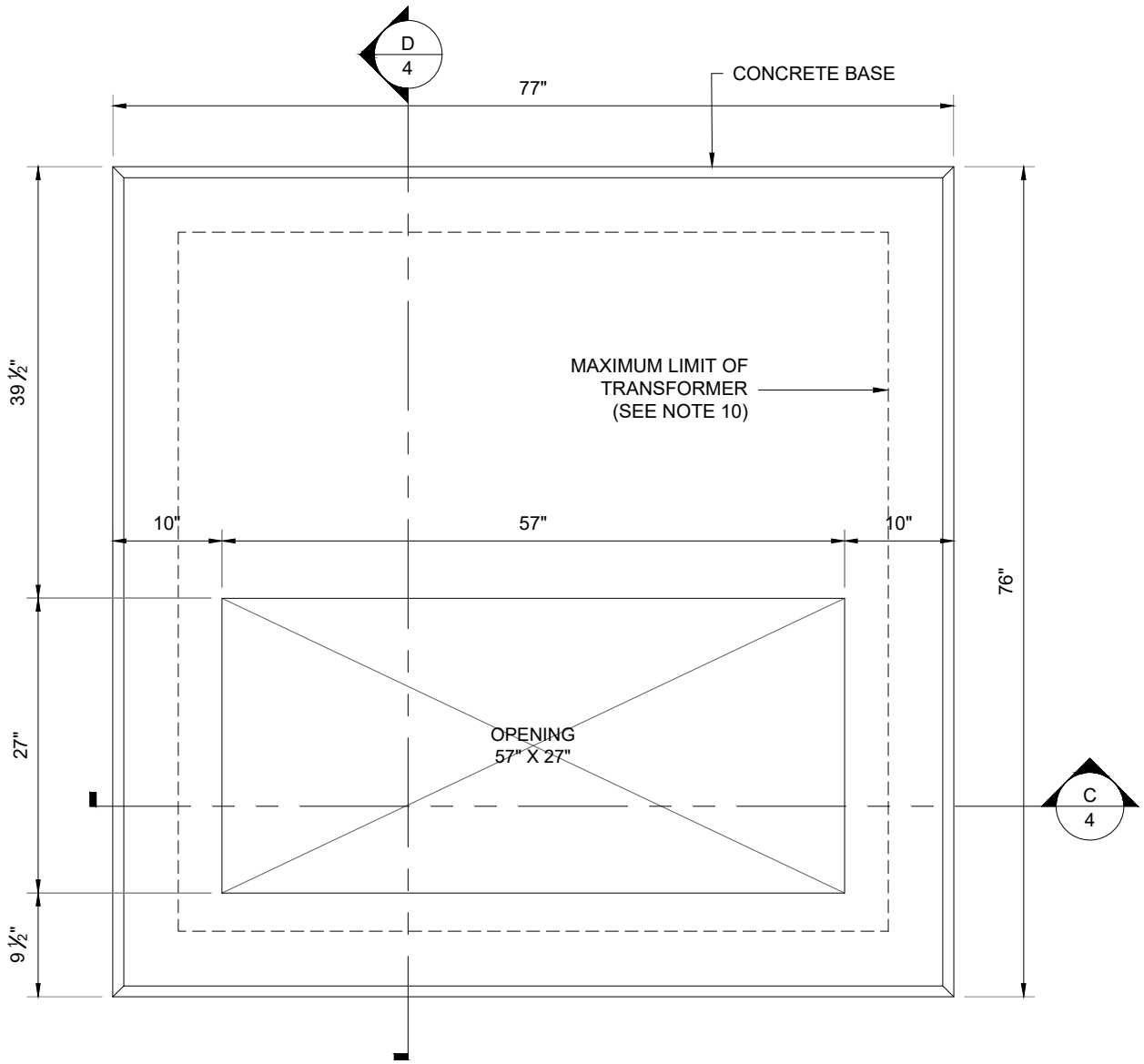
UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-53 VERSION 3
DOCUMENT NO. 4325.039
PAGE 3 OF 18 DATE OCT 4, 2022
SUBMITTED JOSE M. OROZCO LIC. 16380
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

THREE PHASE DEAD FRONT TRANSFORMER
(SEE STANDARD NO. URD-35)



TOP VIEW
CONCRETE BASE DETAILS

DISTRIBUTION ENGINEERING

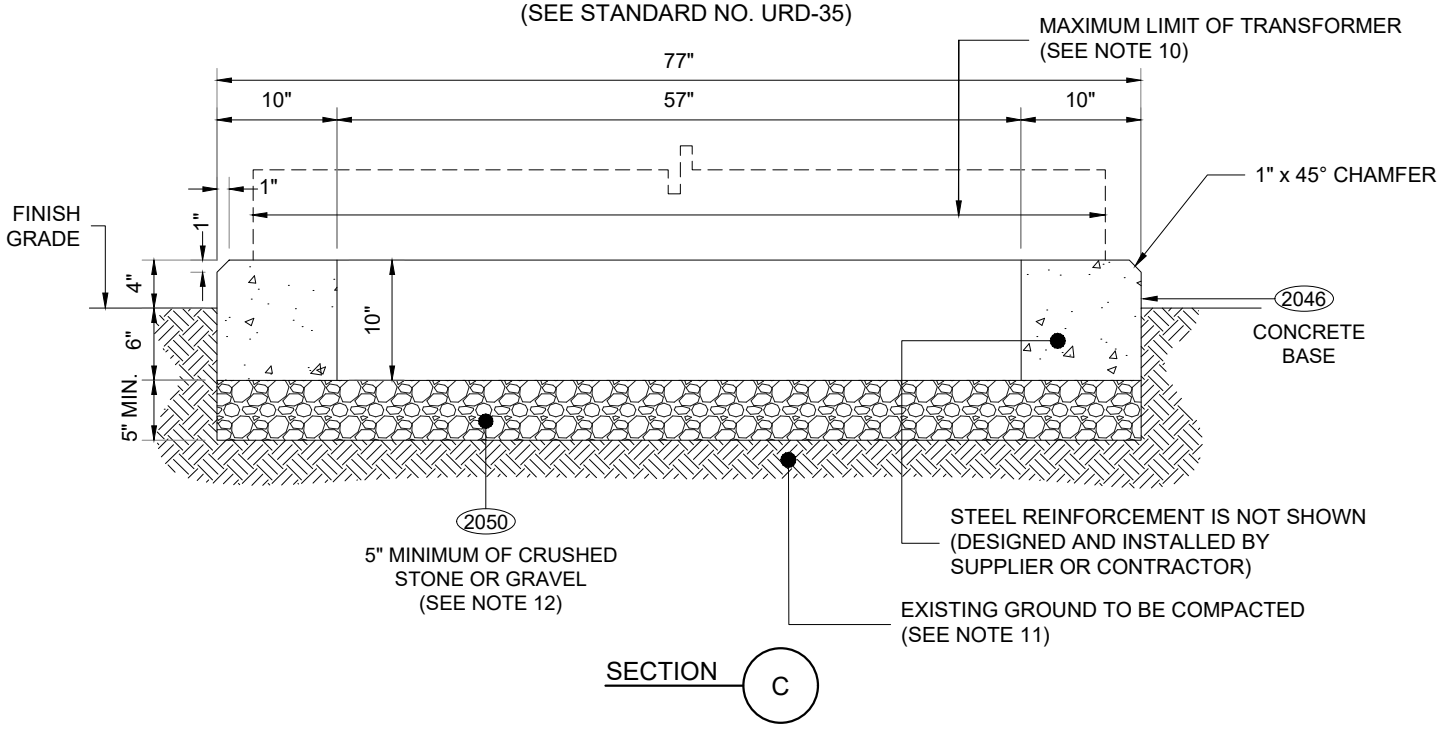
UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-53 VERSION 3
DOCUMENT NO. 4325.039
PAGE 4 OF 18 DATE OCT 4, 2022
SUBMITTED JOSE M. OROZCO LIC. 16380
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

THREE PHASE DEAD FRONT TRANSFORMER
(SEE STANDARD NO. URD-35)



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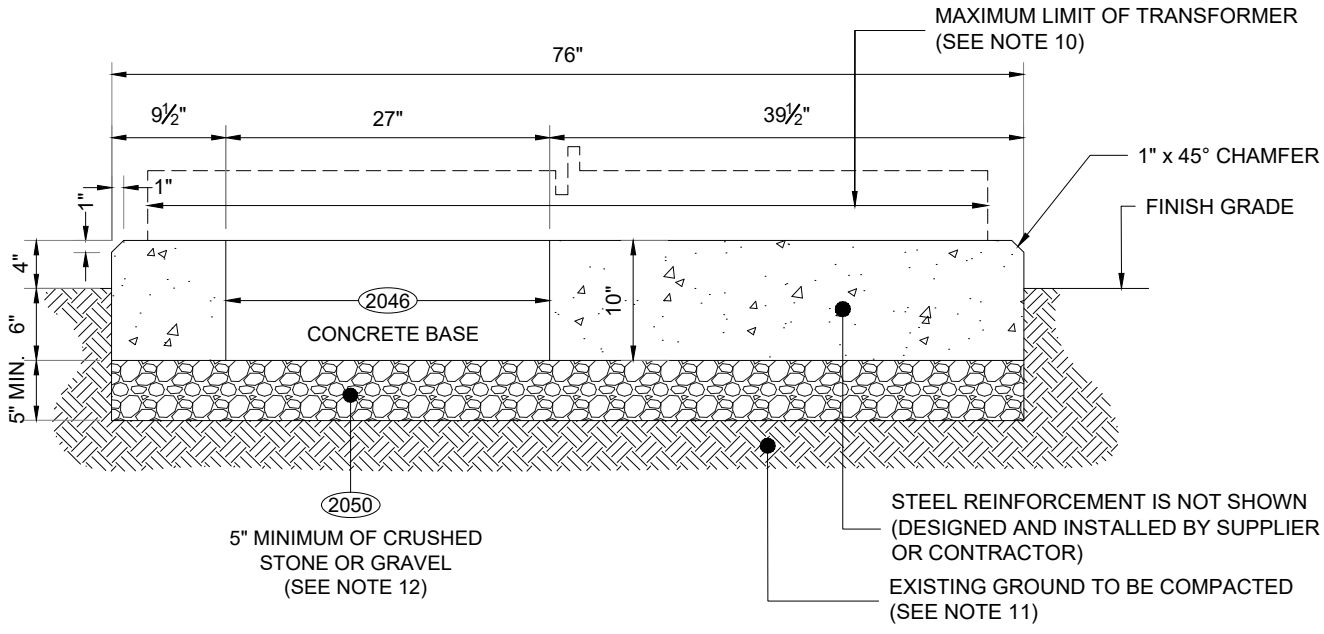


SECTION D

DISTRIBUTION ENGINEERING

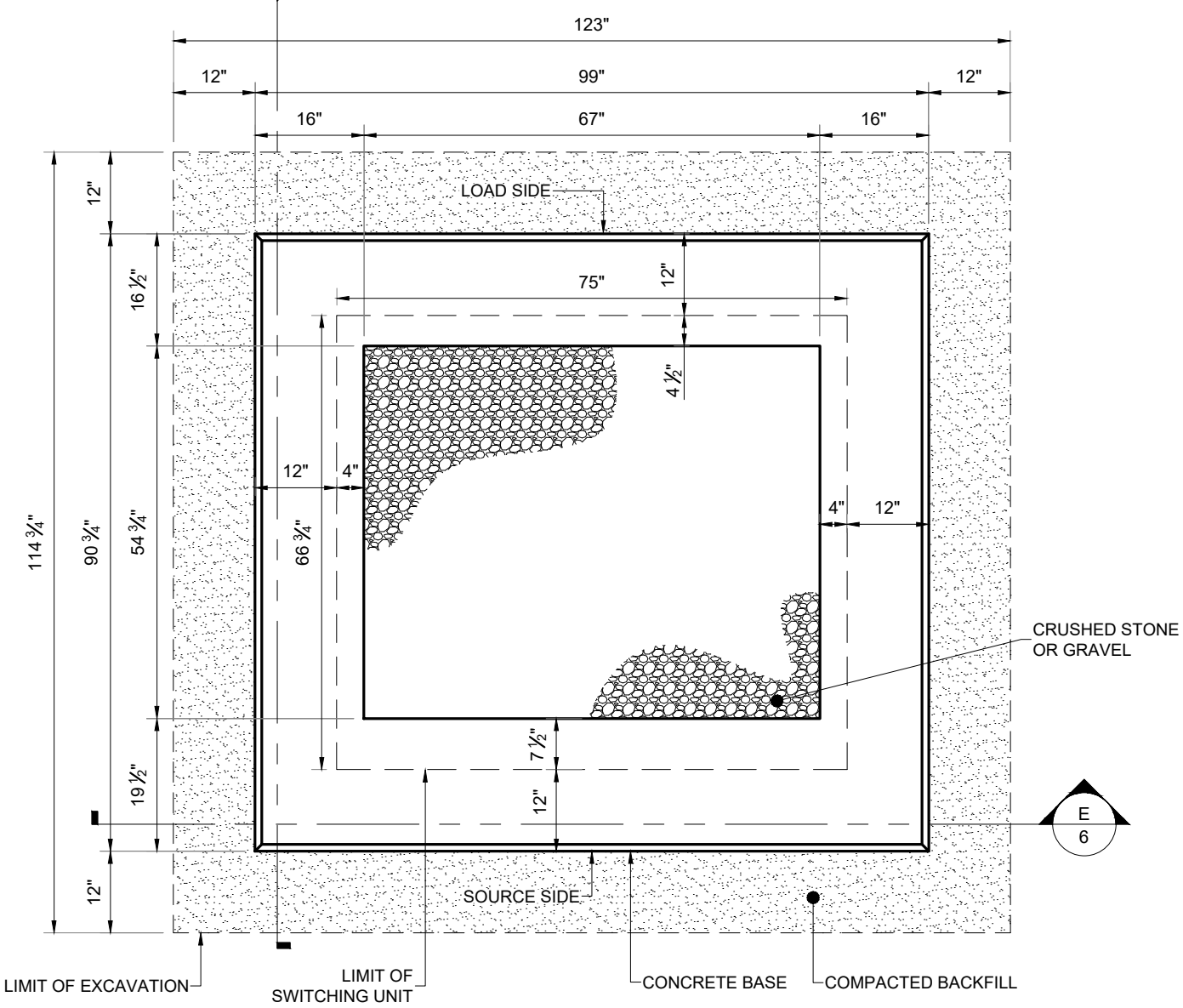
UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	URD-53 VERSION 3
DOCUMENT NO.	4325.039
PAGE	5 OF 18 DATE OCT 4, 2022
SUBMITTED	JOSE M. OROZCO LIC. 16380
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	VICTOR R. FEBRES LIC. 3412

DEAD FRONT SWITCHING UNIT
(SEE STANDARDS NO. URD-11-B OR URD-11-C)



PLAN VIEW

DISTRIBUTION ENGINEERING

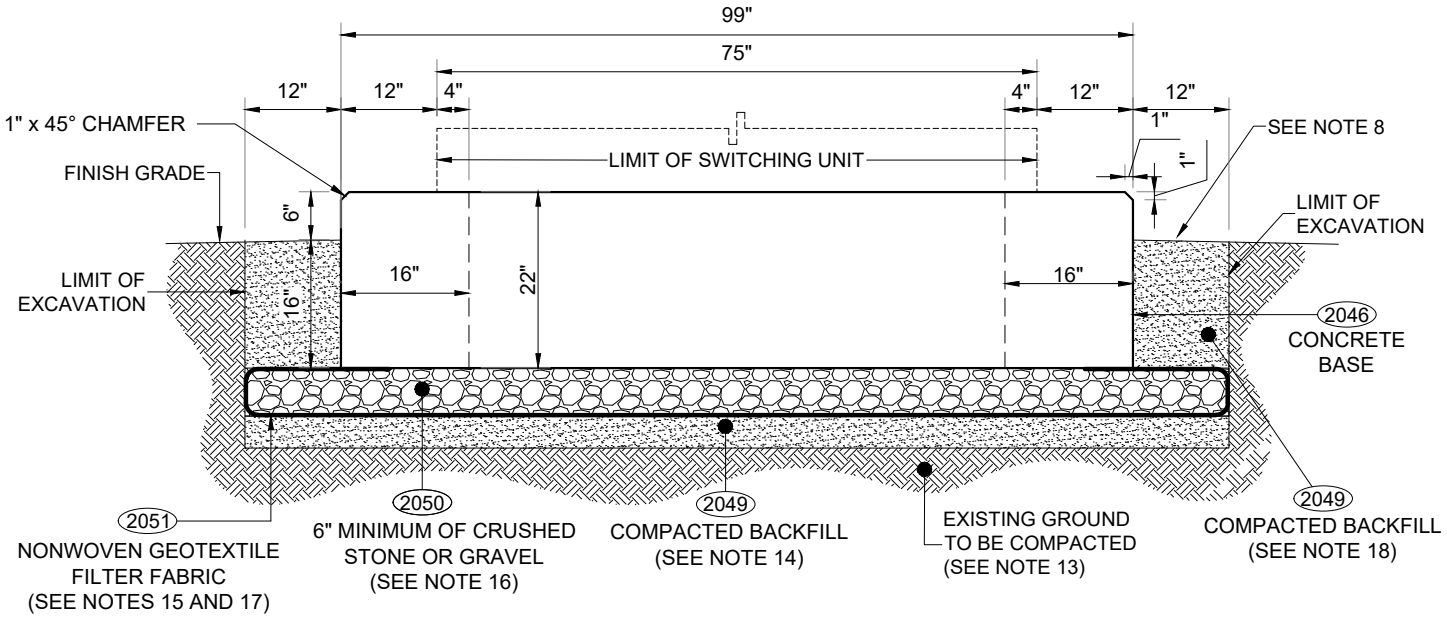
UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-53 VERSION 3
DOCUMENT NO. 4325.039
PAGE 6 OF 18 DATE OCT 4, 2022
SUBMITTED JOSE M. OROZCO LIC. 16380
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

DEAD FRONT SWITCHING UNIT
(SEE STANDARDS NO. URD-11-B OR URD-11-C)



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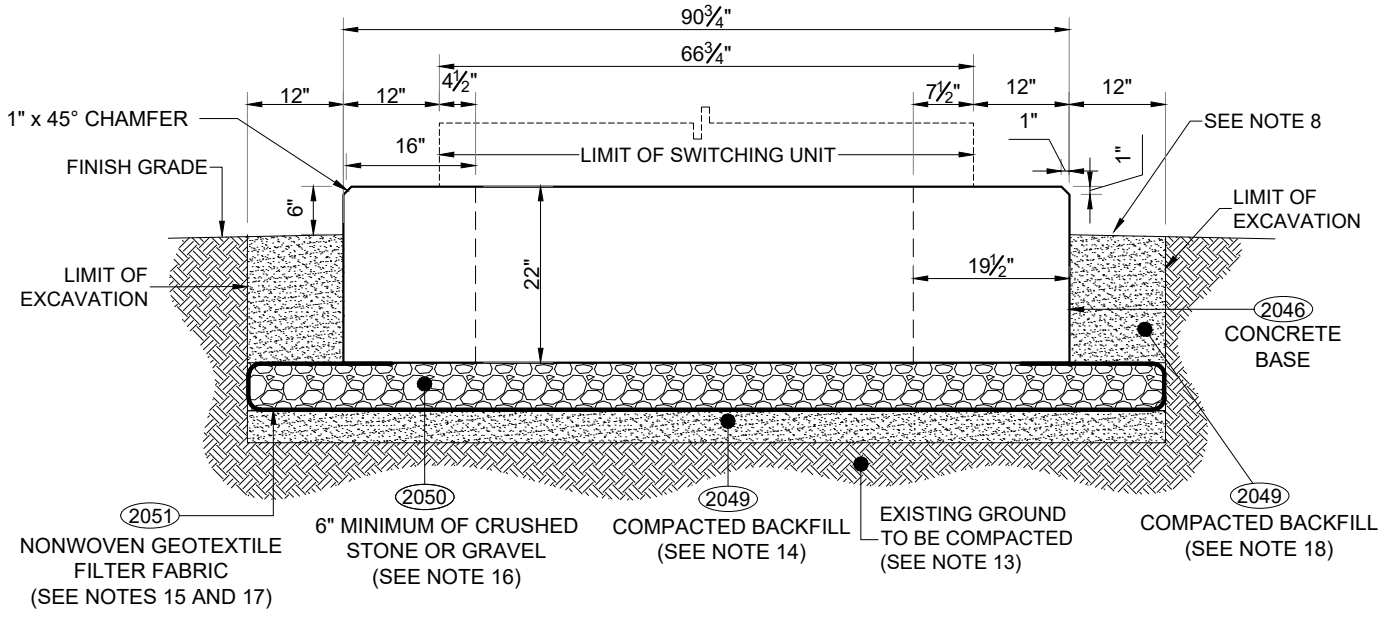


SECTION F

DISTRIBUTION ENGINEERING

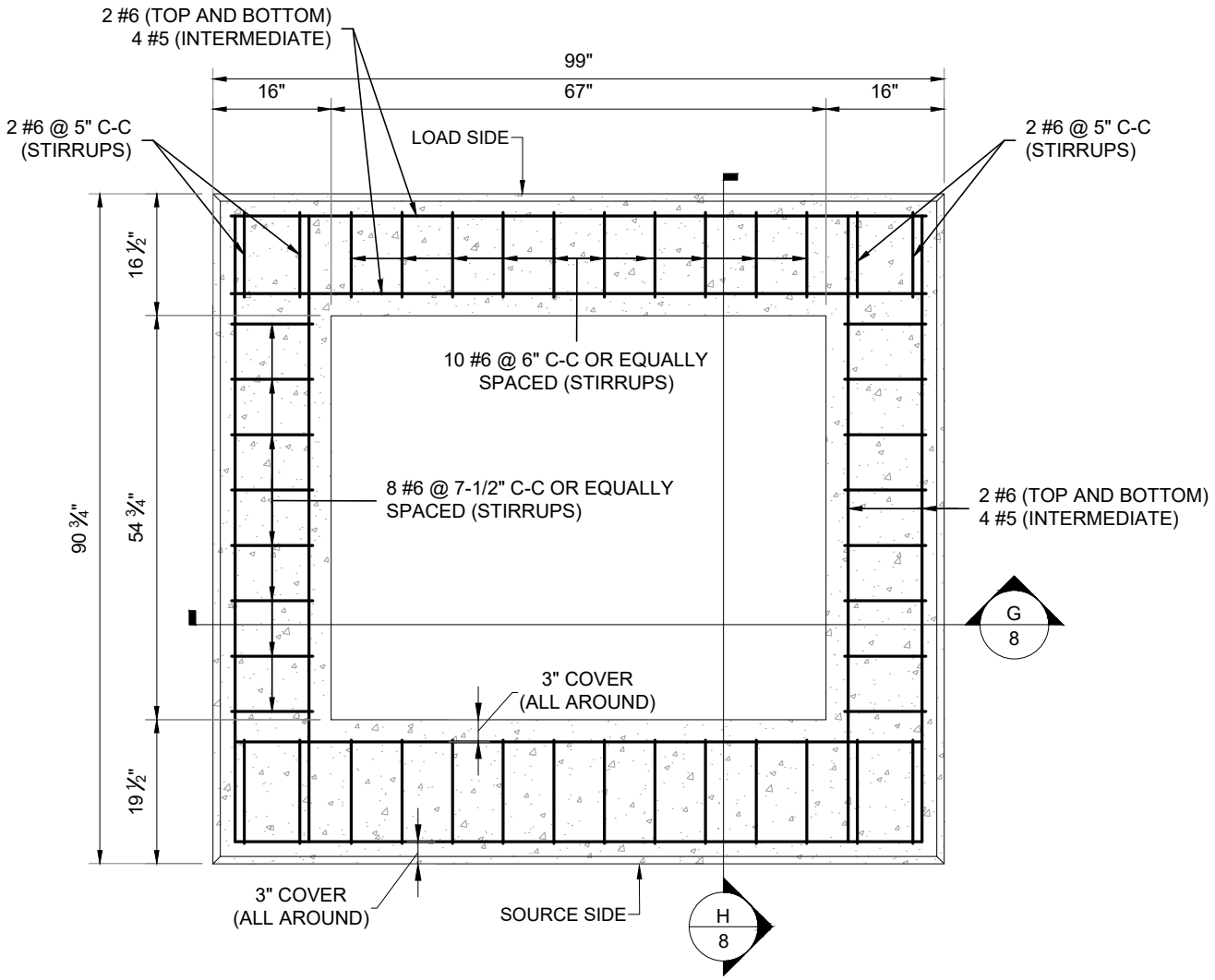
UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-53 VERSION 3
DOCUMENT NO. 4325.039
PAGE 7 OF 18 DATE OCT 4, 2022
SUBMITTED JOSE M. OROZCO LIC. 16380
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

DEAD FRONT SWITCHING UNIT
(SEE STANDARDS NO. URD-11-B OR URD-11-C)



TOP VIEW

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-53 VERSION 3
DOCUMENT NO. 4325.039
PAGE 8 OF 18 DATE OCT 4, 2022
SUBMITTED JOSE M. OROZCO LIC. 16380
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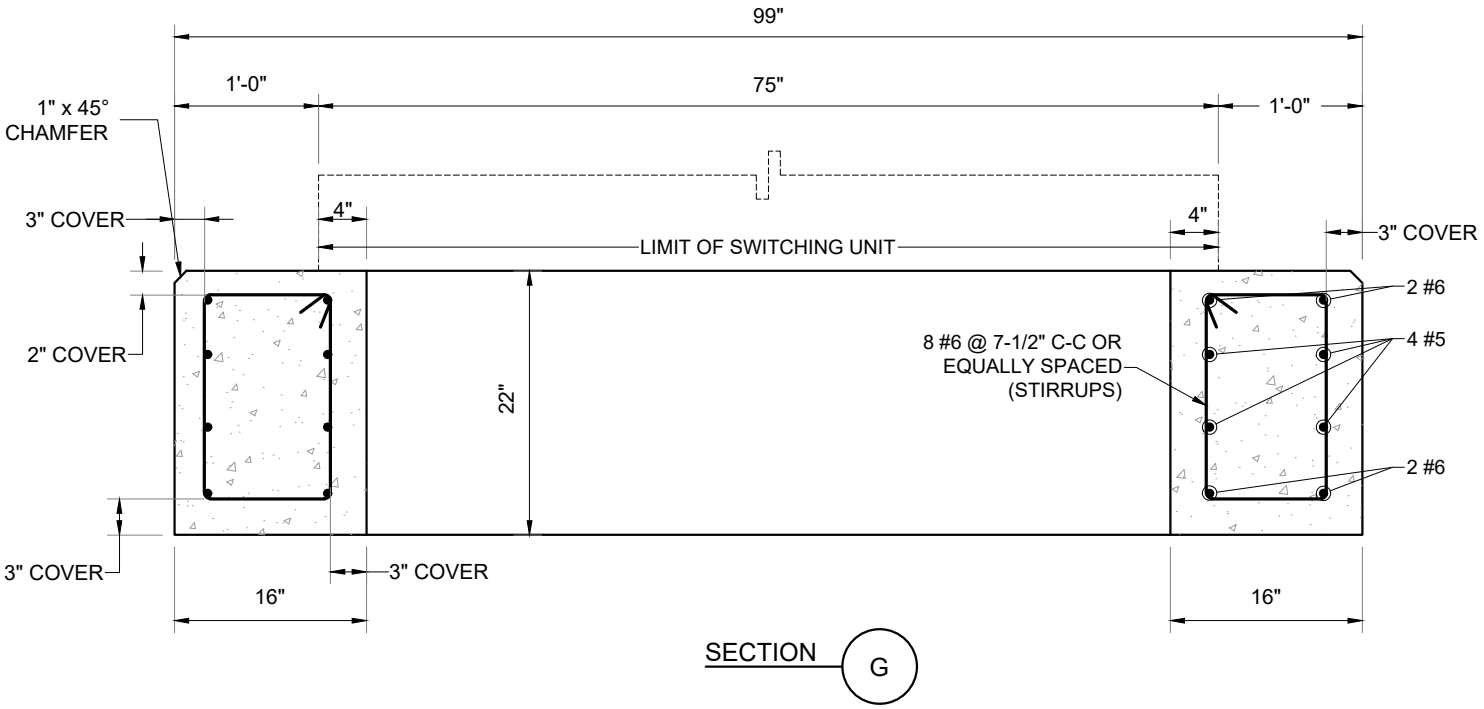
DIGITIZED VICTOR R. FEBRES LIC. 3412

DEAD FRONT SWITCHING UNIT
(SEE STANDARDS NO. URD-11-B OR URD-11-C)



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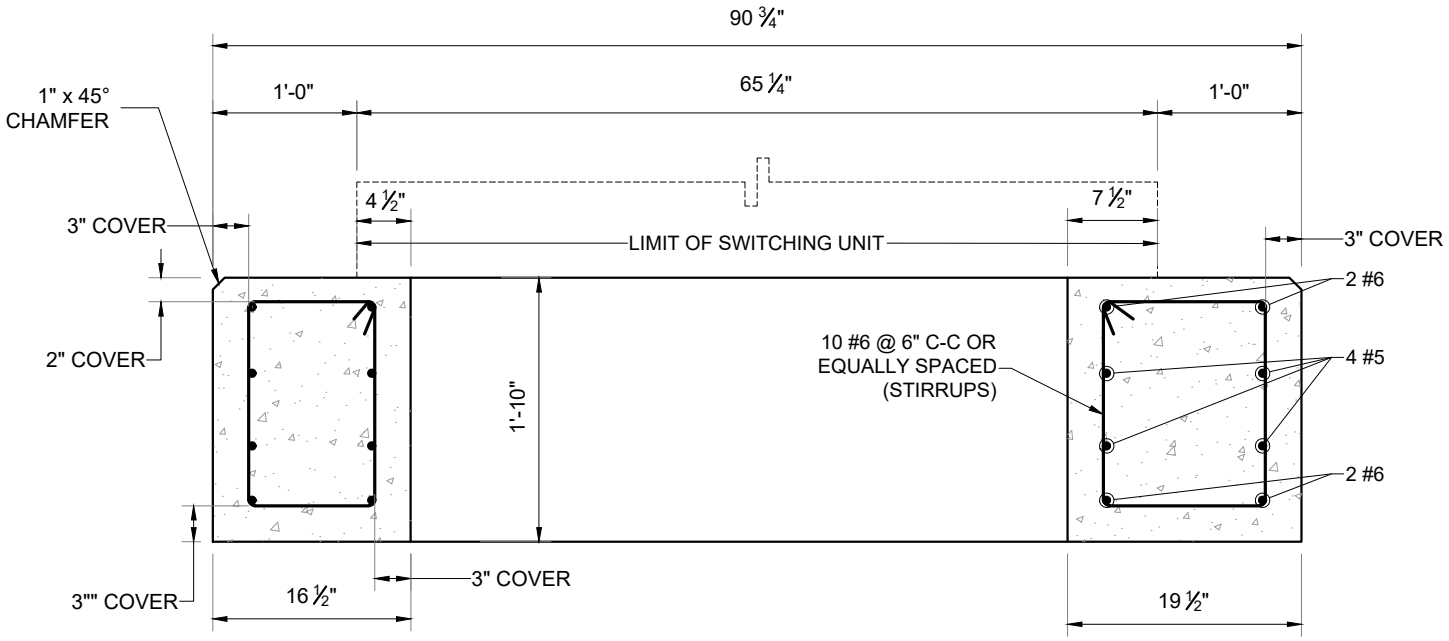


SECTION H

DISTRIBUTION ENGINEERING

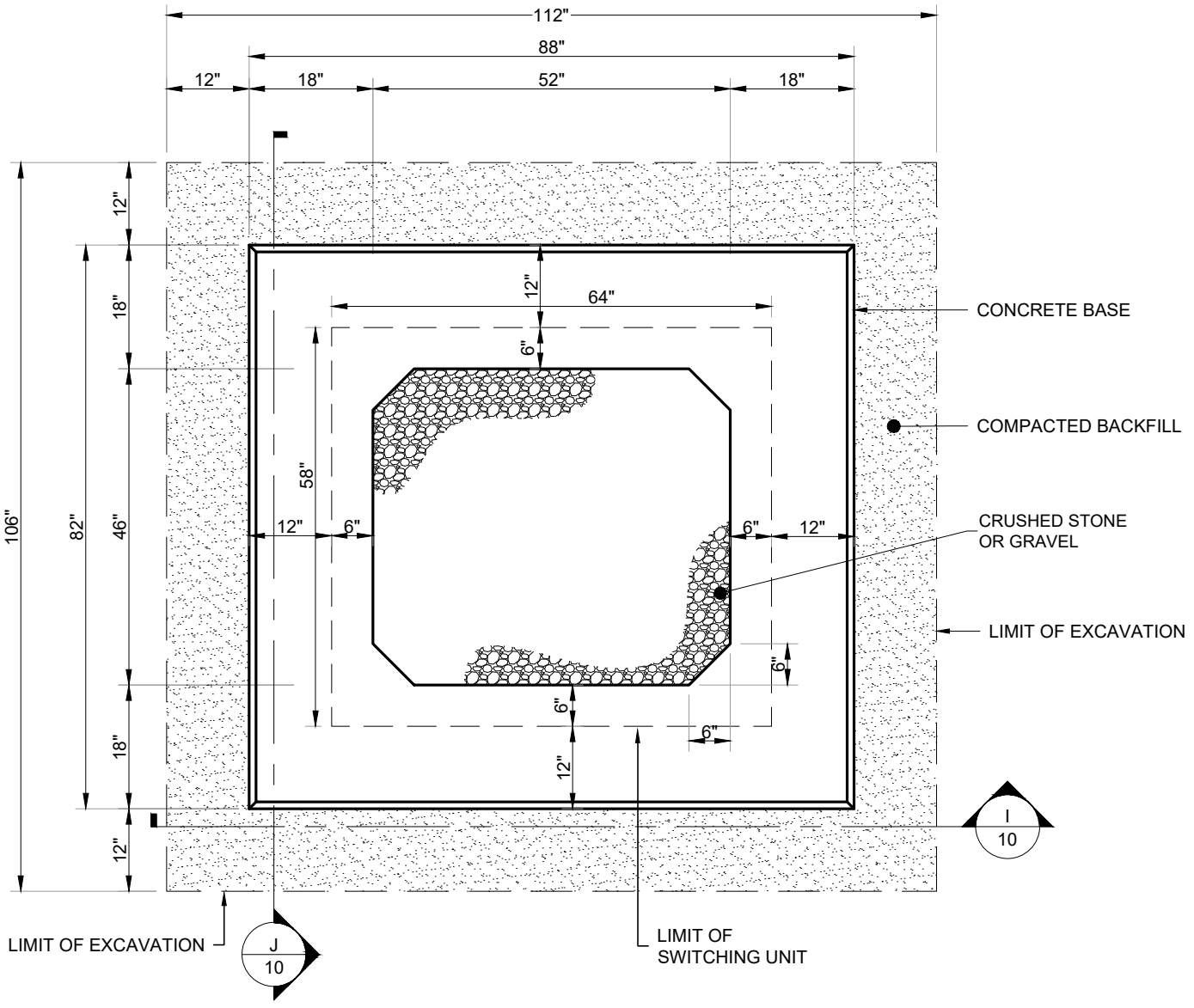
UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-53 VERSION 3
DOCUMENT NO. 4325.039
PAGE 9 OF 18 DATE OCT 4, 2022
SUBMITTED JOSE M. OROZCO LIC. 16380
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

LIVE FRONT SINGLE POLE SWITCHING UNIT
(SEE STANDARD NO. URD-11)



PLAN VIEW

DISTRIBUTION ENGINEERING

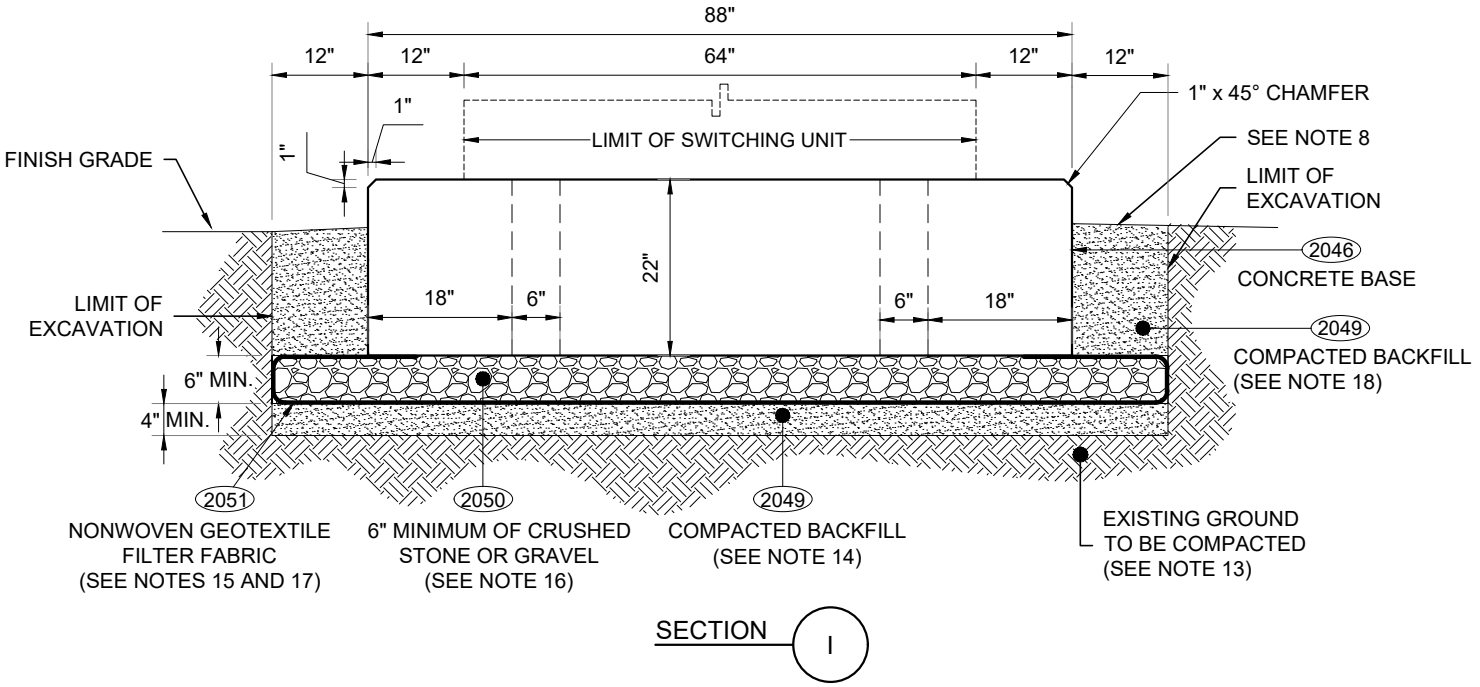
UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

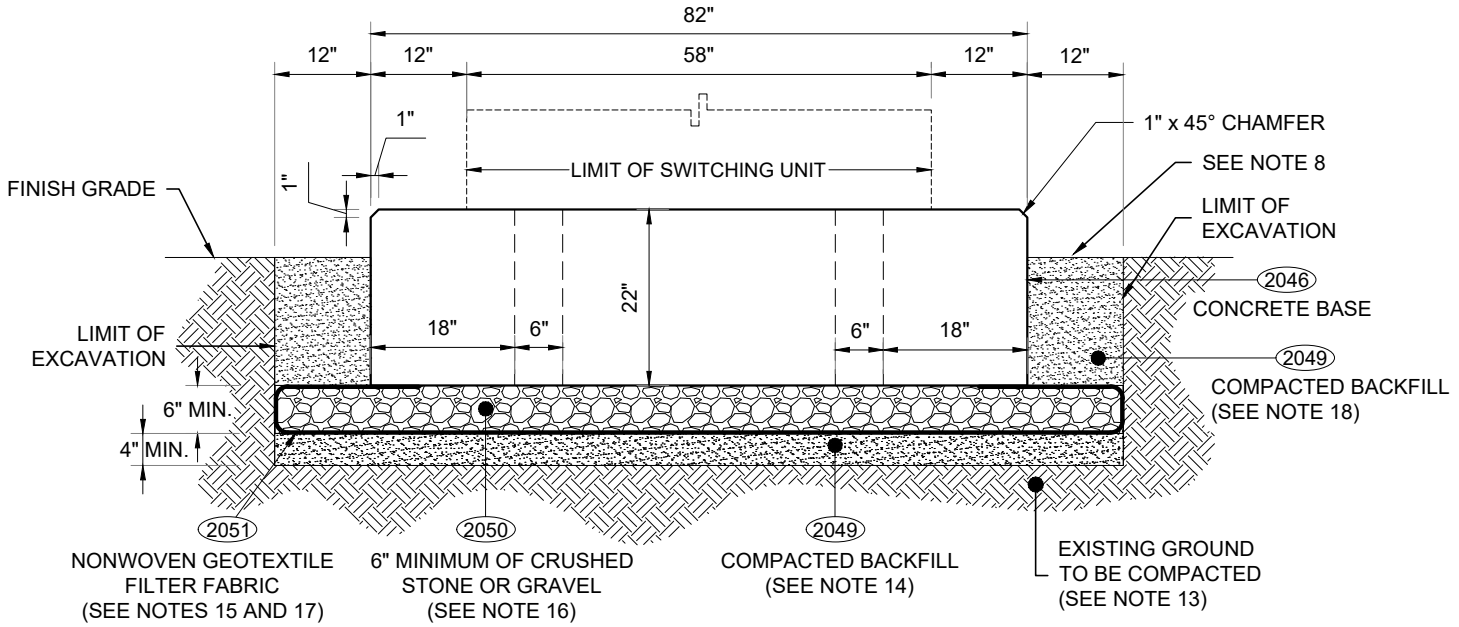
CONCRETE BASES FOR PAD MOUNTED EQUIPMENT
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-53 VERSION 3
DOCUMENT NO. 4325.039
PAGE 10 OF 18 DATE OCT 4, 2022
SUBMITTED JOSE M. OROZCO LIC. 16380
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

LIVE FRONT SINGLE POLE SWITCHING UNIT
(SEE STANDARD NO. URD-11)



SECTION I



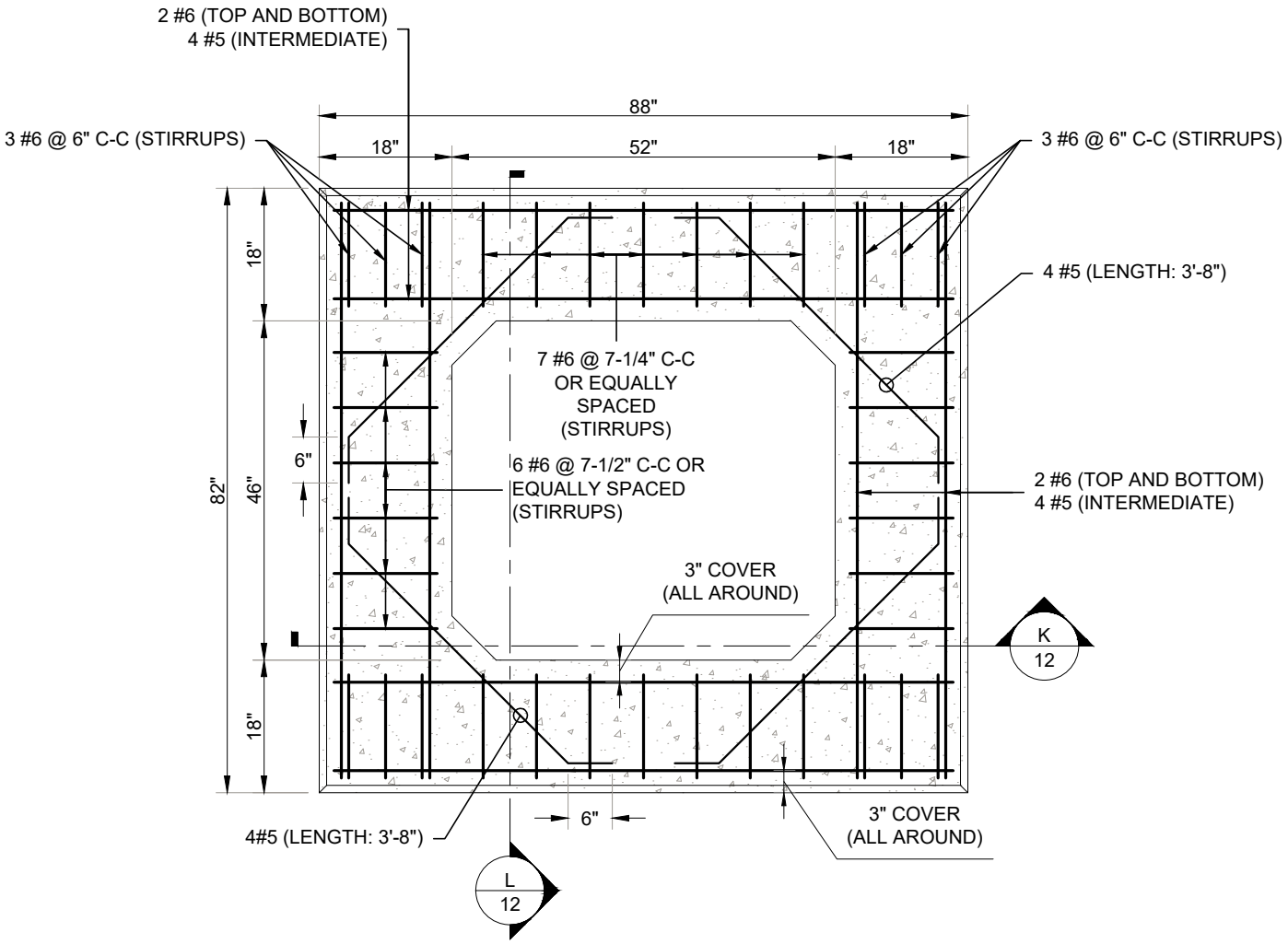
SECTION J

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-53 VERSION 3
DOCUMENT NO. 4325.039
PAGE 11 OF 18 DATE OCT 4, 2022
SUBMITTED JOSE M. OROZCO LIC. 16380
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

LIVE FRONT SINGLE POLE SWITCHING UNIT
(SEE STANDARD NO. URD-11)



TOP VIEW

DISTRIBUTION ENGINEERING

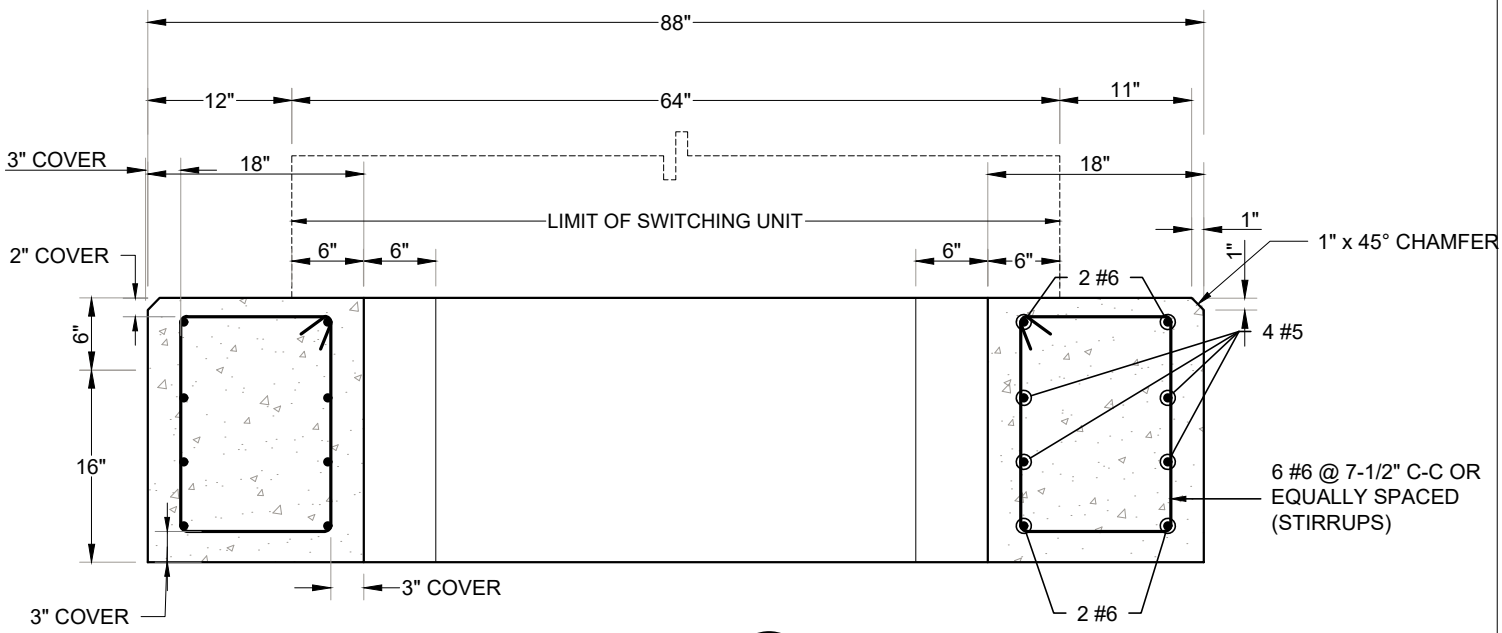
UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

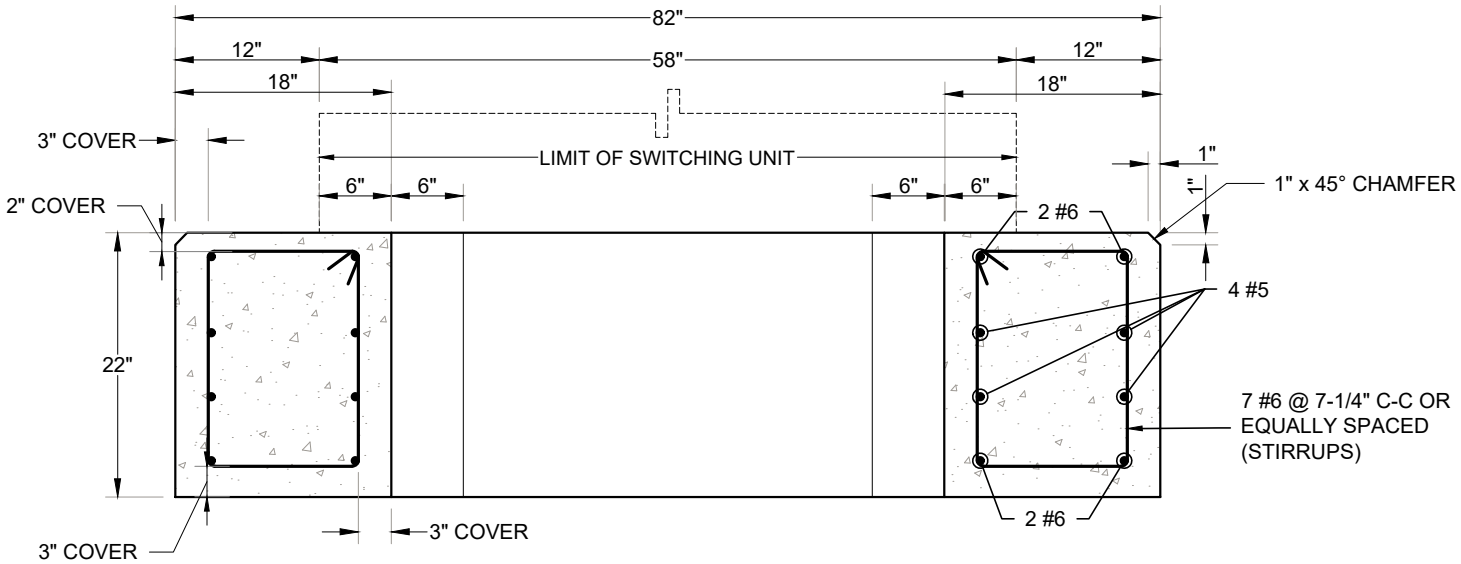
CONCRETE BASES FOR PAD MOUNTED EQUIPMENT
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-53 VERSION 3
DOCUMENT NO. 4325.039
PAGE 12 OF 18 DATE OCT 4, 2022
SUBMITTED JOSE M. OROZCO LIC. 16380
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

LIVE FRONT SINGLE POLE SWITCHING UNIT
(SEE STANDARD NO. URD-11)



SECTION K



SECTION L

DISTRIBUTION ENGINEERING

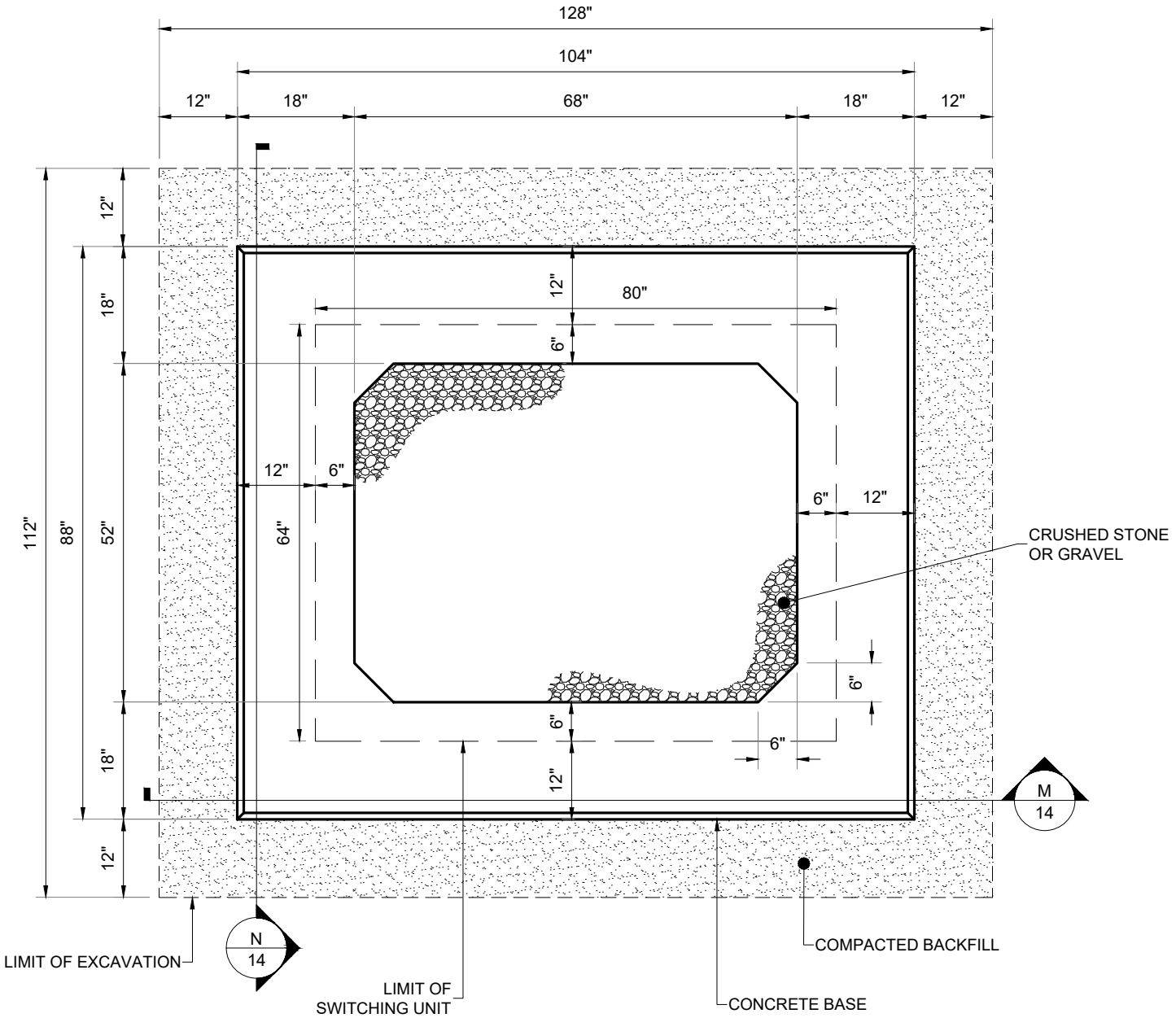
UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-53 VERSION 3
DOCUMENT NO. 4325.039
PAGE 13 OF 18 DATE OCT 4, 2022
SUBMITTED JOSE M. OROZCO LIC. 16380
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

LIVE FRONT GANG OPERATED SWITCHING UNIT
(SEE STANDARD NO. URD-11-A)



PLAN VIEW

DISTRIBUTION ENGINEERING

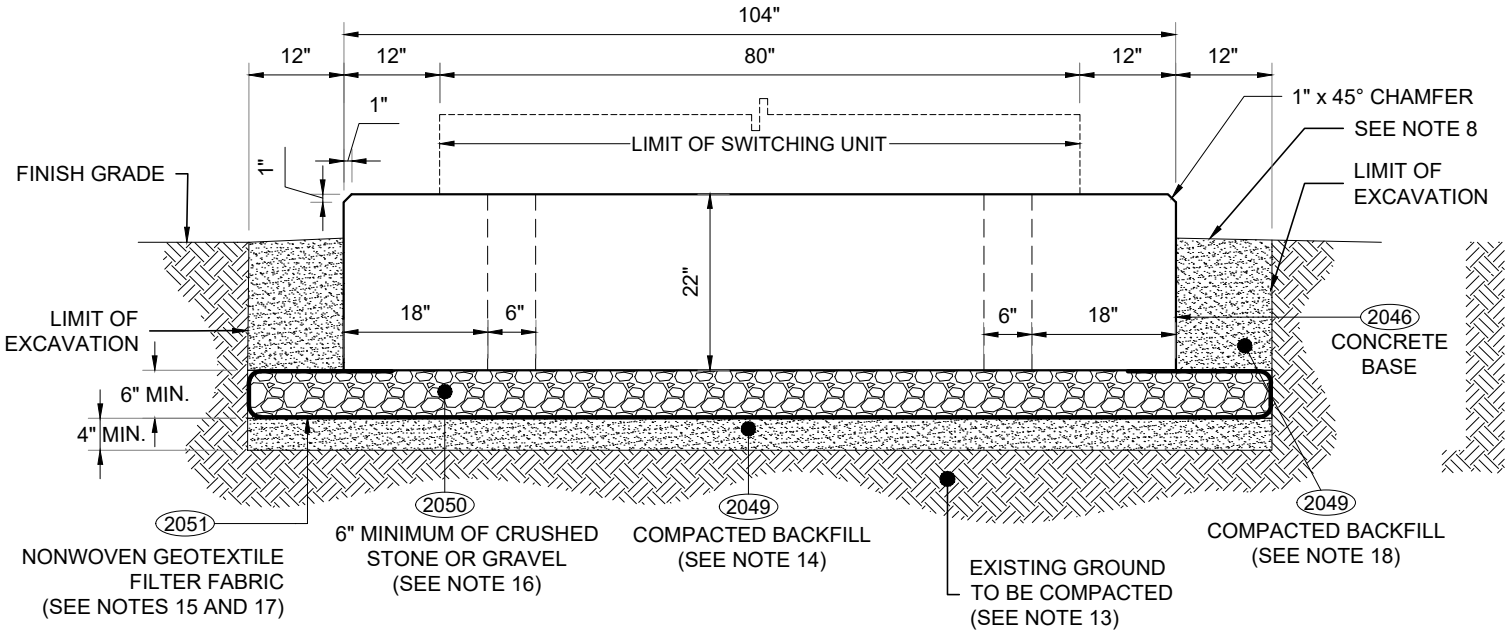
UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

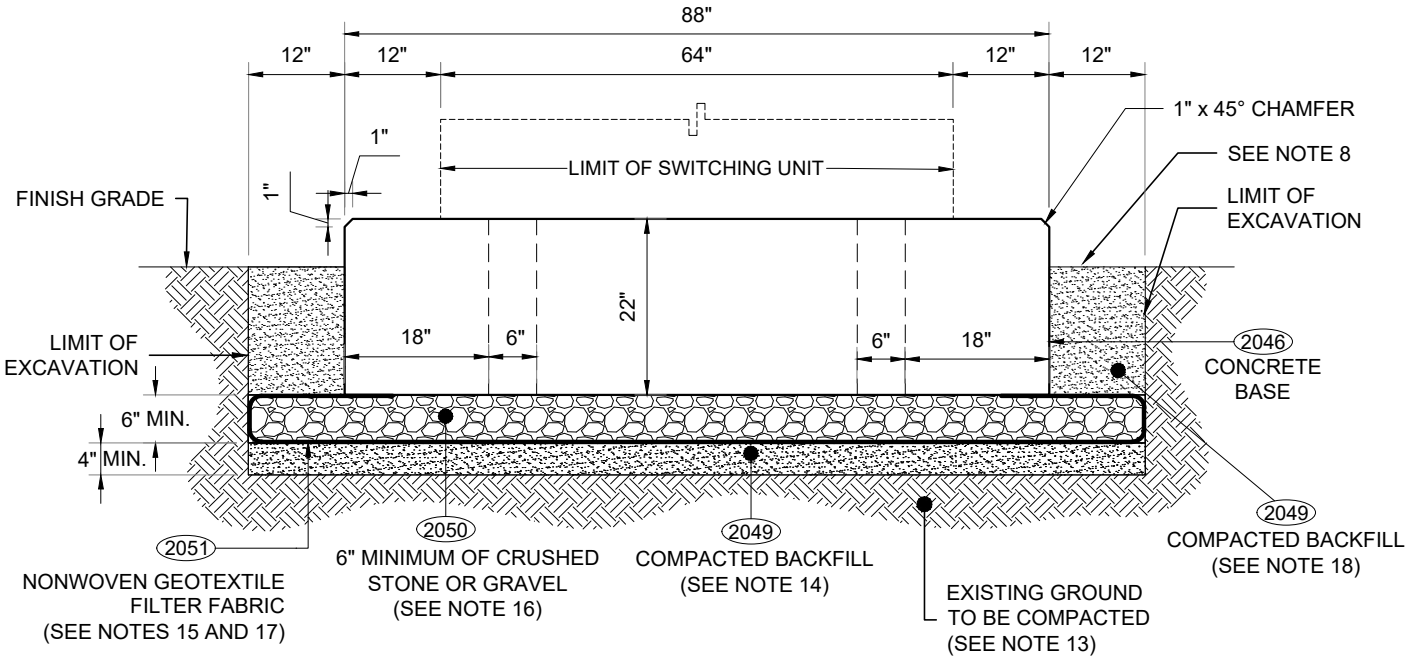
CONCRETE BASES FOR PAD MOUNTED EQUIPMENT
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO.	URD-53 VERSION 3
DOCUMENT NO.	4325.039
PAGE	14 OF 18 DATE OCT 4, 2022
SUBMITTED	JOSE M. OROZCO LIC. 16380
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	VICTOR R. FEBRES LIC. 3412

LIVE FRONT GANG OPERATED SWITCHING UNIT
(SEE STANDARD NO. URD-11-A)



SECTION M



SECTION N

DISTRIBUTION ENGINEERING

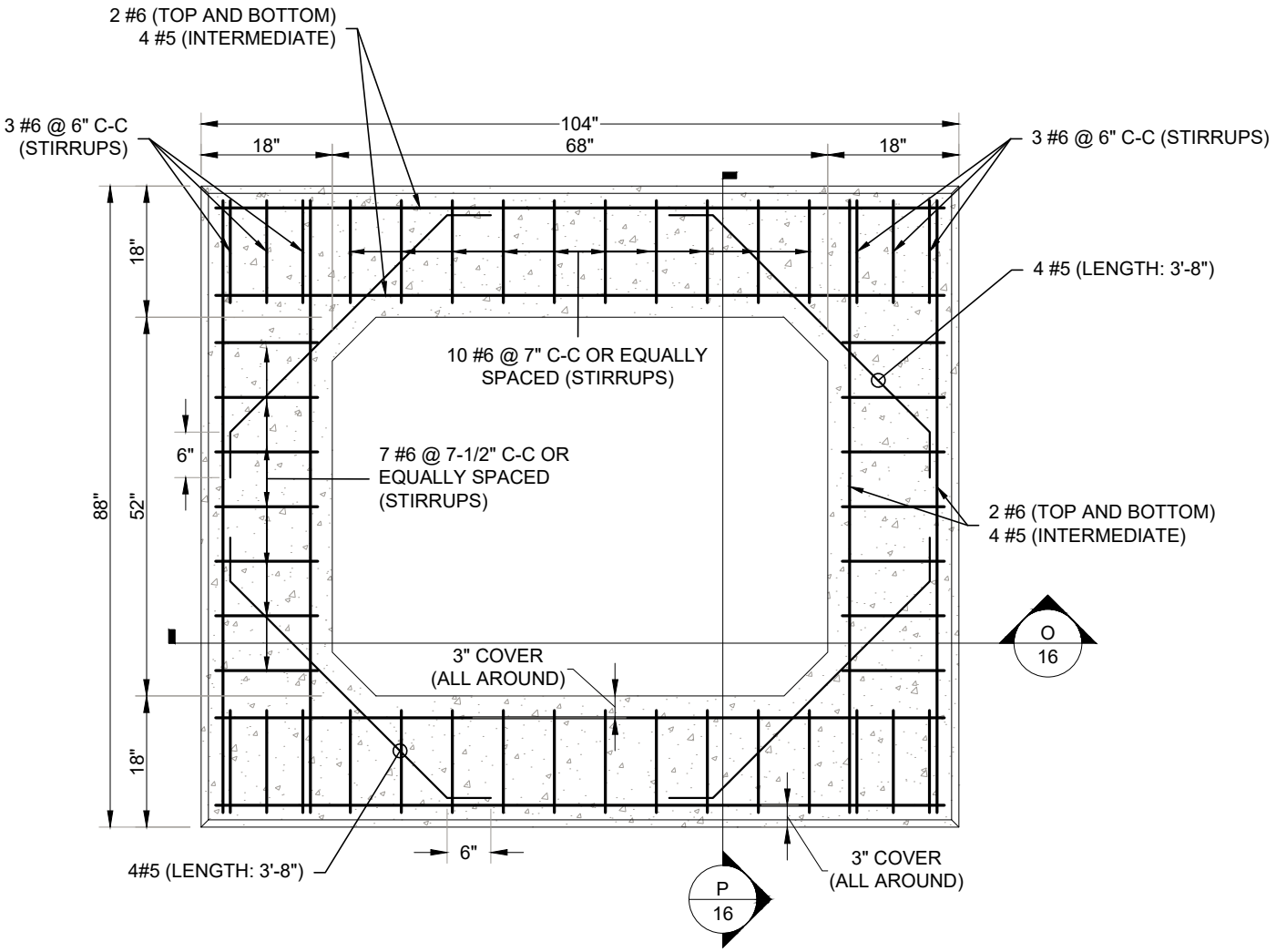
UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-53 VERSION 3
DOCUMENT NO. 4325.039
PAGE 15 OF 18 DATE OCT 4, 2022
SUBMITTED JOSE M. OROZCO LIC. 16380
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

LIVE FRONT GANG OPERATED SWITCHING UNIT
(SEE STANDARD NO. URD-11-A)



TOP VIEW

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-53 VERSION 3
DOCUMENT NO. 4325.039
PAGE 16 OF 18 DATE OCT 4, 2022
SUBMITTED JOSE M. OROZCO LIC. 16380
REVIEWED IVETTE D. SANCHEZ LIC. 13837
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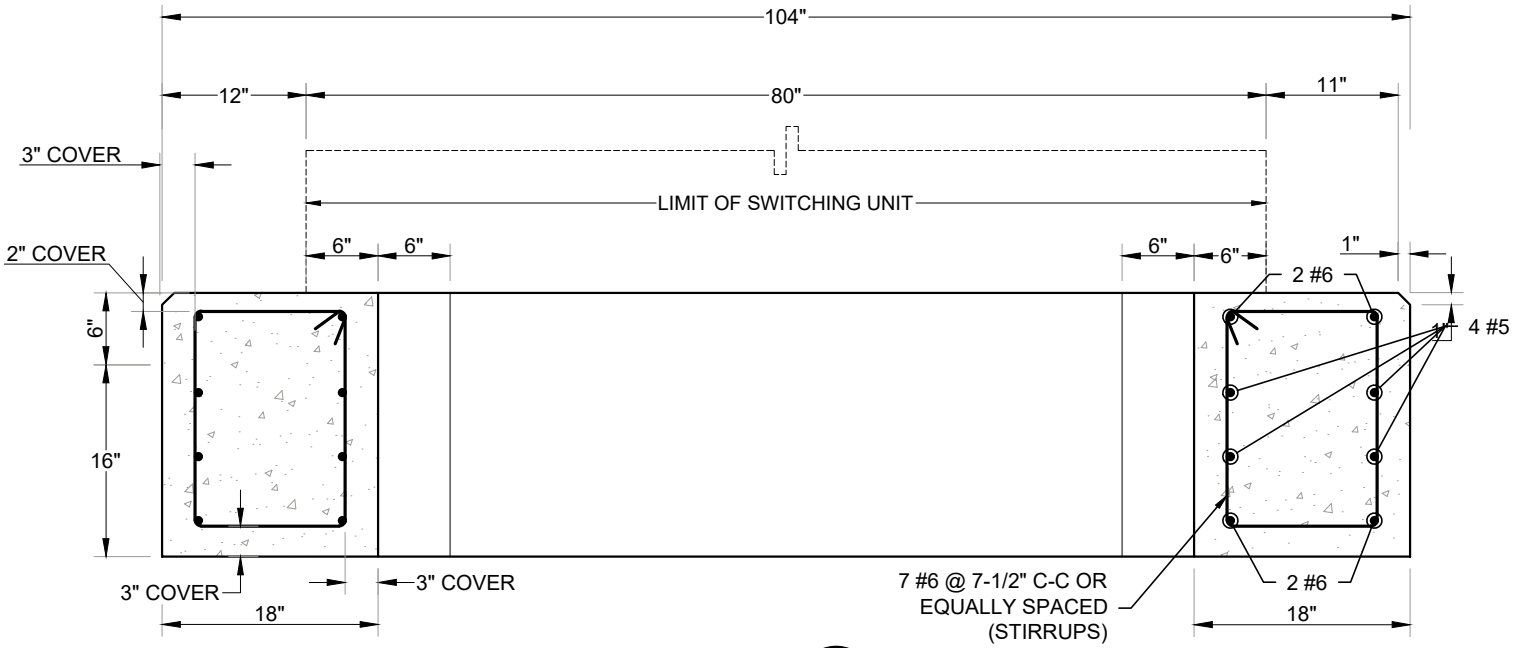
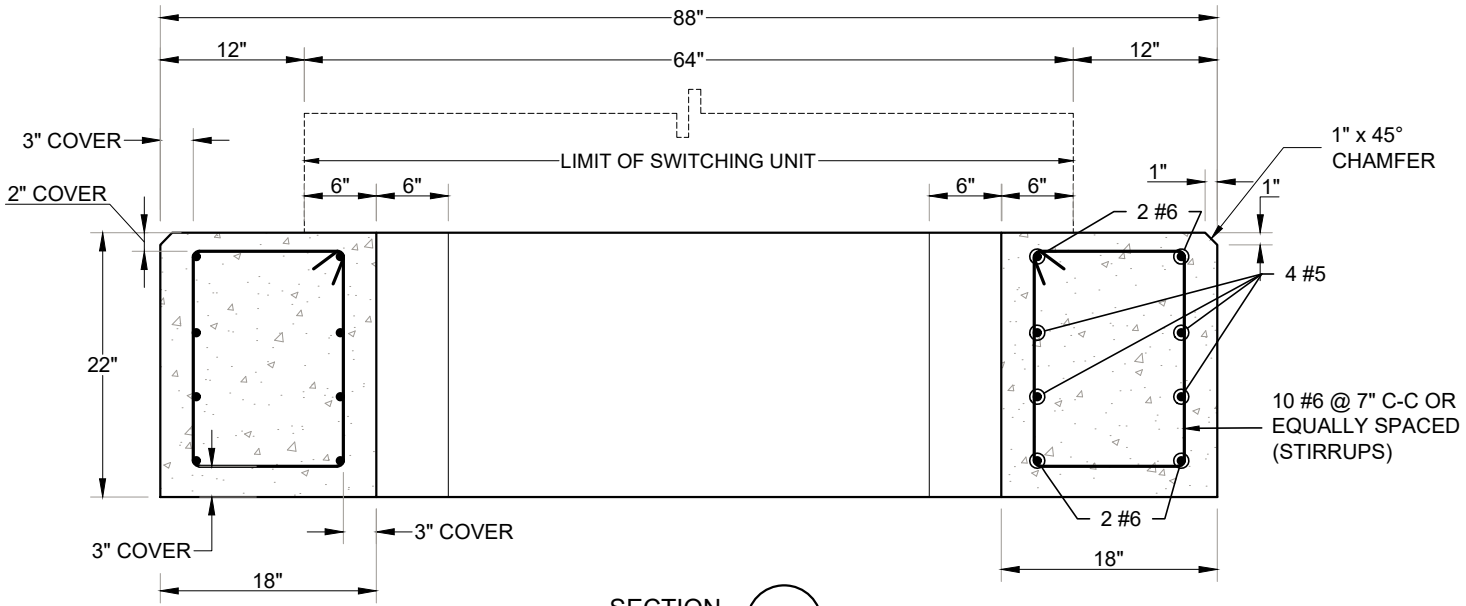
LIVE FRONT GANG OPERATED SWITCHING UNIT
(SEE STANDARD NO. URD-11-A)



SECTION O



SECTION P

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT MAXIMUM VOLTAGE: 13.2 KV NOTES

STANDARD NO. URD-53 VERSION 3
DOCUMENT NO. 4325.039
PAGE 17 OF 18 DATE OCT 4, 2022
SUBMITTED JOSE M. OROZCO LIC. 16380
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

GENERAL NOTES FOR PAD MOUNTED EQUIPMENT CONCRETE BASE

1. THE SUPPLIER IS RESPONSIBLE FOR THE DESIGN OF THE PRECAST CONCRETE BASE, INCLUDING THE REINFORCING STEEL, COMPLYING WITH ALL STANDARDS AND CODES APPLICABLE FOR THIS TYPE OF PRODUCT AND THEIR CORRESPONDING INSTALLATION.
2. THE SUPPLIER SHALL SUBMIT THE SHOP DRAWINGS, CALCULATIONS AND ANY SUPPORTING DOCUMENT REQUIRED FOR THE CORRESPONDING LUMA EVALUATION AND APPROVAL, PRIOR TO SELL THIS PRODUCT. ALL DOCUMENTATION PROVIDED SHALL BE SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER, AS REQUIRED BY LAWS OF PUERTO RICO.
3. IF THE CONCRETE BASE IS NOT A PRECAST ELEMENT AND WILL BE CONSTRUCTED ON SITE, THE CONTRACTOR WILL BE RESPONSIBLE TO BUILD IT IN ACCORDANCE WITH THE DETAILS AND NOTES OF THIS STANDARD.
4. THE CONCRETE MIX SHALL MEET THE REQUIREMENTS OF STANDARD NO. ASTM C94 - STANDARD SPECIFICATION FOR READY-MIXED CONCRETE. THE MINIMUM COMPRESSIVE STRENGTH FOR CONCRETE SHALL BE 4,000 PSI AT 28 DAYS, AS TESTED IN ACCORDANCE WITH STANDARD NO. ASTM C39 – STANDARD TEST METHOD FOR COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
5. THE REINFORCING STEEL SHALL BE FABRICATED AND PLACED IN CONFORMANCE WITH THE SPECIFICATION OF STANDARD NO. ACI 318 - BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE. THE REINFORCING STEEL SHALL BE DEFORMED BAR AND GRADE 60 (MINIMUM YIELD STRENGTH EQUAL TO 60,000 PSI), ACCORDING TO STANDARD NO. ASTM A615 – STANDARD SPECIFICATION FOR DEFORMED AND PLAIN CARBON-STEEL BARS FOR CONCRETE REINFORCEMENT, AND IT SHALL BE NEW BILLET-STEEL, AS REQUIRED. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
6. THE REINFORCING STEEL SHALL BE PLACED AND ADEQUATELY SUPPORTED TO PROVIDE THE MINIMUM CONCRETE COVER REQUIRED, AND IT SHALL BE SECURE AGAINST DISPLACEMENT BY STANDARD NO. ACI 318, LATEST EDITION.
7. THE SURFACE OF THE CONCRETE BASE SHALL BE SMOOTH AND LEVELED, AND IT SHALL HAVE A SLIGHT SLOPE IN THE OFFSET OF 6" FROM EDGES. ALL EDGES SHALL BE CHAMFERED.
8. THE FINAL GRADE OF THE GROUND AROUND THE CONCRETE BASE SHALL HAVE A SLOPE FROM THE CONCRETE BASE TO THE GROUND AND BE WELL DRAINED AT ALL TIMES.

TRANSFORMER CONCRETE BASE NOTES

9. AFTER THE SINGLE PHASE DEAD FRONT TRANSFORMER IS INSTALLED ON THE CONCRETE BASE, A SPACE OF 3" MINIMUM SHALL REMAIN FREE AROUND THE TRANSFORMER, FROM THE EXTERIOR WALL OF THE TRANSFORMER TO THE EDGE OF THE CONCRETE BASE. THE MAXIMUM TOTAL WEIGHT OF SINGLE PHASE TRANSFORMER SHALL BE 2,500 POUNDS.
10. AFTER THE THREE PHASE DEAD FRONT THREE PHASE TRANSFORMER IS INSTALLED ON THE CONCRETE BASE, A SPACE OF 6" MINIMUM SHALL REMAIN FREE AROUND THE TRANSFORMER, FROM THE EXTERIOR WALL OF THE TRANSFORMER TO THE EDGE OF THE CONCRETE BASE. THE MAXIMUM TOTAL WEIGHT OF TRANSFORMER SHALL BE 4,200 POUNDS.
11. AFTER DUCTS ARE IN PLACE, THE EXISTING GROUND IN THE AREA BELOW THE CONCRETE BASE FOR THE TRANSFORMER, SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT OF THE UNDISTURBED SOIL.
12. #67 CRUSHED STONE OR GRAVEL SHALL BE USED FOR THE INSTALLATION OF PRECAST CONCRETE BASE FOR THE TRANSFORMER. THIS MATERIAL SHALL BE UNIFORMLY GRADED AND THE SIZES ARE FROM ¾" DOWN TO FINE PARTICLES. IT SHALL BE FREE FROM SOFT AND DISINTEGRATED PIECES, CLAY, ORGANIC OR OTHER DELETERIOUS MATTER. THE CRUSHED STONE OR GRAVEL SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT.

SWITCHING UNIT CONCRETE BASE NOTES

13. AFTER DUCTS ARE IN PLACE, THE EXISTING GROUND IN THE AREA BELOW THE CONCRETE BASE FOR THE SWITCHING UNIT, CRUSHED STONE OR GRAVEL, AND BACKFILL SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT OF THE UNDISTURBED SOIL. THE MINIMUM AREA OF EXCAVATION WILL INCLUDE 12" AROUND THE CONCRETE BASE.
14. PLACE BACKFILL OVER THE COMPACTED EXISTING GROUND WITH A MINIMUM THICKNESS OF 4". THE BACKFILL SHALL BE A-2-4 MATERIAL (STANDARD NO. ASTM D3282, LATEST EDITION), AND IT SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT.
15. INSTALL THE NONWOVEN GEOTEXTILE FILTER FABRIC (8 OUNCES PER SQUARE YARDS), SIMILAR OR EQUAL TO REGISTERED PRODUCT MIRAFI S800 OR SKAPS GT-180, OVER THE COMPACTED BACKFILL.
16. PLACE CLEAN #67 CRUSHED STONE OR GRAVEL OVER THE NONWOVEN GEOTEXTILE FILTER FABRIC WITH A MINIMUM THICKNESS OF 6". THIS MATERIAL SHALL BE UNIFORMLY GRADED AND SIZE FROM ¾" DOWN TO FINE PARTICLES. IT SHALL BE FREE FROM SOFT AND DISINTEGRATED PIECES, CLAY, ORGANIC OR OTHER DELETERIOUS MATTER. THE CRUSHED STONE OR GRAVEL SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT.
17. THE GEOTEXTILE FABRIC SHALL WRAP PARTIALLY THE CRUSHED STONE OR GRAVEL TO A MINIMUM DISTANCE OF 18" FROM LIMIT OF AREA OF EXCAVATION. THE MINIMUM WIDTH FOR OVERLAPPING OF GEOTEXTILE FABRIC SHALL BE 6".
18. INSTALL THE CONCRETE BASE IN THE CENTER OF THE EXCAVATED AREA, AND PLACE THE BACKFILL (A-2-4 MATERIAL, AS PER STANDARD NO. ASTM D3282, LATEST EDITION) AROUND THE CONCRETE BASE. THE BACKFILL SHALL BE COMPACTED EVERY 6" OF THICKNESS UP TO FINAL GRADE WITH A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698) AT THE PROPER MOISTURE CONTENT.

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT
MAXIMUM VOLTAGE: 13.2 KV
BILL OF MATERIAL

STANDARD NO. URD-53 VERSION 3
DOCUMENT NO. 4325.039
PAGE 18 OF 18 DATE OCT 4, 2022
SUBMITTED JOSE M. OROZCO LIC. 16380
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

MATERIALS					
NO.	GENERAL DESCRIPTION	WAREHOUSE ITEM	QTY.		
			TRANSFORMER		SWITCHING UNIT
			SINGLE PHASE	THREE PHASE	
2046	CONCRETE BASE	VARIES	1	1	1
2049	A-2-4 BACKFILL MATERIAL	038-83207	-	-	2.25
2050	#67 CRUSHED STONE OR GRAVEL	038-83208	0.25	0.50	1.5
2051	NONWOVEN GEOTEXTILE FILTER FABRIC	038-83209	-	-	20

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

DUCT SIZING
MAXIMUM VOLTAGE: 13.2 KV

STANDARD NO. URD-54 VERSION 1
DOCUMENT NO. 4325.040
PAGE 1 OF 2 DATE SEPT 19, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED EMILIO CUADRADO LIC. 3000

PRIMARY VOLTAGE				
PRIMARY CABLE JACKETED CONCENTRIC NEUTRAL (JCN) TYPE	THREE PHASE SYSTEM 3C - 15 KV UG CABLE, CU, XLPE, 1/3 NEUTRAL		SINGLE PHASE SYSTEM 1C - 15 KV UG CABLE, CU, XLPE, 1/3 NEUTRAL 1C - 600 V, CU, XHHW-2 (NEUTRAL)	
	CABLES SIZE	DUCT MIN. DIAMETER (INCHES)	CABLES SIZE	DUCT MIN. DIAMETER (INCHES)
	3C - #2 AWG, 15 KV	3	1C - #2 AWG, 15 KV 1C - #2 AWG, 600 V	2
	3C - 2/0 AWG, 15 KV	4		
	3C - 4/0 AWG, 15 KV	4		
	3C - 500 MCM, 15 KV	6		
	3C - 750 MCM, 15 KV	6		
PRIMARY CABLE TAPE SHIELDED TYPE	THREE PHASE SYSTEM 3C - 15 KV UG CABLE, CU, XLPE 1C – 600 V, CU, XHHW-2 (NEUTRAL)		SINGLE PHASE SYSTEM 1C - 15 KV UG CABLE, CU, XLPE 1C – 600 V, CU, XHHW-2 (NEUTRAL)	
	CABLES SIZE	DUCT MIN. DIAMETER (INCHES)	CABLES SIZE	DUCT MIN. DIAMETER (INCHES)
	3C - #2 AWG, 15 KV 1C - #2 AWG, 600 V	3	1C - #2 AWG, 15 KV 1C - #2 AWG, 600 V	2
	3C – 2/0 AWG, 15 KV 1C - 2/0 AWG, 600 V	4		
	3C – 4/0 AWG, 15 KV 1C - 4/0 AWG, 600 V	4		
	3C – 500 MCM, 15 KV 1C - 4/0 AWG, 600 V	6		
	3C – 750 MCM, 15 KV 1C - 4/0 AWG, 600 V	6		

DISTRIBUTION ENGINEERING

UNDERGROUND DISTRIBUTION STANDARDS

TITLE:

DUCT SIZING
MAXIMUM VOLTAGE: 13.2 KV
NOTES

STANDARD NO. URD-54 VERSION 1
DOCUMENT NO. 4325.040
PAGE 2 OF 2 DATE SEPT 19, 2022
SUBMITTED ROBERTO A. TORRES LIC. 10414
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SECONDARY VOLTAGE				
SECONDARY CABLE XHHW-2, 600 V	THREE PHASE SYSTEM 4C – 600 V UG CABLE, CU, XLPE		SINGLE PHASE SYSTEM 3C - 600 V UG CABLE, CU, XLPE	
	CABLES SIZE	DUCT MIN. DIAMETER (INCHES)	CABLES SIZE	DUCT MIN. DIAMETER (INCHES)
	4C - #2 AWG, 600 V	2	3C - #2 AWG, 15 KV	2
	4C - 2/0 AWG, 600 V	2	3C - 2/0 AWG, 600 V	2
	4C - 4/0 AWG, 600 V	3	3C - 4/0 AWG, 600 V	2
	4C - 500 MCM, 600 V	4	3C - 500 MCM, 600 V	3

LEGEND:

1C - ONE CONDUCTOR
2C - TWO CONDUCTORS
3C - THREE CONDUCTORS
4C - FOUR CONDUCTORS

NOTES:

1. A CONDUIT SYSTEM IS REQUIRED TO PROVIDE A MECHANICAL PROTECTION FOR THE CABLES AND TO FACILITATE ITS INSTALLATION AND REPLACEMENT. THE DIAMETER OF THE DUCTS WILL BE DETERMINED ACCORDING TO THIS STANDARD AND TO THE GUIDELINES OF THE NATIONAL ELECTRICAL CODE (NEC).
2. THE MAXIMUM LENGTH OF THE CABLE RUNS IS LIMITED BY THE TENSION DEVELOPED IN THEM. THE DESIGNER WILL BE RESPONSIBLE TO DEVELOP, AND SUBMIT FOR LUMA'S EVALUATION, THE CALCULATIONS OF THE PULLING TENSION TO WHICH THE CABLES WILL BE SUBJECTED. IT IS NECESSARY TO INDICATE THE PULLING METHOD TO BE USED, PULL EYE OR BASKET, AND THE LOCATION TO PULL AND FEED EACH DUCT.
3. LUMA REQUIRES THAT PULLING TENSION CALCULATIONS BE SUBMITTED FOR ALL PRIMARY AND SECONDARY VOLTAGE CABLES IN DESIGNS FOR UNDERGROUND DISTRIBUTION SYSTEM, TO VERIFY THAT THE CABLES USEFUL LIFE WOULD NOT BE AFFECTED.
4. THE DESIGN SHALL ALLOW CABLE INSTALLATION WITHOUT APPLYING EXCESSIVE STRESS, FOR WHICH THE DESIGNER NEEDS TO CONSIDER THE FOLLOWING:
   A. SELECT THE CORRECT DUCT SIZE
   B. LIMIT THE NUMBER OF CURVES
   C. NOT EXCEED THE ALLOWABLE PULLING TENSION OF THE CABLES
   D. LIMIT THE SIDEWALL PRESSURE ON THE CABLE WHEN IS PULLED AROUND A BEND
5. ALL DUCTS USED IN UNDERGROUND DISTRIBUTION SYSTEMS TO BE TRANSFERRED TO LUMA SHALL BE POLYVINYL CHLORIDE SCHEDULE 40 (PVC SCH-40). ALL DUCT ELBOWS AND ACCESSORIES SHOULD BE ALSO PVC SCH-40.