San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

Hetch Hetchy POWER

ELECTRIC SERVICE GUIDELINES

These Electric Service Guidelines:

- Are subject to change without notice
- Are intended for use by all interested Applicants and particularly by members of technical and professional trades concerned with the design and construction of facilities to receive electrical service from SFPUC.
- Are founded upon standards of good utility practices and safety practices.
- Are designed to provide current information on SFPUC's service equipment and installation requirements. Every effort has been made to ensure these Guidelines are as complete and accurate as possible.
- Contains information essential to the timely and cost-effective establishment of service to new facilities, or to remodeled facilities where load and/or metering have been modified.

If any of the requirements of these Electric Service Guidelines or any of the Applicable Rules and Regulations (as listed in Section I, Paragraph F.) conflict with one another, the most conservative requirement regarding safety shall govern.

Table of Contents

SECTION I – GENERAL INFORMATION

A. Office Location and Telephone Numbers

San Francisco Public Utilities Commission, Power Enterprise
525 Golden Gate Avenue, 7th Floor
San Francisco, CA 94102
(415) 554-0725

B. Acronyms and Abbreviations

AHJ	Authority Having Jurisdiction
AIC	Amperes Interrupting Capacity
AWG	American Wire Gage
BSM	Bureau of Street use and Mapping
CCSF	City and County of San Francisco
DBI	San Francisco Department of Building Inspections
DPW	San Francisco Department of Public Works
EEOR	Electrical Engineer of Record
EID	Electrical Inspection Division, SF Department of Building Inspection
ESG	SFPUC Electric Service Guidelines
EUSERC	Electric Utility Service Equipment Requirements Committee
GRS	Galvanized Rigid Steel
NRTL	Nationally Recognized Testing Laboratory
RRGES	SFPUC “Rules & Regulations Governing Electric Service”
SFEC	San Francisco Electrical Code
SFPUC	San Francisco Public Utilities Commission

C. Definitions

Wherever a word or phrase defined below, or a pronoun used in place thereof, is used in these Electric Service Guidelines, it shall have the meaning set forth in this Section. References to related Sections or documents are provided for convenience but not to exclude other Sections or documents where such terms may be used. The colon (":") is employed in this Section as a symbol for "shall mean." A colon also may be employed in these Electric Service Guidelines or elsewhere to set off a paragraph title or heading from the text that follows or as a punctuation mark in a sentence to direct attention to the matter that follows.

1. Accepted, Approved: Accepted or approved, or satisfactory for the work, as determined in writing by SFPUC. Where used in conjunction with SFPUC’s response to submittals, requests, applications, inquiries, proposals and reports by contractor, the term "approved" shall be held to limitations of the SFPUC’s responsibilities and duties as specified in these service guidelines. In no case shall SFPUC’s approval be interpreted as a release of a contractor from its responsibilities to fulfill requirements of these Electric Service Guidelines and Rules and Regulations and approval from the AHJ or a waiver of SFPUC’s rights under the ESG.
2. Equal: Shall be of the same quality, appearance, and utility to that specified and as determined by SFPUC. Applicant bears all burden of equality proof.

3. Install: Apply, connect, or erect items for incorporation into the Project. The term "Install" also describes operations at the site, including unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and associated operations.
4. Provide: Furnish, install, and connect unless otherwise indicated.
5. As Required: Shall be as required by applicable code requirements, good utility practice, the conditions prevailing, or by SFPUC.
6. Building Side: Equipment typically owned and maintained by the property owner and electrically located further from the electrical source (e.g. substation or distribution line located at or near property boundary).
7. Utility Side: Equipment typically owned, operated, and maintained by SFPUC, before and including the customer's meter.
8. Dedicated Communication Outlet: Consists of two (2) conduits: (1) a one--inch (1") diameter conduit and a dedicated phone line from the telephone service location to the metering location; and (2) a two-inch (2") conduit that meets SFPUC Smart Meter requirements [enclosure provided eight-to-ten (8 – 10) feet above grade], and are provided by Applicant. Applicant shall also provide a Ground Fault Interrupter ("GFI") protected receptacle at a location specified by SFPUC.

D. Service Map

[Reserved]

E. Application for Service

1. General
   [Reserved]

2. Commercial Services
   [Reserved]
3. Responsibilities
   a. SFPUC:
      SFPUC is responsible for planning, designing, and engineering its electrical service facilities and service laterals using SFPUC standards for design, materials, and construction.
   b. Applicant:
      Residential and nonresidential applicants may select a contractor to design their facilities. SFPUC requires a clear path from existing distribution facilities to the location on the applicant's jobsite where the services will be connected. Applicant should follow the SFPUC RULES & REGULATIONS (https://sfpuc.org/accounts-services/water-power-and-sewer-rates). During the early stage of designing their projects, applicants and/or their contractors must fully complete and submit SFPUC's Online Application (https://sfpuc.org/construction-contracts/design-guidelines-standards/hetch-hetchy-power).

F. Applicable Rules and Regulations

All work described in these Electric Service Guidelines ("ESG") shall conform to its requirements as well as those of the following authorities, standards, and publications, and form a part of these ESG to the extent referenced:

1. SFPUC's Rules & Regulations Governing Electric Service ("RRGES")
2. Electric Utility Service Equipment Requirements Committee ("EUSERC")
3. California Public Utilities Commission General Order Numbers 95 & 128
4. San Francisco Electrical Code
5. Electrical Safety Orders, Title 24, State of California Department of Industrial Relations
6. City and County of San Francisco, SFPUC Stormwater Management Ordinance
7. City and County of San Francisco, order 176.707 – Regulation for Excavating and Restoring Streets in San Francisco
8. City and County of San Francisco, Department of Public Works, Bureau of Engineering, Street Section guidelines

If there is a conflict between the ESG and the RRGES, the RRGES shall govern.

G. Permits and Inspections

1. General
   a. SFPUC will not energize any electric service or set any meter until its associated facilities have been inspected and approved by the Authority Having Jurisdiction.
   b. Local and State ordinances require Applicant to obtain all applicable permits.
   c. All proposed construction of switchgear four-hundred amps (400 A) and greater and switchgear rooms shall be reviewed by San Francisco Department of Building Inspection Electrical Plan Check or the Authority Having Jurisdiction before construction starts. This review is additional to SFPUC switchgear submittal review required by the EUSERC standards.
   d. Inspection approval shall be obtained in writing from SFPUC's service representative for each phase of substructure work.
   e. "Certificate of Acceptance" inspections shall be provided to Applicant upon completion of construction and after acceptance of work by SFPUC and prior to use by Applicant.
   f. A photo of the "green tag" shall be provided to SFPUC before service is energized. A written copy of final inspection approval shall be provided to SFPUC.
2. Scheduling Inspections
   To facilitate acceptance of utility substructure work in a timely manner and conducive to Applicant's construction schedule, it is Applicant's responsibility to provide SFPUC with the following advance written notifications:
   a. Commencement of work – ten (10) working days (minimum)
   b. Trench backfill – fifteen (15) working days (minimum)
      i. Regardless of notification time, trenches shall not be backfilled without SFPUC inspection.
      ii. If a trench is backfilled without SFPUC inspection, SFPUC shall require that it be reopened and all work completely exposed for inspection, without additional cost to SFPUC.
   c. Any variations to approved plans.
      i. This shall include instances where it is necessary to clear undocumented obstacles, other utilities, or where a construction drawing is ambiguous.

ii. The respective SFPUC representative, in conjunction with Applicant's civil engineer, shall determine exact locations of all conduits, boxes, or facilities to comply within given field conditions.

iii. Revised conduit routing must be reviewed and approved by SFPUC prior to commencement of work. Applicant shall provide revised as-built drawings for approval by SFPUC. The as-built drawings shall be provided to SFPUC before conduit and equipment shown in the revised drawings is energized.

H. Easements

Utility and access easements shall be provided by Applicant for SFPUC for all electrical distribution facilities located on private property, or as shown on approved SFPUC project drawings. Exceptions shall be approved by SFPUC. SFPUC also reserves the right to require easements for service facilities on private property. Refer to Table I.H for minimum easement requirements.

Table I.H - Minimum Easement Requirements

Facility	Minimum Easement
Conductors in Conduit	10 Feet on each side
Primary Switchgear pad	Size it based on the switchgear dimension Front and Back Sides – 8 Foot Clearance Sides – 3 Foot Clearance
Transformer Pad	15 Feet Wide by 15 Feet Long Operable Sides – 8 Foot Clearance Non-Operable Sides – 3 Foot Clearance
Pad-Mounted Switch	10 Feet Wide by 25 Feet Long Operable Sides – 8 Foot Clearance Non-Operable Sides – 3-foot Clearance
Primary Vault/Pull Box	15 Feet Wide by 15 Feet Long
Secondary Pull Box	5 Feet Wide by 5 Feet Long

I. Clearances

Clearances for easements are as listed above in Table I.H

J. Access to SFPUC Facilities and Equipment

1. Only qualified SFPUC personnel or their qualified approved and retained representative(s) shall be authorized to open, enter, inspect, maintain, or perform any work, of any kind, to any part of SFPUC's electrical system. This shall include energized (active) and non-energized (passive) facilities and is not limited to vaults, underground boxes, enclosures, electrical rooms, cabinets, or any equipment which is part of SFPUC's electrical system. Generally, a minimum of two-week advance notice to SFPUC is required for scheduling work on such facilities.
2. Whenever Applicant's project requires performing new work to existing SFPUC facility or equipment, (e.g. connecting new conduit to an existing vault) only qualified SFPUC personnel or qualified and approved

SFPUC contractor(s) shall perform said work. Work connecting new to existing electric service shall be accomplished in a neat and acceptable manner and with minimum interference to existing SFPUC facilities. Should Applicant elect to have SFPUC personnel perform said work, SFPUC shall charge all associated costs to Applicant. Applicant shall provide 24/7 access to SFPUC's equipment.

K. Temporary Electrical Services

1. General
   a. If temporary electrical service is required for construction, Applicant shall:
      i. Coordinate directly with SFPUC; and
      ii. Pay all costs associated with SFPUC providing temporary electric service.

2. Construction Requirements
   a. Overhead Construction Service Poles:
      i. Construction service poles shall be pressure or thermally treated with an approved American Wood Preservative Association standardized preservative.
      ii. Installations in unstable soil shall require guying or bracing.
      iii. Poles shall be buried 10% plus two (2) feet of pole length. Backfill shall be compacted to ninety-five percent (95%) compaction.
   b. Underground Service:
      i. Applicants must use galvanized rigid steel (GRS) conduits in exposed locations that is subject to damage.
3. Metering Socket Requirements: See Drawings ESG-3-1 "Self-Contained Meter Socket/Panel Configurations" and ESG-3-2 - "Transformer-Rated Meter Socket/Panel Configurations."

L. Temporary Shutdowns of SFPUC Facilities

1. Applicant shall coordinate the need for temporary shutdowns (de-energizing) of existing services via written request to SFPUC.
2. Applicant shall pay SFPUC the estimated cost of a shutdown and any work-arounds in advance of a shutdown.
3. Applicant shall coordinate dates and durations of any shutdowns such that they do not interfere with normal operation of SFPUC facilities.
4. SFPUC shall use best efforts to maintain continuous operation of its facilities as required with temporary connections between new and existing work.
5. Applicant shall restore any existing work that becomes disturbed during work of project to its original condition including maintenance of wiring as required.
6. Applicant shall provide a minimum of a three-week advance notice to SFPUC. The scheduling lead times are estimates and may vary depending on workload and other projects.

M. Warranty

Applicant shall warrant that installation is free from mechanical and/or electrical defects. Applicant agrees to replace or repair at their expense, any part of the installation that fails within a period of one year from final date of acceptance.

N. Closeout

Closeout shall occur upon completion, after a test of completed system demonstrates in the presence of SFPUC personnel that facilities provided and installed under Applicant's work scope operate as designed and free of faults. This includes testing that the meter sockets and its downstream wiring were connected correctly. Such work shall be scheduled in advance and as directed by SFPUC.

O. Standard SFPUC Installation

1. SFPUC standard installation shall be underground as opposed to overhead.
2. All transformers shall be pad-mounted, unless otherwise approved by SFPUC pursuant to Applicant's request and any associated added expense installed as Special Facilities.

END OF SECTION I

SECTION II – METERING REQUIREMENTS

A. General

1. See SFPUC's Rules & Regulations Governing Electric Service ("RRGES"), Section X – "Electric service Operating Policies."
2. A utility grade electrical usage meter and sealing ring are required on Applicant's premises for SFPUC electrical service.
3. Electrical usage shall be metered in accordance with EUSERC standards.
4. Only trained and qualified SFPUC personnel are authorized to seal, unseal, install, and remove meters from their sockets.
5. All metering facilities and service termination installations are subject to SFPUC review and approval.
6. SFPUC shall provide any project-specific requirements after review of Applicant's drawings.
7. SFPUC shall provide, own, and maintain:
   a. Electric meter
   b. Any equipment electrically connected on the SFPUC side of meter
   c. Current and potential transformers (where specified by SFPUC)
   d. Any associated instruments, test switches, and wiring specified by SFPUC
8. Unless otherwise indicated by SFPUC, Applicant shall provide, own, and maintain:
   a. All facilities, equipment and wiring required by SFPUC for a complete installation of SFPUC metering facilities;
   b. Meter sockets and enclosures;
   c. Current transformer landing pads; and
   d. Lugs, conduits, and conductors.
9. Applicant shall verify the labels at each meter socket are correct. This verification of the meter socket labeling shall be done in the presence of a SFPUC representative and at Applicant's expense.
10. Applicant's disconnect shall not be located before SFPUC's meter without an exception letter from SFPUC.
11. For all meter panels, Applicant shall install, own, and maintain a separate, nominal, 2-inch (2") diameter conduit with pull tape inside. The conduit and pull tape must extend from the outside surface of the building, and terminate outside the meter panel or switchboard at the top of the meter section. The open end of the conduit that is exposed to the outside must have a removable, temporary cap or plug. The 2-inch (2") diameter conduit and pull tape must exit the building a minimum of 8 feet (8') above ground.
12. For meter panel rating of two hundred kilowatts (200 kW) or greater, installed inside of a meter room, outdoor type meter panels or some other structure, Applicant shall install an additional nominal, 1-inch (1") conduit diameter extending from the telephone service location and terminating in the meter section of the electric panel

B. Access to Metering Facilities

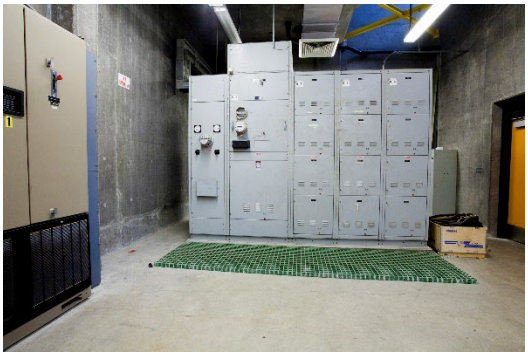
1. All electric meter installations will be located to be accessible to authorized SFPUC representatives for installation, removal, reading, testing, and inspection.

2. SFPUC shall have access to any SFPUC facilities at any time during business hours for reasons including but not limited to:
   a. Meter reading/removal;
   b. Maintenance/testing/inspection;
   c. Equipment installation; and
   d. Or at any time during any emergency
3. Access shall not be blocked by permanent or portable means.
4. Any fenced or enclosed area shall be made accessible with a double locked padlock and/or a key box. Where metering equipment is located inside a building, Applicant shall install a key box. Keys and/or key cards shall be provided to SFPUC.

C. Meter Pedestals

Shall have a minimum rating of 100 amperes (100 A).

D. Metering Equipment Locations



1. All electric meter installations will be located to be accessible to authorized representatives of SFPUC for installation, removal, reading, testing, and inspection.
2. Location requirements shall:
   a. Be subject to SFPUC review and approved after Applicant provides proposed location;
   b. Not pose any risk of bodily harm to SFPUC employees;
   c. Be installed in a readily accessible location;
   d. Be free of a corrosive atmosphere, and extreme temperatures; and
   e. Be free of vegetation in area around metering facilities.
3. Unacceptable locations: Any third-party property.

E. Meter Room Requirements:

1. Shall be provided for sole purpose of housing SFPUC electrical metering facilities and electrical service equipment;
2. Shall have sufficient lighting to allow personnel to read meters and maintain equipment safely;
3. Shall not contain lighting fixtures controlled by occupancy sensors;
   a. Shall have SFPUC logos posted on un-secured side of entrance doors;
   b. Shall meet equipment manufacturers' recommended operating conditions; and
   c. Shall not be used to store any hazardous or noxious materials or materials that would interfere with SFPUC's access to metering equipment.

F. Meter Height

1. Meters will be located not more than seventy-five inches (75") and not less than thirty-six inches (36") above ground or standing surface to centerline of the meter. Meters shall be mounted at a minimum of seventy-two (72") inches from the ground when installed near a driveway. The

SFPUC prefers a meter height of sixty-six inches (66”) for all individual field-mounted meter panel installations. All metering and service termination installations are subject to review and approval of SFPUC.

2. Refer to Drawing ESG-2-1 – “Meter Working Space" (See Appendix)
3. Shall be measured from center of meter to finished grade/floor of standing surface

G. Meter Equipment Working Space Requirements

1. A level standing surface with a clear and unobstructed working space above must be provided and maintained in front of each metering installation. The working space must have a width of not less than thirty inches (30”) and a minimum height of seventy-eight inches (78”). The working space must extend at least thirty-six inches (36”) in front of the surface on which the metering equipment is mounted. Greater depths may be required by the San Francisco Electrical Code. There must be at least ten inches (10”) from the meter centerline to any side obstruction and at least nine inches (9”) from the meter centerline to any obstruction above the meter.
2. Shall comply with SFEC.
3. Refer to Drawing ESG-2-1 – “Meter Working Space” (See appendix).
4. Working space depth shall extend from:
   a. Face of meter socket enclosure;
   b. Front of surface on which metering equipment is mounted (edge of the housekeeping pad; and
   c. Shall be level as per SFEC.

H. Meter Socket and Enclosure Requirements

1. General
   After installation, neither the meter nor its cover shall be plastered.
2. Meter Sockets
   a. Refer to drawing ESG-3-1 - “Self-Contained Meter Socket/Panel Configurations” (See Appendix).
   b. Shall conform to provisions of ANSI C12.10 and UL 414 Standards for Meter Sockets.
   c. Self-contained sockets shall be attached to:
      i. Rear side of socket enclosure or to a stationary support which is solidly connected to socket enclosure; and
      ii. Meter panel to assure alignment of socket ring to socket jaws and prevent removal of panel when a meter is installed.
   d. Instrument transformer rated sockets shall be:
      i. Designed to allow back connections when installed on hinged panels;
      ii. Designed to allow front connections when installed on non-hinged panels; and
      iii. Installed with machine screws to allow meter socket to be easily interchanged or replaced.
   e. Sockets shall include a sealing ring.
   f. Where aluminum service conductors are used, lugs shall be approved for use with aluminum conductors. Oxide inhibitor shall be used for all aluminum conductors and connections.
   g. Where copper service conductors are used, an oxide inhibitor may be used at meter terminals, and/or socket jaws.

h. Line-side conductors shall be connected to top terminals and load-side conductors connected to bottom terminals of meter socket.

3. Meter Enclosures
   a. Shall meet ANSI C12.10 and UL 414 Standards for Meter Sockets;
   b. Doors shall open a full ninety degree minimum to be perpendicular to enclosure;
   c. Exterior enclosures shall be weatherproof and equipped with doors having hold-open provisions; and
   d. All openings shall be closed with sealable plugs.
   e. Refer to Drawing ESG-2-2 – "Combination Meter Panel (200a Max, 0-600v)" (See appendix)

I. Multiple Meters and Submetering

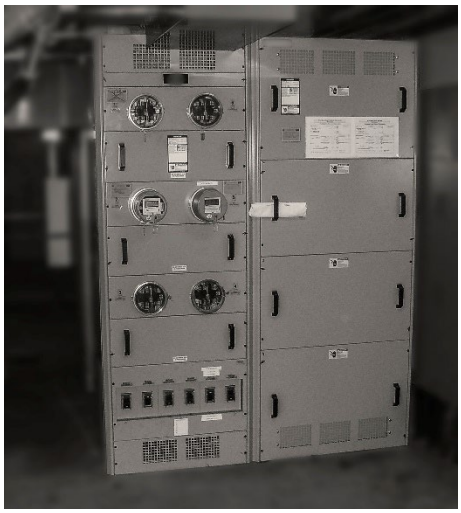
1. General
   a. Refer to drawing ESG-2-4 and ESG-2-5 "Multi-Meter and Submetering Installation Configurations." (See Appendix)
   b. Clear space around each meter socket shall not be less than one inch (1") at the top and the sides, and not less than two inches (2") at the bottom.
   c. Multi-Unit Buildings
      i. Addressed by RRGES, Section X.H.2."
      ii. Number of meter enclosures shall not exceed one for every three (3) floors.

J. Totalized / Master Metering

1. Meter totalizing shall be approved by SFPUC before metering equipment is installed.
2. SFPUC shall not supply electricity to any of the following:
   a. New service to a duplex or multiple dwelling building for the purpose of master metering energy usage of the dwelling units, a central space heating system, or a central domestic water heating system; and
   b. Upgraded service to an existing duplex or multi-unit building for purpose of master metering new central or individual space heating systems.
3. Grouped Meter Socket Spacing:
   a. Sockets shall be arranged such that minimum distances between socket centers shall be nine inches (9") vertically and eight inches (8") horizontally; and
   b. Refer to additional clearance requirements described on drawing ESG-2-3 – "Clearances for Multi-Meter Installations." (See Appendix)

K. Metering Facilities

1. General
   a. Types of Metering Facilities
      i. Up to two hundred amperes (200 A) (Residential)
         1) Less than two hundred fifty volts (250 V), Line-to-Line: The Customer shall provide the socket for a self-contained meter. General Service installation sockets shall have provisions for manual Circuit closing.



2) Two hundred fifty volts (250 V) to six hundred volts (600 V), Line-to-Line: The Customer shall furnish and install a bussed safety socket with factory installed test by-pass facilities for self-contained metering. Otherwise, transformer-rated metering facilities are required. SFPUC will not accept new metering facilities with lever-operated by-pass meter sockets. Upon upgrade or modification of any existing metering facility with lever-operated by-pass meter socket, it will be upgraded to the current standard.

ii. Over two hundred amperes (200 A) – up to six hundred volts (600 V), Line-to-Line): Transformer-rated metering facilities will be required and provided by the Customer. Large Loads – Up to six hundred volts (600 V), Line-to-Line; provisions for reactive power (kVAR-Hour) metering may be required for power factor metering and will be provided by Applicant when connecting new load with a capacity of two hundred kilowatts (200 kW) or larger.

iii. Over six hundred volts (600 V), or six hundred amperes (600 A), Line-to-Line: Applicant will provide SFPUC a metering enclosure with provisions for kVAR-Hour metering. The design drawing of the enclosure and equipment with connections will be submitted to the SFPUC for approval prior to installation."

b. Any multi-residential, commercial, or industrial service shall have test bypass facilities.

2. Self-contained metering facilities zero to two hundred amperes (0-200 A)
   a. Refer to drawing ESG-3-1 "Self-Contained Meter Socket/Panel Configurations"
   b. Single/remote panel may be used with any of the following services:
      i. 120V services, Single Phase
      ii. 120/240V services, Single Phase
      iii. 120Y/208V services, Single Phase
      iv. 208Y/120V services, Three Phase
      v. 240Δ/120V services, Three Phase
      vi. 480Y/277V services, Three Phase
   c. Switchboard/pedestal may be used with any of the following services:
      i. 120/240V Services, Single Phase
      ii. 120Y/208V Services, Single Phase
      iii. 208Y/120V Services, Three Phase
      iv. 240Δ/120V Services, Three Phase
      v. 480Y/277V Services, Three Phase
3. Instrument-Transformer Metering Facilities
   a. Refer to drawing ESG-3-2 "Transformer-Rated Meter Socket/Panel Configurations"(See Appendix).

b. Provide twenty-four inches (24”) horizontal by fifteen inches (15”) vertical of space for meter socket and test switch.
c. All meter panels shall open a full ninety degrees (90˚) (minimum) perpendicular to switchgear section.
d. Single/remote panel four hundred to eight hundred amperes (400-800 A) may be used with any of the following services:
    i. 120/240V Services, Single Phase
    ii. 120Y/208V Services, Single Phase
    iii. 208Y/120V Services, Three Phase
    iv. 240Δ/120V Services, Three Phase
    v. 480Y/277V Services, Three Phase
e. Switchboard/Pedestal four hundred to three thousand amperes (400-3000 A) may be used with any of the following services:
    i. 120/240V Services, Single Phase
    ii. 120Y/208V Services, Single Phase
    iii. 208Y/120V Services, Three Phase
    iv. 240Δ/120V Services, Three Phase
    v. 480Y/277V Services, Three Phase

L. Service Entrance Conductors for Metered Loads

1. Unmetered Service Conductors:
    a. Shall be continuous from service connection point to meter socket or instrument transformer enclosure, or in a main disconnect for group installations;
    b. Metering facilities, conduit, raceway, or wire gutter shall be sealable for those containing unmetered and metered service conductors, wire troughs, and busing;
    c. Shall not pass through any junction box or conduits without approval from SFPUC. This does not prohibit the use of buses or wire troughs on the line side of multi-meter installations if enclosures are sealed; and
    d. Unmetered service conductor conduits within a building shall be covered by two or more inches (≥2”) of concrete if the path from the service point location to the meter location exceeds one hundred fifty feet (150’).
2. Load Conductors shall not pass through SFPUC's sealed sections, including current or potential transformers.

M. Main and Meter Switch Sequence; Single Meter Installation

1. Shall meet EUSERC standards; and
2. SFPUC will only set its meter ahead of a circuit breaker or main switch.

N. Switchboard Service Sections

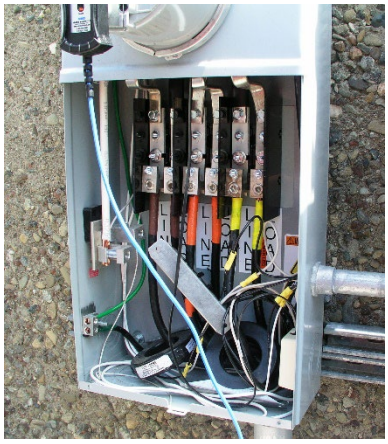
1. General
    a. Shall meet EUSERC standards; and
    b. Meter facilities shall not be mounted on access panels of any metered equipment.
2. Instrument-Transformer Compartment
    a. Shall be provided in section when meter switch exceeds two hundred amperes (200 A); and

b. Shall have provisions to allow installation of current transformers, test switches and meter sockets.

3. Instrument-Transformer Rated Meter Sockets
   a. Space requirement for meter sockets and test switches shall be twenty-four inches (24”) horizontal by fifteen inches (15”) vertical; and
   b. All meter panels shall open a full ninety degrees (90˚) perpendicular to the switchgear section.

O. Current Transformers (CT)

1. CT Metering General
   a. Current and/or voltage transformers are required for services greater than two hundred amperes (200 A).
   b. CT Facilities shall:
      i. Be terminated from CT landing pads to either an approved AIC rated bus gutter or a common mainline switch; and
      ii. Not contain conductors routed from CT landing pads directly to load panels.
2. The applicant shall provide and install
   a. Equipment listed in Section II.A.8
   b. CT Enclosure shall be installed in an accessible location
   c. CT mounting base/landing pads
      i. SFPUC-approved terminal lugs
      ii. Conductors may be terminated directly from landing pads to panels
   d. Conduit (1 inch minimum) between meter socket enclosure and CT enclosure
   e. Load conductor terminations to CT mounting base/landing pad
   f. Bonding of all metering and CT enclosures
3. SFPUC shall provide and install
   a. Equipment listed in Section II.A.7
   b. Meter test switch
   c. CT secondary conductors
4. CT Landing Pads and Enclosures
   a. CT Enclosures shall:
      i. Comply with EUSERC Standards;
      ii. Contain only service conductors, metering equipment, and meter conductors;
      iii. Not be used as a junction box, gutter, or raceway for the purpose of making taps;
      iv. Be an integral and dedicated section of switchgear for all services rated over two hundred amperes (200 A);
      v. Be installed such that top of enclosure is not higher than ninety-six inches (96”) and bottom not lower than six inches (6”) above finished grade/floor;
      vi. Provided with side-hinged covers with provisions for locks and seals. Hinges shall be constructed such that they cannot be disassembled from outside of enclosure; and
      vii. Be equipped with doors that open a minimum of ninety-degrees from front of enclosure. The meter socket associated with the CTs may be mounted on enclosure door.



5. CT Secondary Conductors; raceways used for CT's secondary conductors shall:
   a. Not contain junction boxes or conduits; and
   b. Be approved by SFPUC if greater than ten feet (10') in length.

P. Remote Metering

1. Remote Metering
   c. Required for permanent services exceeding four hundred amperes (400 A)
   d. Otherwise, requires approval or direction of SFPUC

END OF SECTION II

SECTION III – DESIGN REQUIREMENTS OF UNDERGROUND ELECTRICAL FACILITIES

A. Electrical Service Sequence of Work

1. Applicant shall provide full-time supervisory staff to coordinate and maintain their work force for sequencing of project's work requirements.
2. SFPUC will schedule its construction to begin only after Applicant's complete underground electrical duct system has passed inspection and complies with RRGES requirements and these ESG.
3. SFPUC then installs conductors and transformers as required.
4. Once DBI has inspected and approved complete electric service for energization, SFPUC will terminate the service conductors to SFPUC's electric distribution system.

B. Service Location

Electric service for new construction shall be located adjacent to the nearest SFPUC designated power source using permanent facilities. The cost of any temporary work performed by SFPUC to accommodate work of Applicant shall be charged to Applicant.

C. SFPUC-Provided Items

1. Transformer(s), switch(es), conductors, and final termination of all service conductors to SFPUC's electric distribution system;
2. Transformer secondary conductors and final terminations from transformer to the main service panel or medium-voltage switchgear (primary service); and
3. Metering equipment as listed in Section II – Metering Requirements.

D. Applicant-Provided Items

1. Provide and install all electrical underground substructures including (and as required by SFPUC):
   a. Underground concrete vaults;
   b. Medium-voltage switchgear (primary service);
   c. Concrete pads for transformers and switches;
   d. Underground conduits with mechanical protection;
   e. Underground pull boxes (from SFPUC's transformer secondary to main service panel), as required;
   f. Ground rods and ground wires;
   g. Pole riser moldings.
2. Install service conductors in conduits from metering enclosure to SFPUC's approved service connection point.
3. Provide, at no cost to SFPUC, access and easement for all SFPUC facilities located on private property.
4. Pay for all fees associated with SFPUC's work.
5. Submit electric service equipment and vault specifications to SFPUC for approval prior to procurement.
6. Provide metering equipment as listed in Section II – Metering Requirements.

END OF SECTION III

SECTION IV – INSTALLATION REQUIREMENTS OF UNDERGROUND ELECTRICAL FACILITIES

A. Trench and Backfill

1. General
   a. All trenching and excavation work shall be done by Applicant or its contractor.
   b. Shoring shall conform to the State of California Division of Occupational Safety and Health Administration's ("Cal-OSHA's") requirements for trenching and excavation.
2. Backfill
   a. Provide three-inch (3") layer of sand bedding at bottom of trench before placing conduit.
   b. The first ten inches (10") of backfill above the conduit shall be either sand or excavation material.
   c. Any excavation material placed within ten inches (10") of conduits shall be screened through a three-quarter inch (3/4") sieve frame and cleared of organic material.
   d. All backfill shall be compacted in one foot (1') layers with a minimum of ninety-five percent (95%) compaction in street and ninety percent (90%) elsewhere.
   e. Compaction tests shall be provided at various locations, as determined by SFPUC. Refer to CCSF standards.
3. Concrete cap
   a. A concrete cap shall be used for mechanical protection of primary conduits (over 600 V).
   b. The concrete cap shall be poured 6 inches above top of conduit, total width equal to width of the ductbank and depth of 3 inches.
   c. The concrete cap shall consist of a 2-sack sand slurry mix with red-dye.

B. Conductors

1. Secondary Service Conductors:
   a. Aluminum (AL).
   b. Have phase-identifying tape and service address information.
   c. Quantity and size shall be determined by SFPUC (up to the quantity of conductors required to serve one hundred percent (100%) of rated, main service panel.)
   d. Refer to Tables IV.B.3 (1) and IV.B.3 (2).

Table IV.B.3 (1) – Requirements for Residential Single-Phase Loads (AL Conductors)

Main Service Panel Rating (Amp)	Conduit Size	Conduit Number
100-125	3"	1
126-225	3"	1
226-320	4"	1
321-400	5"	1

Table IV.B.3 (2) – Requirements for Three-Phase Loads (AL Conductors)

Main Service Panel Rating (Amp)	Conduit Size	Number of Conduit
200	3"	2

600	5”	2

2. Primary Conductors:
   a. Quantity, size, and type shall be determined by SFPUC.

C. Conduits

1. General
   a. No part of the conduit system shall be covered, hidden from view, or rendered inaccessible before inspection by SFPUC.
   b. Conduits should be installed in an unobstructed vertical plane.
   c. All conduits shall be sealed to prevent infiltration of water into electrical equipment.
   d. All empty conduits shall be provided with ½ inch (1/2”) pull cord capable of withstanding two hundred pounds (200 lb.) of tension.
   e. Refer to Table IV.C.1.

Table IV.C.1 – Minimum Conduit Depths
(From finished grade to top of conduit)

Conduit Use	Open Areas	Below Sidewalks	Streets
Primary	36”	36”	36”
Secondary	24”	24”	24”
Street lights	24”	18”	24”
Service Lateral	18”	18”	24”

   f. After installation, all conduits shall be:
      I. Cleaned of foreign material using brushes and swabs; and
      II. Tested with ninety percent (90%) conduit sized mandrel in the presence of SFPUC; conduits which fail mandrel test shall be replaced or rearranged at Applicant’s expense and retested at Applicant's expense.

2. Requirements
   a. Type shall be Schedule Forty (40) gray polyvinyl chloride (“PVC”) for all distribution and service feeders, or as required by SFEC.
   b. Minimum Bend Radius – Refer to Table IV.C.2.a.

Table IV.C.2.a – Minimum Conduit Bend Radius

Conduit Diameter	Vertical Radius	Horizontal
3”	24”	36”
4”	36”	36”
5”	48”	60”
6”	60”	60”

   c. Conduit Run – Maximum Total Angle:
      i. Conduit run: the section of conduit between pull points;
      ii. Total length: the sum of individual segments length in a conduit run;
      iii. Total angle: the sum of individual bends in a conduit run [e.g. three (3) ninety-degree (90°) and one (1) forty-five degree (45°) bends in a conduit run = 315°];

iv. If applicant elects not to provide cable pulling calculations: (1) the total length of the conduit run shall not exceed two-hundred feet (200'); (2) the total angle of any conduit run shall be reduced to comply with requirements of Table IV.C.2.b. (Maximum Degrees of Bends); and (c) the slope of the conduit run shall not exceed two degrees (2°); and

v. A conduit run shall be modified as required if it fails the preceding requirements.

Table IV.C.2.b - Maximum Degrees of Bends

Total Angle of Run	Results	Comments
0°-180°	Permissible without cable pulling calculation	Concrete encase every ninety degrees (90°) and greater bend. Encasement shall be three inches (3") around entire length of bend, and extend an additional six inches (6") beyond both ends
181°-315°	Provide cable pulling calculations, stamped, and signed by a licensed electrical engineer	
316°-360°	Not Permissible	Not Allowed by default

3. Separation

Minimum radial separation (between conduits): Refer to Drawing ESG-4-1 - "Trench Configurations" (See Appendix).

D. Boxes and Enclosures

1. General
   a. Primary or high voltage boxes or enclosures shall:
      i. Be made of precast concrete;
      ii. Comply with American Society of Testing Materials ("ASTM") C857;
      iii. Be set with box's long dimension oriented in the direction of pull;
      iv. Be located near each transformer pad; and
      v. Have bare box cover marked "SFPUC High Voltage."
      vi. Refer to Drawing ESG-4-2 – "DETAIL – Primary Splice Box – three-foot-by-five-foot (3' X 5')" (See Appendix).
      vii. Refer to Drawing ESG-4-3 – "DETAIL - Primary box – four-foot-six-inches-by-eight-foot-six-inches (4'-6" x 8'-6" x 6") for an example of a typical vault containing equipment such as a switch. If this primary box has a depth greater than seven-foot-six-inches (7'-6"), it may be used to contain certain transformers upon SFPUC approval.

   b. Secondary or low voltage boxes or enclosures shall:
      i. Be made of precast concrete;
      ii. Comply with ASTM C857;
      iii. Be constructed without a bottom;
      iv. Be set with box's long dimension oriented in the direction of pull;
      v. Be located near each transformer pad; and

vi. Have box cover marked "SFPUC Electric".
vii. Refer to Drawing ESG-4-4 – "Detail - Pull Box – seventeen-inches-by-thirty-inches (17" X 30")" for an example of a secondary pull box (See Appendix).
viii. See Drawing ESG-4-5 – "Detail - Pull Box – twenty-four-inches-by-thirty-six-inches (24" X 36")" for an example of a secondary pull box (See Appendix).

c. Non-concrete boxes or enclosures shall:
   i. Have poured concrete bottom; and
   ii. Provide poured concrete bottom for boxes or enclosures with a pre-manufactured bottom.

d. Covers shall:
   i. Be made of precast concrete
   ii. Comply with ASTM C857
   iii. 3 types of covers: incidental, full-traffic rated, and heavy full-traffic rated
   iv. Support a minimum of twenty-thousand pounds (20,000 lbs.) for full vehicular traffic covers;
   v. Support a minimum of eight-thousand pounds (8,000 lbs.) for incidental traffic covers;
   vi. Match design load of box or enclosure for covers' design load;
   vii. Be secured to box or enclosure using penta-head type bolts;
   viii. Have skid resistant surfaces with a minimum coefficient of friction of 0.65;
   ix. Have an approved lifting means;
   x. Be used in the following areas for full vehicular traffic covers: (1) paved streets; (2) alleys; and (3) any other area subject to vehicular traffic; and
   xi. Be used in the following areas for incidental vehicular traffic covers: (1) parking strips adjacent to curbs; (2) sidewalks; (3) pedestrian traffic areas; and (4) any other area subject to occasional vehicular traffic.

e. Locations
   i. Set in undisturbed soil; otherwise soil compaction beneath box shall be: (1) ninety-five percent (95%) minimum relative compaction in six-inch (6”) layers; (2) one-hundred percent (100%) jetted sea-sand; or (3) an approved equal;
   ii. As shown on SFPUC's approved project drawing(s): (1) where required, final locations shall be field-coordinated with SFPUC; and (2) where required, SFPUC reserves the right to have boxes relocated up to a thirty-foot (30’) radius away from the position shown on plans without additional cost to SFPUC;
   iii. Set all non-traffic rated boxes clear of traffic area by a minimum of two feet (2’);
   iv. Unpaved areas shall have the top of box set level to approximately one inch (1”) above finished grade.
   v. For unpaved areas, install a concrete collar around the finish grade 18” wide and 6” depth to be leveled with lid. Refer to Drawing ESG-4-11- “Vault Concrete Collar” (See Appendix).
   vi. Boxes and enclosure located in sidewalks shall: (1) be set with the box’s long dimension parallel with edge of sidewalk; (2) be set flush with top of finished sidewalk; (3) have six inches (6”) (minimum) of concrete around outside edge of

box; and (4) have reinforcing bar on all four sides of box. Refer to Drawing ESG-4-6 – "Typical Pullbox Locations" (See Appendix).

vii. Refer to Drawing ESG-4-10 – " Typical Primary Splice Box Locations " (See Appendix).

f. Extension Rings
   i. Provide pre-manufactured extension rings
   ii. Where an extension ring is required but is not installable due to site conditions, an extension shall be formed from the inside of the box using reinforcing bar with concrete poured from the outside.

g. Cleaning

Upon completion of installation, all boxes or enclosures shall be cleaned of all debris.

2. Primary or High Voltage Pull Boxes
   a. Enclosures which facilitate pulling of high voltage distribution cable(s) and may contain conductor splice(s) or equipment.
   b. Conduits shall enter at pre-formed knock-outs or at locations field-approved by SFPUC. Each conduit termination shall have a bell end and extend no more than two inches (2") into box. The bottom of each conduit shall be installed at least two inches (2") above bottom of box. After conduit installation, all penetrations shall be sealed with a high strength, quick-set grout. Penetrations shall be sealed from both inside and outside of box to prevent infiltration of water and sand. Penetration grouting material shall be approved by SFPUC.
      i. SFPUC vaults for high voltage cables shall comply with Table IV.D.2; complete box assemblies, with the exception that the nameplate material and description shall be as indicated. Refer to appendix for additional requirements such as knockouts, grounding rod, sump pump, racks, etc.
      ii. Preferred entry is short side with knockouts but can used long side knockouts with approval by SFPUC.
      iii. Rack arms of the non-metallic heavy-duty type sufficient to accommodate the cables and future cables may be provided in lieu of metallic rack arms.
      iv. Provide and install three-quarter inch (3/4") diameter x twelve feet (12') long ground rod. Provide listed wire clamps or approved irreversible high compression fittings.

Table IV.D.2 – High Voltage ("HV") Vault Sizes

Type	Dimensions	Application
5	3'-0" x 5'-0" x 4'-6"	Splice Box
6	4'-6" x 6'-6" x 5'-0"	Equipment/Splice Box
7	4'-6" x 8'-6" x 6'-0"	3-way switch/interrupter
7	4'-6" x 8'-6" x 7'-6"	UCD transformer

3. Secondary or Low Voltage Pull Boxes

a. Enclosures that facilitate pulling of secondary or low voltage cables. May contain conductor splice(s), equipment, or service connection(s). All conduits shall enter box from the bottom and rise tight to a side.
b. Covers shall be non-skid concrete. SFPUC enclosures for secondary cables shall comply with Table IV.D.3; complete box assemblies, with the exception that the nameplate material and description shall be as indicated. Refer to appendix for additional requirements such as knockouts, grounding rod, sumps, racks etc.

Table IV.D.3 – Low Voltage ("LV") Enclosures

Size	Depth	Description
17" x 30"	26"	Body
24" x 36"	26"	Body

c. Provide extensions as required.
d. Rack arms of the non-metallic heavy-duty type sufficient to accommodate the cables and future cables may be provided in lieu of metallic rack arms. Racks in low voltage manholes shall be spaced no more than sixteen inches (16") apart.
e. Provide and install five-eighth inch (5/8") diameter by ten feet (10') long ground rod. Provide listed wire clamps or approved irreversible high compression fittings.
f. Conduit Entry – Conduits shall enter at pre-formed knock-outs (side entry), from the bottom of the box, or at locations field-approved by SFPUC.
    i. Side entry – Each conduit termination shall have a bell end and extend no more than two inches (2") into box. The bottom of each conduit shall be installed at least two inches (2") above bottom of box. After conduit installation, all penetrations shall be sealed with a high strength, quick-set grout. Seal penetrations shall be used from both inside and outside of box to prevent infiltration of water and sand. Penetration grouting must be approved by SFPUC.
    ii. Bottom Entry – For secondary boxes without a concrete bottom and if the required depth (as designed) can be met; bottom entry is acceptable. Please note, conduit should turn ninety degrees (90˚) into the box, and the box should be resting on gravel or other drainage material.

E. Transformers and/or Switch pads

1. Exact location and dimensions of each transformer and/or switch pad and location and number of conduits entering the pad shall be determined, inspected, and approved by SFPUC before placing any concrete.
2. Refer to drawings for:
    a. Pre-approved precast primary boxes, transformers pads, and/or switch pads; and
    b. Transformer pad construction details.
    c. Refer to Drawing ESG-4-7 – " 3 Phase Transformer Pad - Type "IIE" (See Appendix).
3. Alternatively, each transformer and/or switch pad shall be constructed as follows:
    a. Using three-thousand pounds-per-square-inch (3,000 psi) steel reinforced concrete as indicated on SFPUC's approved drawings;
    b. Top finish shall be of class two rating;

c. Concrete poured over six inches (6”) minimum finished layer of three-quarters of an inch (3/4”) by one-and-one-quarter inch (1-1/4”);
d. Gravel compacted to ninety percent (90%);
e. Compaction test results shall be submitted to SFPUC; and
f. Concrete mix design and delivery tag may be required as determined by SFPUC.

F. Grounding

1. Ground Electrode Requirements
   a. Quantity of ground electrodes shall be as required to obtain specified resistance for the grounding system;
   b. Grounding system shall provide a resistance to ground of five ohms (5Ω);
   c. If resistance to ground is greater than five ohms (5Ω), more electrodes (connected in parallel) shall be provided to meet the grounding resistance requirement;
   d. Additional rods shall be installed diagonally to one another; and
   e. Rods shall be a minimum of six feet (6’) apart.
   f. Contact SFPUC if field conditions prevent meeting any of these requirements.
2. Ground Electrode Installation: Ground electrodes shall be driven to within 6 inches (6”) above finished grade.
3. Soil resistivity enhancement materials, where required, shall be installed in accordance with manufacturer's instructions at each ground electrode location.

G. Physical Protection

1. SFPUC may require Applicant to provide and install steel barrier posts (bollards) to protect pad-mounted equipment from vehicular damage.
   a. A line of bollards shall be called a “bollard alignment.”
   b. Bollard quantity varies with the size of equipment to be protected (based on requirements listed below), with a minimum of two (2) bollards per side.
   c. Individual bollards shall be separated from its neighbor by no more than forty-two inches (42") and no less than eighteen inches (18").
   d. All bollards within a bollard alignment shall be equidistant from its neighbor.
   e. Avoid locating bollards where two bollard alignments intersect.
   f. Bollard alignments shall have a minimum clearance of thirty-six inches (36") from the operable end of the equipment (front), and a minimum clearance of twenty-four inches (24") from the non-operable ends.
   g. Provide removable bollards with provisions for a safety lock when separation between operable end(s) of the equipment and bollard alignment is smaller than the minimum safe operating distance of the equipment.
   h. Refer to Drawing ESG-4-9 – " Typical Bollard" (See Appendix).
2. Aesthetic walls, fencing or screens are not substituting for equipment protection barriers.
3. Permanent Fence/Wall
   a. If a permanent fence or other engineered structure is provided, provide a minimum of thirty-six inches (36") (for access) from the non-operable ends – while maintaining proper clearances to operate the equipment at the operable ends.

i. When in doubt, provide the following minimum requirements for twelve kilovolt (12kV) or less equipment:
ii. Eight feet (8') from the front and back;
iii. Three feet (3') from the sides; and
iv. Provide two (2) exits located at different walls, separated from one another as far as possible (ideally opposite walls diagonal from one another). One exit shall be an 8 ft-wide gate and other personnel gate exit shall have panic hardware.

H. Aesthetic Screening

1. General
   a. SFPUC may approve installation of aesthetic screens around pad-mounted equipment to minimize visual impacts.
   b. Screens may be landscaping, retaining walls, decorative walls, etc.
   c. Screens shall be installed, owned, and maintained by Applicant unless SFPUC's equipment is in public right-of-way.
   d. Screens shall not impair maintainability and operability of SFPUC's electrical equipment.
   e. Gates or doors may be placed in screens provided minimum clearances are maintained with gates or doors fully open.
2. Screen Clearances
   a. Pad-mounted Transformer, provide clearances of:
      i. Eight feet (8') in front (minimum); and
      ii. Three feet (3') on other three sides.
   b. Pad-mounted Switchgear, provide clearances of
      i. Eight feet (8') in front and back (minimum); and
      ii. Three feet (3') on other two sides.

END OF SECTION IV

SECTION V – INSTALLATION REQUIREMENTS OF OVERHEAD ELECTRICAL FACILITIES

A. [Reserved.]

END OF SECTION V

SECTION VI – GENERATING FACILITIES INTERCONNECTIONS INSTALLATION REQUIREMENTS

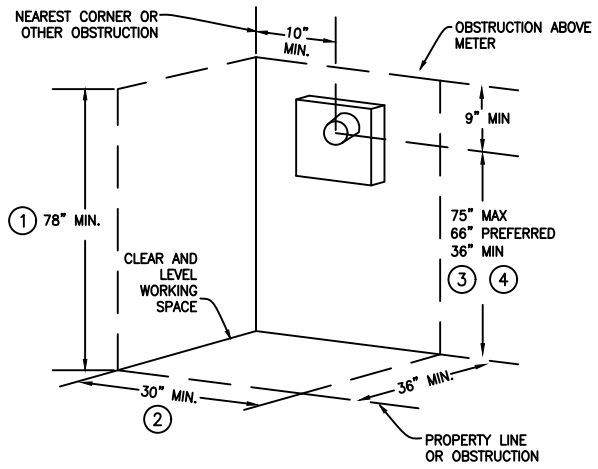
A. [Reserved.]

END OF SECTION VI

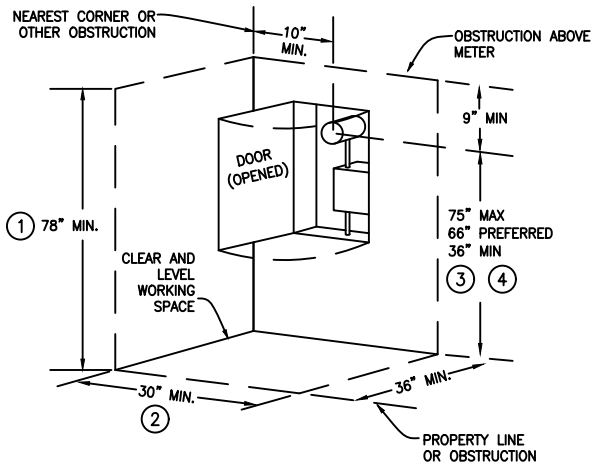
[This Page is Intentionally Left Blank]

APPENDIX

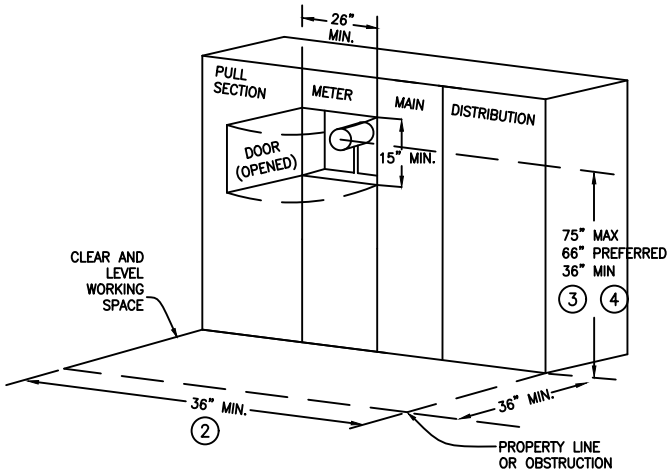
[This Page is Intentionally Left Blank]



A SEMI–FLUSH INSTALLATION
NTS



B ENCLOSED INSTALLATION (PEDESTAL)
NTS



C ENCLOSED INSTALLATION (SWITCHBOARD)
NTS

SHEET NOTES

A. COMPLY WITH REQUIREMENTS OF EUSERC DWG. G7.

B. WORKING SPACE IN FRONT OF METER PERMITS ACCESS TO METERING FACILITY AND PROVIDES SAFE WORKING ENVIRONMENT FOR MAINTENANCE PERSONAL AND SHALL BE LOCATED ENTIRELY ON CUSTOMER'S PROPERTY.

C. ALL WORKING SPACES SHALL BE KEPT CLEAR AND UNOBSTRUCTED AT ALL TIMES. LANDSCAPING, STRUCTURES, OR OTHER STORED MATERIALS SHALL NOT INTRUDE INTO WORKING SPACE.

D. WHEN METERS OR METERING EQUIPMENT ARE MOUNTED IN CABINET ENCLOSURES, WORKING SPACE SHALL BEGIN FROM CABINET'S OUTER FACE.

E. HEIGHT OF WORKING SPACE SHALL BE A MINIMUM OF 78" FROM STANDING SURFACE.

F. WIDTH OF WORKING SPACE SHALL BE 30 INCHES MINIMUM ON ONE–METER INSTALLATION AND SHALL EXTEND ADDITIONAL WIDTH NECESSARY FOR ACCESS TO TOTAL NUMBER OF METERING PANELS. CENTERLINE OF ANY METER SHALL NOT BE LESS THAN 10 INCHES FROM ADJACENT SIDE WALL OR OTHER PROTRUDING OBSTRUCTION.

G. DEPTH OF WORKING SPACE SHALL BE 36" MINIMUM SERVICE RATED 150V OR LESS TO GROUND. WHEN SERVICE IS IN EXCESS OF 150V TO GROUND, DEPTH SHALL BE AS REQUIRED BY APPLICABLE ELECTRICAL CODES OR AS DICTATED BY PHYSICAL DESIGN AND ARRANGEMENT OF METERING CUBICLES.

H. ASSUME INDOOR METER INSTALLATION FOR METER HEIGHTS SHOWN.

NUMBERED NOTES

1. 78" MINIMUM REQUIRED FOR OTHER THAN INDIVIDUAL FIELD–INSTALLED METER PANELS.

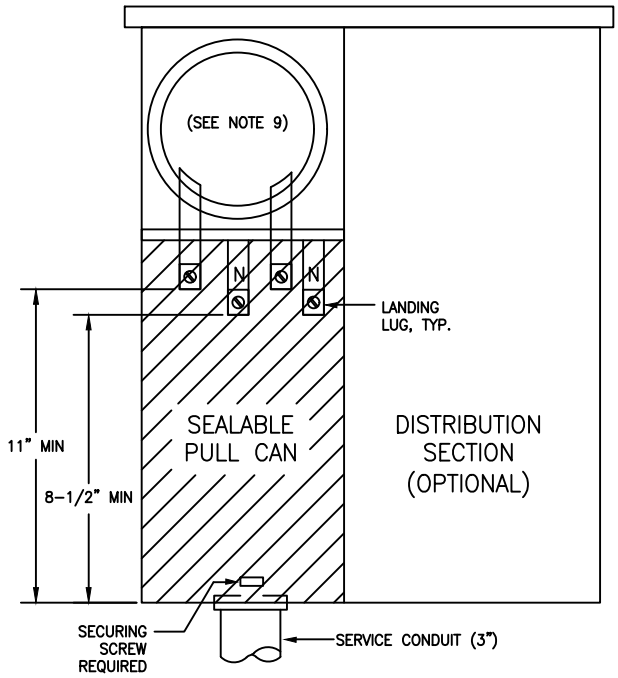
2. TO ALLOW CABINET DOOR TO OPEN FULLY (90° OR MORE), THE 30" MINIMUM WIDTH DIMENSION OF METER WORKING SPACE SHALL BE INCREASED AS NECESSARY.

3. METER HEIGHT SHALL BE 48" MINIMUM WHEN INSTALLED OUTDOORS.

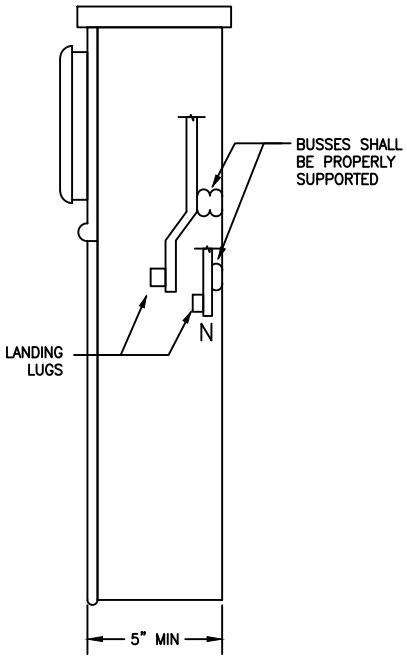
4. METER HEIGHT SHALL BE 72" MINIMUM WHEN INSTALLED NEAR A DRIVEWAY.

SCALE: NOTED	METER WORKING SPACE			CITY AND COUNTY OF SAN FRANCISCO SAN FRANCISCO PUBLIC UTILITIES COMMISSION POWER ENTERPRISE
DRAWING NO.	Reviewed by:	Adopted Date:	Effective Date:	
ESG–2–1	Approved by::	12/13/2019	12/13/2019	

EUSERC DWG. 301



FRONT VIEW



SIDE VIEW

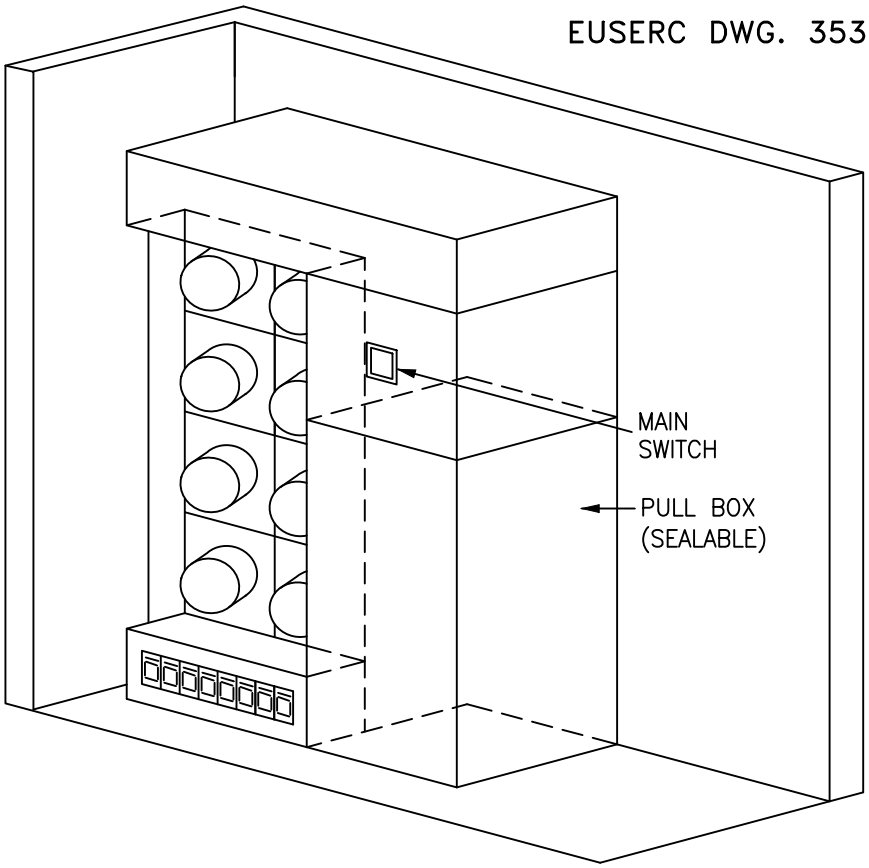
NOTES:

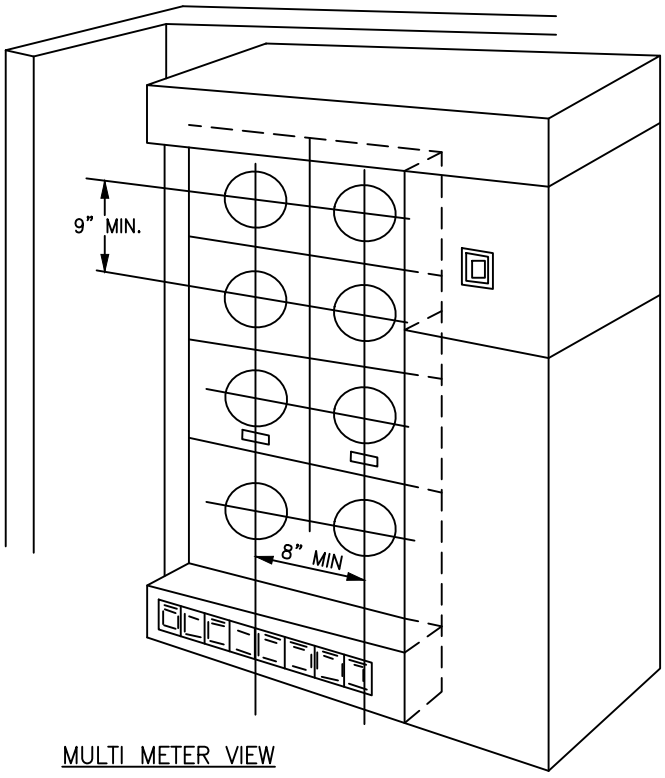
1. THIS EQUIPMENT MAY BE CONSTRUCTED FOR UNDERGROUND SERVICE SUPPLY OR AS A COMBINATION PANEL ALLOWING EITHER OVERHEAD/UNDERGROUND SERVICE SUPPLY APPLICATIONS.
2. ONLY ONE SET OF TERMINATING FACILITIES SHALL BE PROVIDED AND LOCATED AS SHOWN FOR BOTH UNDERGROUND AND OVERHEAD SERVICE SUPPLY APPLICATIONS. TERMINATING FACILITIES FOR SERVICE CONDUCTORS SHALL BE ALUMINUM BODIED, PRESSURE-TYPE LUGS WITH A RANGE OF NO. 6 AWG THROUGH 1/0 AWG.
3. PROVIDE BONDING SCREW OR JUMPER IF NEUTRAL TERMINAL IS INSULATED FROM ENCLOSURE.
4. A MINIMUM RADIAL CLEARANCE OF 1-1/2 INCHES IS REQUIRED BETWEEN ENERGIZED BUS TERMINALS AND BETWEEN ENERGIZED BUS TERMINALS AND GROUNDED OR NEUTRAL SURFACES.

   EXCEPTION: MINIMUM CLEARANCE TO ENCLOSURE WALL BEHIND A TERMINATING FACILITY MAY BE REDUCED TO 1 INCH.
5. ENCLOSURE BONDING AS PER NEC REQUIREMENTS SHALL BE INSTALLED PRIOR TO INSTALLATION OF SERVICE CONDUCTORS. BONDING CONNECTIONS FOR SERVICE CONDUIT ONLY IS PERMITTED AT BOTTOM OF ENCLOSURE. ALL OTHER BONDING OR GROUNDING CONNECTIONS SHALL BE MADE ABOVE PULL CAN AREA AND NO GROUNDING OR BONDING CONDUCTORS SHALL PASS THROUGH PULL CAN AREA.
6. ENCLOSURES SHALL BE RAINTIGHT WHERE EXPOSED TO WEATHER.
7. PULL CAN SECTION COVER SHALL BE SEALABLE FROM FRONT AND PROVIDED WITH A SECURING SCREW.
8. THIS FACILITY SHALL NOT SUPPLY OTHER METERS.
9. REFER TO DRAWING ESGR-3-1 "SELF-CONTAINED METER SOCKET/PANEL CONFIGURATIONS"

SCALE: NOTED	COMBINATION METER PANEL (200A MAX, 0-600V)			CITY AND COUNTY OF SAN FRANCISCO SAN FRANCISCO PUBLIC UTILITIES COMMISSION POWER ENTERPRISE
DRAWING NO. ESG-2-2	Reviewed by: Approved by::	Adopted Date: 12/20/2019	Effective Date: 12/20/2019	

EUSERC DWG. 353



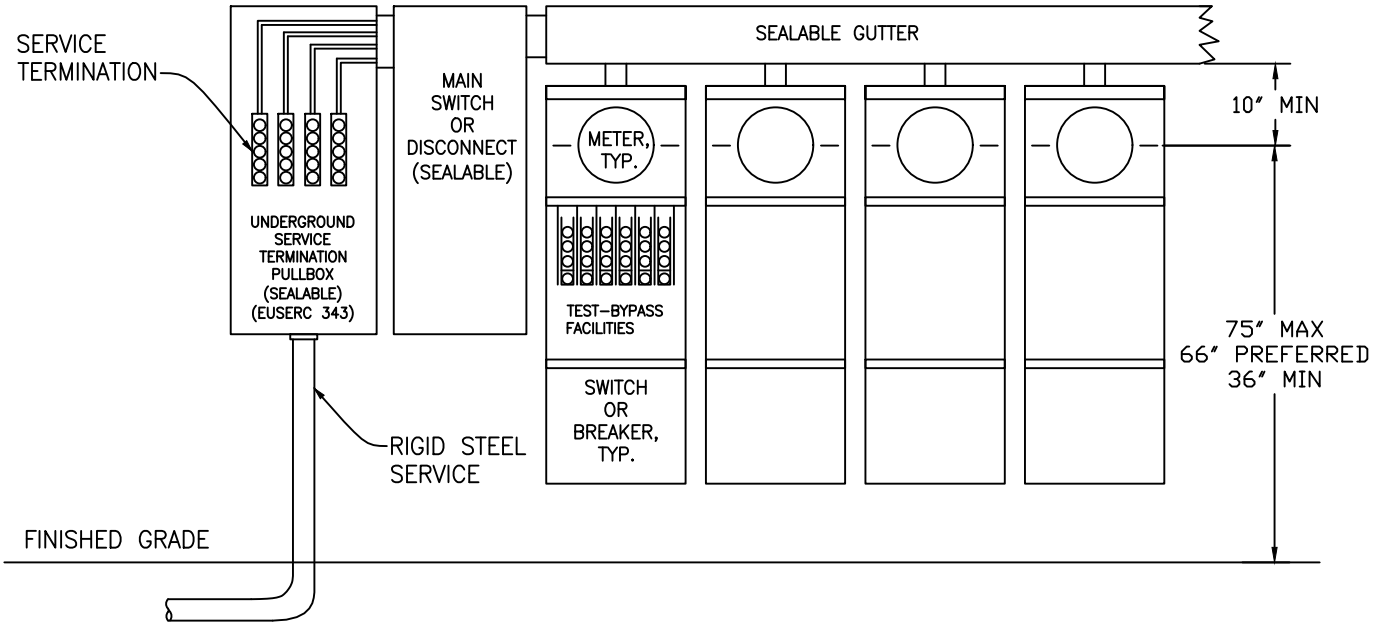


MULTI METER VIEW

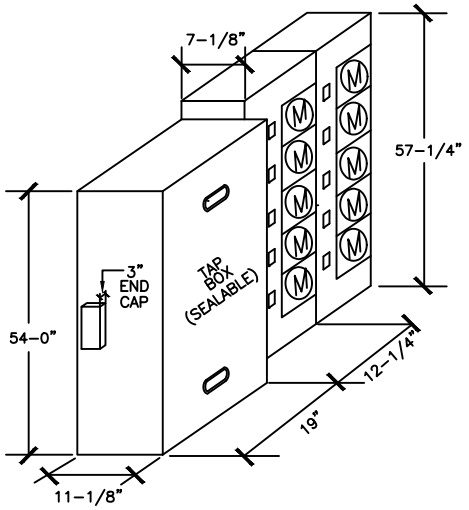
NOTES:

1. COMPLY WITH REQUIREMENTS OF EUSERC DWG 353.

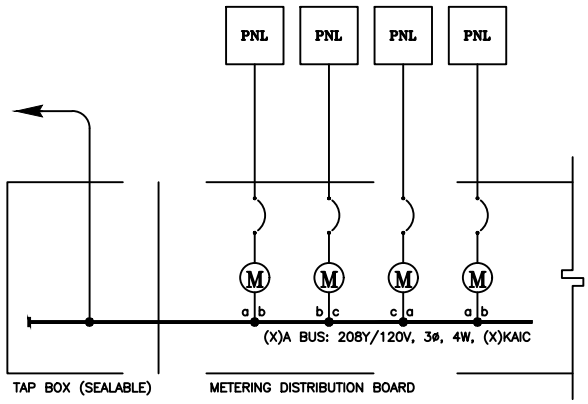
SCALE: NOTED	CLEARANCES FOR MULTI-METER INSTALLATIONS			CITY AND COUNTY OF SAN FRANCISCO SAN FRANCISCO PUBLIC UTILITIES COMMISSION POWER ENTERPRISE
DRAWING NO. ESG-2-3	Reviewed by: Approved by::	Adopted Date: 12/27/2019	Effective Date: 12/27/2019	



B GROUPED METERS WITH MAIN DISCONNECT
NTS

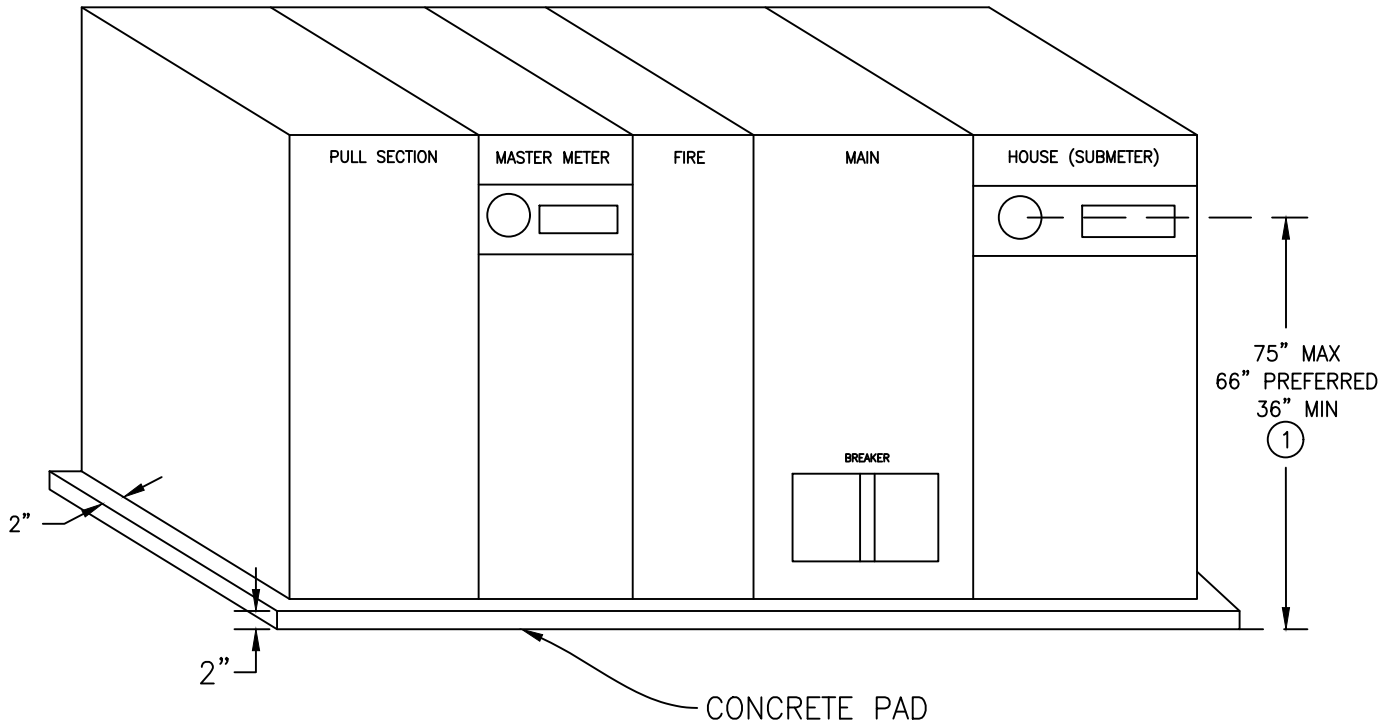


C GROUP METERS WITHOUT MAIN DISCONNECT
NTS



A ILLUSTRATIVE PARTIAL SINGLE LINE
NTS

SCALE: NOTED	MULTI-METER INSTALLATION CONFIGURATIONS			CITY AND COUNTY OF SAN FRANCISCO SAN FRANCISCO PUBLIC UTILITIES COMMISSION POWER ENTERPRISE
DRAWING NO. ESG-2-4	Reviewed by: Approved by::	Adopted Date: 12/30/2019	Effective Date: 12/30/2019	



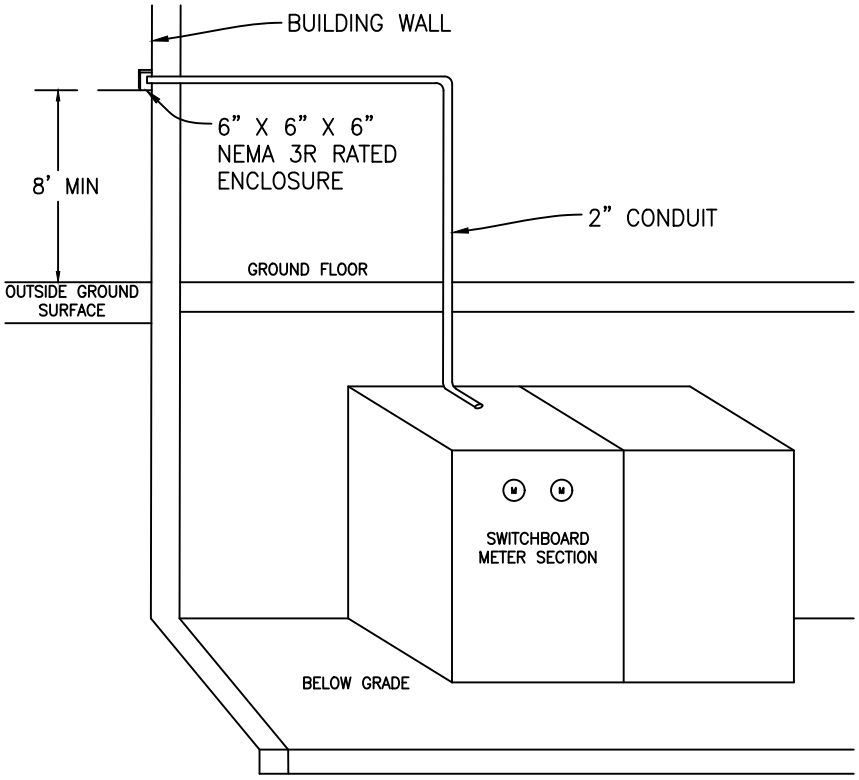
A SUBMETER INSTALLATION

NTS

NUMBERED NOTES

1. MEASURED FROM FINISHED FLOOR TO CENTER OF METER.

SCALE: NOTED	SUBMETERING INSTALLATION			CITY AND COUNTY OF SAN FRANCISCO SAN FRANCISCO PUBLIC UTILITIES COMMISSION POWER ENTERPRISE
DRAWING NO. ESG-2-5	Reviewed by: Approved by::	Adopted Date: 9/30/2022	Effective Date: 9/30/2022	



A CONDUIT INSTALLATION (BELOW GRADE)

NTS

SHEET NOTES

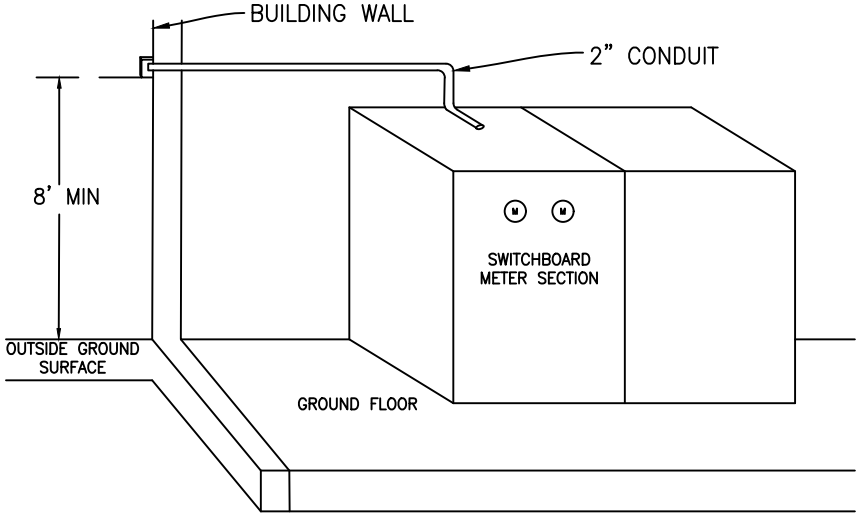
A. CONDUIT MAY BE INSTALLED IN THE FLOORS, CEILINGS, AND WALLS OF THE ROOM.

B. ALL BENDS MUST HAVE A MINIMUM 12" RADIUS.

C. CONDUITS INSTALLED IN WALLS, CEILINGS, FLOORS, OR CONCRETE MUST BE MADE OF RIGID STEEL. FOR ALL OTHER LOCATIONS THE CONDUIT TYPE CAN BE EMT OR BETTER.

D. JUNCTION BOX OF MINIMUM SIZE OF 12" X 12" X 4" IS REQUIRED FOR PULLING WHEN THE TOTAL NUMBER OF DEGREES OF CONDUIT BENDS EXCEEDS 270 BETWEEN END POINTS OR JUNCTION BOXES. JUNCTION BOX IS ALSO REQUIRED WHEN THE CONDUIT RUN LENGTH EXCEEDS 100 FEET.

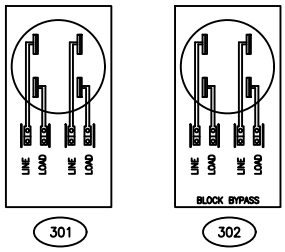
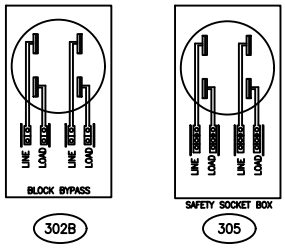
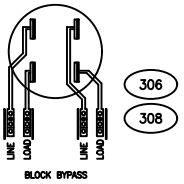
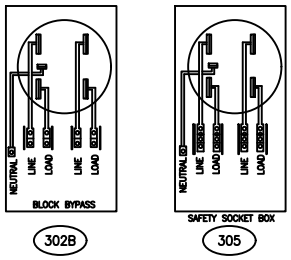
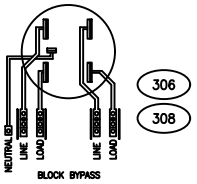
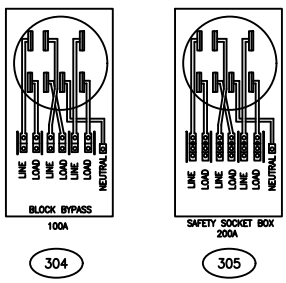
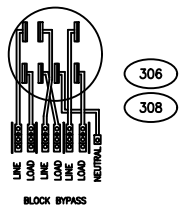
E. CONDUIT MUST NOT BE INSTALLED INSIDE OF A TRANSFORMER ROOM.



B CONDUIT INSTALLATION (GROUND FLOOR)

NTS

SCALE: NOTED	SMARTMETER CONDUIT INSTALLATION FOR INDOOR METER ROOM			CITY AND COUNTY OF SAN FRANCISCO SAN FRANCISCO PUBLIC UTILITIES COMMISSION POWER ENTERPRISE
DRAWING NO. ESG-2-6	Reviewed by: Approved by::	Adopted Date: 10/17/2022	Effective Date: 10/17/2022	

TYPES OF SERVICE	EUSERC REFERENCE	SELF-CONTAINED SOCKET	
		SINGLE/REMOTE PANEL	SWITCHBOARD/PEDESTAL
1ø, 2W, 120V (2)	FIGURE 1A: • (0-200A): SOCKET: DWG. F-1, CODE 4 PANEL: DWG. 301 OR 301A • (201-400A): SOCKET: DWG. F-1, CODE 4 PANEL: DWG. 302	 (1A) Code 4, 301/301A/302 EUSERC Dwg. G1, Figure 1	
1ø, 3W, 120/240V (2)	FIGURE 2A (0-200A): • SOCKET: DWG. F-1, CODE 4 • PANEL: DWG. 302B OR 305 FIGURE 2B (0-200A): • SOCKET: DWG. F-1, CODE 4 • PANEL: DWG. 306 OR 308	 (2A) Code 4, 302B/305 EUSERC Dwg. G1, Figure 2	 (2B) Code 4, 306/308 EUSERC Dwg. G1, Figure 2
1ø, 3W, 120Y/208V (2)	FIGURE 3A (0-200A): • SOCKET: DWG. F-1, CODE 5A • PANEL: DWG. 302B OR 305 FIGURE 3B (0-200A): • SOCKET: DWG. F-1, CODE 5A • PANEL: DWG. 306 OR 308	 (3A) Code 5A, 302B/305 EUSERC Dwg. G1, Figure 3	 (3B) Code 5A, 306/308 EUSERC Dwg. G1, Figure 3
3ø, 4W, 208Y/120V (2) 3ø, 4W, 240Δ/120V (2) 3ø, 4W, 480Y/277V (1)	FIGURE 4A: • 100A: SOCKET: DWG. F-1, CODE 7 PANEL: DWG. 304 • 200A: SOCKET: DWG. F-1, CODE 7 PANEL: DWG. 305 FIGURE 4B (0-200A) • SOCKET: DWG. F-1, CODE 7 • PANEL: DWG. 306 OR 308	 (4A) Code 7, 304/305 EUSERC Dwg. G1, Figures 6&7	 (4B) Code 7, 306/308 EUSERC Dwg. G1,Figures 6&7

SHEET NOTES:

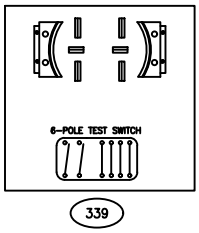
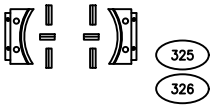
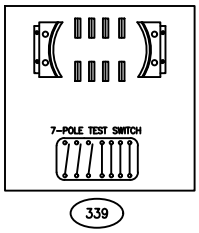
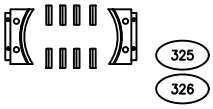
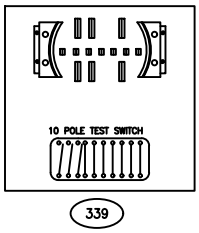
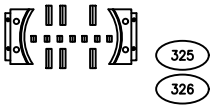
1. ALL SOCKETS SHALL BE U.L. LISTED.
2. REFER TO EUSERC REQUIREMENTS AND DRAWING NUMBERS SHOWN.
3. BOND NEUTRAL TO METER SOCKET.
4. CIRCUIT CLOSING DEVICES SHALL NOT BE USED.
5. BLOCK BYPASS FACILITIES ARE REQUIRED.

NUMBERED NOTES:

(1) PROVIDE 200 AMP CONTINUOUS-DUTY SAFETY SOCKET.

(2) PROVIDE CONTINUOUS-DUTY RATED BLOCK BYPASS.

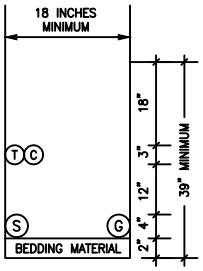
SCALE: NOTED	SELF-CONTAINED METER SOCKET/PANEL CONFIGURATIONS			CITY AND COUNTY OF SAN FRANCISCO SAN FRANCISCO PUBLIC UTILITIES COMMISSION POWER ENTERPRISE
DRAWING NO. ESG-3-1	Reviewed by:	Adopted Date: 1/3/2020	Effective Date: 1/3/2020	
	Approved by::			

		TRANSFORMER–RATED SOCKET	
TYPES OF SERVICE	EUSERC REFERENCE	SINGLE/REMOTE PANEL	SWITCHBOARD/PEDESTAL
1ø, 2W, 120V			
1ø, 3W, 120/240V	FIGURE 6A (0–800A): • SOCKET: DWG. F–1, CODE 6 • PANEL: DWG. 339 FIGURE 6B (400–3000A): • SOCKET: DWG. F–1, CODE 6 • PANEL: DWG. 325 OR 326	 6A Code 6, 339	 6B Code 6, 325/326
1ø, 3W, 120Y/208V	FIGURE 7A (0–800A): • SOCKET: DWG. F–1, CODE 8 • PANEL: DWG. 339 FIGURE 7B (400–3000A): • SOCKET: DWG. F–1, CODE 8 • PANEL: DWG. 325 OR 326	 7A Code 8, 339	 7B Code 8, 325/326
3ø, 4W, 208Y/120V 3ø, 4W, 240Δ/120V 3ø, 4W, 480Y/277V	FIGURE 8A (0–800A): • SOCKET: DWG. F–1, CODE 13 • PANEL: DWG. 339 FIGURE 8B (400–3000A): • SOCKET: DWG. F–1, CODE 13 • PANEL: DWG. 325 OR 326	 8A Code 13, 339	 8B Code 13, 325/326

NOTES:

1. ALL SOCKETS SHALL BE U.L. LISTED.
2. REFER TO EUSERC REQUIREMENTS AND DRAWING NUMBERS SHOWN.
3. BOND NEUTRAL TO METER SOCKET.
4. CIRCUIT CLOSING DEVICES SHALL NOT BE USED.
5. BLOCK BYPASS FACILITIES ARE REQUIRED.
6. WHEN NONMETALLIC CONDUITS ARE USED BETWEEN CURRENT TRANSFORMER (C.T.) AND METER SOCKET, PROVIDE (1)#12 MINIMUM SOLID GREEN GROUND CONDUCTOR.
7. INCREASE C.T. SECONDARY CONDUCTOR SIZES FOR LENGTHS GREATER THAN 50 FEET.

SCALE: NOTED	TRANSFORMER–RATED METER SOCKET/PANEL CONFIGURATIONS			CITY AND COUNTY OF SAN FRANCISCO SAN FRANCISCO PUBLIC UTILITIES COMMISSION POWER ENTERPRISE
DRAWING NO. ESG–3–2	Reviewed by: Approved by::	Adopted Date: 1/10/2020	Effective Date: 1/10/2020	



DETAIL NOTES:

1. ALL DEPTHS AND COVER REQUIREMENTS ARE MEASURED FROM FINAL GRADE.
2. TRENCH DIMENSIONS ARE TYPICAL.
3. NON-UTILITY FACILITIES ARE NOT ALLOWED IN ANY JOINT UTILITY TRENCH, E.G. IRRIGATION CONTROL LINES, BUILDING FIRE ALARM SYSTEMS, ETC.
4. 12" MINIMUM RADIAL SEPARATION SHALL BE MAINTAINED FROM ALL GAS FACILITIES

C SECTION: TYP. SERVICE TRENCH

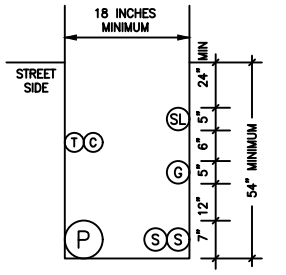
NTS

	G	T	C	S	P	SL
G GAS		12"	12"	12"	12"	12"
T TELEPHONE	12"		1"	12"	12"	12"
C CABLE TV	12"	1"		12"	12"	12"
S ELECTRIC SECONDARY	12"	12"	12"	1"	3"	1"
P ELECTRIC PRIMARY	12"	12"	12"	3"	3"	6"
SL STREETLIGHT	12"	12"	12"	1"	6"	
FOREIGN ELECTRIC SOURCE (NON-SFPUC)	12"	12"	12"	12"	12"	12"

DETAIL NOTES:

1. SUBJECT TO FIELD CONDITIONS, SEPARATIONS SHALL BE AS GREAT AS POSSIBLE. MINIMUM SEPARATION DISTANCES SHALL COMPLY WITH GO128.
2. WHERE ANY SEPARATION CAN NOT BE ACHIEVED, APPLICANT SHALL REQUEST A VARIANCE FROM SFPUC. APPLICANT SHALL SUBMIT A WRITTEN REQUEST AND INCLUDE A PROPOSED DESIGN.
3. SEPARATIONS SHALL BE MAINTAINED AT ABOVE-GROUND TERMINATIONS.
4. PROVIDE THE FOLLOWING SEPARATION DISTANCES BETWEEN SFPUC FACILITIES AND "WET" UTILITIES:
   a. HORIZONTAL: 36" MINIMUM WITH 12" MINIMUM OF UNDISTURBED EARTH BETWEEN FACILITIES.
   b. VERTICAL CROSSINGS: 12" MINIMUM

A SCHEDULE: MINIMUM RADIAL SEPARATIONS

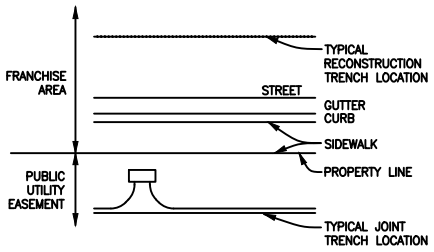


DETAIL NOTES:

1. ALL DEPTHS AND COVER REQUIREMENTS ARE MEASURED FROM FINAL GRADE.
2. TRENCH DIMENSIONS ARE TYPICAL.
3. NON-UTILITY FACILITIES ARE NOT ALLOWED IN ANY JOINT UTILITY TRENCH, E.G. IRRIGATION CONTROL LINES, BUILDING FIRE ALARM SYSTEMS, ETC.

D SECTION: TYP. JOINT DIST. TRENCH

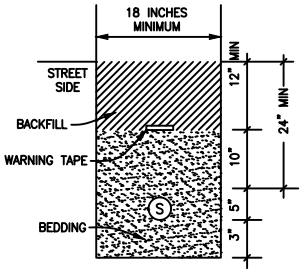
NTS



DETAIL NOTES:

1. PREFERRED TRENCH LOCATION IS WITHIN PUBLIC UTILITY EASEMENT

B PLAN: TYP. TRENCH LOCATIONS

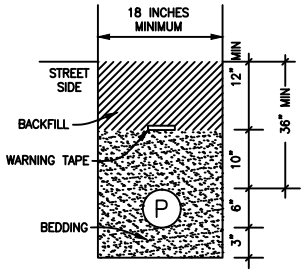


DETAIL NOTES:

1. ALL DEPTHS AND COVER REQUIREMENTS ARE MEASURED FROM FINAL GRADE.
2. TRENCH DIMENSIONS ARE TYPICAL.
3. NON-UTILITY FACILITIES ARE NOT ALLOWED IN ANY JOINT UTILITY TRENCH, E.G. IRRIGATION CONTROL LINES, BUILDING FIRE ALARM SYSTEMS, ETC.
4. MINIMUM CONDUIT COVERED DEPTH FROM TOP OF CONDUIT SHALL BE 24 INCHES.

E SECTION: ELEC. ONLY TRENCH (SECONDARY)

NTS



DETAIL NOTES:

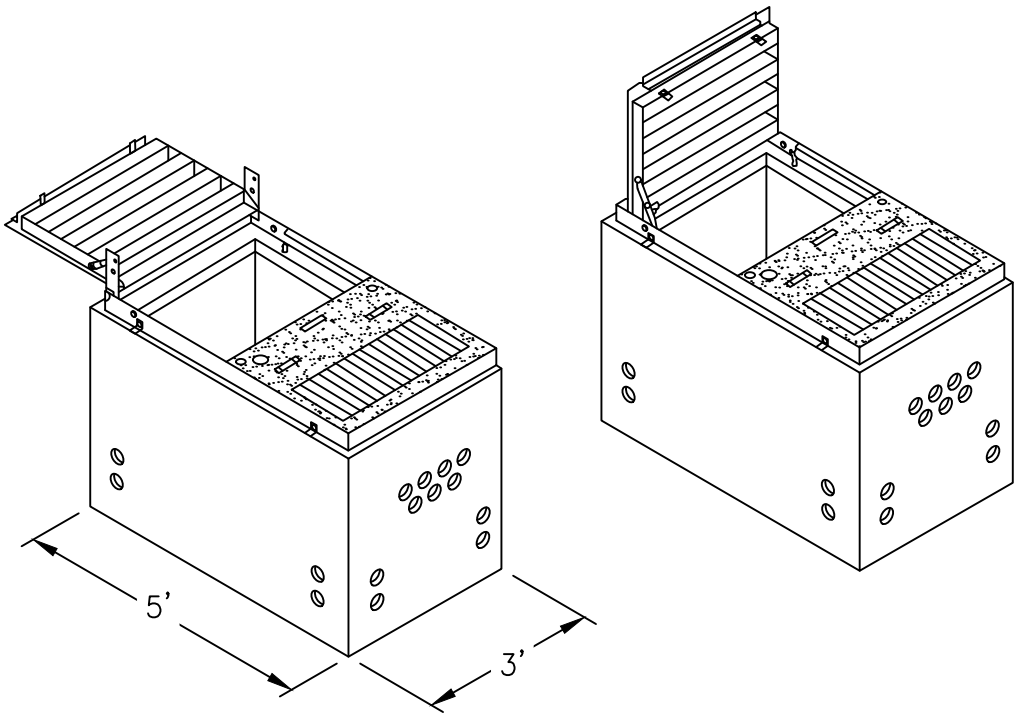
1. ALL DEPTHS AND COVER REQUIREMENTS ARE MEASURED FROM FINAL GRADE.
2. TRENCH DIMENSIONS ARE TYPICAL.
3. NON-UTILITY FACILITIES ARE NOT ALLOWED IN ANY JOINT UTILITY TRENCH, E.G. IRRIGATION CONTROL LINES, BUILDING FIRE ALARM SYSTEMS, ETC.
4. MINIMUM CONDUIT COVERED DEPTH FROM TOP OF CONDUIT SHALL BE 36 INCHES.
5. FOR COVERED DEPTHS LESS THAN 36 INCHES, FOLLOW ELECTRIC SERVICE GUIDELINES SECTION IV.A. TO INSTALL CONCRETE CAPS.

F SECTION: ELEC. ONLY TRENCH (PRIMARY)

NTS

SCALE: NOTED	TRENCH CONFIGURATIONS		
DRAWING NO. ESG-4-1	Reviewed by: / Approved by::	Adopted Date: 1/16/2020	Effective Date: 1/16/2020

CITY AND COUNTY OF SAN FRANCISCO
SAN FRANCISCO PUBLIC UTILITIES COMMISSION
POWER ENTERPRISE

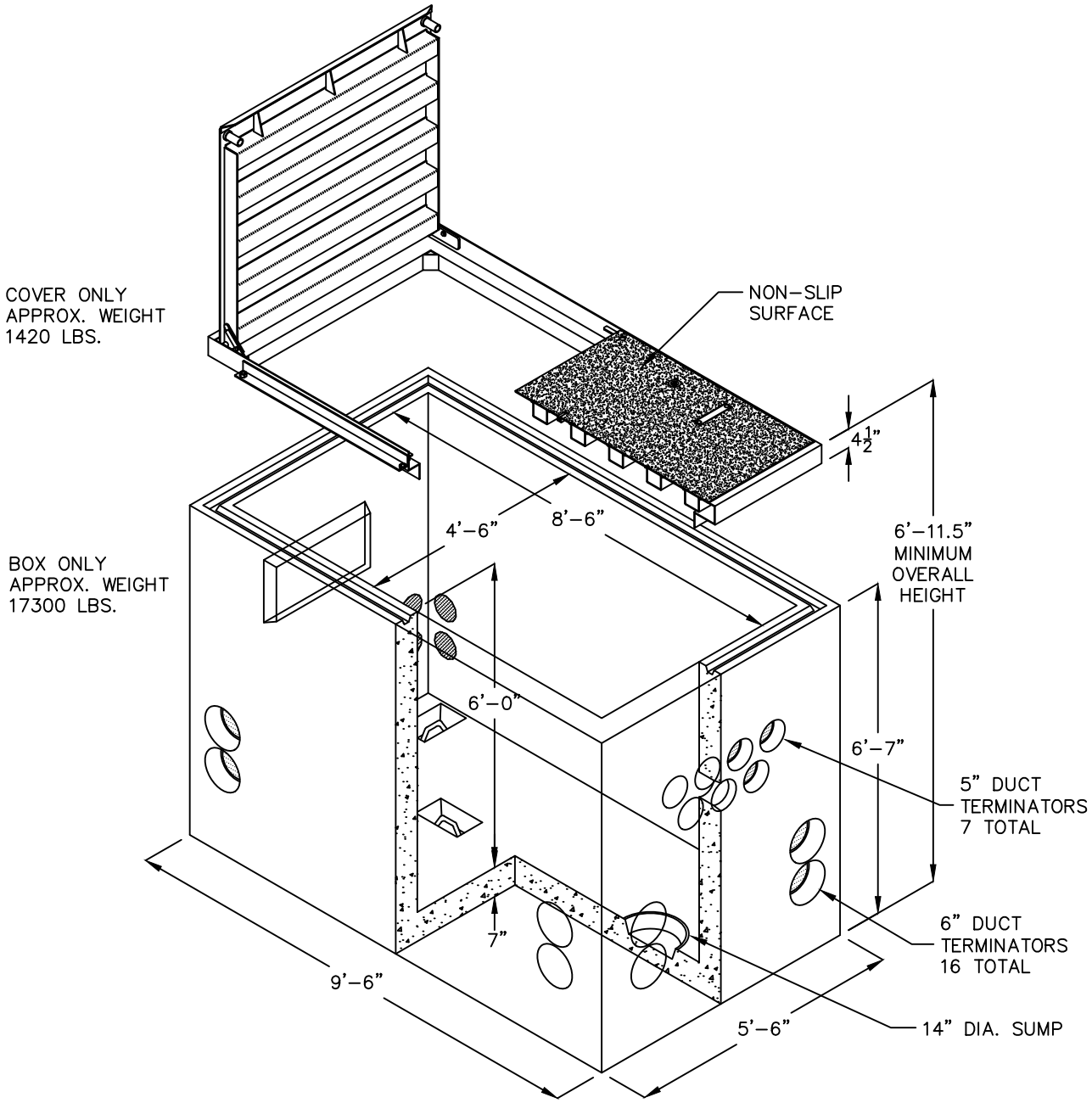


ENCLOSURE SIZE	TYPE OF TRAFFIC LOADING
3' X 5' X 3' 6"	INCIDENTAL
3' X 5' X 3' 6"	FULL–TRAFFIC
3' X 5' X 4' 6"	HEAVY FULL–TRAFFIC

NOTES:

1. IF ADDITIONAL DEPTH IS REQUIRED, EXTENSIONS IN 6" INCREMENTS SHALL BE INSTALLED.

SCALE: NOTED	PRIMARY SPLICE BOX – 3' X 5' (#5)			CITY AND COUNTY OF SAN FRANCISCO SAN FRANCISCO PUBLIC UTILITIES COMMISSION POWER ENTERPRISE
DRAWING NO. ESG–4–2	Reviewed by: Approved by::	Adopted Date: 2/7/2020	Effective Date: 2/7/2020	

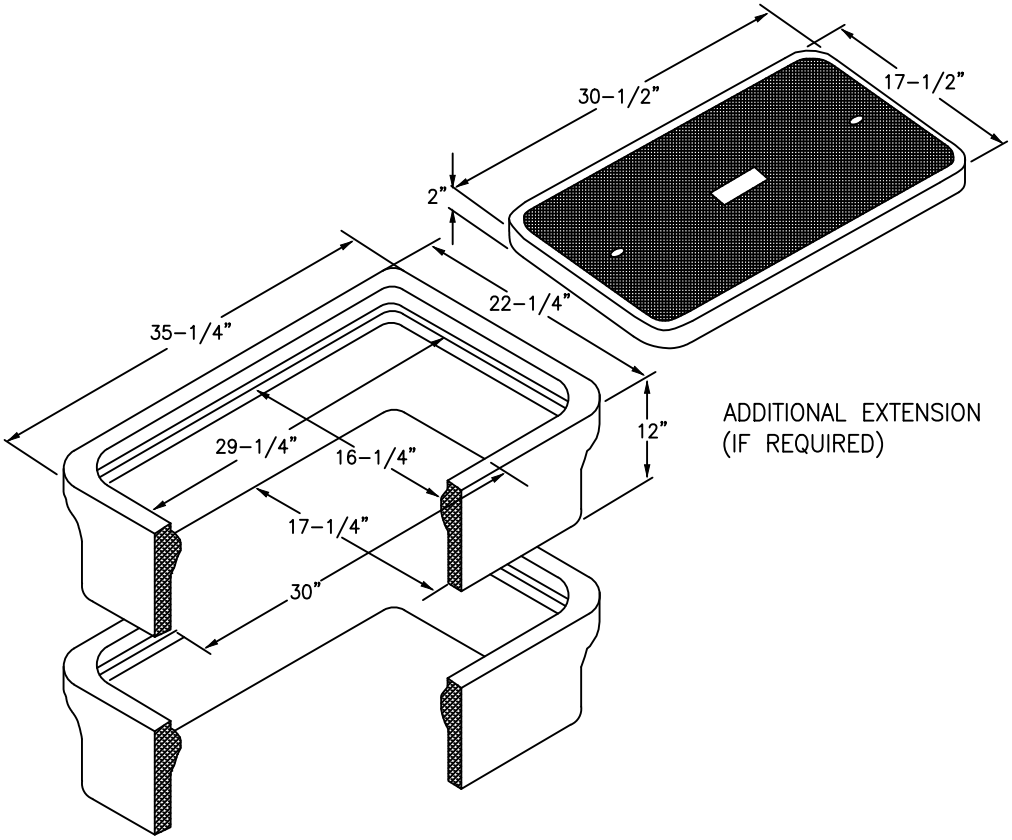


ENCLOSURE SIZE	TYPE OF TRAFFIC LOADING
4' 6" X 8' 6" X 6' 0"	INCIDENTAL
4' 6" X 8' 6" X 6' 0"	FULL-TRAFFIC
4' 6" X 8' 6" X 7' 0"	HEAVY FULL-TRAFFIC

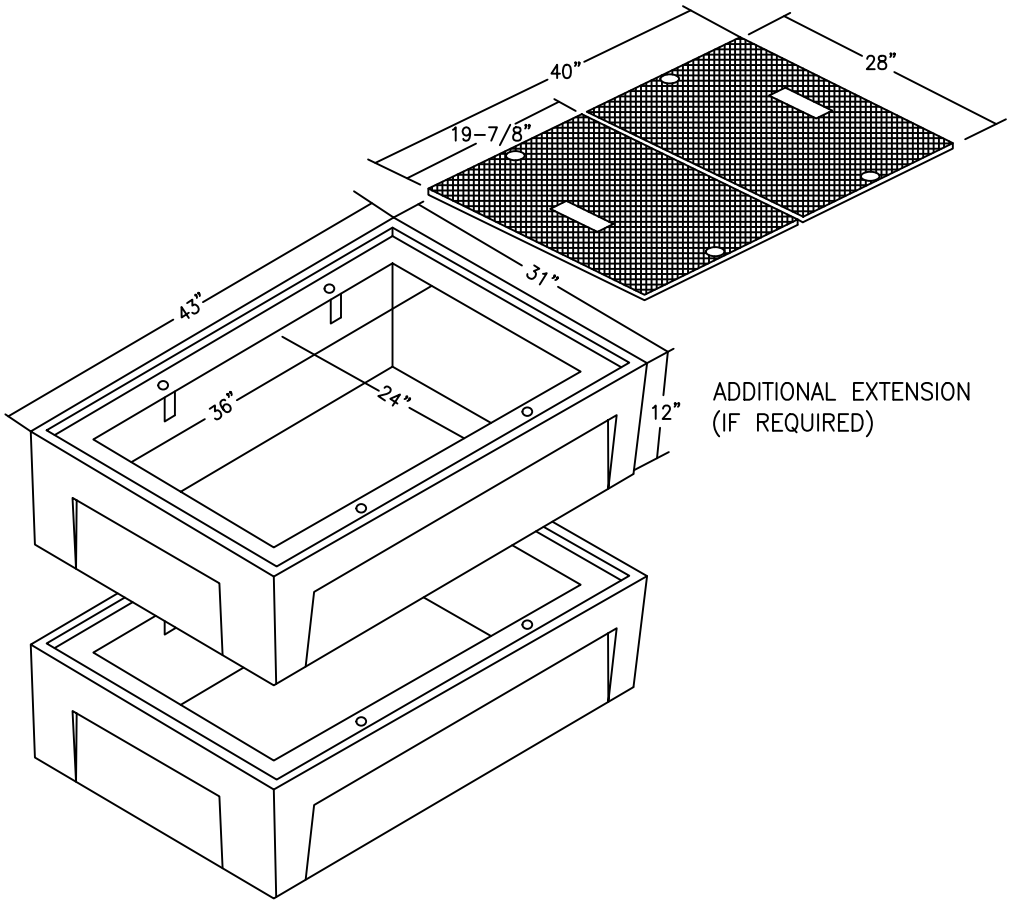
NOTES:

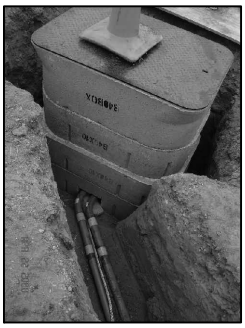
1. IF ADDITIONAL DEPTH IS REQUIRED, 6" INCREMENTAL EXTENSIONS SHALL BE INSTALLED.

SCALE: NOTED	PRIMARY BOX – 4'-6" X 8'-6" (#7)			CITY AND COUNTY OF SAN FRANCISCO SAN FRANCISCO PUBLIC UTILITIES COMMISSION POWER ENTERPRISE
DRAWING NO. ESG-4-3	Reviewed by: Approved by::	Adopted Date: 2/7/2020	Effective Date: 2/7/2020	



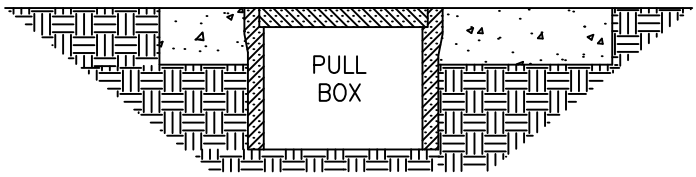
SCALE: NOTED	PULL BOX – 17" X 30"			CITY AND COUNTY OF SAN FRANCISCO SAN FRANCISCO PUBLIC UTILITIES COMMISSION POWER ENTERPRISE
DRAWING NO. ESG–4–4	Reviewed by: Approved by::	Adopted Date: 2/7/2020	Effective Date: 2/7/2020	



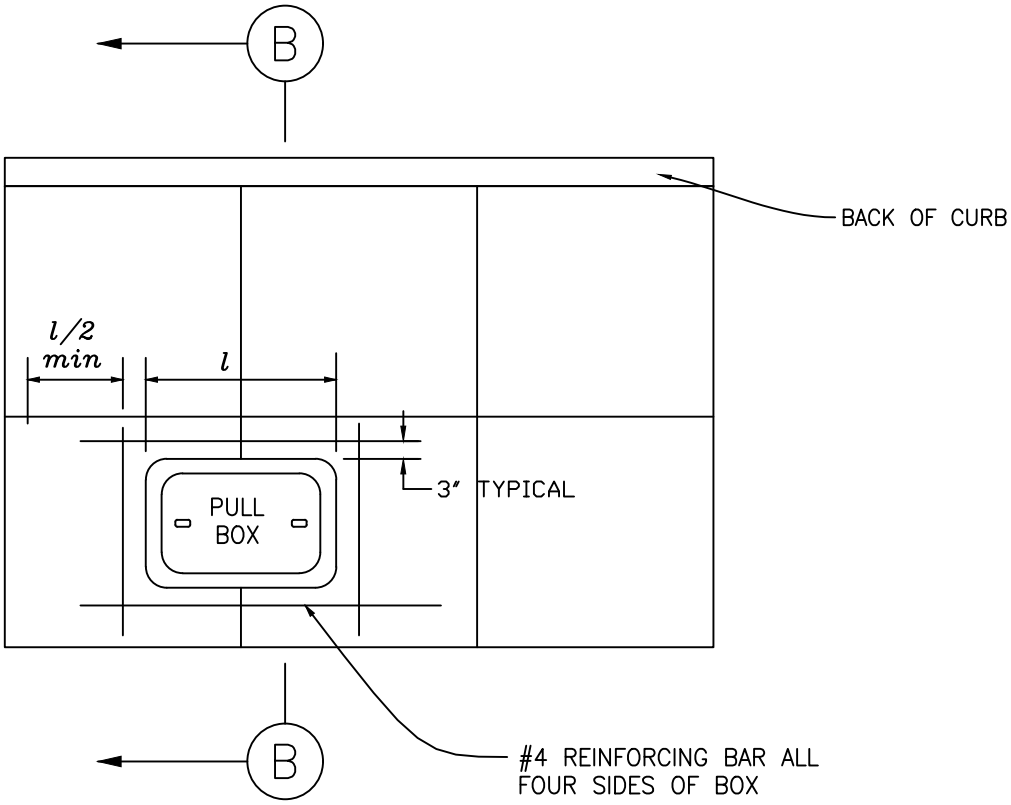


SCALE: NOTED	PULL BOX — 24" X 36"		
DRAWING NO. ESG-4-5	Reviewed by:	Adopted Date: 2/7/2020	Effective Date: 2/7/2020
	Approved by::		

CITY AND COUNTY OF SAN FRANCISCO
SAN FRANCISCO PUBLIC UTILITIES COMMISSION
POWER ENTERPRISE



B SECTION
NTS

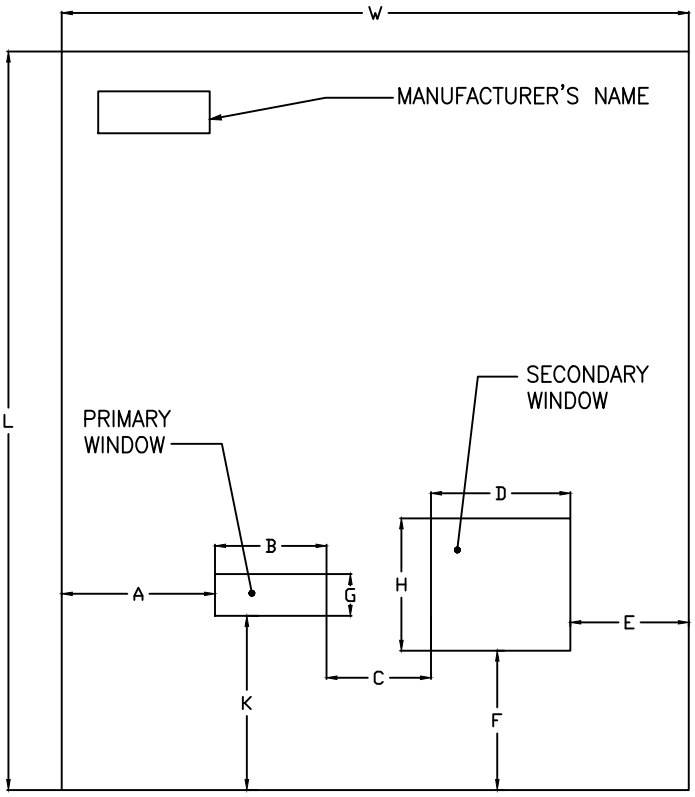


A PLAN
NTS

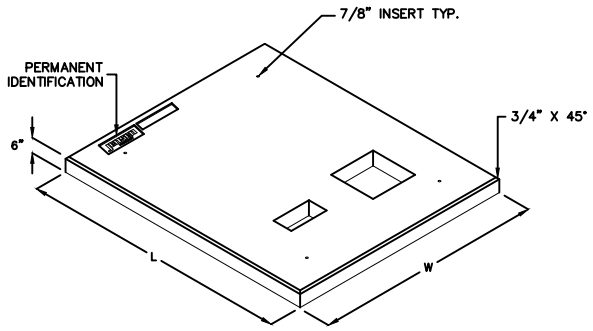
NOTES:

1. CALL SFPUC FOR INSPECTION BEFORE POURING CONCRETE.

SCALE: NOTED	TYPICAL PULLBOX LOCATIONS			CITY AND COUNTY OF SAN FRANCISCO SAN FRANCISCO PUBLIC UTILITIES COMMISSION POWER ENTERPRISE
DRAWING NO. ESG-4-6	Reviewed by: Approved by::	Adopted Date: 1/24/2020	Effective Date: 1/24/2020	



FRONT OF PAD



ISOMETRIC VIEW

PLAN VIEW

TRANSFORMER	PAD DIMENSIONS										
KVA SIZE	A	B	C	D	E	F	G	H	K	L	W
150	17	16	15	19	13	10	6	17	14	61	80
300	22	16	15	20	17	20	6	19	25	106	90
500											
750											
1000											

COMMENTS:

GROUND WIRE SHALL

1. RUN FROM THE GROUND ROD OUTSIDE THE PAD, UNDER THE PAD TO THE PRIMARY WINDOW
2. GO TO THE SURFACE OF THE PAD FROM THE PRIMARY WINDOW, RUN FROM THE TOP TO THE SECONDARY WINDOW
3. GO BACK DOWN THE SECONDARY WINDOW AND CONNECT TO THE GROUND ROD LOCATED WITHIN THE SECONDARY WINDOW
4. UNLESS OTHERWISE NOTED, THE MINIMUM SEPARATION BETWEEN THE PRIMARY AND SECONDARY GROUND ROD SHALL BE A MINIMUM OF SIX FEET
5. PROVIDE A CONTINUOUS #2AWG SOLID, SOFT DRAWN BARE COPPER GROUND WIRE THAT RUNS FROM THE 5/8"x8' COPPERCLAD GROUND ROD, UNDER THE PAD, TO THE PRIMARY WINDOW, THEN ABOVE THE PAD FROM THE PRIMARY WINDOW, THROUGH THE SECONDARY WINDOW, TO THE SECONDARY GROUND ROD OUTSIDE THE PAD.

NOTES:

1. PRECAST PADS SHALL HAVE MANUFACTURER'S NAME IDENTIFIED AND WEIGHT NOTED
2. PRIMARY CONDUITS SHALL BE INSTALLED TO THE LEFT OF PAD, WITH APPROPRIATE SPACING FROM ONE ANOTHER
3. SECONDARY CONDUITS SHALL BE INSTALLED CLOSE TO THE FRONT OF THE PAD

SCALE: NOTED	3 PHASE TRANSFORMER PAD – TYPE "IIE"			CITY AND COUNTY OF SAN FRANCISCO SAN FRANCISCO PUBLIC UTILITIES COMMISSION POWER ENTERPRISE
DRAWING NO. ESG–4–7	Reviewed by: Approved by::	Adopted Date: 1/24/2020	Effective Date: 1/24/2020	

REQUIREMENTS:

In rare situations, a service transformer may have to be located within a building. In this case, the transformer vault must comply with SFPUC requirements. SFPUC directs the designer to refer to the requirements of National Electrical Code (NFPA 70) article 450 in regards to oil–insulated Transformers Installed indoors where SFPUC's requirements are silent

Ventilated openings, doorway widths, rating of the room and prevention of foreign objects must be met.

All penetrations shall have a minimum 3–hour fire rating

Sump shall be provided

INSTALLATION/PATHS:

There shall be a clear equipment access path between the vault and the building exterior or right–of–way.

The path toward the vault shall be smooth, without seams or ridges or pads; and be designed such that it can support both the weight of the equipment to be installed, and the machines needed to install said equipment.

The slope of the path shall be no more than 3 degrees.

The vault shall be located no more than one floor below the building's exterior finished grade.

The vault opening shall be large enough for SFPUC to install and remove our equipment located within the vault.

An unobstructed level area shall be provided at the entrance to the vault, this unobstructed area shall be large enough for moving SFPUC equipment into and out of the in–building vault via mechanical means, such as with cranes or hoists

LOCATION:

As much as possible, vaults shall be located such that they can be ventilated outside without using ducts.

Vaults shall be dry and not subject to running, standing, flooding, or infiltration of water.

Please contact SFPUC for project specific vault locations

DOORS/ACCESS:

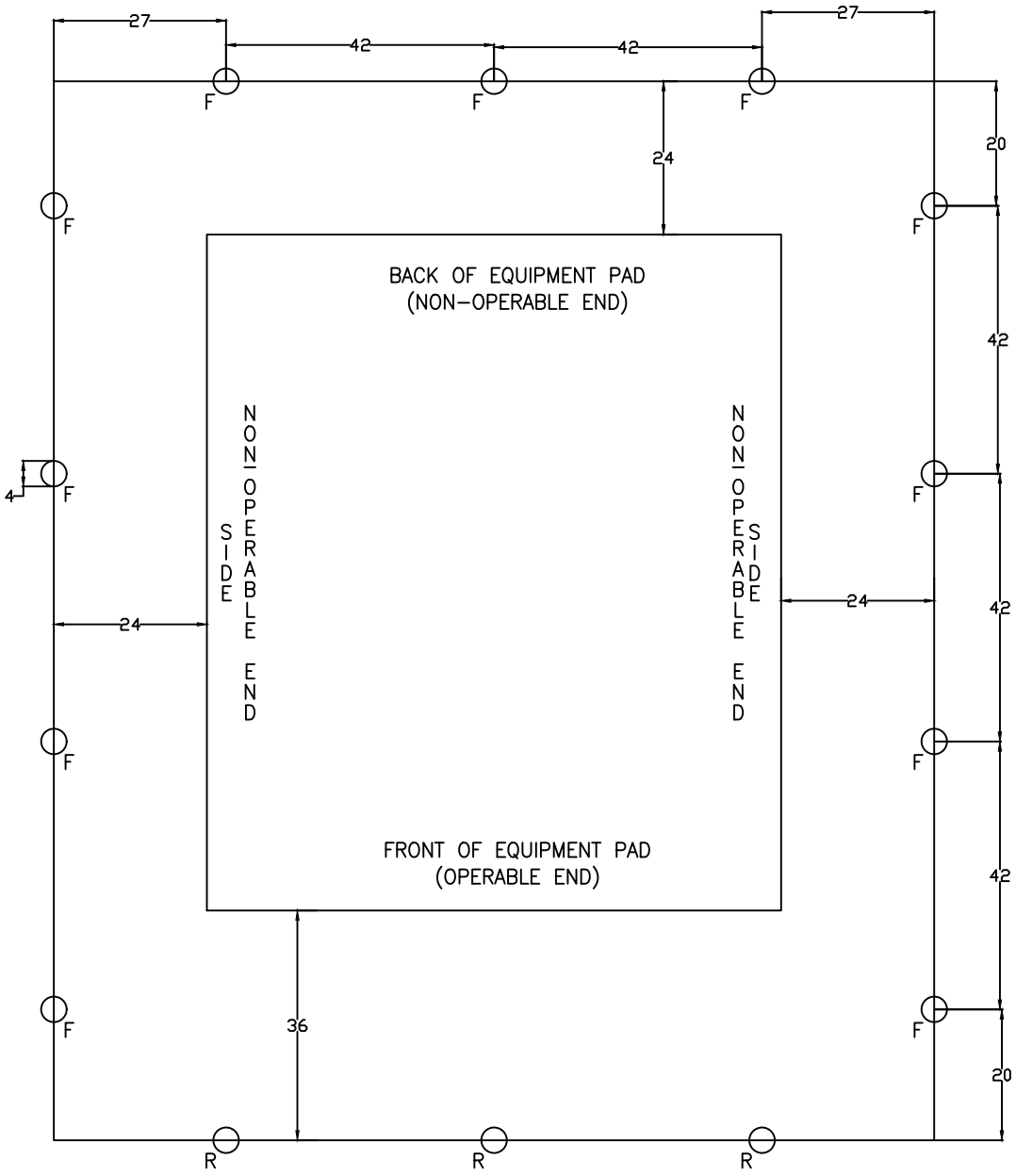
One or more door(s) or ceiling hatch shall be provided for every vault.

Door access shall be kept unobstructed at all times; with SFPUC employees having rights to access the site with no restriction

If access to the vault is controlled via locks/a locked door, keys for those locked doors shall be kept in a readily accessible key box near the first locked door. A spare set shall also be provided upon acceptance of the vault

After the vault have been accepted by SFPUC, no non–SFPUC personnel shall not enter the vault without SFPUC being present

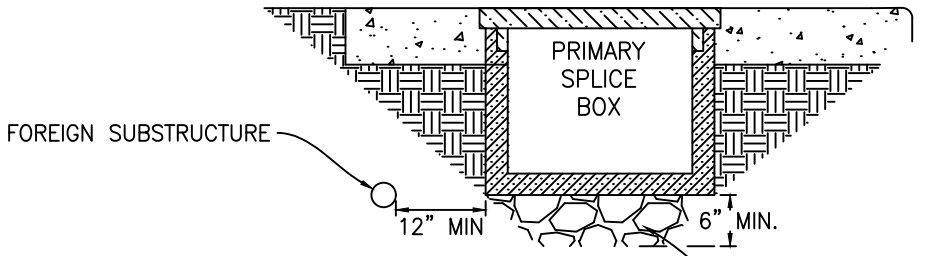
SCALE: NOTED	BUILDING TRANSFORMER VAULTS			CITY AND COUNTY OF SAN FRANCISCO SAN FRANCISCO PUBLIC UTILITIES COMMISSION POWER ENTERPRISE
DRAWING NO. ESG–4–8	Reviewed by: Approved by::	Adopted Date: 1/24/2020	Effective Date: 1/24/2020	



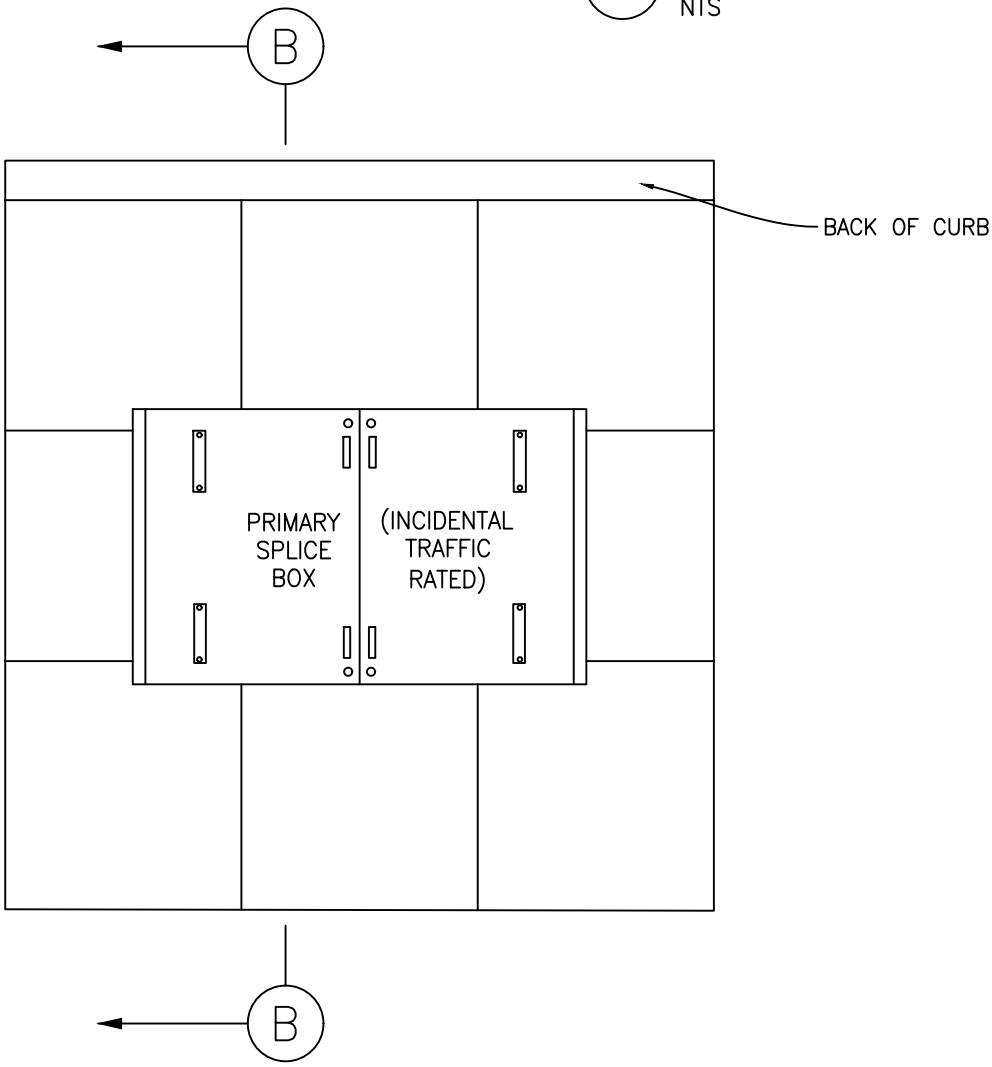
LEGEND
F = FIXED BOLLARD
R = REMOVABLE BOLLARD

1. DIMENSIONS ARE IN INCHES

SCALE: NOTED	TYPICAL BOLLARD			CITY AND COUNTY OF SAN FRANCISCO SAN FRANCISCO PUBLIC UTILITIES COMMISSION POWER ENTERPRISE
DRAWING NO. ESG–4–9	Reviewed by: Approved by::	Adopted Date: 1/24/2020	Effective Date: 1/24/2020	



B SECTION
NTS

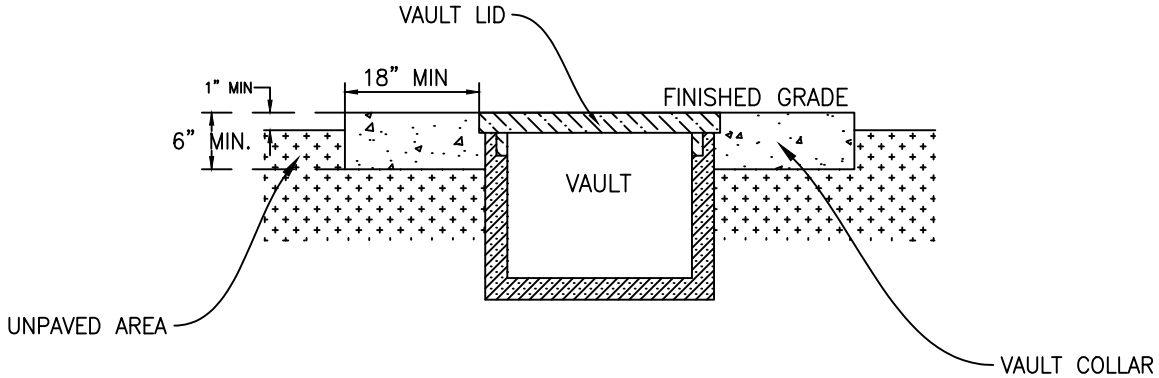


A PLAN
NTS

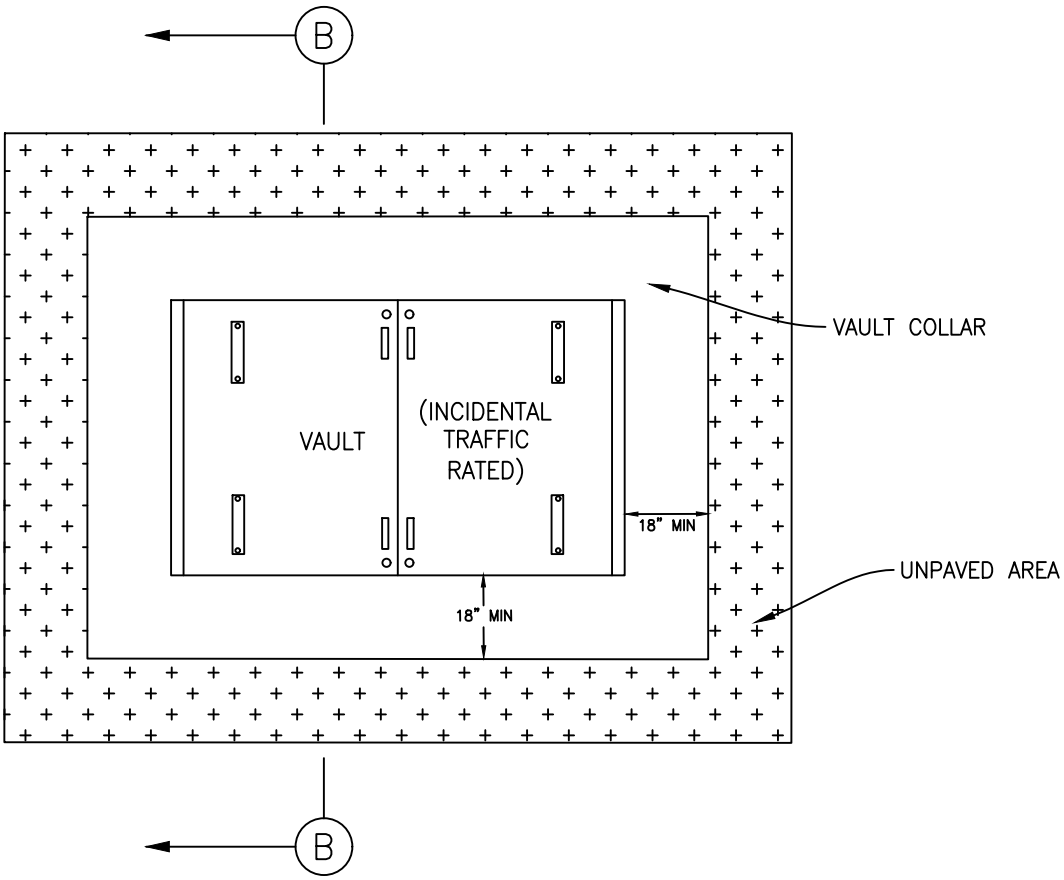
NOTES:

1. CALL SFPUC FOR INSPECTION BEFORE POURING CONCRETE.

SCALE: NOTED	TYPICAL PRIMARY SPLICE BOX LOCATIONS			CITY AND COUNTY OF SAN FRANCISCO SAN FRANCISCO PUBLIC UTILITIES COMMISSION POWER ENTERPRISE
DRAWING NO. ESG-4-10	Reviewed by: Approved by::	Adopted Date: 10/14/2022	Effective Date: 10/14/2022	



B SECTION
NTS



A PLAN
NTS

NOTES:

1. VAULT COLLAR SHALL BE INSTALLED ON UNPAVED AREAS.
2. VAULT LID AND VAULT COLLAR SHALL HAVE THE SAME GRADE LEVEL.

SCALE: NOTED	VAULT CONCRETE COLLAR			CITY AND COUNTY OF SAN FRANCISCO SAN FRANCISCO PUBLIC UTILITIES COMMISSION POWER ENTERPRISE
DRAWING NO. ESG-4-11	Reviewed by: Approved by::	Adopted Date: 10/19/2022	Effective Date: 10/19/2022	