

2017 REVISION TABLE

(To the 2016 Electric Line Extension and Service Standards)

CHAPTER	TITLE	REVISION DESCRIPTION
Chapter 1 Forms: 1-6 & 1-7	Forms – Request for Attachment to Utility & Streetlight Pole	Added Email Address field to these forms.
Chapter 1 Form: 1-8	Form – Request for Removal of Utilities – Demolition or Construction	Changed title of form from “Customer Contract Administration” to “Utilities Development Services”
4.02c1	General Restrictions of Easements/Rights-Of-Way	Added text: “Trees should be planted a minimum of 6 foot from electric lines to the base of the tree.” This wording is being added to sync with Development Services current practice.
5.04c6	Metering	Updated Appendix D, references to Photos 1, 2, 3 and 4.
5.04e	Metering – Instrument Transformer Conduit	Changed minimum conduit size from 1-1/4” to 1-1/2”. Added text “The conduit must be contiguous from the meter socket to the switchgear CT cubicle (See Appendix-D, Drawing 19).”
5.08b3	Self-Supporting Meter Mounting	Added note 3: “When served from an overhead source, post type meter must be no closer than 15 feet from the pole.”
5.16	Metering – Adding Surge Suppression to Meter Sockets	Deleted 5.16a, b1, b2, b3 & c. Revised 5.16b to 5.16a and changed text to “Colorado Springs Utilities does <u>not</u> allow home and business owners to install or contract the installation of surge suppression devices on self-contained electric meter sockets”
6.01d	Temporary Electrical Service – General	Changed text from “Contract Administration” to “Utilities Development Services”.
6.03	Temporary Electrical Service – Scheduling of Temporary Electrical Service	Revised text “Most normal temporary service requests are processed <u>within 5 to 7 10</u> business days if a distribution transformer or secondary junction box is readily available.”
7.01c4	Permanent Residential Services – Method of Attachment	Added note 4 “Service drop anchor or riser attachments shall not be located on chimneys, firewalls, or parapet walls”
7.07c4	Permanent Residential Services – Residential Service inspection Responsibilities	Revised text “Connect overhead secondary <u>within 7 10</u> business days after all required inspections are completed.”
7.08a	Permanent Residential Services – Residential Meter Installation	Revised text “Upon completion of the required Colorado Springs Utilities inspections and installation, the meter will be set and the final service will be energized <u>within 10 business days</u> , after receipt of the following”
7.08a1&2	Permanent Residential Services – Residential Meter Installation	Changed text from “Customer Contract Administration” to “Utilities Development Services”.

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8.04a	Underground Residential Development – Electric System Design and Payment	Changed text from “Contract Administration” to “Development Services”.
Chapter 8 Form: 8-6	Form – Application for Gas and Electric Line Extension	Added Email Address field to this form.
Chapter 8 Form: 8-6	Form – Application for Gas and Electric Line Extension	Changed text from “Contract Administration” to “Utilities Development Services”.
10.01b1a & 10.02b1a	Commercial Underground and Overhead Systems	Added text “The design of the Colorado Springs Utilities’ electrical service is based on information furnished by the Customer at the time of initial service design; therefore, no significant additions or changes shall be made to the Customer’s installation without providing a new load data form and receiving subsequent approval from Colorado Springs Utilities.”
10.01c3	Commercial Underground Systems	Added text: “Commercial three phase below grade vault mounted transformers may be considered as an option on properties previously developed and where there is no space for padmounted equipment to be installed or have been designated as “Historic Structures”. These are non-preferred installations due to operational issues and will be evaluated on a case by case basis by CSU personnel.”
10.01i2	Commercial Underground Systems - Scheduling	Revised text “Within seven ten (710) business days of the Q.C. inspector receiving an order and a Load Data Form from Electric Service and, upon receiving the design fee and other fees, easement documents, the service order from Colorado Springs Utilities Customer Service, the Regional Building Department inspection approval documentation, and completion of Colorado Springs Utilities installation, the meter will be set and the final service will be energized.”
10.01f2	Commercial Underground Systems	Changed text from “Contract Administration” to “Utilities Development Services”.
10.02f3	Overhead Commercial Service – Method of Attachment	The <u>max</u> conduit must be a minimum of 2 inch rigid-GRC and extend above the roof to obtain an 18 inch clearance between the roof and the lowest point of the service drop.
10.02j2	Overhead Commercial Services - Scheduling	Revised text “Upon receiving all other fees, if any, easement documents as required, the service order from Colorado Springs Utilities Customer Service, the Regional Building Department inspection approval documentation, and completion of Colorado Springs Utilities installation, the final service will be energized <u>within 10 business days.</u> ”
10.03a6	Commercial Overhead To Underground Secondary	Added note 6: “ When served from an overhead source, meter pedestal or post type meter installation must be no closer than 15 feet from the pole.”
10.03b2	Commercial Overhead to Underground Secondary - Scheduling	Revised text “Upon receiving all fees, if any, easement documents, the service order from Colorado Springs Utilities Customer Service, the Regional Building Department’s inspection approval documentation, and completion of Colorado Springs Utilities installation, the final service will be energized <u>within 10 business days.</u> ”

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10.06c4f	Colorado Springs Network Service Area – Spot (480Y/277)	The Property Owner and/or Customer <u>shall be qualified to work around energized, electrical equipment</u> , will perform maintenance as specified by the manufacturer of the Customer's bus and Colorado Springs Utility material specification 194-8 (Low Voltage Busway for 277/480V Spot Networks) and will document the maintenance for Colorado Springs Utilities' review.
10.06 Figure 1	Commercial/Industrial Development	Updated Outlined Area for the Downtown Network Service Area.
Chapter 10 Form: 10-25	Form – Electric Load Data Form	Added Email Address field to this form.
Chapter 11	System Alteration and Conversion	11.02, 11.03, 11.05 & 11.06 – Changed “Colorado Springs Utilities” to “CSU”. 11.04 “System Improvement Program (SIP) – Major rewrite of this section.
Appendix C	Table 3	Added Siemens as approved for the 13 Terminal Meter Socket
Appendix D Drawing 14	CT Cabinet Installation	Changed minimum conduit size from 1-1/4” to 1-1/2” “ <u>1-1/2</u> ” SCH80 PVC OR GRC- 50' MAX, OR EMT- 2' MAX (SEE NOTE 7)”
Appendix D Drawing 15	Combination Metering Installation	Mike Sheehan - Changed minimum conduit size from 1-1/4” to 1-1/2” “ <u>1-1/2</u> ” SCH80 PVC OR GRC- 50' MAX, OR EMT- 2' MAX (SEE NOTE 7)” Daniel Gonzales - Add 2” minimum dimension between meter socket and other equipment.
Appendix D Drawing 16	Typical Grounding/Bonding for All Self-Contained Services up to 480 Volts	Mike Sheehan – Added note “1-1/2” SCH80 PVC OR GRC CONDUIT MIN.” Daniel Gonzales - Add 2” minimum dimension between meter socket and other equipment.
Appendix D Drawing 17	Typical Grounding/Bonding for CT Cabinet and Gutter	Mike Sheehan – Added note “1-1/2” SCH80 PVC OR GRC CONDUIT MIN.” Removed note “Where metallic nipple is used, bonding of the nipple is not required.” Daniel Gonzales - Add 2” minimum dimension between meter socket and other equipment.
Appendix D Drawing 19	Outdoor Commercial Switchgear EUSERC Metering Option	Mike Sheehan – Changed minimum conduit size from 1-1/4” to 1-1/2” “ MIN 1-1/2” SCH80 PVC OR GRC” Added text to note 7 “Conduit must be contiguous from the meter socket to the switchgear CT cubicle,”
Appendix D Photo 4	Bar Type Current Transformer	Added this drawing to reference Chapter 5.04c6 for the installation of CT cabinets and relabeled old Drawing 4 to 5 and Drawing 5 to 6.
Appendix D Photo 6	Photovoltaic Service Equipment Labeling	Updated photo with new photo showing smaller Disconnect Switch and larger REC Meter Socket. Added note and image of “Special Project Meter”. Added text to REC Meter Label “Larger size meter socket is required”

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Appendix F 1-3	Overhead Pole & Street Light Pole Identification Guide	Updated this standard with current tags and descriptions.
Appendix F 7-1	Transformer Types and Hardware Guide	Added Type 229 to Single-Phase Table on pg.1 and updated Three-Phase Transformer dimensions and weights on pg.6.
Appendix F 7-16	Indoor Transformer Vault Specification	Addition of a new standard for the Indoor Transformer Vault Specification.
Appendix F 8-4	Junction Box & 1-Phase UG Secondary Connectors	Updated note that Junction Box has Tier-15 loading.
Appendix F 10-2	4'X4' Vault, Covers, Extensions, & Driveover Modification	Changed pg. 2/2 Note 4 from AASHTO rating to incidental H20 rating and described where a heavy duty lid can be used. Removed Pedestrian lid H10 loading reference and added 300 lbs. per sq. ft. loading.
Appendix F 10-3	4'X7'-8" Vault, Covers, Extensions	Changed pg. 2/2 Note 4 from AASHTO rating to incidental H20 rating and described where a heavy duty lid can be used. Removed Pedestrian lid H10 loading reference and added 300 lbs. per sq. ft. loading.
Appendix F 10-4	6'X12' Vaults & Lids	Updated pg. 1/2 6x12 drawings to show #2 solid CU vault electrode on one side of the long wall on each half of the vault. Added 6x12 vault extension drawing and table to pg. 1/2.
Appendix F 10-6	15kV 200-Amp 1-Phase Vault 4X4 & Padmount	Changed pg. 1/2 Note 4 by removing reference to high volume traffic or speeds over 30 mph and added explanation of where a pedestrian or heavy duty lid can be used.
Appendix F 10-7	15kV 200-Amp 3-Phase Vault 4X7	Revised note 3. Changed Note 3 by removing reference to high volume traffic or speeds over 30 mph and added explanation of where a pedestrian or heavy duty lid can be used.
Appendix F 11-1	Trenching, Backfill/Compaction, Concrete Mixes, & Aggregate Base Course Materials	Pg. 5 – Updated T&D Mix #3 to reference the City Standards Specification Section 206 or CDOT Specifications for Road and Bridge Construction, Section 206.
Appendix F 14-6	Meter Types – Self Contained (Class200) & Transformer Rated (Class 20)	Changed voltage for item 102-301-065 from 120 to 240. Deleted item 102-301-019 Type 10C.
Appendix F 14-11	Meter Socket Wiring Schematics	Removed note "For overhead services, meter sockets are furnished with a hub sized as needed, available hub sizes are 1-1/4", 1-1/2", 2" and 2-1/2"" from pages 1, 3, 4, 5, 6, 7 & 8.
Appendix F 15-2	Bumper Post Installations	Pg. 1 – Concrete-Filled Pipe Bumper Post – Added "Reflective to note about three bands of 4" tape. On Note 2 – Added 6" GRC to note and added the color yellow for paint.
Appendix F 18-209	Clearance of Service Drops to Buildings, Signs, Etc. (Attached)	Changed vertical dimension clearance from Service Drop to Hot Tub to "See Note 5". Added Note 5 "NESC 234E2 Note 2 states: Spas (including whirlpools, hot-tubs, or other similar installations not suitable for swimming) are not considered as swimming pools covered by Rule 234E, Table 234-3. Please refer to Regional Building Department for the clearance over Spas since NEC does not have same exception as NESC and considers Spas as a swimming pool."

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Appendix F 18-304	Clearance of UG Electric Conduit/Cable from other Facilities	Moved Note 8 to top and changed text “All private telecommunication and fiber optic cables <u>when being installed in a separate trench and which is paralleling Colorado Springs Utilities infrastructure (Electric, Gas, Water and Wastewater)</u> must maintain a minimum radial distance of 5’ (feet) from any Colorado Springs Utilities infrastructure (Electric, Gas, Water and Wastewater).
Appendix F 20-2	Maximum Available Secondary Fault Current	Updated 10kA minimum length conductor per transformer size table with values for each transformer without accounting for an upgrade (previous table showed distance for next size transformer to account for an upgrade, 25kVA showed 50kVA distance).
Phone Numbers & Contact Information	Phone Numbers & Contact Information	Changed text from “Customer Contract Administration (Line Extensions) & Temporary Service Applications” to “Utilities Development Services”. Updated contact phone numbers and updated FE Service Area Map.



Colorado Springs Utilities
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REQUEST FOR ATTACHMENT TO UTILITY POLE

Company Name _____ Date _____
Phone Number _____

Responsible Party for Billing Purposes: _____

Email Address _____

Billing Address _____

Pole Location: _____
(Physical Street Address)

FIMS Pole Number OH _____ Elec. Grid Map Number _____

New Attachment _____ Vacate Attachment _____ (Remove from Billing)

Antenna Attachment YES NO

***Note: Map/Job Print, Revocable Permit and Pole Attachment Payment Must Accompany Each Request**

FOR COLORADO SPRINGS UTILITIES ELECTRIC DEPARTMENT'S USE ONLY
FOR ANTENNA ATTACHMENTS PLEASE REFER TO L:\Field Engineering\Pole Attachments\Antenna Pole Attachments

EXISTING ATTACHMENTS

Level One _____

Level Two _____

Level Three _____

Level Four _____

Level Five _____

OTHER _____

POLE OWNERSHIP

CSU Other _____

Field Check by : _____ Date : _____ FE Work Order #: _____

Attachment Fee: \$ _____

Remarks: _____

Approved by: _____
(Field Engineering Supervisor)

Southwest District Field Engineering 1521 Hancock Expwy
P.O. Box 1103 MC:1812, Colorado Springs, CO 80947-1812
Office (719)668-5564 Fax (719)668-5956



Colorado Springs Utilities
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REQUEST FOR ATTACHMENT TO STREETLIGHT POLE

Date _____

Company Name _____ Phone Number _____

Responsible Party for Billing Purposes: *Not Applicable*

Email Address: _____

Address: _____

Pole Location: _____
(Physical Street Address)

FIMS Pole Number: SL _____ Elect. Grid Map Number _____

New Attachment: _____ Attachment Type: _____

Antenna Attachment YES NO

***Note: Map/Job Print, Revocable Permit and Pole Attachment Payment Must Accompany Each Request**

FOR COLORADO SPRINGS UTILITIES USE ONLY
FOR ANTENNA ATTACHMENTS PLEASE REFER TO L:\Field Engineering\Pole Attachments\Antenna Pole Attachments

EXISTING ATTACHMENTS

OTHER _____

STREETLIGHT POLE OWNERSHIP

CSU Other

Field Check by: _____ Date : _____ FE Work Order #: _____

Attachment Fee: \$ _____

Remarks: _____

Approved by: _____
(Field Engineering Supervisor)

Southwest District Field Engineering 1521 Hancock Expressway
P.O. Box 1103 MC:1812, Colorado Springs, CO 80947-1812
Office (719)668-5564 Fax (719)668-5956



COLORADO SPRINGS UTILITIES
UTILITIES DEVELOPMENT SERVICES
 2880 International Cir, Suite 210 • Colorado Springs, CO 80910
 Phone (719) 668-8111 Fax (719) 668-8130

Date: _____

REQUEST FOR REMOVAL OF UTILITIES - DEMOLITION OR CONSTRUCTION

Property Address*: _____

**A single application may be submitted for bus shelters, traffic signals or multiple properties of one owner with a separate attachment of additional addresses*

Property Use: Residential Commercial

Property Owner: _____ Phone: _____

Contractor: _____ Phone: _____

Notify Upon Completion of Utilities Removal: Owner Contractor

Notes: _____

- Requested Services for Removal:
- Electric
 - Transformer
 - Gas
 - Water
 - Wastewater

The Owner/Agent understands and agrees as follows:

Owner/Agent requests that Colorado Springs Utilities' (Utilities) electric, natural gas, water and/or wastewater services servicing the property be disconnected prior to proposed demolition or construction.

_____ (the undersigned) hereby warrants that he/she is the Owner or Duly Authorized Agent of the Owner (either is referred to herein as "Owner/Agent") of the above described property and hereby authorizes Utilities to remove all requested electric, natural gas, water, and/or wastewater services to the above described property and to execute such work as may be necessary to insure the integrity of Utilities' systems and the safety of all concerned. Owner/Agent agrees at his/her expense to meet all Utilities' requirements, including but not limited to those standards and authorized procedures for removal of said utilities. Such standards may be obtained at www.csu.org/business/development_services/utility_specifications.

(The utility removals are typically completed in 5-10 business days, however, emergency service requirements may affect scheduling.)

ELECTRIC

Commercial Electric Service: After Utilities has disconnected service from Utilities' side of the transformer, the Owner/Agent will have a licensed Electrician remove the Commercial Electric service wires from the secondary bushings at the transformer. This must be performed before any construction or demolition activities to protect the secondary bushings from damage.

Residential Electric Service: Utilities will remove the Residential Electric service wires from the transformer.

NATURAL GAS

Utilities will disconnect and cap the Natural Gas service line at or as close as possible to the property line.

WATER (Please check one)

Inspections 719-668-3524

- Service line to be reused within two (2) years:** Any service disconnection and reconnection must be in compliance with Utilities' Line Extension and Service Standards.
- Service line not to be reused:** If the water service line is not to be reconnected or reused, then the water service line and tap shall be removed by Owner/Agent back to the water main in accordance with Utilities' Line Extension & Service Standards for Water. If Utilities is required to remove the service line and tap, Utilities will invoice the Owner for all removal costs and main line repairs on a time and materials basis; and Owner/Agent will pay any such invoice within thirty (30) days of receipt.

Inspection fees will be paid by the Owner/Agent to Utilities in accordance with Colorado Springs Utilities' Tariff

WASTEWATER (Please check one)

Inspections 719-668-3524

- Service line to be reused within (2) years:** If the wastewater service line will be reconnected, Owner/Agent will have a Licensed Excavator remove and cap (water tight) the wastewater service line in compliance with Utilities' Line Extension and Service Standards and may require CCTV inspection to confirm the integrity of the service line.
- Service line not to be reused:** If the wastewater service line is not reconnected or reused, then the wastewater service line and tap shall be removed by Owner/Agent back to the wastewater main. If Utilities is required to remove the service line and tap, Utilities will invoice the Owner/Agent for all removal costs and wastewater main line capping on a time and materials basis; and Owner/Agent will pay any such invoice within thirty (30) days of receipt.

Inspection fees will be paid by the Owner/Agent to Utilities in accordance with Colorado Springs Utilities' Tariff

GENERAL PROVISIONS

The term "reconnection" as used in this Request for Removal of Utilities applies only when no alterations to the existing service connection points are required either by Owner/Agent or by current Utilities' Line Extension and Service Standards. If for any reason it should become necessary to reinstall or reconnect any of the utility services that have been disconnected pursuant to this Request for Removal of Utilities or

transformers, wires, conduits, meters, poles, and other equipment of Colorado Springs Utilities necessary to render service to the customer. In order to comply with the requirements of the National Electric Safety Code the customer shall not make grade changes or build permanent or portable structures (buildings, sheds, decks, swimming pools, patios, patio covers, antennas, etc) under, over or within 5 feet measured horizontally on both sides of low voltage overhead or underground service drops (under 600 volts) without prior written approval of Colorado Springs Utilities except that in the case of a swimming pool, the horizontal clearance requirement may be larger (see Appendix F, 18-211). Any changes in the location of the facilities shall be at the sole expense of the customer.

4.02 General Restrictions of Easements/Rights-Of-Way:

- a) To comply with the requirements of the National Electrical Safety Code, it is necessary that easements and rights-of-way grades not be changed by excavation or filling by more than 6 inches without prior written approval from Colorado Springs Utilities for all utility lines involved. Changes in grades and elevations may not reduce safe ground clearances of overhead wires or reduce the depth of burial of underground cables as established by Codes and/or Colorado Springs Utilities. No grading is allowed within 15' of the centerline of an underground transmission line and excavations will not reduce support strength of overhead line structures. Full cost of any alteration or relocation of utility lines will be borne by the customer requesting the change.
- b) It is permissible to install fences and landscaping in easements, except where such fences will stop access to utility lines or conflict with utility equipment. Other permanent structures and buildings are not acceptable. This includes but is not limited to permanent structures such as water quality, water detention, swales or drop structures, and retaining walls. In the event a fence or landscaping must be removed, it is Colorado Springs Utilities policy to replace existing facilities to meet or exceed the original installation.
- c) Colorado Springs Utilities must have access at all times for operation, maintenance, construction, and inspection purposes. Landscaping of easements is permissible; however, it is necessary for utility crews to have adequate access to vaults and padmount equipment, and structures.
 - 1) For distribution systems, a minimum 36 inch wide path and clear opening is required in fence gates to replace equipment in residential rear-lot installations. Access clearances for Colorado Springs Utilities vaults and padmount equipment are shown in Appendix F, Construction Standard 18-302. No trees, shrubs, fences, large landscape rocks (Over 1.5 inches in size), or other obstruction will be permitted in the access area. Trees should be planted far enough away from padmounted equipment so that when they reach maturity, overhanging branches will not obstruct a crane setting or removing equipment. It is best to select trees with supple branches that can be tied back without danger of breaking their limbs. **Trees should be planted a minimum of 6 foot from electric lines to the base of the tree.** -Call Utility Notification Center of Colorado at least three business days prior to digging.

- 6) CT cabinets shall be installed immediately adjacent to the associated meter socket(s). A minimum clearance will be provided in front of the CT cabinet to fully open the door and have at least 3 feet of working space. The maximum height to the top of a CT cabinet will not exceed 7 feet above finished grade. Physical location of the CTs must be centered between 48 inches and 72 inches above finished grade. CTs must be installed with the white dot (H-1) facing the line side. The contractor will be required to label the line side and load side of the CT cabinet. The line and load sides shall be marked accordingly as "LINE" or "LOAD". The "VT Pack" is to be installed per Advanced Metering Technologies Group specifications (see 5.04a2), so that the connection point (plug) is accessible for installation of the wiring harness. No other meter devices or customer equipment will be allowed within the CT cabinet. Any variance requires written approval from the Colorado Springs Utilities Advanced Metering Technologies Group Supervisor (see Phone Section). See Appendix D, Drawing 14 and Photos ~~1~~, 2, 3 and 4 for a typical CT cabinet installation.

d) Instrument Transformers (CTs & VTs) In Customer Switchgear:

1) General:

Under unique circumstances, approval to install instrument transformers (CTs & VTs) in a customer's switchgear may be granted by the Colorado Springs Utilities Advanced Metering Technologies Group Supervisor. Such approval will be provided in writing for each individual installation in the comments area on the customer reply sheet of the load data form. Approval will depend on whether or not routine work, e.g. shunting and replacing of CTs, can be accomplished in a safe manner consistent with Colorado Springs Utilities safe work practices, as well as on accessibility for routine maintenance and inspection. Such instrument transformer (CT & VT) installations will be outdoors in a location considered readily accessible during normal working hours, e.g. in a public parking garage. If a "VT Pack" is needed, it is to be installed so that the connection point (plug) is accessible for installation of the wiring harness (see 5.04a2). On 277/480 volt services, when the CT cabinet is not large enough to accommodate the VT Pack, then an external VT Pack enclosure will be required. Rigid conduit will be run from the instrument transformer (CT & VT) compartment or section to the meter socket location as noted below. All raceways and compartments ahead of the metering will be sealable by Colorado Springs Utilities, including the CT section. See Appendix D, Drawings 12 & 13 for typical instrument transformer (CT & VT) metering installations.

2) Outdoor Commercial Switchgear (EUSERC) Metering Option:

Commercially available EUSERC multi-meter switchgear meeting Colorado Springs Utilities requirements in Appendix D, Drawing 19 is approved for optional use in the Colorado Springs Utilities Electric Distribution System for commercial services. Metering switchgear is an option to be provided, installed and maintained by the customer at an outdoor location that is readily accessible by Colorado Springs Utilities. The metering switchgear shall include mounting provisions for instrument transformers (CTs & VTs) and metering equipment with phase/neutral terminals for a #12 copper potential connection.

e) Instrument Transformer Conduit:

In all instrument transformer metering cases, the customer will furnish and install a minimum 1-1/24 inch conduit between the meter socket and the instrument transformer (CT & VT) location for use by Colorado Springs Utilities. All such conduit above ground and accessible

to pedestrians will be schedule 80 PVC or galvanized rigid steel conduit (SCH80 PVC or GRC). The maximum distance (total length of conduit run) will be 50 feet with no more than three 90-degree bends in a single pull section. Colorado Springs Utilities will install and terminate conductors from the instrument transformer (CT & VT) secondary to the meter socket using the customer-furnished conduit; the customer will not install any conductors or ground wires in this conduit. **This conduit must be contiguous from the meter socket to the switchgear CT cubicle (See Appendix-D, Drawing 19).** The customer shall install a pull line for pulling instrument transformer (CT & VT) wire.

5.05 Self-Contained Meter Sockets:

a) Codes and Standards:

- 1) All meter sockets, meter stacks, and modular metering systems will be manufactured in accordance with the latest revision of the following:
ANSI C.12.7, ANSI/UL 50, ANSI/UL 414, and NEMA 250, as well as all other applicable code and Standards, with revisions and modification as contained in this specification.
- 2) All meter sockets used on the Colorado Springs Utilities electric system shall conform to the following requirements. Colorado Springs Utilities personnel have been instructed not to install a meter at a location where the meter socket does not comply with ALL of the following criteria. See also Chapter 5, 5.15 “Meter Sets for Approved Meter Sockets”.
- 3) For questions regarding these requirements, contact the Advanced Metering Technologies Group Supervisor (see Phone Section).

b) Electrical Ratings:

- 1) All sockets/housings shall be rated 300V or 600V as detailed in ANSI C.12.7.
- 2) Minimum socket ampacity rating:

Continuous Socket Application	Continuous Ampacity Rating
Residential (single residence overhead service)	100
Residential (single residence underground service)***	200***
Residential/Commercial (Class 320 Self Contained)	320
Commercial – Single Phase*	100*
Commercial – Three Phase	200
Ganged meters/stacks (multi-unit dwelling):	
Main “house” socket - single phase**	100**
Socket feeding individual dwelling unit	100

*125 amp sockets with horn bypass are acceptable for maximum commercial single phase service ratings of 125 amps; examples of such would include telemetering installations, cablevision pedestals, sprinkler system pedestals, telephone pedestals, and site lighting at or under 125 amps. The disconnect/breaker size will be limited to 125 amps and rating based on NEC requirements.

**The main “house” socket for apartment or residential complexes shall have a minimum continuous rating of 100 amps. Loads metered off this socket are typically, but not limited to common areas, offices, recreational areas, and laundry rooms and billed to the owner under an appropriate commercial tariff. In ganged sockets, the disconnect/breaker size for the house socket shall not exceed manufacturer’s ampacity rating; for example, the disconnect/breaker shall be limited to 125 amps for a socket rated 125 amps continuous.

- a) The meter location must meet all requirements of the applicable City Code, National Electrical Safety Code, and the National Electrical Code.
- b) All doors leading to the meter locations will have all locking devices removed and will remain open at all times for access by Colorado Springs Utilities personnel.
- c) All conduit and cable work from the secondary terminals on the transformer or weatherhead will be done in accordance with Regional Building Department code requirements. The Regional Building Department will be responsible for inspection and acceptance.
- d) On padmount transformer installations, the customer will provide and install all secondary cable and cable connectors and make connections to the secondary terminals of the transformer as specified by Colorado Springs Utilities.
- e) On transformer vault installations, the customer will provide and install all secondary conduit and cable but Colorado Springs Utilities will make the connections to the transformers. The customer is to leave enough slack cable to make the connections.
- f) The customer may elect to use Colorado Springs Utilities approved, individual meter sockets or ganged meter panel. In some cases when electric load is of a certain magnitude, current transformer metering may be required.
- g) It will be the responsibility of the owner to correct any errors in tagging. Installations of this type will be subject to inspection by Colorado Springs Utilities service personnel to ensure proper tagging. See marking of multiple meter sockets for details (see paragraphs 5.13 and 5.14).
- h) The apartment owner and/or manager will notify each tenant that the metering is being changed to individual metering and that they, the tenants, must make arrangements with Colorado Springs Utilities Customer Service, either by telephone, or in person, to have a meter contract initiated in their name (see Phone Section). Until all contracts have been negotiated and meters set, the billing will continue on the master meter.
- i) During construction, flatted or jumpering of the meter sockets will not be allowed.

5.08 Self-Supporting Meter Mounting:

- a) Self-supporting meter sockets will only be allowed to be mounted on approved utility structures (see Appendix D, Drawings 5 & 10). Approved utility structures include:
 - 1) Utility grade pole
 - 2) 6"x 6" pressure-treated post
 - 3) 3"x 3"x 3/16" angle iron
 - 4) 2 " minimum diameter GRC post
- b) When post type mounting is necessary, the minimum requirements are as follows:
 - 1) Posts are to be 2 inch diameter GRC or 3"x 3"x 3/16" angle iron set in 18 inches of concrete. Wood is not to be used for permanent support posts but temporary installations may use 4"x 4" pressure treated wood posts without concrete.
 - 2) Cross bars are to be 2"x 3/16" strap iron or material of equal rigidity (2 inch wide unistrut type channels will be acceptable).
 - 3) When served from an overhead source, post type meter must be no closer than 15 feet from the pole.

5.16 Adding Surge Suppression to Meter Sockets:

- ~~a) Until 2006, Colorado Springs Utilities provided 3 point surge protection service to its customers for an additional fee. This protection was installed on the electric, telephone, and cable television service entrances to customer-owned residences. Existing HomeVantage@ Surge Protection customers were given the opportunity to sign a Transfer of Ownership document in order to maintain the surge equipment after the program was discontinued. Customers that did not sign the Transfer of Ownership will eventually have the surge device removed when Colorado Springs Utilities' work is scheduled on their residence.~~
- ab)** Colorado Springs Utilities does not allow home and business owners to install or contract the installation of surge suppression devices on self-contained electric meter sockets. ~~All such devices shall be UL listed for that purpose and the installation work shall be done only by licensed electricians or others qualified to safely perform the work. Colorado Springs Utilities in no way accepts responsibility for compensatory or consequential damages resulting from the installation of said devices by others.~~
- ~~1) Installation of a surge suppressor to a meter socket must be coordinated with Colorado Springs Utilities personnel, as meter removal, re-installation and re-sealing is required. There will be a time and material charge for this service. To schedule your installation, call the Colorado Springs Utilities Advanced Metering Technologies Group Supervisor (see Phone Section).~~
- ~~2) Plug-in devices designed to fit between the meter and socket are not allowed on sockets equipped with a lever bypass without customer approval. This type of surge protector will compromise the bypass safety features incorporated into all self-contained sockets used by Colorado Springs Utilities, which results in a future requirement to temporarily shut off service for periodic meter testing.~~
- ~~3) Surge protectors that are designed to be mounted to the exterior of a meter socket shall be weather resistant and shall not be installed inside the socket. Surge suppressors that fail when mounted inside a socket can damage the electric meter and/or internal wiring. The wiring connections of such arresters shall be made to the load side terminals of the socket.~~
- ~~e) The most effective way of protecting your home from lightning surges is to cascade protective devices. A heavy duty "lightning arrester" at your service panel will divert the bulk of an electrical surge. Any remaining surge, as well as those generated inside the building, can be diverted by lighter duty power strip or outlet surge protectors installed on appliances or sensitive electronics. All electric power and communications (cablevision and phone), grounded conductors, and metallic cable sheaths entering the same building should be connected to the same grounding electrode system in accordance with NEC requirements for proper surge protection.~~

5.17 Electric Meter Testing

a) Acceptance testing for new electric meters:

- 1) All new electric meters received by Colorado Springs Utilities are certified and tested by the manufacture for accuracy.

CHAPTER 6

Temporary Electrical Service

6.01 General:

- a) Temporary construction service may be provided prior to the installation of permanent service and meter (not to exceed 18 months). Non-construction temporary service may be provided when temporary service is required for a short period of time (4 to 45 days) or for “Special Events” (1 to 3 days).

City Ordinance prohibits Peddlers of Foodwares from connecting to any utility service. All religious, nonprofit, and charitable organizations are exempt from peddler licensing requirements. “Special Events” require a revocable permit (issued by the City of Colorado Springs) and do not fall under this City ordinance.

- b) All Colorado Springs Utilities installed temporary pedestals will be non-metered. The customer will be billed a flat monthly consumption until the temporary service is removed.
- c) All temporary service panels will be equipped with ground-fault circuit interrupters (GFCIs) in accordance with National Electrical Code (NEC) requirements and OSHA regulations. The standard temporary electric service voltage will be either 120/240 volt or 120/208 volt single-phase, three-wire service. Any other voltage, including three-phase, may be provided by special arrangement with Colorado Springs Utilities Field Engineering on a Time-and-Material basis (see paragraph 6.05). All customer installations will conform to the rules and regulations of OSHA, the current edition of the NEC and the National Electrical Safety Code in all aspects including ground-fault protection.
- d) Any temporary service request (except for “Special Events”) must be initiated by contacting Colorado Springs ~~Utilities Contract Administration Development Services~~ (see Phone Section). The requesting party must complete a temporary service application and inform Utilities of the intended use for the temporary power. Providing incorrect or inadequate information can result in immediate revocation of the temporary power contract. The application will remain on file with ~~Contract Administration Utilities Development Services~~. Prior to orders being issued to install temporary service, the requesting customer must pay an installation/removal charge for each request. See 6.05 for “Special Events” process.
- e) All commercial temporary services, overhead or underground, are to be metered.
- f) Grading, excavation, ground rod, stake or post installation work will not be started until an underground facilities location has been completed. Call 811 for utility locates. See 2.03b for Underground locate requirements.

6.02 Temporary Construction Service (Not to exceed 18 months):

a) Construction Needs:

Temporary service may be provided for construction needs, which include but are not limited to: Non-metered service for construction power for a residential development. Metered service for sales trailers and temporary construction offices (considered commercial). Please reference Appendix D, Drawings 6A & 6B for temporary overhead service installation and Drawings 7, 8, 9, 10A & 10B for temporary underground post type or pedestal service installation.

b) Overhead Electrical Service Loop and Meter Supports:

The customer must construct and supply service loop supports in accordance with Appendix D, Drawings 6A or 6B. These supports should be located not less than 15 feet and not more than 100 feet from the nearest overhead distribution pole. The attachment point height will be determined by Utilities after evaluation of field conditions and must meet NESC conductor clearance requirements. Temporary construction power for a residential development shall be non-metered.

c) Underground Temporary Non-Metered Construction Power Electrical Service:

When existing primary and secondary facilities are available, standard temporary service in an underground service area may be provided as follows:

- 1) For temporary service for construction power for a residential development, Colorado Springs Utilities will pre-install a non-metered temporary electric pedestal at each lot during the development phase.

All Utility provided temporary pedestals provide two 20 amp, 120-volt duplex outlets with ground fault protection and one 50 amp breaker with a 240-volt range outlet with GFCI. The care of Colorado Springs Utilities-owned pedestal is the responsibility of the party requesting the service. Colorado Springs Utilities will inspect the pedestal at the time of removal and will note the condition. If repairs are necessary, Colorado Springs Utilities will provide material and labor, which will be billed to the party requesting the service. Should the pedestal be damaged beyond repair, a time and material charge will be assessed for the full replacement of the pedestal.

- 2) The customer may elect to provide and install a metered temporary electric pedestal or post type meter, as long as Colorado Springs Utilities has not pre-installed a pedestal and the pedestal/post meter conforms to the requirements detailed in Appendix D, Drawings 7 or 8. Each transformer and/or secondary junction box will be limited to two temporary installations.

d) Oversized Temporary Electrical Service:

Any temporary service needs larger than 50 amps will be metered, installed by the customer, and coordinated in advance with the Field Engineering Section. Load data forms will be required on temporary services with mains greater than 200 amps. Regional Building Department inspections will be required on temporary services with mains larger than 50 amps.

6.03 Scheduling of Temporary Electrical Service:

Most normal temporary service requests are processed within 5 to 7-10 business days if a distribution transformer or secondary junction box is readily available. In areas where the pedestals are pre-installed with the distribution system in the development phase, temporary service requests will be processed in two business days or less. In the instance a distribution transformer or secondary junction box is not available, or a secondary voltage other than the standard voltages is needed, this policy will not apply (see Paragraph 6.06).

6.04 Short-Term Temporary Service (4 to 45 Days):

- a) The purpose of this policy is to provide prompt temporary electric service to meet short-term non-construction type energy needs for consumers such as circuses, fairs, fireworks stands, Christmas tree sales, seasonal business and other similar activities, which need

Code and all Regional Building Code requirements. Clearance of the drip loop wires will meet both NESC and NEC (see Appendix F, 18-208 and 18-209).

- 2) For a house with under eave service installation, the customer will not place the service knobs in the roof. A minimum of 2 inches of thread length into a solid framing member (stud) is required for use of a service knob. Service knobs with a 4 inch thread length are recommended. On buildings of a masonry or fireproof construction, dead-end devices are to be mounted by means of through-bolts set in the structure. (see Appendix D, Drawing 2)
- 3) For a house with less than 12 feet of ground clearance to the eaves, the customer will be required to install a mast-type riser through the roof. The conduit must be a minimum of 2 inch galvanized rigid steel and extend above the roof to obtain an 18 inch clearance between roof and the lowest point of the service drop. (see Appendix D, Drawing 1)
- 3)4) Service drop anchor or riser attachments shall not be located on chimneys, firewalls, or parapet walls.

d) Length of Service Drop:

Allowable length of service drops will be governed by clearances required by the National Electrical Safety Code. In general, service drops should not exceed 100 feet in length and large service drops should be proportionately shorter. If minimum attachment height of 12 feet at the service mast is provided, service drops over 60 feet in length may require Colorado Springs Utilities to install a service drop lift pole on the customer's property in order to meet NESC clearances. This may be avoided by the customer increasing the service attachment height. See Appendix C, Table 1 or Table 2 for typical conductor sizing and span length limits for various attachment heights. For complex clearance situations, one option offered by Colorado Springs Utilities is an underground service line (see Section 7.04).

e) Service Drop Lift Poles:

Where length of the service drop is excessive, or proper clearances cannot be maintained, or the size of the conductor would cause undue mechanical strain upon either the customer's structure or Colorado Springs Utilities pole line, Colorado Springs Utilities may be required to install a service drop lift pole on the customer's or adjacent property owner's premises. A suitable right-of-way must be obtained from the customer and/or property owner when a service supplies more than one customer.

f) Service Entrance Conductors:

- 1) The customer's service entrance conductors and conduit may be defined as the service conductors between the terminals of the service equipment and a point normally outside the building clear of building walls where joined by tap or splice to the service drop wires, at the point of common coupling. Service entrance conductors and conduit that are not outside the building must be approved by Colorado Springs Utilities QC Inspector or Advanced Metering Technologies Group Supervisor (see Phone Section).
- 2) Service entrance conductors will have a current-carrying capacity at least as great as that provided in Article 220 and meet requirements of Article 230 of the National Electrical Code.
- 3) At least 18 inches of conductor will extend from the service head for connection to Colorado Springs Utilities service drop wires. The neutral conductor will be marked distinctly so that it can be readily identified.
- 4) Only electric service line conductors will be installed in the service conduit.
- 5) Colorado Springs Utilities will require that the customer's service entrance conductors, meter loop, and service entrance switch be installed in accordance with the National

- 3) Make the inspection of the riser conduit to the service equipment. SCH80 PVC or GRC will be required for all risers; SCH40 PVC is not acceptable above grade because it becomes brittle at cold ambient temperatures and is subject to impact damage.
- 4) Connect overhead secondary within 7-10 business days after all required inspections are completed.

7.08 Residential Meter Installation:

- a) Upon completion of the required Colorado Springs Utilities inspections and installation, the meter will be set and the final service will be energized within 10 business days, after receipt of the following:
 - 1) Service Contract - Is initiated at ~~Customer Contract~~Utilities Development Services Administration when a customer signs a service contract.
 - 2) Development Fees – Paid at Utilities Development Services Customer Contract Administration when signing a service contract.
 - (a) Electric Extension Design Fee & Contract – For new underground residential developments (subdivisions).
 - (b) Residential Service Fees (Underground Only) - Inspection/Connection fees.
Overhead services do not have this fee.
 - (c) Electric Contribution-In-Aid-To-Construction Fees – When Utilities must extend primary electric to reach a lot or subdivision.
 - 3) RBD Inspection - An inspection approval from the Regional Building Department for the wiring (Code compliance clearance.)
 - 4) Easement Documents – Easement documents needed to bring service to the property, if required.
 - 5) Load Data Form – This form is required for services rated greater than 200 amps.

meter and electric service locations have been approved by Colorado Springs Utilities Field Engineering and that the customer is in agreement with the approved locations. This requirement places electric meters on the front or on the sides immediately adjacent to the front, of all residential structures. The service must be located so as to be free of surface covering by concrete, asphalt, etc., and have no obstructions between the meter and the street, otherwise conduit shall be installed from the meter socket to the junction box or transformer, according to 10.01 (d) and 7.02a2 (b). This requirement will be met prior to Colorado Springs Utilities Field Engineering approval of the preliminary platting process.

- 3) Water, wastewater, storm drain, gas plans, final grading plans, and street profile plans. These will be used to design the electric distribution system with minimum conflict with other utilities and structures.
- b) Plans may be submitted to Colorado Springs Utilities Field Engineering as AutoCad drawing files on a compact disk (CD). Please contact the appropriate district (see map) for criteria on submitting these plans.
- c) Please note that if a current recorded plat of subdivision and current approved addressing is not provided for the project, the customer will need to submit a Utilities Addressing Plan (UAP) to Colorado Springs Utilities. A Utilities Design CAD File will need to be submitted to Colorado Springs Utilities. Any questions regarding either the UAP or Utilities Design CAD File should be directed to Colorado Springs Utilities (see Appendix B).

8.04 Electric System Design and Payment:

- a) The developer submits an "Application for Gas & Electric Line Extension", which includes the developer's construction installation date (see form at the end of this chapter). The field engineer assigned to the project will provide an electrical facilities design and residential aid-to-construction contract to the developer then complete the construction drawing and specifications. When the developer accepts the contract and electrical facilities design, arrangements need to be made between the developer and Colorado Springs Utilities ~~Contract Administration Development Services~~ personnel for payment. Full payment is required prior to Colorado Springs Utilities establishing a firm construction schedule date for the installation of electric facilities.
- b) Padmounted transformers are normally utilized for underground electric service. Below grade, vault mounted transformers and fusing may be requested, with the difference in cost to be paid by the builder/developer. Field Engineering will determine the additional cost.
- c) Prior to the scheduled construction start date, the project will be inspected by Colorado Springs Utilities to verify that the conditions listed in paragraph 8.05 have been met. In the event the site requirements have NOT been satisfied, the project will be removed from the schedule and given the next available schedule opening.

8.05 Scheduling of Job:

The Scheduling Coordinator will provide construction scheduling time frames. Prior to the scheduling and installation of the electrical facilities, Colorado Springs Utilities must receive full payment and the customer must meet the following conditions:



Gas Work Order # _____

Electric Work Order# _____
(Internal Use)

APPLICATION FOR GAS AND ELECTRIC LINE EXTENSION

(Residential Electric - Residential and Commercial Gas)

To be submitted to:

North Work Center Field Engineering
7710 Durant Drive, P.O. Box 1103, Mail Code 2150
Colorado Springs, CO 80947-2150

or

South Work Center Field Engineering
1521 Hancock Expressway, P.O. Box 1103, Mail Code 1812
Colorado Springs, CO 80947-1812

Project: _____ **Date:** _____
(Subdivision, address, or description of project)

Applicant: _____
(Entity that will enter into contract) Individual () Partnership () Corporation () Limited Liability Company () Other ()

This application is intended for: ___ Gas ___ Electric ___ Both Avg. Building Sq. Footage? _____

Will communications facilities be installed joint trench with electric? ___ Yes ___ No
Will there be any "Parade / Model" homes built within this project? ___ Yes ___ No
Will the first lift of asphalt be installed prior to the construction of utilities? ___ Yes ___ No
Will this project use soil cementing in the roadways? ___ Yes ___ No

Projected date that site will be ready for gas and/or electric installation _____

If an applicant advances funds for construction of Gas Mainline Facilities, they may receive refunds for that facility. The Applicant must notify Colorado Springs Utilities prior to the start of construction if the Applicant desires to enter into a Refund Contract. Please check box to request applicable Gas Mainline Refund Facilities Contract []

Note: a meter will not be installed until the person financially responsible for the billing has set up an account with **Utilities Development Services (668-8111)**.

PLAN REQUIREMENTS (2 sets if submitting for both gas and electric)

- ___ Water System Plan ___ Wastewater System Plan & Profile ___ Utilities Addressing Plan (UAP)*
- ___ Street Plan & Profiles ___ Storm Drain Plan & Profile ___ Utilities Design CAD File (UDCF)*
- ___ Utility Service Plan ___ Recorded Plat or Utility Easement ___ Gas loads per building (if commercial)

* See requirements in Appendix B of the Colorado Springs Utilities Line Extension and Service Standards

Applicant agrees to provide Colorado Springs Utilities with a **recorded plat or acceptable easements** prior to construction. The Applicant agrees to notify Colorado Springs Utilities of any changes following submittal of application that may affect the design, scheduling, and construction of the gas and electric distribution system.

Applicant's Signature (Contract holder)

Agent's Name (Project Contact)

Applicant's Name (Please type or print)

Address

Address

City, State, and Zip Code

City, State, and Zip Code

Telephone and FAX Numbers

Telephone and FAX Numbers

Cellular/Field Numbers (If Applicable)

Email Address

Email Address

Please indicate who the Designs, and Contracts should be sent to: **Applicant** ___ **Agent** ___

Applicant's Signature Authorizing the **Agent** to sign contracts and bind Applicant to such contracts regarding gas and electric.

11/09/16

CHAPTER 10

Commercial/Industrial Development

10.01 Commercial Underground Systems:

a) General:

- 1) The following service and requirements will apply to development of commercial businesses, industrial businesses, schools, apartment complexes (five-family and up), townhouses, and condominiums (consisting of a cluster of buildings constructed on one common lot or prescribe plot of ground). This includes all other service requests not covered under Chapter 7 "Permanent Residential Services". Contact the South Area Field Engineering Section (see Phone Section) and see section 10.06 for requirements in the downtown network system. Commercial underground electric distribution is an electrical system complete with conduit, primary voltage conductor, vaults, and padmounted transformers to reduce the primary system voltage to a standard usable voltage (listed in paragraph 3.02) and/or secondary service conductor installed to a designated termination as outlined below. Refer to paragraph 5.02d, for Multiple Outdoor Meters. The type of service and voltage specified by Colorado Springs Utilities is dependent on the location and load requirement of the customer.
- 2) Regional Building Department permits are required for all installations whether metered or non-metered. See paragraph 10.01 e) 3) for details regarding non-metered services.
- 3) Grading, excavation, ground rod, stake or post installation work will not be started until an underground facilities location has been completed. Call 811 for utility locates. See 2.03b for Underground locate requirements.

b) Request for Service:

- 1) To initiate a request to serve a given development, complex, or building, the customer must submit the following to Colorado Springs Utilities Field Engineering:
 - (a) A completed Load Data Form (see form at the end of this chapter). Blank forms are also supplied by Colorado Springs Utilities Field Engineering. The design of the Colorado Springs Utilities' electrical service is based on information furnished by the Customer at the time of initial service design; therefore, no additions or changes shall be made to the Customer's installation without providing a new load data form and receiving subsequent approval from Colorado Springs Utilities.
 - (b) A complete set of plans consisting of a plot plan with vicinity map, street plans, electrical and mechanical plans, grading plans, and a plan showing the location of all other utilities.
- 2) Please note that if a current recorded plat of subdivision and current approved addressing is not provided for the project, the customer will need to submit a Utilities Addressing Plan (UAP) to Colorado Springs Utilities. A Utilities Design CAD File will need to be submitted to Colorado Springs Utilities. Any questions regarding the UAP or Utility Design CAD File should be directed to Colorado Springs Utilities (see Appendix B).

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system constraints, the Field Engineer will notify the customer and work out an agreeable alternative to meet the needs of the customer. A design, diversified demands, fault current figures and metering requirements will be provided to the customer by Colorado Springs Utilities.

- 2) It is the policy of Colorado Springs Utilities to accommodate the aesthetic needs of the customer as much as possible on placement of padmount equipment. However, these needs cannot always be satisfied because of system operational constraints and financial consideration. In the event Colorado Springs Utilities cannot meet the customer's needs, the Field Engineer will notify the customer and work out an agreeable solution.

- ~~2)~~
- 3) Padmounted transformers are normally utilized for underground electric service. Below grade, vault mounted transformers may be requested, with the difference in cost to be paid by the builder/developer. Field Engineering will determine the additional cost. Commercial three phase below grade vault mounted transformers may be considered as an option on properties previously developed and where there is no space for padmounted equipment to be installed or have been designated as "Historic Structures". These are non-preferred installations due to operational issues and will be evaluated on a case by case basis by CSU personnel.

d) Minimum Conduit Size:

All main disconnects in excess of 50 amp rating will have a minimum conduit size of 2 inch. Wire size must conform to Article 220 of the National Electrical Code.

e) Conduit and Wire Size for Minor Loads in an Underground Installation:

- 1) For the purpose of this Chapter, the term "minor load" will mean any metered or non-metered loop having a main disconnect of 50 amps or less. Multiple disconnects with a maximum 50 amp rating each and within compliance with Article 230-71 of the NEC (6-handle Rule) will be considered minor loads.
- 2) This policy will only apply to the installation between the meter or point of common coupling (PCC) connections and Colorado Springs Utilities secondary source.
 - (a) The minimum acceptable conduit size is to be one inch:
 - (1) SCH80 PVC or GRC must be used where entering or exiting the ground and at any point that constitutes a shear point. All meter socket (and PCC) risers will be SCH80 PVC or GRC. All GRC will be coated with an asphaltic coating or suitable corrosion protection material where installed underground.
 - (2) PVC or HDPE conduit may be used in underground applications when 30 inches of ground cover is present. See Appendix-C, Table 3 for Approved Electrical Materials, and Appendix-E for specification 194-2 regarding "Polyethylene Conduit for Underground Installation".
 - (b) The minimum acceptable wire size for minor load, metered or non-metered loops is:
 - (1) #6 copper or aluminum.

(b) The minimum acceptable wire size for minor load, metered or non-metered loops is:

(1) #6 copper or aluminum.

(2) This will apply to both neutral and phase conductors.

(3) Any insulation type approved for designated use by the National Electrical Code is acceptable.

(c) By-pass jaws are not required on meter sockets for minor loads.

3) Non-metered 120V Services:

(a) Non-metered applications are limited and available only after a customer has met and agreed to the requirements for a commercial non-metered electric load and has signed a Nominal Load Contract/Agreement with Colorado Springs Utilities. The rate is based on the amount of energy used, which may not exceed 66kWh per day.

(b) For unmetered 120V load tap services, the contractor is required to install either a 10A circuit breaker for 900 Watt services, or a streetlight fuse kit, sized for the load requirements. See Appendix F EDCS 8-7 for construction details, and Appendix C Table 3 for approved materials.

f) Customer Installation Requirements in an Underground Area:

1) Due to additional costs of undergrounding a distribution system, partial participation in the installation of the electrical distribution system will be required of the customer. All such work must be done by a licensed electrical contractor at the customer's expense. Appropriate mainline extension and aid-to-construction fees may apply. A design fee will be collected by ~~Contract Administration-Utilities Development Services~~ at time of building permit. The current Electric Tariffs, as adopted by City Council, should be consulted.

2) The customer will be responsible to install the electrical distribution facilities within the private property adhering to Colorado Springs Utilities design policies and all applicable codes. Installations by the customer creating noncompliance with Colorado Springs Utilities policies and/or applicable electrical codes will be relocated as necessary at the sole expense of the customer. Transformers and switches will be located to be accessible from the street, driveway, or parking area without obstruction. Primary distribution or secondary services will not pass under any form of structure. When a transformer is remote from the street, the customer will provide a driving surface no less than 10 feet wide to within 12 feet of a transformer location. Acceptable materials for a driving surface include concrete, asphalt, architectural pavers and aggregate base course. For aggregate base course, the top six (6) inches of topsoil shall be stripped with a width approximately 5' wider than driving surface road width. Fill 6" and taper approximately 2.5' on both sides. Aggregate base course material will conform to Colorado State Aggregate Base Course Class 5 or Class 6. See Appendix F, Construction Standard 11-1 for Class 5 or 6 aggregate base course material gradation specs and compaction requirements. All driving surfaces will be subject to approval by Colorado Springs Utilities. The customer will be responsible to identify any possible conflicts with the electrical distribution system within the private commercial projects.

- (c) Make inspections of all secondary conduits and wiring/equipment on the source side of the service point on all unmetered services.
- (d) Make the inspections of customer-installed equipment on the primary side of the transformer, including the preparation of the transformer site.
- (d) Equipment locations may not vary from the locations selected by Colorado Springs Utilities. Express written consent from Colorado Springs Utilities will be required before location changes will be accepted.
- (e) **Trenching and Boring of Conduit:**
 - (1) If required depth of trench or bored-in conduit cannot be met, new proposed depth must be approved in advance by CSU inspector.
 - (2) Potholing may be required, at the discretion of CSU inspector, to prove the need for any excessive depth proposed, prior to approval.
 - (3) Conduit will be required for any installation that exceeds CSU maximum depth as shown in Electric Distribution Construction Standard 11-1(see Appendix-F).

i) Scheduling:

- 1) Upon completion of the required inspections, Colorado Springs Utilities work will be scheduled. Transformers will generally be installed two (2) weeks after an approved pad compaction test is received.
 - (a) Call the Colorado Springs Utilities Scheduling Coordinator for scheduling time frames (see Phone Section).
- 2) Within ~~seventeen~~ **(710)** business days of the Q.C. inspector receiving an order and a Load Data Form from Electric Service and, upon receiving the design fee and other fees, easement documents, the service order from Colorado Springs Utilities Customer Service, the Regional Building Department inspection approval documentation, and completion of Colorado Springs Utilities installation, the meter will be set and the final service will be energized.

j) Access to Tie Into Colorado Springs Utilities Equipment:

- 1) Only licensed electricians working for a licensed contractor will be authorized to access and work in Colorado Springs Utilities padmount equipment when hired by customers for commercial/industrial installations (Customers/contractors are not allowed inside Colorado Springs Utilities vaults). Safe work practices shall be followed as required by applicable OSHA regulations. All such work shall meet the requirements of current editions of NEC and NESC, as well as Colorado Springs Utilities Standards. Electricians shall not move or operate any Springs Utilities primary cables, primary elbows or transformer accessories.
- 2) If a contractor is approved by Colorado Springs Utilities for unattended access, the contractor must receive a Work Permit for Unattended Access.
- 3) It will be the contractor's responsibility to provide appropriate lockout/tagout devices on the padmount cabinet as required by OSHA for worker safety and to also protect the public and the padmount while working on or around the padmount. Electricians shall not move or operate any Colorado Springs Utilities primary cables, primary elbows or transformer

(c) Access to Primary Metering Equipment: The contractor will contact Colorado Springs Utilities Inspections to requests access to the equipment. A Colorado Springs Utilities representative will be assigned the responsibility to coordinate with the electrician in a manner that will assure operating safety. The electrician and the Colorado Springs Utilities representative will make an appointment and meet at the job site. A Work Permit for Unattended Access will be signed and issued to the licensed electrician for such access, authorizing work in this equipment.

k) Painting of Colorado Springs Utilities Equipment:

Vault lids or padmount equipment may be painted by the customer to match the surrounding color scheme. All identification numbers and warning signs must remain intact and clearly visible. Once the customer paints the equipment he assumes permanent responsibility for the upkeep of the paint. For acceptable paint type see Appendix F, Construction Standard 19-10.

l) Overhead to Underground Primary Feed Source:

When the primary feed source is from an overhead line, the customer is to install conduit to the pole, 90 degree bend, and PVC stub up the pole as described in Appendix D, Drawing 4B.

10.02 Overhead Commercial Service:

a) General:

- 1) The standard method of connection between Colorado Springs Utilities overhead distribution system and the customer's service entrance location is by means of overhead wires, which are provided by Colorado Springs Utilities. The customer must install and maintain the overhead meter socket, entrance conduit, entrance wire, weatherhead, and point of attachment, and CT cabinets if applicable.
- 2) The maximum size single-phase transformer that will be installed by Colorado Springs Utilities on a pole is 75 kVA; similarly, the maximum three-phase bank will be 225 kVA. New services with an estimated diversified load greater than can be supplied by those transformer sizes will be served by a padmount transformer and underground systems (see paragraph 10.01).
- 3) Regional Building Department permits are required for all installations whether metered or non-metered. See paragraph 10.01 e) 3) for details regarding non-metered services.
- 4) Grading, excavation, ground rod, stake or post installation work will not be started until an underground facilities location has been completed. Call 811 for utility locates. See 2.03b for Underground locate requirements

b) Request for Service:

- 1) To initiate a request to serve a given development, complex, or building, the customer must submit the following to Colorado Springs Utilities Field Engineering.
 - (a) A completed load data form (blank forms supplied by the Colorado Springs Utilities Field Engineering). The design of the Colorado Springs Utilities' electrical service is based on information furnished by the Customer at the time of initial service design;

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therefore, no additions or changes shall be made to the Customer's installation without providing a new load data form and receiving subsequent approval from Colorado Springs Utilities.

- (b) A complete set of plans consisting of a plot plan with vicinity map, street profile plans, electrical and mechanical plans, grading plans, and a plan showing the location of all other utilities.
- 2) Please note that if a current recorded plat of subdivision and current approved addressing is not provided for the project, the customer will need to submit a Utilities Addressing Plan (UAP) to Colorado Springs Utilities. A Utility Design CAD File (UDCF) will need to be submitted to Colorado Springs Utilities. Any questions regarding either the UAP or Utility Design CAD File should be directed to Colorado Springs Utilities (see Appendix B).
- c) Electric System Design:**
- Colorado Springs Utilities Field Engineering will evaluate the load data form and design a system that will meet the needs of the customer and the requirements of Colorado Springs Utilities. In the event the requested services and voltage needs cannot be met by Colorado Springs Utilities due to system constraints, the Field Engineer will notify the customer and work out an agreeable alternative to meet the needs of the customer. A design, minimum service attachment height, diversified demands, fault current figures and metering requirements will be provided to the customer by Colorado Springs Utilities.
- d) Number of Services to Buildings:**
- Multiple services will be installed only with prior written approval by the Chief Electrical Inspector of the Regional Building Department. Colorado Springs Utilities may add an additional charge for providing multiple services.
- e) Point of Attachment:**
- 1) The service entrance wiring will be brought to a point outside the building which may be satisfactorily reached from the Colorado Springs Utilities poles and lines without service trespass on other property and must meet National Electrical Safety Code height clearances.
- 2) Information relative to existing poles and wires of the electrical distribution system will be obtained from and the details approved by Colorado Springs Utilities before locating the service entrance to a building.
- f) Method of Attachment:**
- 1) On all new or remodeled buildings, the customer will install a service bracket or other dead-end insulating device of adequate strength to support the Colorado Springs Utilities service drop on the building and withstand a minimum of 400 pounds horizontal tension per cable. On buildings of masonry or fireproof construction, dead-end devices are to be mounted by means of through-bolts set in the structure. A four-spool rack may be necessary in some instances. Refer to the load data reply letter for specific requirements in each installation.
- 2) The point of attachment of all service drops will meet the requirements of Article 230 of the National Electrical Code. Service knobs will not be placed in the roof. For a building with less than 12 feet of ground clearance to the eaves, a mast-type riser through the roof

with less than 12 feet of ground clearance to the eaves, a mast-type riser through the roof will be required. Conductor clearance will be as set forth in the National Electrical Safety Code or Section 230 of the National Electrical Code, whichever is greater.

- 3) The mast conduit must be a minimum of 2 inch rigid-GRC and extend above the roof to obtain an 18 inch clearance between the roof and the lowest point of the service drop. Also, see Article 230 of the National Electrical Code and the Regional Building Department code requirements (see Appendix D, Drawing 1).

g) Length of Service Drop:

Allowable length of service drops will be governed by Article 230 of the National Electrical Code. In general, service drops should not exceed 100 feet in length and large conductor size service drops should be proportionately shorter. The service mast or service pole will withstand a minimum of 400 pounds tension per cable attachment. Multiplex cable requires one such attachment; open wire services require three or four such attachments, each to hold 400 pounds tension. Guys or braces may be needed for this strength depending on the height of unsupported mast.

h) Service Drop Poles:

Where length of the service drop is excessive, or proper clearances cannot be maintained, or the size of the conductor would cause undue mechanical strain upon either the customer's structure or the Colorado Springs Utilities pole line, a service pole may be required on the customer's property or adjacent property-owner's premises. A suitable right-of-way must be obtained from the customer and/or property owner when a service supplies more than one customer.

i) Service Entrance Conductors:

- 1) The service entrance conductors and conduit may be defined as the service conductors between the terminals of the service equipment and a point usually outside the building, clear of building walls, where joined by tap or splice to the service drop.
- 2) Service entrance conductors will have a current-carrying capacity at least as great as that provided in Article 220 and meet requirements of Article 230 of the National Electrical Code.

j) Scheduling:

- 1) Upon completion of the inspection process and receipt of the required design fee, Colorado Springs Utilities work will be scheduled and installed. Call the Colorado Springs Utilities Scheduling Coordinator for a scheduling time frame (see Phone Section).
- 2) Upon receiving all other fees, if any, easement documents as required, the service order from Colorado Springs Utilities Customer Service, the Regional Building Department inspection approval documentation, and completion of Colorado Springs Utilities installation, the final service will be energized within 10 business days.

10.03 Commercial Overhead To Underground Secondary:

a) General:

In some instances it may be to the customer's advantage to install the secondary service line underground, even if they are located in an overhead distribution area. All such work must be done by a licensed electrical contractor at the customer's expense. See 10.01 for Commercial Underground System requirements. The customer is required to (see Appendix D, Drawings 3A & B and Drawing 4A):

- 1) Provide trenching, backfilling, compaction of secondary trenches and restoration of all concrete or asphalt surfaces and landscaping, if any, from pole riser to meter socket. See paragraphs 10.01f and 7.07 for required inspections.
- 2) Install secondary conduit from the base of pole riser to meter socket as shown in Appendix D, Drawings 3A and 4A, sized in accordance with Colorado Springs Utilities and National Electrical Code standards (refer to paragraph 10.01d and 10.01e). See Appendix-C, Table 3 for Approved Electrical Materials, and Appendix-E for specification 194-2 regarding "Polyethylene Conduit for Underground Installation".
- 3) Install secondary conductor, from the meter socket to the base of the riser pole, sized in accordance with the National Electrical Code Standards. Adequate additional length must be left on conductors at the base of the riser pole for the Utility to install up the pole and connect to Colorado Springs Utilities secondary lines with a 12 inch drip loop. The Colorado Springs Utilities Field Engineer will specify on the load data form the additional length of cables needed to make connections up the pole. As noted in paragraph 2.03a, only utility workers qualified to safely work near high voltage overhead lines are authorized to approach such lines closer than 10 feet.
- 4) Clearly mark phasing on three-phase services. Distinctly mark the neutral wire so it can be readily identified.
- 5) Point of Common Coupling is at the point where Colorado Springs Utilities wire connects to the Customers' wires at the top of the pole. This is also referred to as the "Service Point" by the NEC. The maintenance and repair from this point into the customers electrical equipment is the sole responsibility of the customer. This includes but not limited to all secondary conduits, junction boxes, conductors, connectors, current transformer cabinets, and meter sockets.

5)6) When served from an overhead source, meter pedestal or post type meter installation must be no closer than 15 feet from the pole

b) Scheduling:

- 1) Upon completion of the inspection process, Colorado Springs Utilities work will be scheduled and installed. Call the Colorado Springs Utilities Scheduling Coordinator for scheduling time frame (see Phone Section).
- 2) Upon receiving all fees, if any, easement documents, the service order from Colorado Springs Utilities Customer Service, the Regional Building Department's inspection approval documentation, and completion of Colorado Springs Utilities installation, the final service will be energized within 10 business days.

c) Conduit and Wire Size for Various Loads in an Overhead to Underground Installation:

Refer to paragraphs 10.01d and 10.01e.

Voltage Busway for 277/480V Spot Networks). Maintenance of the secondary network bus shall be the responsibility of the Property Owner and/or Customer. The Property Owner and/or Customer [shall be qualified to work around energized, electrical equipment](#), will perform maintenance as specified by the manufacturer of the Customer's bus and Colorado Springs Utility material specification 194-8 (Low Voltage Busway for 277/480V Spot Networks) and will document the maintenance for Colorado Springs Utilities' review.

- (g) The Property Owner and/or Customer is responsible for the maintenance of the vault including, but not limited to, structural integrity, exterior condition and unobstructed entry to the vault, including doors and ventilation ducts. The Property Owner and/or Customer are also responsible for sealing the vault against water or debris from entering the vault.
- (h) Service equipment shall be capable of interrupting the available fault current as listed in Colorado Springs Utilities' material specification 194-8 (Low Voltage Busway for 277/480V Spot Networks).
- (i) The Spot Network Vault shall be built in accordance with Article 450-41 through 450-48 (2011 ed.) and Article 230-1 (2011 ed.) of the most current edition of the National Electric Code (NEC). This shall be construed as being the minimum requirements. Where conflicts occur between this document and the NEC the more stringent requirement shall apply.
- (j) The design of the Colorado Springs Utilities' electrical service is based on information furnished by the Customer at the time of initial service design; therefore, no significant additions or changes shall be made to the Customer's installation without providing a new load data form and receiving subsequent approval from Colorado Springs Utilities' Electric Planning. Additions or changes to the Customer's installation may require facilities to be redesigned by both Colorado Springs Utilities and the Customer, which may include the construction of an additional Spot Network Vault. No relocation or replacement will be made unless access, suitable easements and/or property rights are provided without cost to Colorado Springs Utilities.

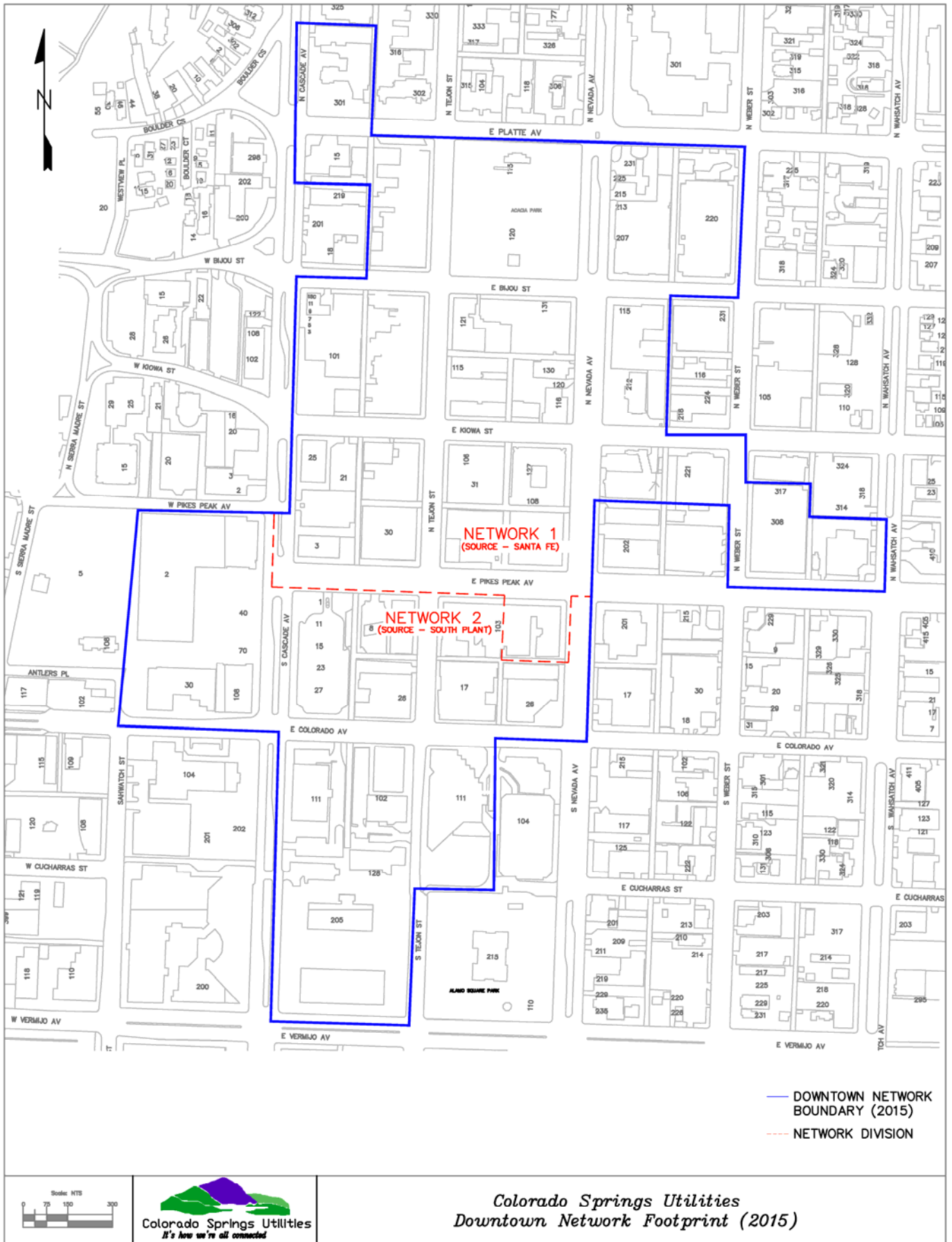
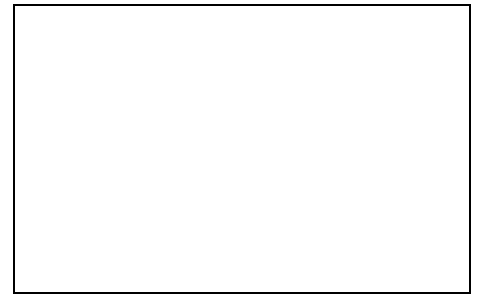


Figure 1



Colorado Springs Utilities

It's how we're all connected



For office use only

Field Engineering

ELECTRIC LOAD DATA FORM

FORM FE-40 REVISED 12/9/2015

FOR OFFICE USE ONLY

INPUT BY: _____ F.E. W.O. NUMBER: _____ FIELD ENG.: _____

PROJECT (ELECTRICAL WORK SITE)

ADDRESS: _____ ZIP: _____

***If multiple addresses--attach list to this form

BUSINESS NAME: _____

BUSINESS TYPE: _____

BUILDING SQ. FOOTAGE: _____ NUMBER OF UNITS: _____

ELECTRICIAN (PERSON OR COMPANY SUBMITTING LOAD DATA FORM)

COMPANY: _____ CONTACT PERSON: _____

ADDRESS: _____ ZIP: _____

TELEPHONE: _____ CELLULAR: _____ EMAIL: _____

SERVICE REQUESTED Load information relating to this request is for typical load items associated with this class/size of metered main breaker panel. This request can include/involve multiple addresses. Typical load item combinations that are different will require a separate Load Data Form for each metered combination.

NEW GUTTER/BUSS SIZE: _____ NEW METERED MAIN SIZE: _____ STATUS: NEW TYPE: PERMANENT
 EXISTING TEMPORARY

EX. GUTTER/BUSS SIZE: _____ EX. METERED MAIN SIZE: _____ INFO. ONLY

METER LOCATION: _____

SERVICE DESIRED:	# OF METERS:	# OF MTR SOCKETS BY CUSTOMER:
<input type="radio"/> OH	1PH _____	1PH _____
<input type="radio"/> UG	3PH _____	3PH _____
<input type="radio"/> OH to UG		

VOLTAGE: (please circle)
1PH 120V 2W 1PH 120/240V 3W 1PH 120/208V 3W WYE 3PH 120/208V 4W WYE 3PH 277/480V 4W WYE

INSTALLING SWITCHGEAR: (please circle)
YES OR **NO** IF YES, WILL METERING BE INTEGRAL OR REMOTE TO SWITCHGEAR _____

ENTRANCE CONDUCTORS: (SIZE & TYPE) _____ # PER PHASE: _____ CONDUIT: (SIZE & #) _____

CUSTOMER COMMENTS: _____

CHAPTER 11

SYSTEM ALTERATION AND CONVERSION

11.01 Conversion of Existing System:

All relocations and/or alterations of existing overhead and underground lines and equipment will be accomplished at the expense of the customer initiating the request on a Time-and-Material billing basis. The customer will be required to provide all necessary easements and right-of-way without cost to Colorado Springs Utilities (CSU). The request must be submitted allowing ample time for Colorado Springs Utilities Field Engineering to investigate, engineer, schedule, and construct the relocations.

11.02 Requirements for Work Performed on Time-and-Material Basis:

All work performed on a Time-and-Material contract will have the full amount of the estimate deposited with ~~Colorado Springs Utilities~~CSU, prior to scheduling the work to be performed. The customer requesting the conversion will be responsible for the actual cost of the work and will be either billed for any additional costs incurred over and above the estimate, or will be reimbursed the difference between the estimate and the actual cost, whichever may be applicable.

11.03 Conversion of Single Residential Overhead Service to Underground:

- a) In the event the property owner requests conversion of the service conductor from overhead to underground, the customer must convert his meter loop from overhead to underground.
- a)b) The property owner must provide the 2 inch SCH80 PVC or GRC riser at the meter location as well as supply the necessary conduit to pass under patios, driveways and sidewalks, and trenching and backfilling between the meter and pole riser (see 7.04). All installations must conform to ~~Colorado Springs Utilities~~CSU specifications and must be inspected and approved by ~~Colorado Springs Utilities~~CSU personnel. ~~Colorado Springs Utilities~~CSU will install the pole riser and connect the new underground service wire and will remove the overhead service wire at no expense to the property owner. The property owner will be responsible for the removal of the overhead mast. The property owner will assume all costs incurred in replacing fences, sod, trees, shrubs, and other landscaping items, and the repair of damages to, or the remodeling of building structures.

11.04 System Improvement Program (SIP):

- a) a) The System Improvement Program (SIP) provides an avenue for CSU and its customers to share the cost of burying primary voltage power lines (7kV to 115kV only). Costs are not shared for converting secondary service to a building or converting individual services from overhead to underground. Distribution burial requirements as outlined in Appendix F, Construction Standard 11-1 will apply. The *Application to Request System Improvement Funds (SIP Request)* form must be submitted by the customer to CSU. The customer will be required to provide all necessary easements and right-of-way without cost to CSU. The SIP Request must be submitted allowing ample time for the following:

- 1) CSU Field Engineering investigation and estimate, which is used to determine deposit percentage, see Table 1 Summary in Section 11.04
- ~~a)2) Contract and deposit submittal deadlines, see Table 1 Summary in Section 11.04~~ The System Improvement Program (SIP) provides funds for applicants submitting a proposal to match funds to bury a primary voltage power line (7kV to 115kV only). The matching funds do not apply to the cost of converting the secondary service to the building or converting individual services from overhead to underground. Distribution burial requirements as outlined in Appendix F, Construction Standard 11-1 will apply.
- b) Once CSU confirms that the proposed project is a viable candidate, a SIP contract will be developed. In order to be included in CSU SIP budgeting process for the following calendar year and to have funds matched on a 50/50 basis, applicants for distribution and/or transmission conversion projects must submit the signed SIP contract before any deadline summarized in Table 1 ~~Table 4~~. The SIP Contract will be required with a deposit of five percent (5%) of the total estimated cost of conversion on or before March 1st. If the SIP Contract is approved and budgeted by CSU, and funds are available, CSU will cover fifty percent (50%) of the total cost of conversion and the applicant will be responsible for fifty percent (50%).
- ~~b) b) The SIP process is conducted on a calendar year basis. In order to be included in Colorado Springs Utilities CSU SIP budgeting process for the following calendar year and to have funds matched on a 50/50 basis, applicants for distribution and/or transmission conversion projects must submit an request SIP Request form for SIP fund. Upon submission of the SIP Request, a SIP Contract with CSU must be signed before any deadline summarized in Table 1. The SIP Contract will be requireds along with a deposit of five percent (5%) of the total estimated cost of conversion on or before March 1st. If the request SIP Contract is approved and budgeted by Colorado Springs Utilities CSU, and funds are available, Colorado Springs Utilities CSU will cover fifty percent (50%) of the total cost of conversion and the applicant will be responsible for fifty percent (50%) of the total cost of conversion.~~
- b)c) For distribution conversion project requests approved contracted with CSU and budgeted by Colorado Springs Utilities CSU, the remaining forty five percent (45%) of the total estimated cost of conversion must be deposited by Jan 31 of the year following Utility Board City Council approval of the budget and as per paragraph 11.02. If the Colorado Springs Utilities CSU² budget is not approved, funds are not available, and/or the project is removed from the budget prior to final budget approval, the five percent (5%) deposit will be refunded. If the applicant does not deposit the remaining forty-five percent (45%) as per paragraph 11.02, the project will be cancelled and the five percent (5%) deposit will not be refunded.
- e)d) Underground transmission projects require unique materials that must be ordered 18 to 24 months in advance of construction. For this reason, the design, material ordering, and construction phases of the project may span two years. The signed contract and 5% deposit as described in paragraph 11.04 b) are due on March 1st of the year before the design and material ordering are expected to happen. The remaining 45% developer requester contribution will be paid to Colorado Springs Utilities CSU after the Utility Board City Council approves the budget and prior to any materials being ordered for the project. Due to material lead times, projects submitted on March 1st for construction in the following year will be scheduled for the third quarter or later in the construction year if funding allows. ~~transmission conversion project requests approved and budgeted by Colorado Springs~~

~~Utilities will require a deposit at the time of material purchase. The amount of this deposit will be specified in the SIP contract. The applicant's remaining portion of the total estimated cost of conversion must be deposited as per paragraph 11.02. If the Colorado Springs UtilitiesCSU budget is not approved, funds are not available, and/or the project is removed from the budget prior to final budget approval, the five percent (5%) deposit will be refunded. If the applicant does not provide the material remaining (45%) contribution upon request, deposit, the project will be cancelled and the five percent (5%) deposit will not be refunded. If the applicant does not deposit their remaining portion of the total estimated cost of conversion as per paragraph 11.02, the deposits made to date will not be refunded.~~

~~d)e) _____~~ In the event that a SIP ~~request~~ Contract is submitted between March 2nd and May 1st, ~~Colorado Springs UtilitiesCSU~~ will consider the request to match funds on a 60/40 basis if SIP funds are available. If ~~the a~~ late ~~request~~ SIP Contract is approved and funds are available, ~~Colorado Springs UtilitiesCSU~~ will cover forty percent (40%) of the total conversion cost and the applicant will be responsible for sixty (60%) of the total conversion cost in accordance with paragraph 11.02. Refund policies remain as indicated in preceding paragraphs.

For distribution conversion project ~~requests~~ SIP Contracts, the remaining fifty-five percent (55%) of the total estimated cost of conversion will need to be deposited by Jan 31st of the year following City Council approval of the budget and as per paragraph 11.02. If, upon evaluation, it is determined that funds are not available, the five percent (5%) deposit will be refunded. If the applicant does not deposit the remaining fifty-five percent (55%) of the total estimated cost of conversion as per paragraph 11.02, the project will be cancelled and the five percent (5%) deposit will not be refunded.

~~f) _____~~ In the event that a SIP Contract is submitted after May 1st, CSU will consider the request to match funds on a 70/30 basis if SIP funds are available. If a late SIP Contract is approved and funds are available, CSU will cover thirty percent (30%) of the total conversion cost and the applicant will be responsible for seventy percent (70%) of the total conversion cost in accordance with paragraph 11.02. Refund policies remain as indicated in preceding paragraphs.

For distribution conversion project SIP Contracts, the remaining sixty-five percent (65%) of the total estimated cost of conversion will need to be deposited by Jan 31st of the year following City Council approval of the budget and as per paragraph 11.02. If, upon evaluation, it is determined that funds are not available, the five percent (5%) deposit will be refunded. If the applicant does not deposit the remaining sixty-five percent (65%) of the total estimated cost of conversion as per paragraph 11.02, the project will be cancelled and the five percent (5%) deposit will not be refunded.

~~In the event that the request SIP Contract is submitted for SIP funds after May 1st, the request will not qualify for funding for the following year a customer would like to have 50/50 matching funds, the customer could submit a SIP Request Form for the . However, the request will be carried over to the next following year to request funds for the following subsequent year on a 50/50 basis.~~

~~f) _____~~ During the annual Colorado Springs UtilitiesCSU SIP budgeting process, funds will be allocated to cover smaller scale distribution conversion projects. Large distribution conversion projects and all transmission conversion projects will be prioritized as follows:

~~1) First priority will be given to project proposals to match funds on a 50/50 basis to bury power lines in residential areas.~~

~~— Second priority will be given to project proposals to match funds on a 50/50 basis to bury power lines in non-residential areas.~~

~~— 3) Third priority will be given to any public or governmental agency submitting a proposal to match funds on a 50/50 basis to bury a power line.~~

~~— 4) Fourth priority will be given to any entity submitting a late proposal to match funds on a 60/40 basis.~~

~~— 5) Finally, if the available monies are not fully committed on the above matching funds options, the monies will be made available for the remaining portion of that budget year on a first-come, first-serve 60/40 matching funds basis.~~

Summary of SIP program dates and requirements:

Table 111 Summary of SIP program Dates and Requirements

<u>Submit Signed Contract plus 5% Deposit by:</u>	<u>Developer / Utilities Contribution</u>	<u>Remaining 45% Deposit Due:</u>	<u>Comments</u>
<u>On or before March 1st of year prior to execution</u>	<u>50/50</u>	<u>After Utility Board City Council Approval and...</u> <u>- Distribution: by Jan 31 of execution year</u> <u>- Transmission: prior to material ordering</u>	<u>For transmission projects, expect a two year cycle: Design and material ordering in first year; construction in second. Contract and 5% deposit must be received March 1st of the year before the design year. Transmission projects submitted for construction in the following year will be scheduled for construction in the third quarter or later of that following year as funding allows.</u>
<u>March 1 to May 1</u>	<u>60/40</u>		
<u>After May 1</u>	<u>70/30</u>		<u>Projects submitted after June 1 are not likely to make the budget for the following year.</u>

11.05 Conversion of Residential and/or Commercial Overhead to Underground (SIP):

[Colorado Springs Utilities CSU](#) will consider requests from property owners in residential and commercial areas to place existing distribution and transmission facilities underground. The following conditions will apply:

- a) The area to be converted must be deemed by [Colorado Springs Utilities CSU](#) to meet size, operational, and reliability requirements. Distribution conversion projects will be considered to qualify for the SIP if they are a full block in length or longer. Transmission conversion projects considered to qualify for the SIP must meet minimum lengths as specified in [Colorado Springs Utilities CSU](#)'s standards. Distribution conversion projects for areas smaller than one city block will be converted on a Time-and-Material contract and do not qualify for SIP funds. For information on Time-and-Material process, see section 11.02. Transmission projects that do not meet minimum lengths required per [Colorado Springs Utilities' CSU](#) standards will not be considered for conversion and do not qualify for SIP funds.
- b) Property owners in the area of consideration should choose one individual with the power of attorney to act as spokesperson and should submit a written request to [Colorado Springs Utilities CSU](#). This request should contain a list of addresses with signatures of property owners in the area considered for conversion. Every property owner must agree to the conversion; otherwise, the project will not be considered by [Colorado Springs Utilities CSU](#). If the applicant is seeking SIP funding for conversion, see section 11.04 for additional requirements.
- c) [Colorado Springs Utilities CSU](#) Field Engineering and/or Substation and Transmission Engineering will prepare the necessary plans, easement requests if required, Time-and-Material cost estimate, and a SIP contract. This will be presented to the spokesperson for the property owners. The property owners will have 90 days to either accept or reject the conversion proposal. Once [Colorado Springs Utilities CSU](#) receives the accepted, executed SIP contract, the deposits, and the easements, construction coordination will be handled through the group spokesperson.
- d) Each property owner will be responsible for converting their meter loop from overhead to underground and obtaining an inspection from Regional Building Department.
 - 1) In residential areas the property owner must supply and install the necessary conduit to pass under patios, driveways and sidewalks, and trenching and backfilling between the meter and the property line. [Colorado Springs Utilities CSU](#) will install new underground service wire from the transformer to the new meter socket locations. Requirements as outlined in paragraph 11.03 will apply, excluding all pole riser requirements.
 - 2) In commercial areas, the property owner must supply and install all secondary conduit and conductor as outlined in Chapter 10. The property owner will then be responsible for removing the overhead service mast.
- e) The poles and overhead primary distribution and/or transmission will be removed by [Colorado Springs Utilities CSU](#) when all property owners are converted to the underground system.
- f) The cost estimate and actual cost will be in compliance with paragraph 11.02, Requirements for Work Performed on Time-and-Material basis.

Note: [Colorado Springs Utilities CSU](#) does not guarantee that other utility facilities, such as telephone equipment or CATV lines, which might be attached to [Colorado Springs Utilities CSU](#) poles, will be placed underground. For further information, these utilities should be contacted individually.

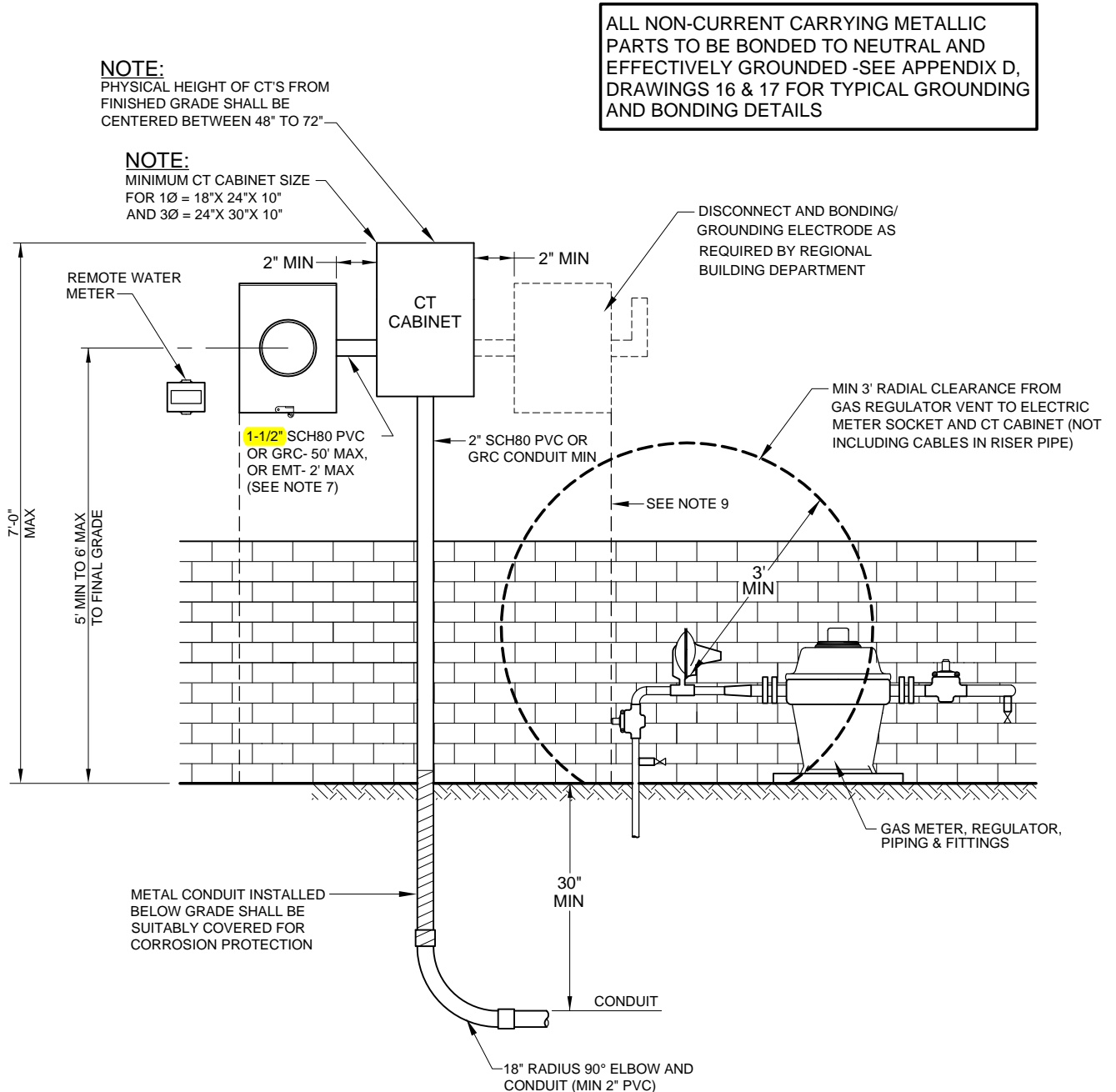
11.06 Improvement Districts:

- a) Relocation of existing electrical lines and equipment in areas declared by City Council to be in an Improvement District will be accomplished according to the most recent Utility Relocation Agreement in effect with the City of Colorado Springs at the time of request. [Colorado Springs UtilitiesCSU](#) will be notified in advance of the projects by those city departments scheduling and undertaking such projects. This notice will be such as to allow the proper scheduling, engineering, and budgeting of the relocations. Projects not budgeted by [Colorado Springs UtilitiesCSU](#) due to improper notification will not be completed or undertaken unless approved by City Council.
- b) Please note that if a current recorded plat of subdivision and current approved addressing is not provided for the project, the customer will need to submit a Utilities Addressing Plan (UAP) to [Colorado Springs UtilitiesCSU](#). A Utilities Design CAD File will need to be submitted to [Colorado Springs UtilitiesCSU](#). Any questions regarding either the UAP or Design CAD File should be directed to [Colorado Springs UtilitiesCSU](#) (see Appendix B).

<p>Meter Socket, 7 Terminal, 200A, Lever Bypass (Commercial, 3-Phase, only for self-contained meters)</p>	<ul style="list-style-type: none"> • Three Phase, 4 Wire-Wye, 120/208V • Three Phase, 4 Wire-Wye, 277/480V • Three Phase, 4 Wire-Delta, 120/240V 	<p>Milbank Manufacturing Co: U4701-RRL</p> <p>Cutler Hammer: UTE7213BCH</p> <p>Siemens/Landis & Gyr: 40407-025</p> <p>Suggested manufacturers listed above or other equivalent. See Chapter 5, “5.05 Self-Contained Meter Sockets”, Appendix E – Specification 102-600-130, and Appendix F – Standard 14-11 “Meter Socket Wiring Schematics” for meter socket requirements.</p>
<p>Meter Socket, 13 Terminal, 20A, Pre-wired Test Switches, Instrument Transformer Rated (Commercial, 3-Phase, for CT meter)</p>	<ul style="list-style-type: none"> • Three Phase, 4 Wire-Wye, 120/208V • Three Phase, 4 Wire-Wye, 277/480V • Three Phase, 4 Wire-Delta, 120/240V 	<p>Milbank Manufacturing Co:*</p> <p>UC3913-RL-WC-11</p> <p>Siemens 9837-0701*</p> <p>See Appendix E for Material Specification 102-600-077.</p>
<p>Meter Socket, 8 Terminal, 20A, Pre-wired Test Switches, Instrument Transformer Rated (Commercial, 3-Phase & 1-Phase, for CT meter)</p>	<ul style="list-style-type: none"> • Single Phase, 3 Wire-Wye, 120/208V • Single Phase, 3 Wire-Wye, 120/240V • Three Phase, 3 Wire-Delta, 120/240V • Single Phase, 4 Wire-Delta, 120/240V 	<p>Milbank Manufacturing Co:*</p> <p>UC4415-RL-WC-21</p> <p>See Appendix E for Material Specification 102-600-070.</p>

* Approved manufacturer as listed or approved equal. Approval must be in writing by Colorado Springs Utilities Engineering Standards.

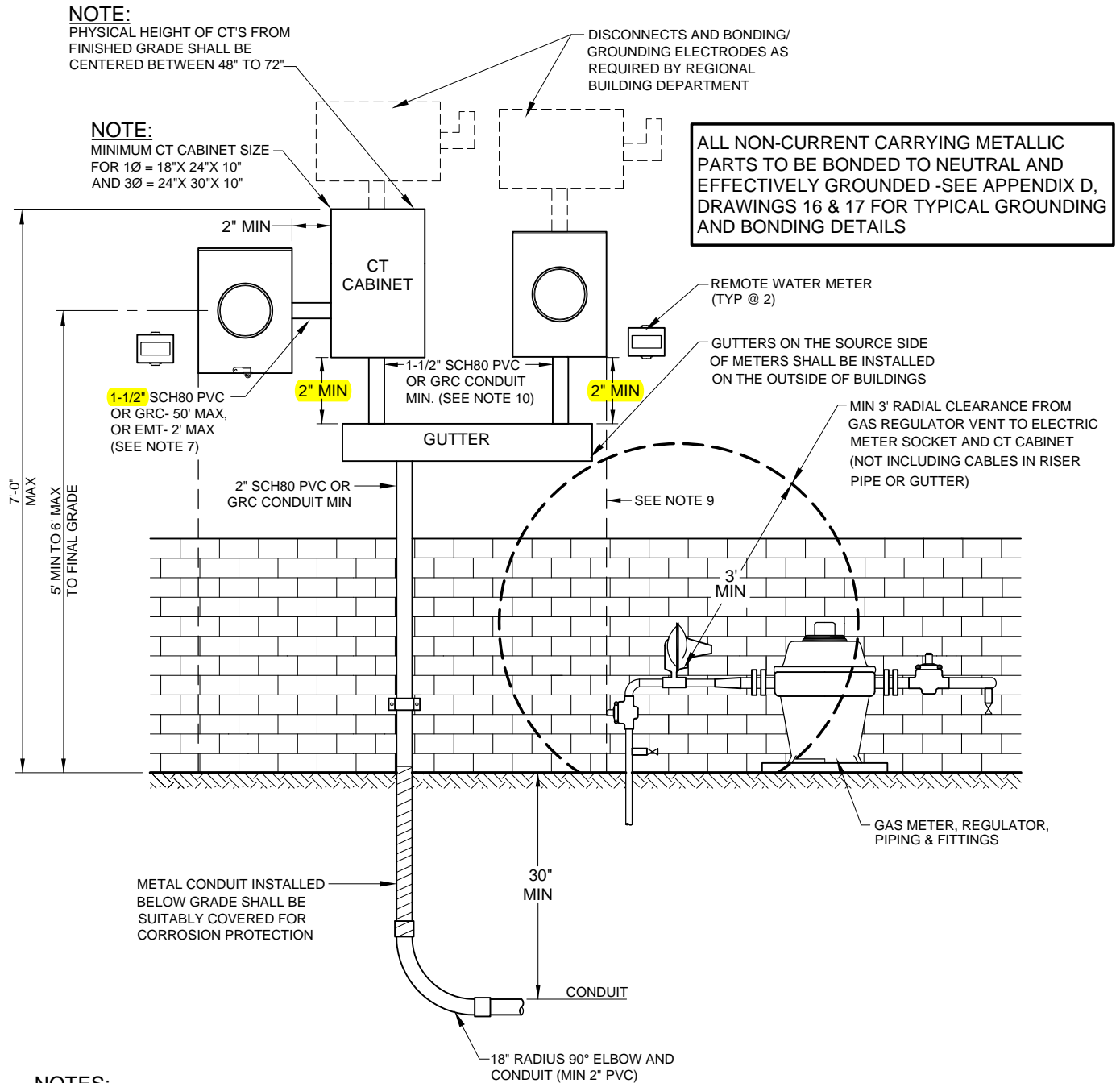
DRAWING 14 - CT CABINET INSTALLATION



NOTES:

1. CT cabinet to be sealable by Colorado Springs Utilities.
2. See Section 5.12 regarding equipment ahead of the meter.
3. Installation to conform with Chapter 10 Commercial/Industrial Development.
4. Conduit clamp must be above ground.
5. GRC conduit shall be suitably covered below grade for corrosion protection.
6. Refer to trench information, 7.02a (residential) or 10.1f (commercial).
7. Install conduit towards front of CT cabinet to avoid CT secondary wiring behind service entrance conductors. No grounding or other conductors to be installed by customers/contractors in the instrument transformer (CT & VT) metering conduit.
8. For 277/480 volt services, a VT ("VT Pack") is required to be installed inside the CT cabinet.
9. All above ground gas piping to be installed outside of each meter socket 30" minimum clear working space.

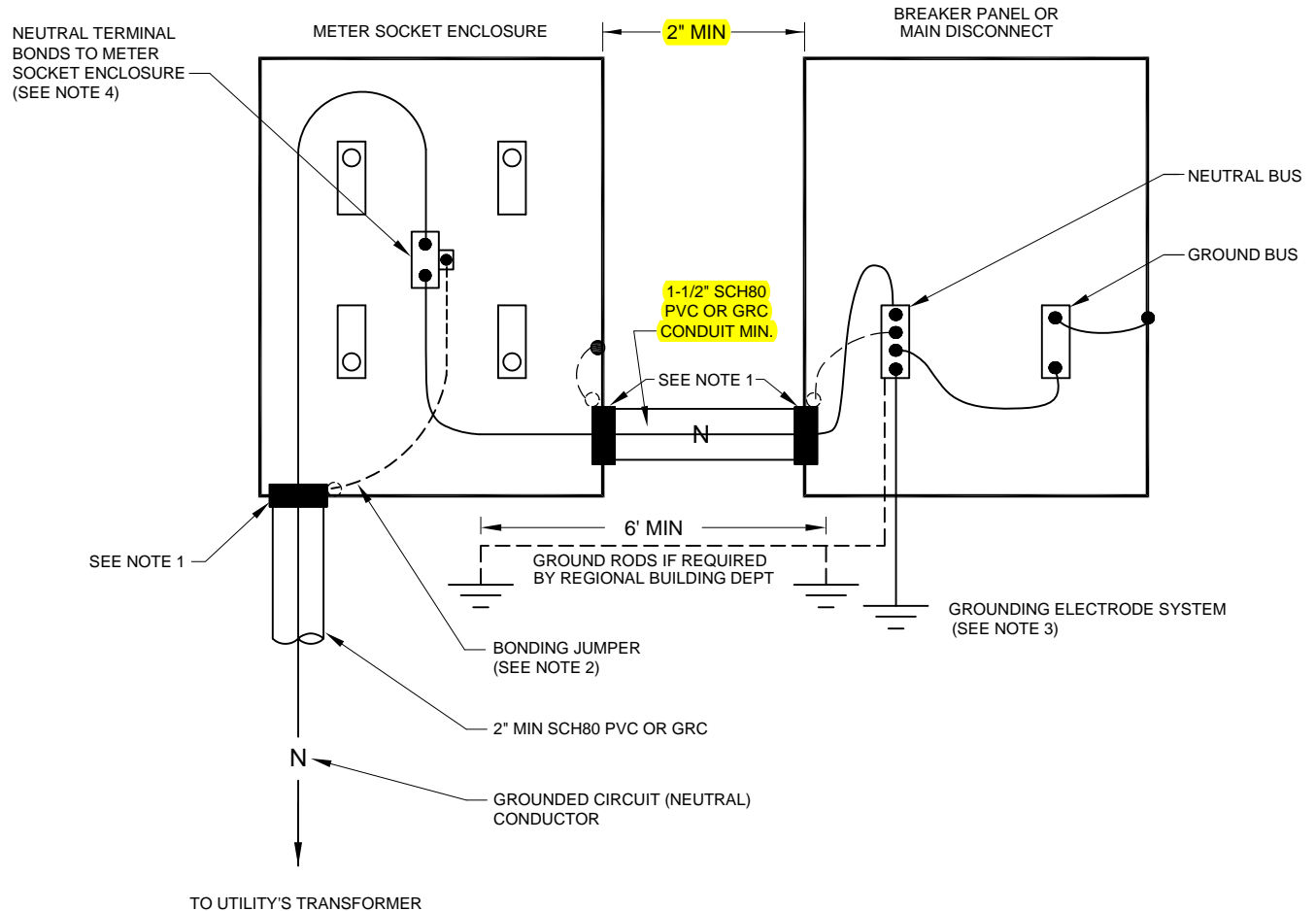
DRAWING 15 - COMBINATION METERING INSTALLATION



NOTES:

1. CT cabinet and gutter to be sealable by Colorado Springs Utilities.
2. See Section 5.12 regarding equipment ahead of the meter.
3. Installation to conform with Chapter 10 Commercial/Industrial Development.
4. Conduit clamp must be above ground.
5. GRC conduit shall be suitably covered below grade for corrosion protection.
6. Refer to trench information, 10.1f (commercial).
7. Install conduit towards front of CT cabinet to avoid instrument transformer (CT & VT) secondary wiring behind entrance conductors. No grounding or other conductors to be installed by customers/contractors in the instrument transformer (CT & VT) metering conduit.
8. For 277/480 volt services, a VT ("VT Pack") is required to be installed inside the CT cabinet.
9. All above ground gas piping to be installed outside of each meter socket 30" minimum clear working space.
10. See 5.12 for requirements for sealing equipment ahead of the meter.

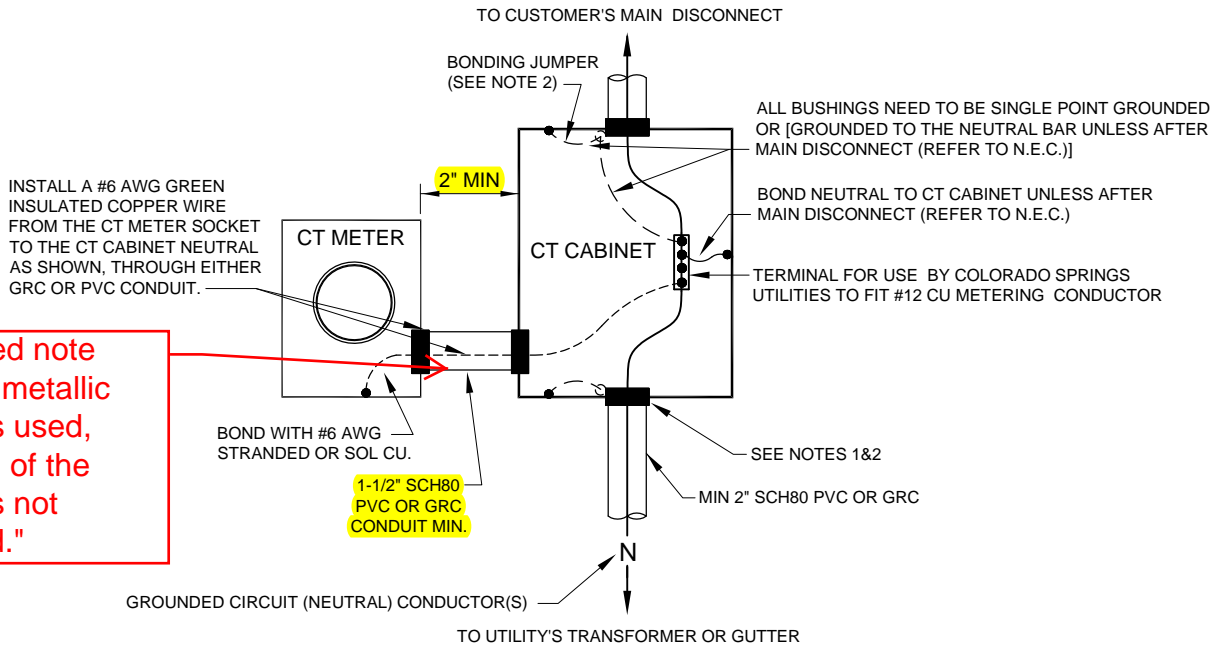
**DRAWING 16 - TYPICAL GROUNDING/BONDING FOR
ALL SELF-CONTAINED SERVICES UP TO 480 VOLTS**



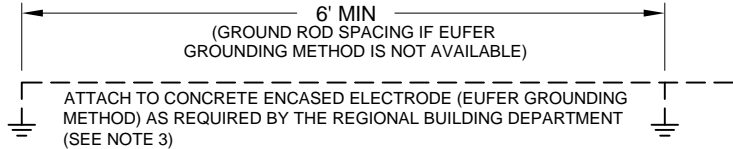
NOTES:

1. Metal conduit raceway (SCH80 PVC also allowed) shall be bonded to the neutral conductor by the use of a grounding bushing (with bonding jumper), bonding locknuts, threaded conduit hub, or other as approved by the Regional Building Department. Bonding of the nipple can be done on either the meter socket side or the panel side but not at both.
2. When a grounding bushing is used, a bonding jumper shall be installed to connect with the neutral grounding terminal as required by the Regional Building Department. (For a 100 amp service, the minimum size of bonding jumper shall be #6 Copper and for a 200 amp service, it shall be #4 Copper).
3. The Eufar grounding method is required in foundations for all residential and commercial buildings, as per the 2005 NEC. Exterior ground rods are no longer acceptable unless the building does not meet the necessary criteria for the Eufar grounding method, i.e., where there is not an approved concrete encased electrode available. This concrete encased electrode (along with approved alternate grounding methods, consisting of metal water pipes, metal building frame, ground ring, driven ground rods, etc.) shall be bonded to the neutral conductor, unless after main disconnect, and installed as required by the Regional Building Department. The grounding electrode system may be attached to the neutral terminal in either the CT Cabinet or the gutter.
4. If the meter socket is fed from an upstream (supply side) breaker or disconnect, where the neutral is already bonded to the grounding electrode system, do not connect the neutral ground lug (NEC 250).

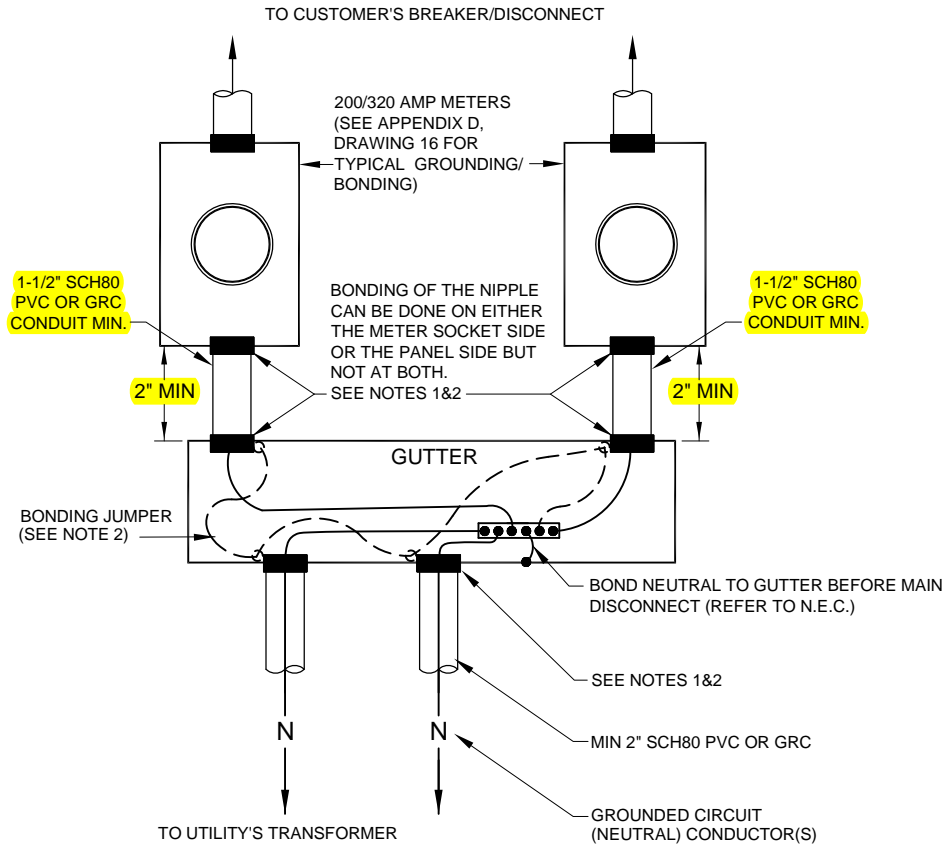
DRAWING 17 - TYPICAL GROUNDING/BONDING FOR CT CABINET AND GUTTER



Removed note
"Where metallic nipple is used, bonding of the nipple is not required."

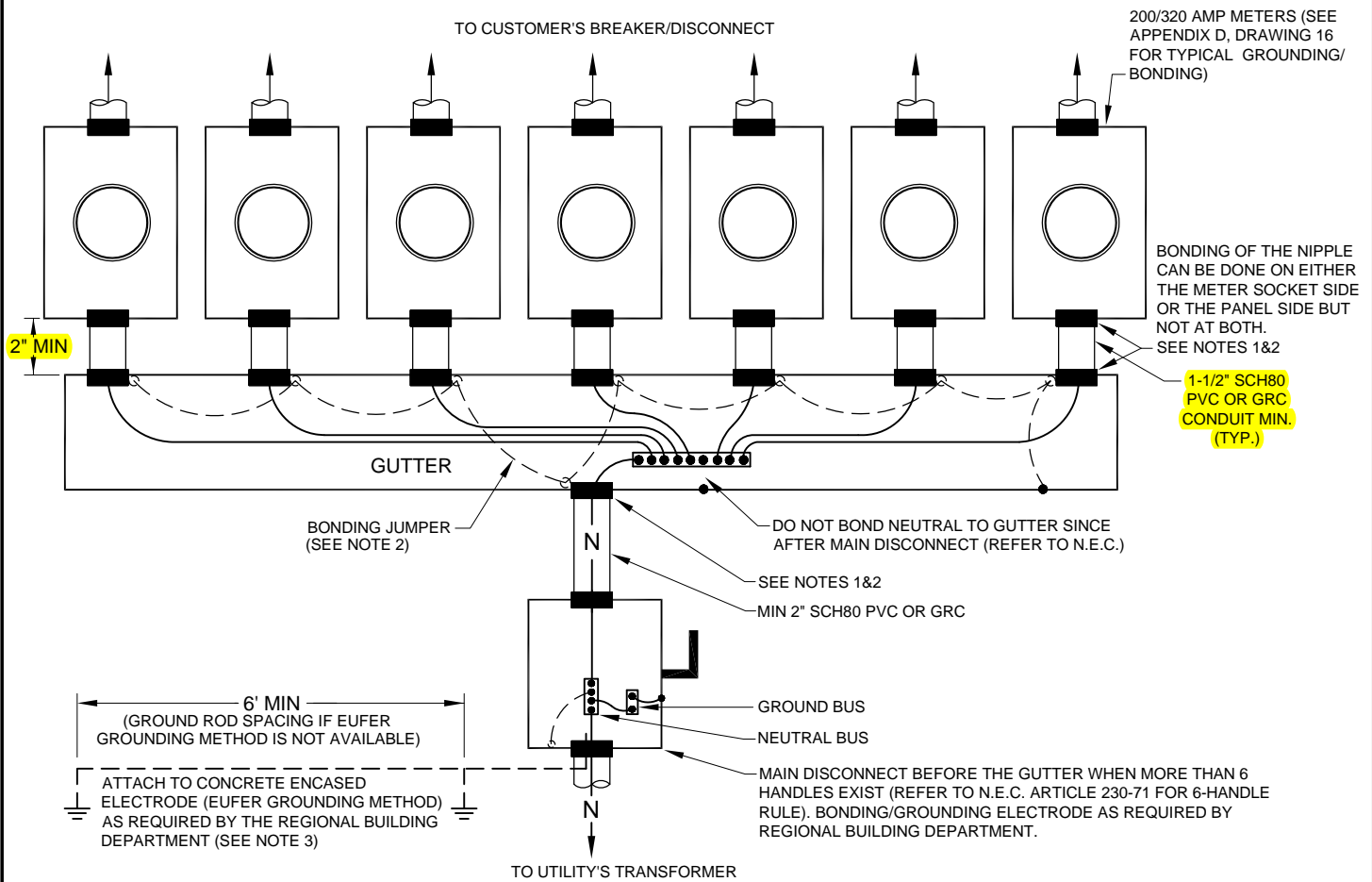


GROUNDING/BONDING FOR CT CABINET DETAIL



GROUNDING/BONDING FOR GUTTER DETAIL

DRAWING 17 - TYPICAL GROUNDING/BONDING FOR CT CABINET AND GUTTER (CONTINUED)



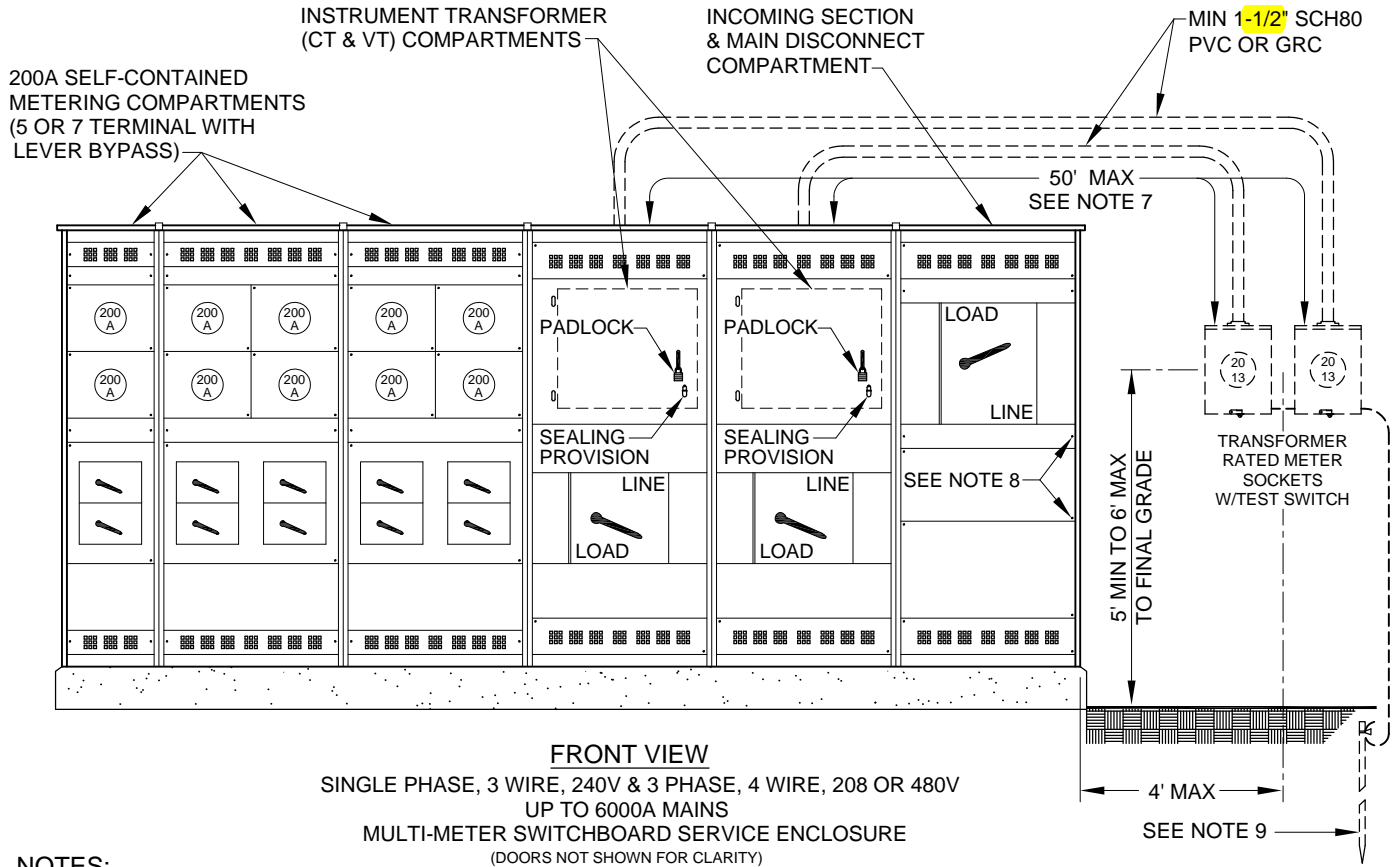
GROUNDING/BONDING FOR MAIN DISCONNECT BEFORE THE GUTTER DETAIL

NOTES:

1. Metal conduit raceway (SCH80 PVC also allowed) shall be bonded to the neutral or grounding conductor by the use of a grounding bushing (with bonding jumper), bonding locknuts, threaded conduit hub, or other as approved by the Regional Building Department. See Appendix D, drawings 14 & 15.
2. When a grounding bushing is used, a bonding jumper shall be installed to connect with the bonded enclosure. The bonding jumpers shall be sized to meet NEC Table 250-66 as required by the Regional Building Department; this table is duplicated in part below. Bonding to be completed by contractor.
3. The Eufur grounding method is required in foundations for all residential and commercial buildings, as per the 2005 NEC. Exterior ground rods are no longer acceptable unless the building does not meet the necessary criteria for the Eufur grounding method, i.e., where there is not an approved concrete encased electrode available. This concrete encased electrode (along with approved alternate grounding methods, consisting of metal water pipes, metal building frame, ground ring, driven ground rods, etc.) shall be bonded to the neutral conductor, unless after main disconnect, and installed as required by the Regional Building Department. The grounding electrode system may be attached to the neutral terminal in either the CT Cabinet or the gutter.
4. All neutral conductors shall be terminated in CT cabinets and gutters to a common connection.

SIZE OF LARGEST SERVICE-ENTRANCE CONDUCTOR OR EQUIVALENT AREA FOR PARALLEL CONDUCTORS		SIZE OF BONDING JUMPER CONDUCTOR
COPPER	ALUMINUM OR COPPER-CLAD ALUMINUM	COPPER
#1/0 or smaller	#3/0 or smaller	6
#2/0 or #3/0	#4/0 or 250 kcmil	4
Over #3/0 thru 350 kcmil	Over 250 kcmil thru 500 kcmil	2
Over 350 kcmil thru 600 kcmil	Over 500 kcmil thru 900 kcmil	#1/0
Over 600 kcmil thru 1100 kcmil	Over 900 kcmil thru 1750 kcmil	#2/0
Over 1100 kcmil	Over 1750 kcmil	#3/0 or 12-1/2% of conductor kcmil, whichever is larger

DRAWING 19 - OUTDOOR COMMERCIAL SWITCHGEAR EUSERC METERING OPTION



NOTES:

1. Metering switchgear (deadfront distribution switchboards rated 600 volts or less) is an option to be provided, installed and maintained by customer.
2. Metering switchgear shall consist of pad-mounted deadfront switchboards rated 6000 amperes or less, 600 volts or less, the enclosure sections shall contain circuit breakers (molded case and low-voltage power), fusible or non-fusible switches, mounting provision for instrument transformers (CTs & VTs), and metering or control equipment, with associated interconnections and supporting structures per EUSERC Specifications, Section 300, "Metering and Service Equipment" (latest revision). Metering switchgear shall be constructed of galvanized steel or aluminum, and meet all applicable NEMA, ANSI, UL, and NFPA standards.
3. Colorado Springs Utilities supplied permanent brass identification tags will be placed at each meter in the self-contained metering compartments in conformance with the requirements outlined in 5.13. Duplicated brass identification tags will be placed on the outside access doors of the self-contained metering compartments.
4. The instrument transformer (CT & VT) compartments shall have slotted bolts installed by customer or contractors in the instrument transformer (CT & VT) metering conduit.
5. All compartment exterior doors shall have a dual locking (padlock) provision.
6. A spare terminal (replacement) block shall be provided by the manufacturer for every five (5) self-contained meter sockets.
7. 50 foot maximum distance for conduit, no grounding or other conductors to be installed and bonded to the CT metering sockets if sockets are more than four (4) feet from the switchgear. **Conduit must be contiguous from the meter socket to the switchgear CT cubicle,** refer to paragraph 5.04e for instrument transformer conduit installation.
8. Slotted sealing screws required on front covers and removable panels as shown.
9. A supplemental electrode (driven ground rod) must be installed and bonded to the CT metering sockets if sockets are more than four (4) feet from the switchgear.
10. Arrangement of compartments (sections) may differ from what is shown depending on customer requirements and load considerations.
11. All conductors or buss on load side of disconnects are not to be routed or re-enter the line side of the instrument transformer (CT & VT) or metering compartments, including main disconnects.
12. Self-contained metering compartments are required to have a lever bypass at each meter terminal. Meter socket covers are to be the ringless type, with no outer doors or other material covering the meter.
13. Sections rated over 200A up to 1200A shall accommodate bar-type CT's furnished by Colorado Springs Utilities; over 1200A shall accommodate window-type CT's furnished by Colorado Springs Utilities.
14. Section rated 277/480 volts shall accommodate a VT Pack furnished by Colorado Springs Utilities.
15. On 277/480 volt services, when the CT cabinet is not large enough to accommodate the VT Pack, then an external VT Pack enclosure (NEMA 3R, 14"h x10"w x 8"d minimum dimensions, with a backplane) will need to be installed within 10 linear foot of the CT compartment.

PHOTO 4 – Bar Type Current Transformer
(See 5.04c6 for installation conditions)

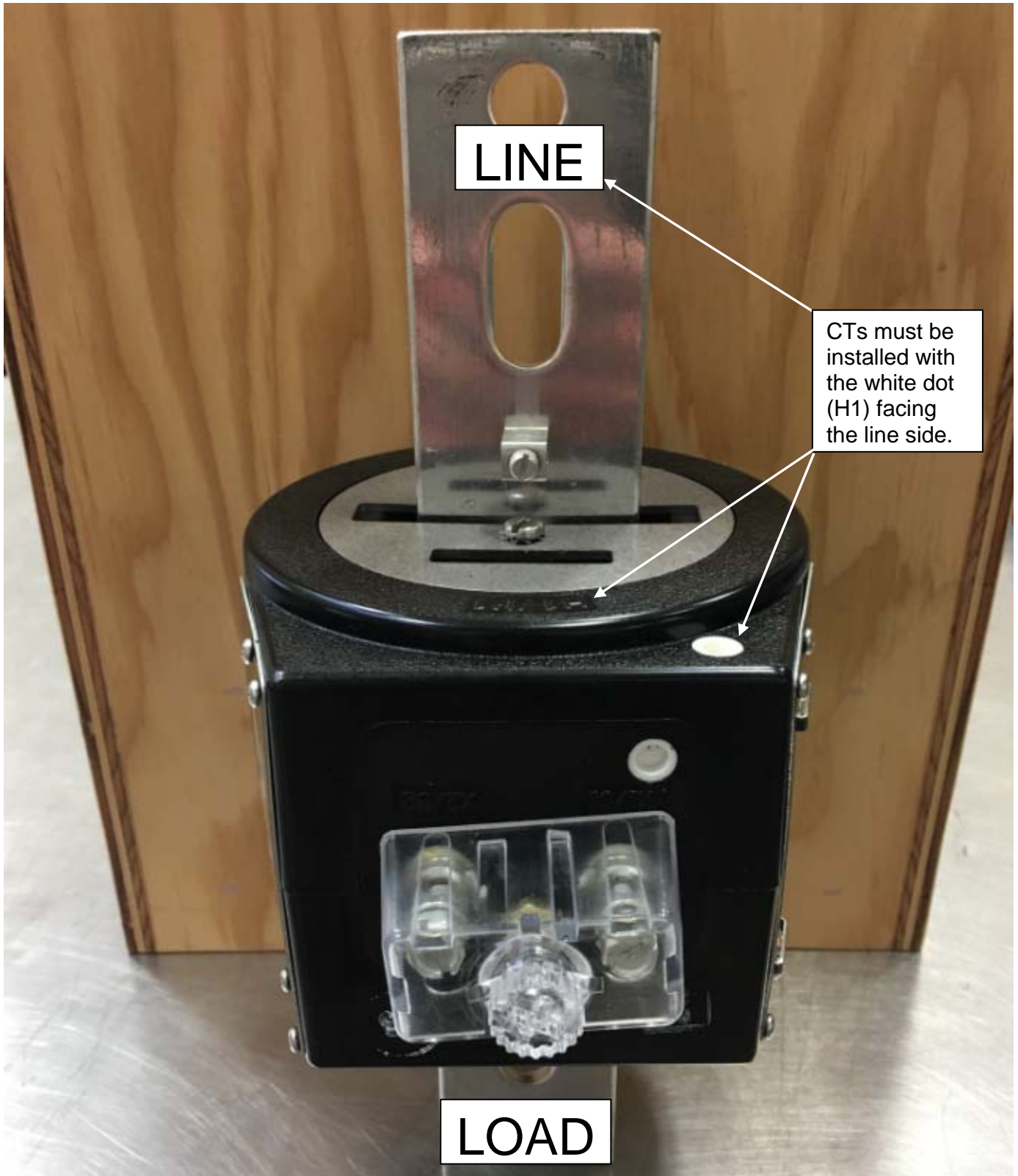
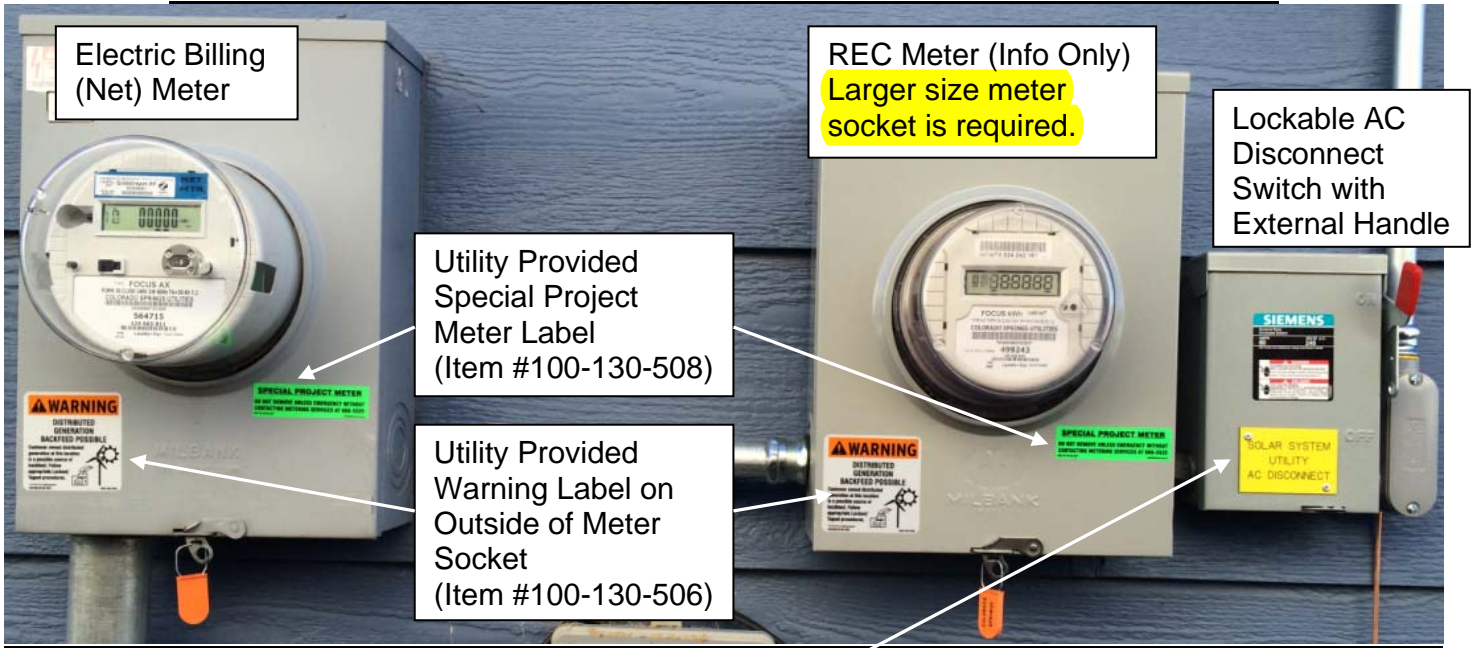


PHOTO 6 – PHOTOVOLTAIC SERVICE EQUIPMENT LABELING



Customer Provided "AC Disconnect" Placard on AC Disconnect Switch



WARNING, DISTRIBUTED GENERATION
SIZE = 8-1/2" X 4"
(ITEM #100-130-505)
(FOR POLE RISERS & TRANSFORMERS)



WARNING, DISTRIBUTED GENERATION
SIZE = 3" X 3"
(ITEM #100-130-506)
(FOR METER SOCKETS)



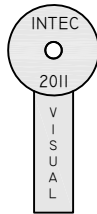
WARNING, DISTRIBUTED GENERATION
SIZE = 1-1/4" X 7"
(ITEM #100-130-507)
(FOR CABLES)

WARNING, DISTRIBUTED GENERATION LABELS

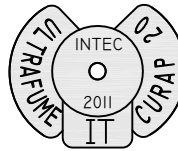
Identifies customer owned distribution generation at a location that is a possible source of backfeed. Follow appropriate Lockout/Tagout procedures.

- 8-1/2"x4" size labels to be installed on pole risers & transformers,
- 3"x3" size labels to be installed on meter sockets where distributed generation exists.
- 1-1/4"x7" size label to be installed on individual cables connected where distributed generation equipment exists.

Note: Various installations may require additional customer provided labeling.



POLE VISUALLY INSPECTED IN 2011. NO BORINGS OR PRESERVATIVE CHEMICAL TREATMENTS APPLIED.



POLE INSPECTED AND TREATED WITH ULTRAFUME, CURAP 20 AND INTERNAL TREATMENT WAS INJECTED INTO THE POLE WITH PERM E8 IN 2011.



POLE INSPECTED WITHOUT A FULL DIG AND TREATMENT. POLE INSPECTION MAY INCLUDE "SOUND AND BORE", "SOUND ONLY", "SOUND AND SELECT BORE" AND "PARTIAL EXCAVATE" IN 2010



POLE INSPECTED VIA FULL 18" DIG AND TREATED WITH MITC-FUME IN 2010



POLE INSPECTED VIA FULL 18" DIG, TREATED WITH WOODFUME AND INTERNAL TREATMENT WAS INJECTED INTO THE POLE IN 2010



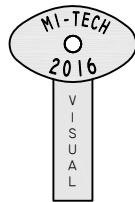
POLE INSPECTION INCLUDES "SOUND AND BORE" AND "PARTIAL EXCAVATION" IN 2016.



POLE INSPECTION INCLUDES "SOUND AND BORE" AND "FULL EXCAVATION" IN 2016.



POLE INSPECTION INCLUDES TREATMENT WITH G FUME.



POLE VISUALLY ONLY INSPECTED. NO BORINGS OR PRESERVATIVE CHEMICAL TREATMENTS APPLIED.



POLE INSPECTED AND INTERNAL TREATMENT WAS INJECTED INTO THE POLE.



POLE INSPECTED AND EXTERNAL TREATMENT WAS APPLIED TO THE POLE.

WOOD POLE INSPECTION AND TREATMENT TAGS

PRIORITY REJECT POLE

(RED TAG)



(RED TAG)



POLES CLASSIFIED AS "PRIORITY REJECT" SHALL INDICATE A POLE WITH LESS THAN 33% REMAINING POLE STRENGTH AND SHALL BE LABELED WITH TWO RED TAGS TO DENOTE DANGER/PRIORITY THAT WILL BE SCHEDULED FOR URGENT REPLACEMENT. (THE ARROW ON THE TAG DENOTES THE DIRECTION OF THE POLE DEFECT.)

REJECT POLE

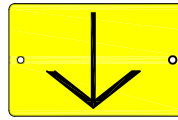
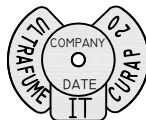
(RED TAG)



POLES CLASSIFIED AS "REJECT" SHALL INDICATE A POLE WITH MORE THAN 33% AND LESS THAN 67% REMAINING POLE STRENGTH THAT IS NON-REINFORCEABLE AND SHALL BE LABELED WITH ONE RED TAG TO DENOTE IT IS NOT URGENT AND WILL BE SCHEDULED FOR REPLACEMENT. (THE ARROW ON THE TAG DENOTES THE DIRECTION OF THE POLE DEFECT.)

REINFORCEABLE REJECT POLE

(YELLOW TAG)



POLES CLASSIFIED AS "REINFORCEABLE REJECT" SHALL INDICATE A POLE WITH LESS THAN 67% REMAINING POLE STRENGTH THAT IS REINFORCEABLE AND SHALL BE LABELED WITH ONE YELLOW TAG THAT WILL BE SCHEDULED FOR REINFORCEMENT WITH STEEL TRUSS AND BANDS. PRIMARY POLES CLASSIFIED AS "REINFORCEABLE REJECT" MUST BE ACCESSIBLE BY BUCKET TRUCK. (THE ARROW ON THE TAG DENOTES THE DIRECTION OF THE POLE DEFECT.)

WOOD POLE INSPECTION REJECT TAGS

Reject tag identification is similar for Mi-Tech, Intec & Osrose inspection process.

DISCLAIMER

"All company and product names on this sheet are used for reference and informational purposes. The rights to all such names are the property of the name owners."



SINGLE PHASE TRANSFORMERS, PRESENT TYPES
ABBREVIATIONS USED ON DISTRIBUTION TRANSFORMER TYPE SHEETS

PRIMARY

INTERFACE:

LIVE: LIVE FRONT (ANY VOLTAGE)
 DF: DEAD FRONT (12.5KV)
 RTE: RTE ELBOW (34.5KV)
 ESNA: ESNA ELBOW (34.5KV)

TAPS:

N: NO TAPS
 S: STRADDLE (2 - 2-1/2% ABOVE AND BELOW NORMAL RATING)
 B: BELOW (4 - 2-1/2% BELOW NORMAL RATING)

FEED:

LF: LOOP FEED
 RF: RADIAL FEED
 ANSI I: HORIZONTAL PRIMARY INTERFACE
 ANSI II: DIAGONAL PRIMARY INTERFACE

FUSING:

B: BAYONET EXPULSION (FIELD REPLACEABLE)
 CCL: CLIP-MOUNTED FULL RANGE CURRENT LIMITING FUSE (LIVE FRONT SIDE COMPARTMENT)
 PCL: PARTIAL RANGE CURRENT LIMITING FUSE (NOT FIELD REPLACEABLE)
 E: EXTERNAL FULL RANGE CURRENT LIMITING FUSE (NOT FIELD REPLACEABLE)
 WL: WEAK LINK (UNDER-OIL EXPULSION FUSE - REQUIRES LID REMOVAL FOR REPLACEMENT)
 IL: ISOLATION LINK (INTERNAL - NOT FIELD REPLACEABLE)
 I: INTERNAL

SWITCHES:

ΔY: DELTA-WYE
 DIS: DISCONNECT
 LOOP: 4 POSITION LOOP DISCONNECT
 2I: 2 INDEPENDENTLY OPERABLE SWITCHES FOR IN/OUT/DISCONNECT
 3I: 3 INDEPENDENTLY OPERABLE SWITCHES FOR IN/OUT/DISCONNECT

7-1 NOTES:

1. Fuse types will vary with transformer kVA size. Refer to the applicable transformer material specification for detailed information on fusing.
2. All units in a bank to be the same type.
3. The transformer type is the last 3 digits of the item number; for example, type 3 transformer item numbers are 196-XXX-003. The middle 3 digits of this item number are kVA size with those above 750kVA represented by 8XX when XX is the kVA rating in hundreds, i.e. 810 for 1000kVA, 815 for 1500kVA, 825 for 2500kVA.
4. Beginning in 1997, taps were discontinued on 500kVA and smaller 3-phase padmount types 150/153 & 160/163; small kVA 3-phase units without taps begin with Company Number 39694.
5. New submersible type 223 is limited to 1-phase applications - **DO NOT** install type 223 in any 3-phase banks- internal secondary neutral tank grounds will create fault if banked. Use type 225 for 3-phase banks.
6. Type 3 transformers starting with Company Number 41000 no longer have taps. Older type 3 transformers had taps below rated voltage.
7. Beginning with Company Number 52034, all overhead transformers except type 9 & 26, will be equipped with an IFD (Internal Fault Detector). The red shipping lock ring must be removed upon installation. The red shipping lock should be installed anytime the transformer is moved.
8. Overhead transformer center bolt lifting eye use shall be limited to a maximum size of 50 kVA transformer or 2,000 lbs.

SINGLE-PHASE OVERHEAD (CONVENTIONAL, LID MOUNTED PRIMARY BUSHINGS, POLE MOUNTED BRACKETS - TANK WELDED)

TYPE 196-XXX-	PRIMARY VOLTAGE (kV)	SECONDARY VOLTAGE (V)	DESC* CODE	FUSING ¹	TAPS	ADDITIONAL COMMENTS	REPLACES TYPES
003	12.47GRDY/7.2	120/240	1 4 6	N	B/N ⁶	2-BUSHING	001
007	12.47	120/240	1 4 6	N	N	USE ONLY FOR DELTA-PRIMARY	005
009	12.47GRDY/7.2	120	1 4 6	N	N	1-BUSHING AMR PROJECT	
015	19.92/34.5Y	277/480Y	1 4 6	N	S	2-BUSHING	
016	19.92/34.5Y	120/240	1 4 6	N	S	2-BUSHING	
018	12.47GRDY/7.2	240/480	1 4 6	N	N	1-BUSHING	008
022	12.47GRDY/7.2	277/480Y	1 4 6	N	N	1-BUSHING	011
026	19.92/34.5Y	120	1 4 6	N	N	1-BUSHING AMR PROJECT	
029	12.47GRDY/7.2	120/240	1 4 6	N	B	FOR USE ON 6.9KV SYSTEM	
114	12.47GRDY/7.2	120/240	3 4 6 8	I	B	TEMPORARY POWER (TYP)	

*NOTE: For Description Codes (See 7-1, page 3)

SINGLE-PHASE PADMOUNT/UNDERGROUND

TYPE 196-XXX-	PRIMARY VOLTAGE (kV)	SECONDARY VOLTAGE (V)	INTER- FACE	FEED	FUSING ¹	SWITCH	TAPS	ADDITIONAL COMMENTS	REPLACES TYPES
126	12.47GRDY/7.2	480/240	DF	LF	B/IL		N	ANSI II, TAN	
129	12.47GRDY/7.2	240/120	DF	LF	B/IL		N	ANSI II	
134	34.5GRDY/19.92	240/120	ESNA	LF	B/PCL		S	ANSI I	
223	12.47GRDY/7.2	240/120	DF	RF	B/IL		N	STAINLESS TANK (SEE NOTE 5)	123
225	7.2	240/120	DF	RF	B/IL		N	STAINLESS TANK (SEE NOTE 5)	125
229	12.47GRDY/7.2	240/120	DF	LF	B/IL		N	STAINLESS TANK, ANSI II	

* Conventional - lid mounted primary bushings.

** Live front secondary also. Arresters on primary and secondary. With secondary CT's & PT's.

ELECTRIC DISTRIBUTION CONSTRUCTION STANDARDS

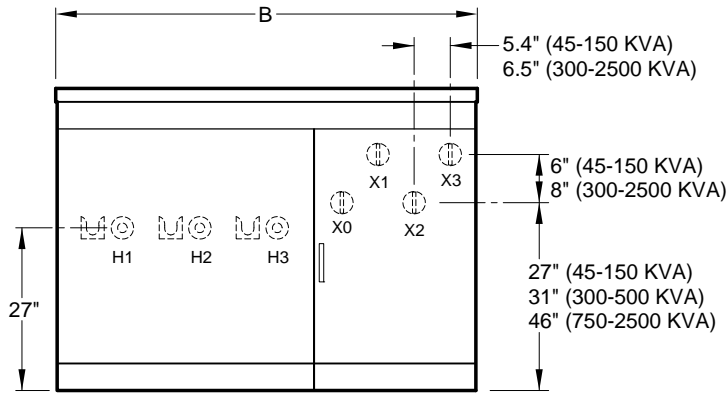
APPROVED AS OF:
8-15-2016

TRANSFORMER TYPES AND HARDWARE GUIDE

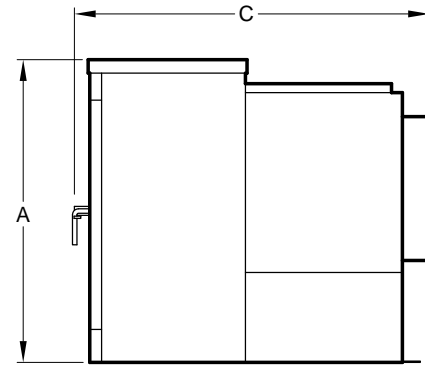


7-1 PG. 1/8

**12.47kV THREE-PHASE PADMOUNT TRANSFORMER TYPES 150/153
APPROX. 2012 DESIGN WEIGHTS & DIMENSIONS**



FRONT VIEW



RIGHT VIEW

THREE-PHASE RADIAL FEED PADMOUNT 12470GrdY/7200 - 208Y/120 VOLTS				
RATING (kVA)	HEIGHT (INCHES) "A"	WIDTH (INCHES) "B"	DEPTH (INCHES) "C"	WEIGHT (POUNDS)
45	50.5	70.0	46.2	2,244
75	52.3	70.5	54.1	2,718
150	48.4	62.0	52.2	3,221
300	56.4	62.0	54.2	4,237
500	60.4	73.6	56.1	6,785
750	68.4	72.1	67.1	8,265
1000	68.8	66.0	67.2	11,850

THREE-PHASE RADIAL FEED PADMOUNT 12470GrdY/7200 - 480Y/277 VOLTS				
RATING (kVA)	HEIGHT (INCHES) "A"	WIDTH (INCHES) "B"	DEPTH (INCHES) "C"	WEIGHT (POUNDS)
75	52.3	70.5	54.1	2,718
150	52.4	70.5	54.1	3,101
300	56.4	62.0	55.1	4,053
500	56.4	62.0	58.1	5,829
750	68.4	72.1	65.6	8,196
1000	68.8	66.0	67.2	8,196
1500	68.4	79.6	72.1	12,216
2000	72.8	70.0	70.2	13,598
2500	72.8	70.0	70.2	14,212

Colorado Springs Utilities

Specification for Indoor Transformer Vaults

1. SCOPE:

Pad-mounted transformers, located outside, away from any structures, and on the customer's property, is the standard for all commercial installations. In some cases, where it has been determined that an outdoor location is not available, a vault installation may be utilized. This must be approved for use by CSU Field Engineering, based on no reasonable locations available outside of the building. Colorado Springs Utilities will provide pad-mounted transformers with less-flammable oil for these cases.

This General Specification is to be used as a definition of Company policy concerning the installation of transformer vaults within customer premises. This shall be understood to be minimum requirements. Any deviation from this specification must be approved in writing by Colorado Springs Utilities (CSU). CSU will not provide electrical service to the customer until the vault is completed in accordance with this specification.

The customer shall provide an electrical vault at ground level, with external access, inside of the building that meets the requirements of this document and all applicable state and local code requirements. The customer is responsible for installing and maintaining any items such as sprinklers, smoke alarms, etc. that may be required by local authorities. All alternate vault locations must be approved in writing by CSU.

The installation must meet all applicable state and local code requirements. The Vault shall be built in accordance with Article 450 part III, and Articles 230-250, of the most current edition of the National Electric Code (NEC). This shall be considered the minimum requirements. Where conflicts occur between this document and the NEC the more stringent requirement shall apply.

After the vault is completed and accepted by CSU, no work shall be done on, in or through the vault without the permission of CSU. This includes all future customer services, and vault modifications. **Maintenance of the vault once complete will be the responsibility of the building owner.**

2. STANDARD SERVICE VOLTAGE:

A. For available voltage levels, see the CSU Electric Line Extension Service Standards, 3.02.

3. SIZE OF VAULT

The size of the vault is determined by the building's load and the number of transformers. The vault drawings on pages 8-9 show CSU requirements for vault space based upon one or two transformers. Minimum inside vault dimensions are specified to provide 3 feet around the sides and back of the transformer, and a clear space at least 8 feet in front, to allow necessary maintenance, switching and cable pulling. This area is to be kept clear of any materials or debris. The ceiling height and hoist system must be able to lift a 72 inch tall transformer at least 24 inches to clear the bottom-fed primary and secondary cables.

4. BUILDING MATERIALS FOR VAULT

- A. The support walls, floor, and ceiling shall have a minimum 3 hour fire rating, (class A) and be constructed as follows.
 - 1. Reinforced concrete – 6” thick minimum, (preferred construction)
 - 2. Reinforced concrete – filled block – 8” thick minimum
- B. The floor shall be designed to support the weight of the transformer and other associated equipment that is installed. Each transformer bay should be able to support the minimum weight of 21,000 lbs.
- C. The vault shall have a 4 inch tall concrete curb that is sealed for oil containment per NEC 450.43B. A 4 inch tall by 2 foot long concrete ramp shall be rigidly installed on both sides of each access door for access to rolling equipment (see drawing for ramp placement). Other than the curb and ramp, the floor shall be flat from the vault to the sidewalk or driveway.
- D. The floor and curb shall be sealed with Dayton Superior Corporation DAY-CHEM AGGREGLOSS (J-25) or equivalent.
- E. The customer shall provide an overhead hoist/crane system, inside the vault, that is capable of picking up and moving a minimum of 13,500 lbs. and is supported by the vault walls and/or ceiling. The hoist/crane system shall have the ability to extend through the vault doors 6 ft. past the exterior wall of the vault. The hoist shall be a Chester Hoist Zephyr Low Headroom Design model 1422-8 or equivalent. The customer shall submit detailed working drawings stamped by a registered professional engineer to CSU Standards Engineering for approval prior to construction.

5. VAULT VENTILIATION

The ventilation system for the vault shall be unique and will be reviewed and approved by CSU. There shall be no tie into the building system (no exceptions) for both intake and exhaust. These intake and exhaust openings shall not be located near any adjacent ventilation systems.

- A. The air spacing or opening between each louver shall measure a maximum distance of 4 inches. The louvers shall be thermostatically controlled and the electrical feed to the louvers shall come from a separate grid vault. **Thermostatically controlled louvers are required on both gravity flow and forced air venting.** A screen or wire mesh, which covers the vault-side of the entire louvered section(s), is required to prevent birds or other animals from entering the vault. This layout and others which are designed to freely circulate a sufficient amount of air throughout the vault and around the electrical equipment will be acceptable.
- B. Gravity Flow – The net free area (opening area minus the area of the louvers and, or grating) shall be no less then (3) square inches per KVA capacity installed in the vault. The ventilation openings shall in conformance with Article 450-45 of the NEC. Final ventilation locations to be verified by the CSU engineer.
- C. Forced Air – Forced air ventilation will required additional vault space for the duct and blower motor. The customer shall provide Colorado Springs Utilities with the complete specification for the ventilation system. The customer shall install the ventilation system. The blower shall be thermostatically controlled.

Requirements: For forced air, the ventilation system shall be capable of providing five (5) cubic feet per minute per KVA of capacity installed in the vault. Air flow shall be directed to the



transformers so that it will flow through and around the radiators of the transformer tank.

6. ELECTRICAL

- A. Grounding: The rebar superstructure in the floor and the rebar superstructure in all of the vault walls surrounding the transformers shall be bonded together. Each corner (4) of the transformer vault shall have a grounding connection point bonded to the rebar superstructure in the walls. The grounding connection point shall consist of a significant piece of 2/0 stranded bare copper wire bonded to the rebar superstructure to allow a sufficient length of said 2/0 stranded copper wire to be routed under the floor to the transformer(s). The connection for 1/2" rebar shall be made with Burndy Compression Connector (YGHP29C2), the connection for 5/8" rebar shall be made with Burndy Compression Connector (YGHP34C26). The connections shall be made with Burndy type Y-35 Hypress hand-operated hydraulic tool. No other method for attaching 2/0 stranded bare copper will be accepted. **All rebar and grounding connection points shall be inspected by CSU Quality Control Inspectors before any concrete is poured. Any failure to comply with this specification will mean the removal of all concrete for inspection purposes.**
- B. The secondary conductors and connections shall be installed and owned by the customer. These shall be installed in conduit. The conduit shall enter into the bottom of the transformer cabinet to a height of 4 inches above the floor and sealed to the floor, to prevent oil from escaping containment. All cables shall be sealed inside the conduit as well, to prevent the entrance of gas into the vault. See Appendix F; drawings 7-4 through 7-15 for placement of conduit and connection requirements. No single service entrance shall exceed a 4000 ampere rating.
- C. Conduit and Cables
1. The customer shall provide all conduit runs needed by CSU conductors within the building. Any conduit run(s) encased in concrete shall have a minimum of 2" cover. In all cases conduit runs should be as near straight as possible, and free of excessive bends. CSU shall designate the location of all conduit entrances prior to construction. CSU will provide all primary services conduit from outside the building to the transformer vault, entering up through the floor into the cabinet. Duct shall be installed 4 inches above the floor and sealed as stated above.
 2. CSU will provide and own the primary conductors.
- D. Lighting of transformer vaults shall be provided and owned by the customer. Fixtures may be installed by a contractor before CSU occupies the vault space. Lighting shall be 48" LED light strips that are wall mounted. CSU will designate the final placement of all lighting, before installation in the vault. Lighting shall not be positioned over the transformers. All wiring must conform to the current edition of the NEC and the "Electric Line Extension & Service Standards" (ELESS).
- E. The metering for the building shall conform to chapter 5 of the ELESS. All metering shall be located outside of the transformer vault. The customer shall have prior approval from the CSU Meter Shop and Field Engineering Departments for any job requiring instrument transformers and any fabrication of such equipment. All such drawings for the specified equipment shall be provided to both CSU Meter Shop and Field Engineering Departments for approval prior to fabrication of the metering equipment.
- F. Smoke alarms shall be installed and owned by the customer per NFPA standards.

7. VAULT ACCESS

- A. Provisions must be made for employees authorized by CSU to access the vault. All passageways and openings shall be made so that the vault equipment (including transformers) can be replaced during future maintenance. **The main doorway to the street shall be no less than the height of the hoist beam by 11 feet wide, with Class "A" fire doors. If two doors with a center post are used in each opening, the center post must be removable.** The doors shall open out of the vault and all double doors must be capable of latching at the top, bottom, and middle. The hinges on these doors should have a set screw to prevent hinge pins and doors from being lifted out. These doors shall not open into or near any of the building's air supply/ventilation systems. All access doors to the vault shall have electrical warning labels installed. Two access locations are required, on opposite ends of the vault. The customer shall provide all door lock sets to be keyed alike to Schlage B660P.
- B. Two lockable boxes shall be provided by the customer and attached next to the vault doors. One box shall contain a labeled key for fire emergency access with a Colorado Springs Fire Department designated lock. The other box shall be made available for a CSU padlock. The boxes shall be ordered from Colorado Springs Fire Department.
- C. Each vault door shall have an electrical warning label attached to it. CSU item number 100-130-455 is approved and shall be used for this purpose.

8. ACCEPTANCE CRITERIA

The vault shall be energized only after an inspection by CSU. The following items must be completed before such inspection (and the subsequent vault energizing) occurs:

1. Fireproofing of steel beams within the vault must be completed.
2. Ventilation system shall be installed and operable.
3. Vault floor shall be sealed as required to prevent transformer oil from penetrating the vault floor.
4. Customer service entrance conduit shall be installed and sealed where the bus goes through the vault floor to the customer's switch gear room.
5. Permanent fire doors, smoke detectors, and locks shall be installed and operational.
6. Hoist system with detachable extension in place.
7. **CSU does not allow any foreign objects to enter the transformer vault. Surface-mounted rigid electrical conduit and outlet boxes are allowed provided they are approved by the local authorities.**

9. CUSTOMER AGREEMENT

A statement shall be signed and returned to CSU agreeing to build the vault according to these vault specifications. An additional statement shall be signed and returned to CSU designating the vault as a CSU substation with a copy of the statement sent to the Pikes Peak Regional Building Department Electrical Inspector. The only authorized signer is the building owner.

The following statement must be signed by the owner and one copy of the specification returned to:

Colorado Springs Utilities Representative
Energy Services Electric Planning
Colorado Springs Utilities
1521 Hancock Expressway
Colorado Springs, CO 80947-1821

The preceding vault specifications meet with our approval.

_____ Owner
_____ Date

The undersigned hereby authorizes the use of the transformer vault located in:

Customer Name _____
Address _____
City, State, & Zip Code _____

The vault is designated as a Colorado Springs Utilities Substation.

Signed _____
Title _____
Date _____

Cc: Pikes Peak Regional Building Department, Chief Electrical Inspector



Acceptance Check List

1. Rebar superstructure and grounding connection points.

Pass Fail

Comments: _____

CSU Inspector: _____ Owner/ Project Manager _____ Date _____

2. Primary and Secondary conduit feeds.

Pass Fail

Comments: _____

CSU Inspector: _____ Owner/ Project Manager _____ Date _____

3. Ventilation system installed and working at required CFM.

Pass Fail

Comments: _____

CSU Inspector: _____ Owner/ Project Manager _____ Date _____

4. Permanent fire doors, smoke detectors, and locks installed & operational.

Pass Fail

Comments: _____

CSU Inspector: _____ Owner/ Project Manager _____ Date _____

5. Customer service entrance ducts installed & sealed where the bus goes through the vault floor to the customer's switch gear rooms.

Pass Fail

Comments: _____

CSU Inspector: _____ Owner/ Project Manager _____ Date _____

6. Secondary services tested for proper connections before being energized.

Pass Fail

Comments: _____



CSU Inspector: _____ Owner/ Project Manager _____ Date _____

7. Hoist system in place with adequate capacity and operational. Pass Fail

Comments: _____

CSU Inspector: _____ Owner/ Project Manager _____ Date _____

8. Vault floor and curbing sealed. Pass Fail

Comments: _____

CSU Inspector: _____ Owner/ Project Manager _____ Date _____

9. Fireproofing completed. Pass Fail

Comments: _____

CSU Inspector: _____ Owner/ Project Manager _____ Date _____

10. No foreign piping in vault. Pass Fail

Comments: _____

CSU Inspector: _____ Owner/ Project Manager _____ Date _____

11. All required lock boxes installed. Pass Fail

Comments: _____

CSU Inspector: _____ Owner/ Project Manager _____ Date _____

12. Finished vault inspected. Pass Fail

Comments: _____

CSU Inspector: _____ Owner/ Project Manager _____ Date _____



ELECTRIC DISTRIBUTION CONSTRUCTION STANDARDS

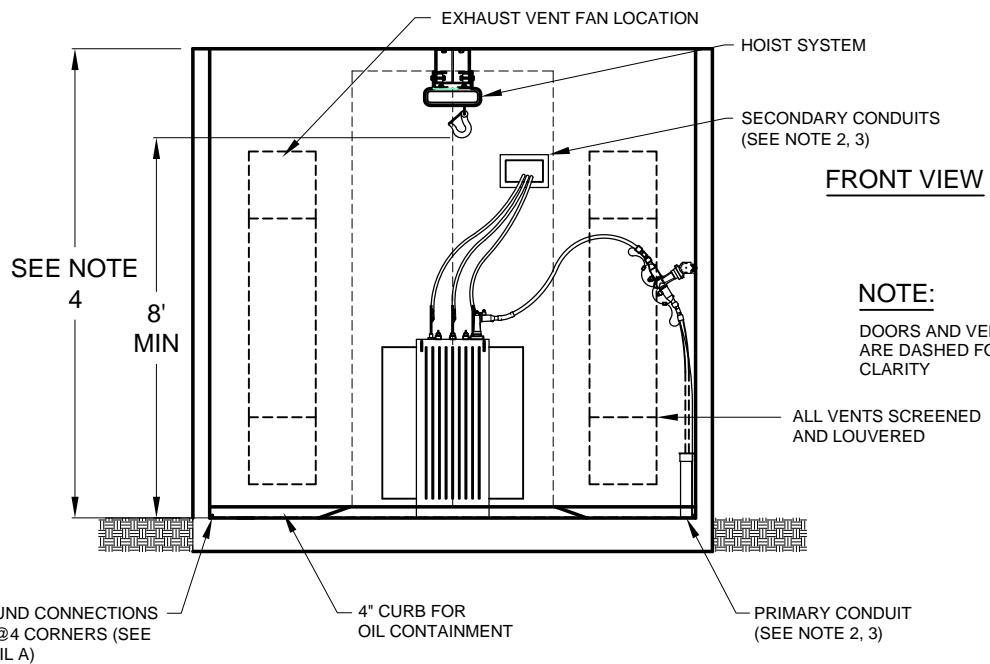
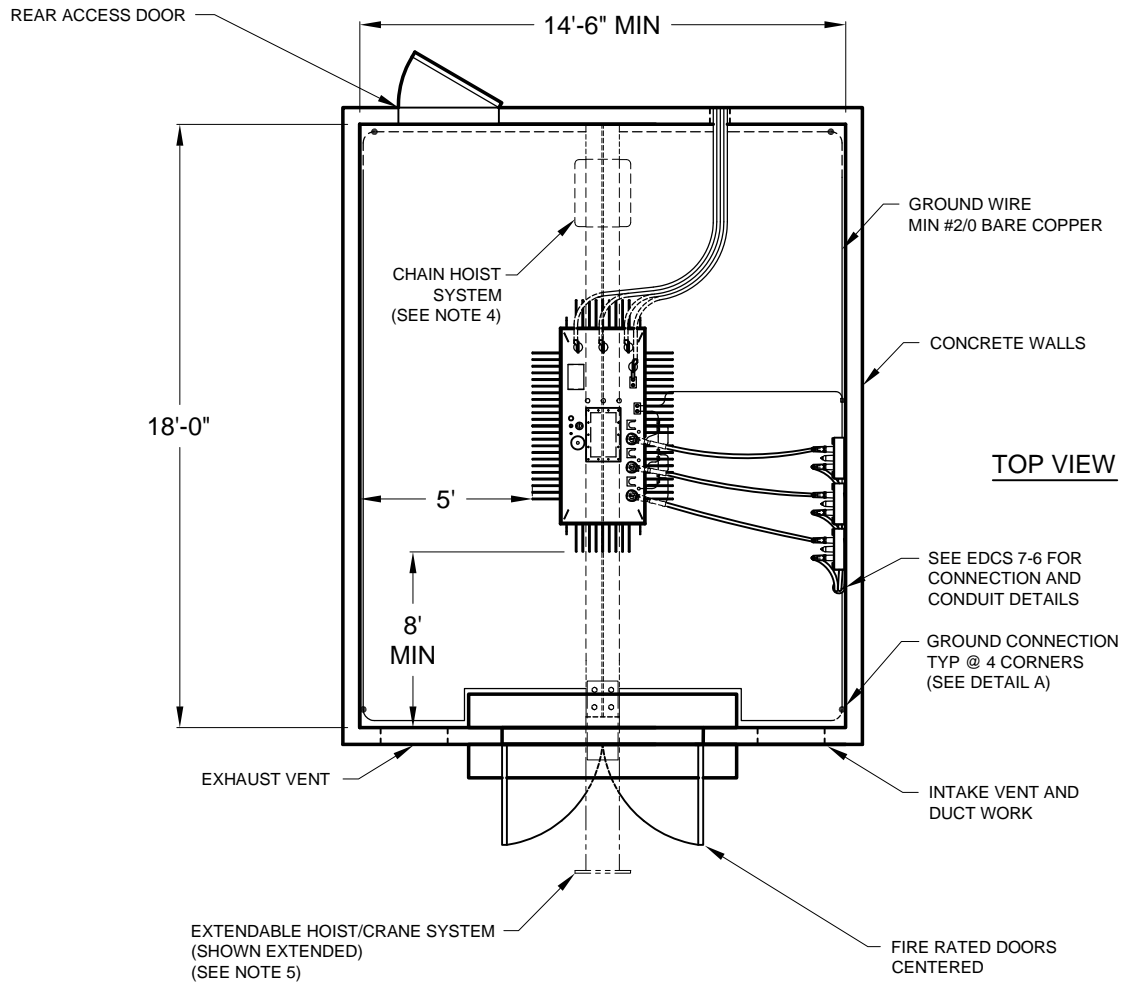
APPROVED AS OF:
11-16-2016

Indoor Transformer Vault Specification

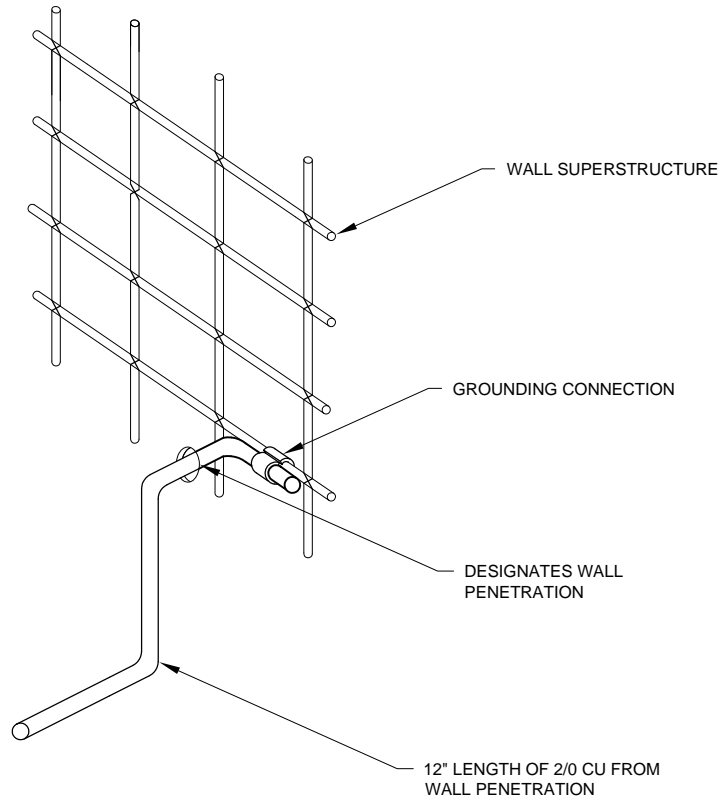
7-16

PG.7/9

GROUND LEVEL TRANSFORMER VAULT



GROUND LEVEL TRANSFORMER VAULT

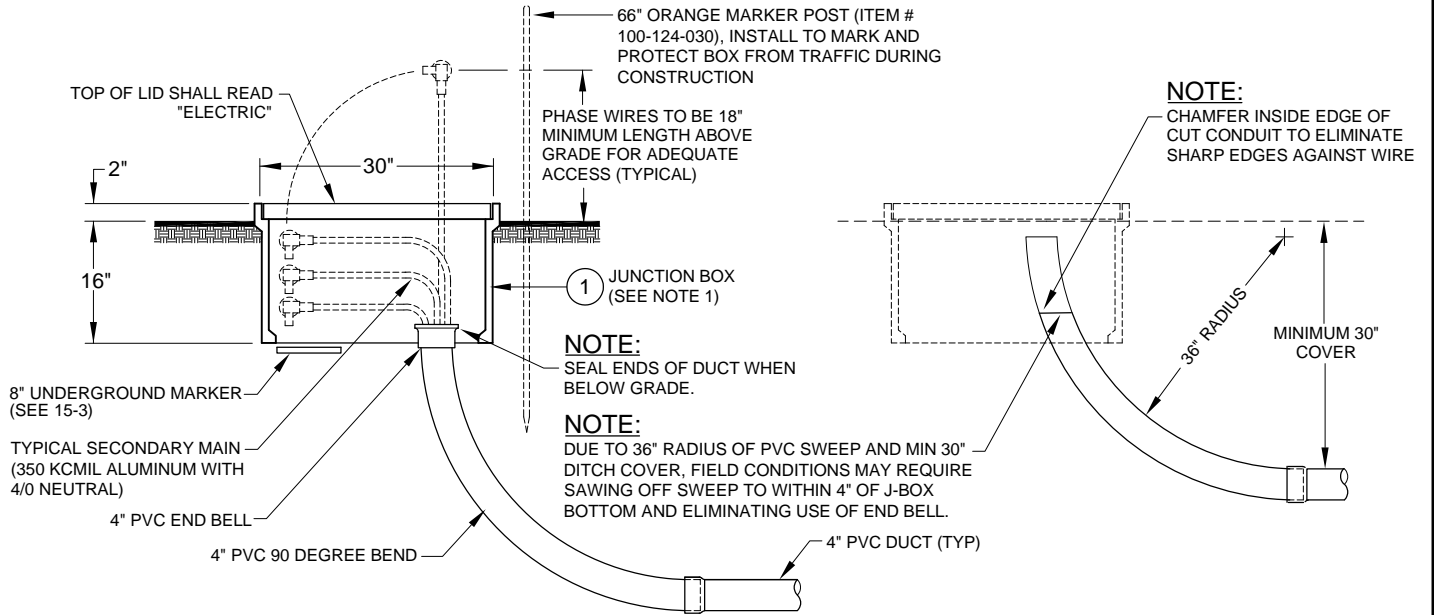


DETAIL A

NOTES:

1. For multiple transformer configurations add an additional 12' room width and additional double doors for each additional transformer.
2. The primary conduits enter the vault below the 3-ways that feed the transformer. The secondary conduits that feed the customer gear, are typically located on the rear wall. The final location of the primary and secondary conduits shall be determined before construction. Conduit size is determined by size and number of cables.
3. See CSU EDCS (Electric Distribution Construction Standards) section 7-6 for details on primary and secondary conduit placement. (Disregard 7-6 notes 4, 7, 9 and 17).
4. Ceiling height and doors shall be tall enough to accommodate the hoist plus 8 feet below the hoist hook.
5. Hoist system shall be able to extend 6 feet past outer wall doors to allow transformer to be moved outside the vault.

JUNCTION BOX INSTALLATION

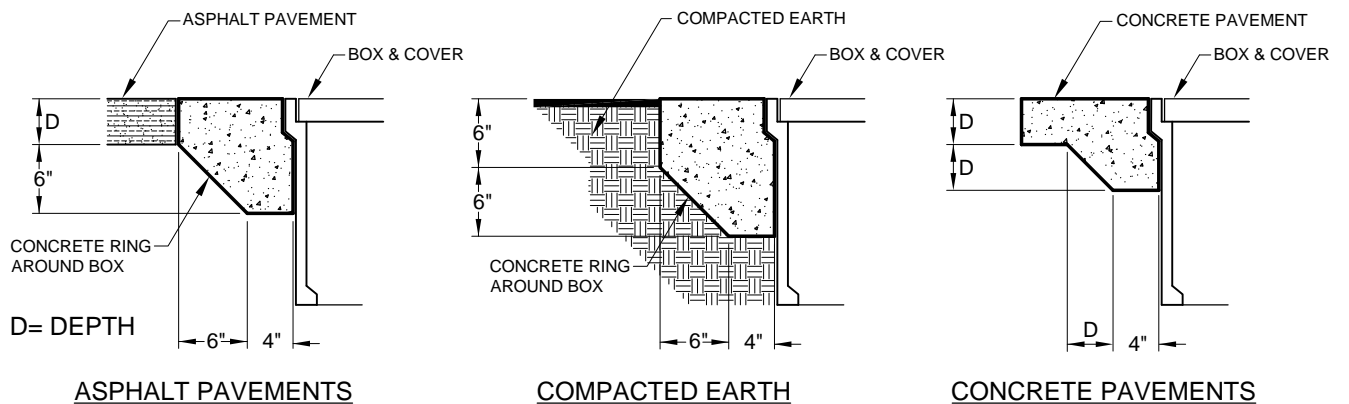


DESCRIPTION	ITEM NO.	BOX WGT	LID WGT	TOTAL WGT
JBOX, SECONDARY, SUBSURFACE, 17"x 30"x 18"	194-115-113	58 LBS	50 LBS	108 LBS
JBOX, SECONDARY, SUBSURFACE, 13"x 24"x 18"	194-115-126	45 LBS	25 LBS	70 LBS
COVER, REPLACEMENT, 2" THICK, 20K, 17"X 30"x 18"	194-115-180			
COVER, REPLACEMENT, 2" THICK, 20K, 13"X 24"x 18"	194-115-181			

NOTE:

Junction box has Tier-15 loading for off-street/incidental (unintentional) traffic locations only, e.g. sidewalks, residential driveways, parking lots, road shoulder etc., not in roadways or alleyways.

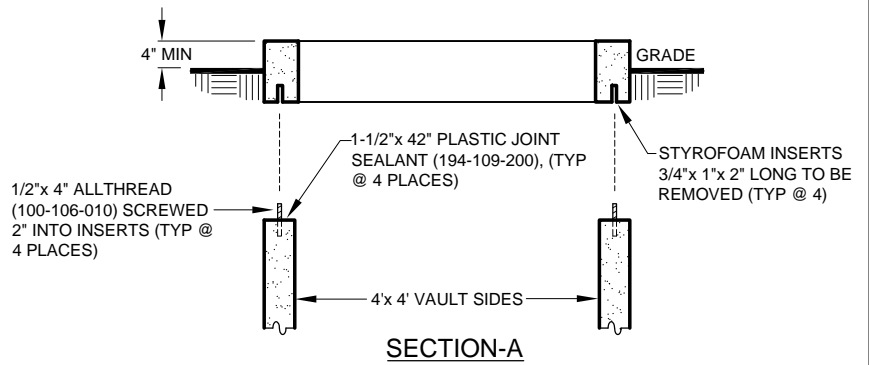
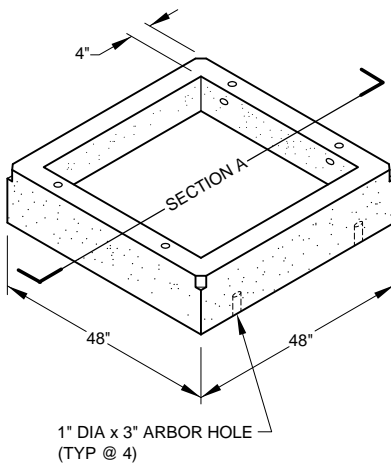
JUNCTION BOX REINFORCEMENT OPTIONS FOR NON-PREFERRED INSTALLATIONS



NOTES:

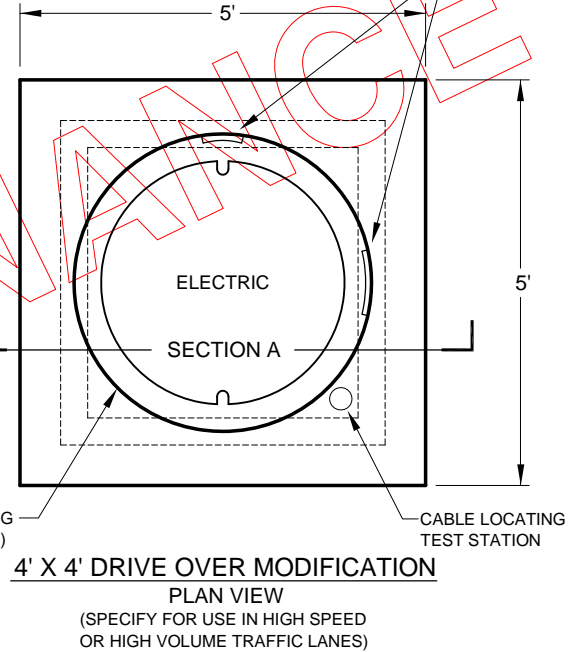
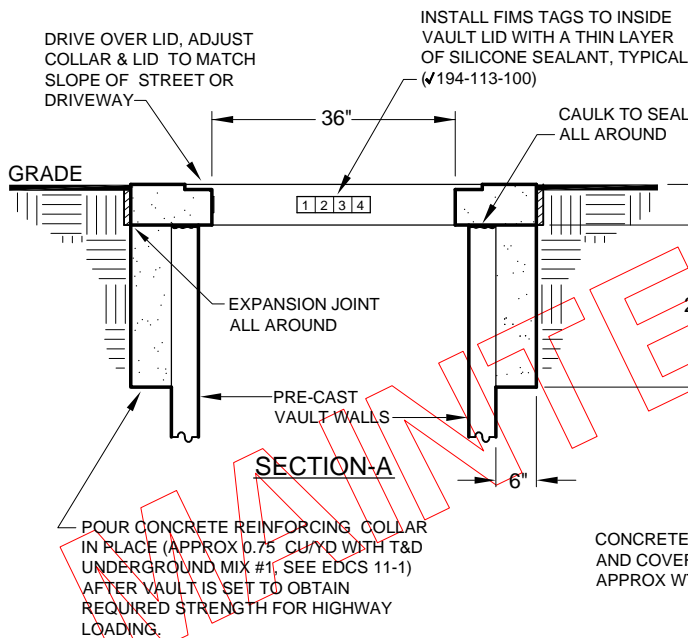
1. Non-preferred installation locations include driveways, alleys, parking lots, and off roadway applications where subject to occasional non-deliberate heavy vehicles.
2. Concrete encasement to be 3,000 psi min.
3. Concrete encasement ring dimensions to be equal to design pavement depth.
4. Pavement and subgrade to be as shown on engineering plans.

CONCRETE 4' x 4' VAULT EXTENSION



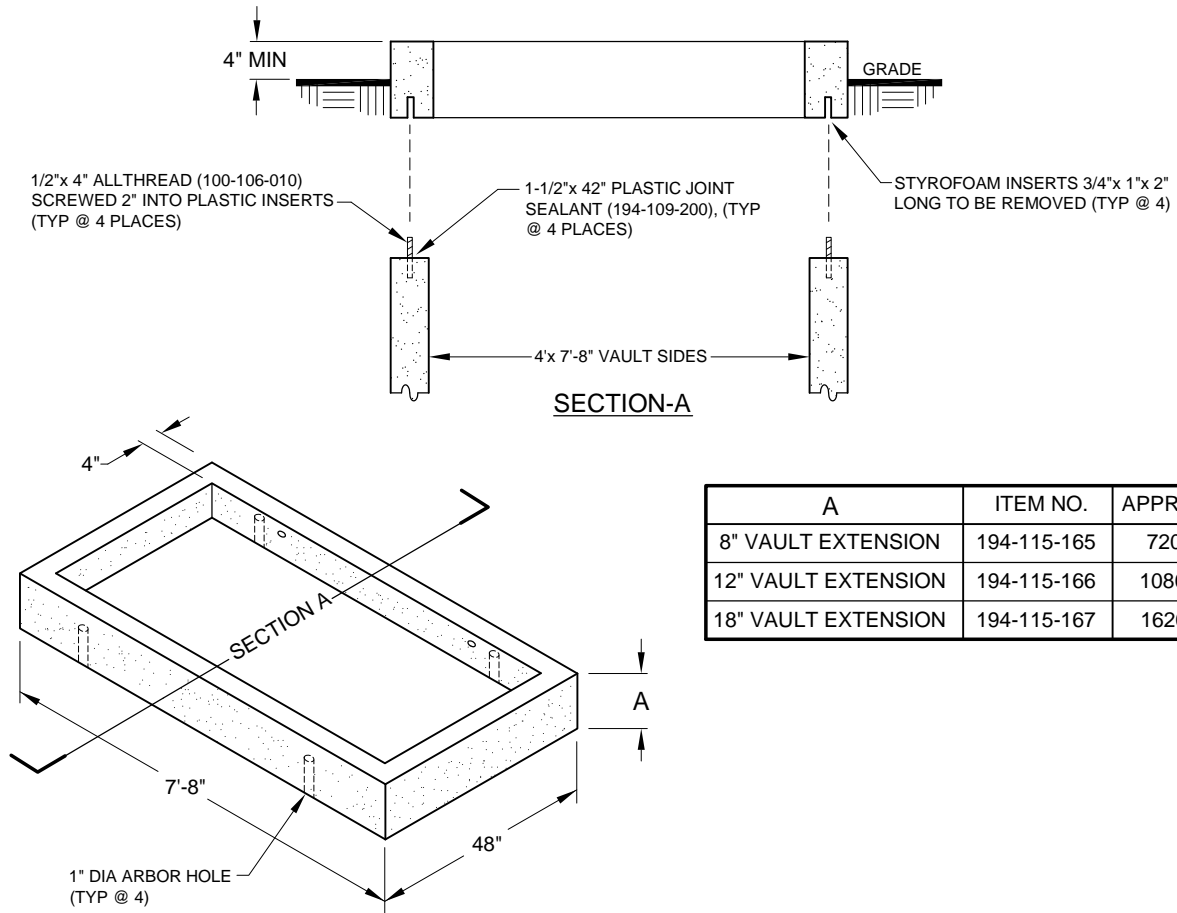
A	ITEM NO.	APPROX. WT.
4" VAULT EXTENSION	194-115-151	250 LBS
8" VAULT EXTENSION	194-115-152	500 LBS
12" VAULT EXTENSION	194-115-156	750 LBS
18" VAULT EXTENSION	194-115-160	840 LBS

UNDERGROUND FIMS LABELS
INSTALL LARGE TAG ON NORTH
SIDE OF LID, SMALL TAG ON
WEST SIDE (SEE SECTION-A)



4. The heavy duty rated cover (heavy duty lid has an incidental H20 rating of 16,000 lbs. dual wheel load without allowance for impact) is for off-street/incidental (unintentional) traffic locations only, e.g. sidewalks, residential driveways, parking lots, road shoulder etc., not in roadways or alleyways. The 6x12 vault (194-115-106) with ring and manhole cover (194-115-115) are recommended where vehicular traffic is expected (see EDCS 10-4). The pedestrian rated cover is designed for pedestrian loading only (300 lbs. per sq. ft.). For existing covers in the distribution system, if no markings on the cover state otherwise, assume it is pedestrian rated only.
5. Use foam sealer between vault cover (+/- 3") and concrete vault when raising vault cover to meet grade, typical for sealing new or existing covers.
6. Cable locating test station: remove one stainless steel nut from stainless steel bolt, loop #6 copper wire around bolt. Apply silicone sealant around nut area on exterior side of test station for waterproofing. Install jam nut and tighten with proper tools. Bond #6 wire to system neutral with proper compression crimp. This will provide Central Locating with an above-ground attachment for locating underground primary cables.
7. Plug all lifting inserts with duct seal to keep their integrity at final installation.
8. Replace any uneven or rocking manhole covers with gasketed manhole cover (194-115-188).

CONCRETE 4'x 7'-8" VAULT EXTENSION



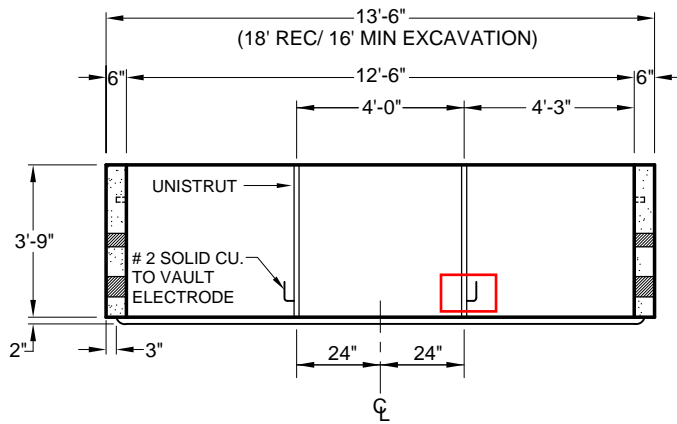
A	ITEM NO.	APPROX. WT.
8" VAULT EXTENSION	194-115-165	720 LBS
12" VAULT EXTENSION	194-115-166	1080 LBS
18" VAULT EXTENSION	194-115-167	1620 LBS

NOTES:

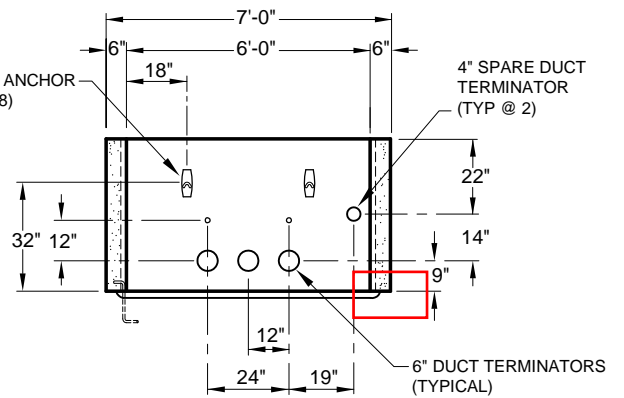
1. Refer to Electric Distribution Construction Standard 10-1 for installation notes.
2. For typical (behind curb, non-sidewalk) installations, install pedestrian (or heavy duty) rated cover 3-1/2" above grade.
3. For typical sidewalk installations, install pedestrian (or heavy duty) rated cover flush to top of proposed sidewalk. Adequately compact soil around lid perimeter to avoid future settling of sidewalk.
4. The heavy duty rated cover (heavy duty lid has an incidental H20 rating of 16,000 lbs. dual wheel load without allowance for impact) is for off-street/incidental (unintentional) traffic locations only, e.g. sidewalks, residential driveways, parking lots, road shoulder etc., not in roadways or alleyways. The 6x12 vault (194-115-106) with ring and manhole cover (194-115-115) are recommended where vehicular traffic is expected (see EDCS 10-4). The pedestrian rated cover is designed for pedestrian loading only (300 lbs. per sq. ft.). For existing covers in the distribution system, if no markings on the cover state otherwise, assume it is pedestrian rated only.
5. Use foam sealer between vault cover (+/- 3") and concrete vault when raising vault cover to meet grade, typical for sealing new or existing covers.
6. Plug all lifting inserts with duct seal to keep their integrity at final installation.
7. Use 3/8" dia. x 4" thick pea gravel inside vault for drainage in muddy or poor soil conditions (one ton will cover approximately 2-1/2 vaults).

6' WIDE x 12'-6" LONG x 7' HIGH VAULT

(ITEM #194-115-106)

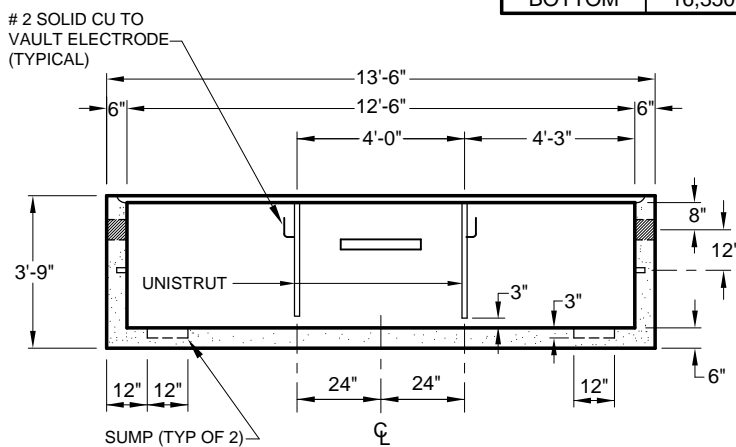


SIDE ELEVATION-TOP HALF
(OPPOSITE SIDE SIMILAR)

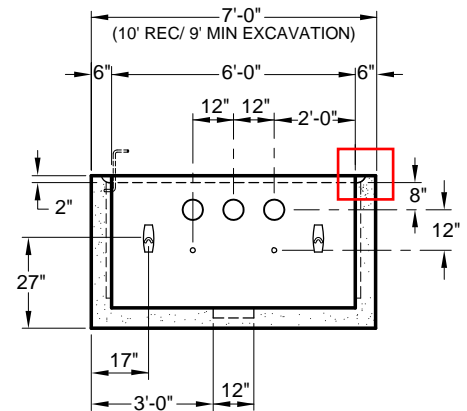


END ELEVATION-TOP HALF
(OPPOSITE SIDE SIMILAR)

VAULT HALF	APPROX WT
TOP	10,800 LBS
BOTTOM	16,350 LBS

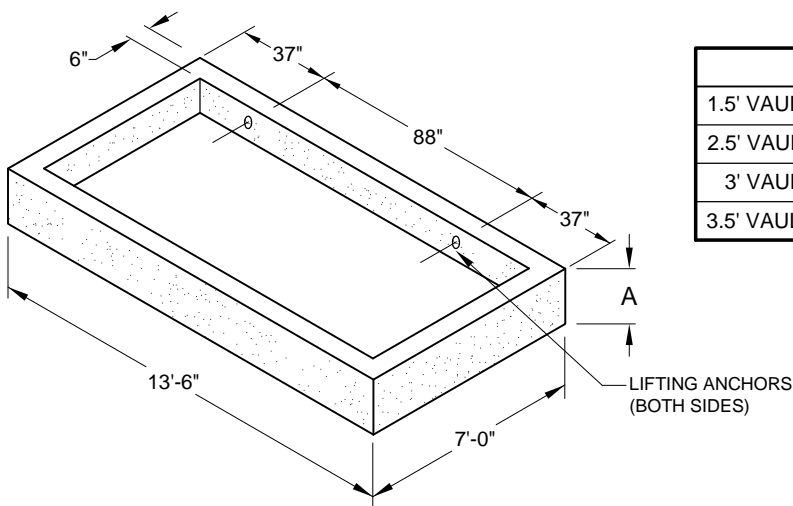


SIDE ELEVATION-BOTTOM HALF
(OPPOSITE SIDE SIMILAR)



END ELEVATION-BOTTOM HALF
(OPPOSITE SIDE SIMILAR)

CONCRETE 6'x 12'-6" VAULT EXTENSION



A	ITEM NO.	APPROX. WT.
1.5' VAULT EXTENSION	194-115-161	4,333 LBS
2.5' VAULT EXTENSION	194-115-162	7,222 LBS
3' VAULT EXTENSION	194-115-163	8,667 LBS
3.5' VAULT EXTENSION	194-115-164	10,111 LBS

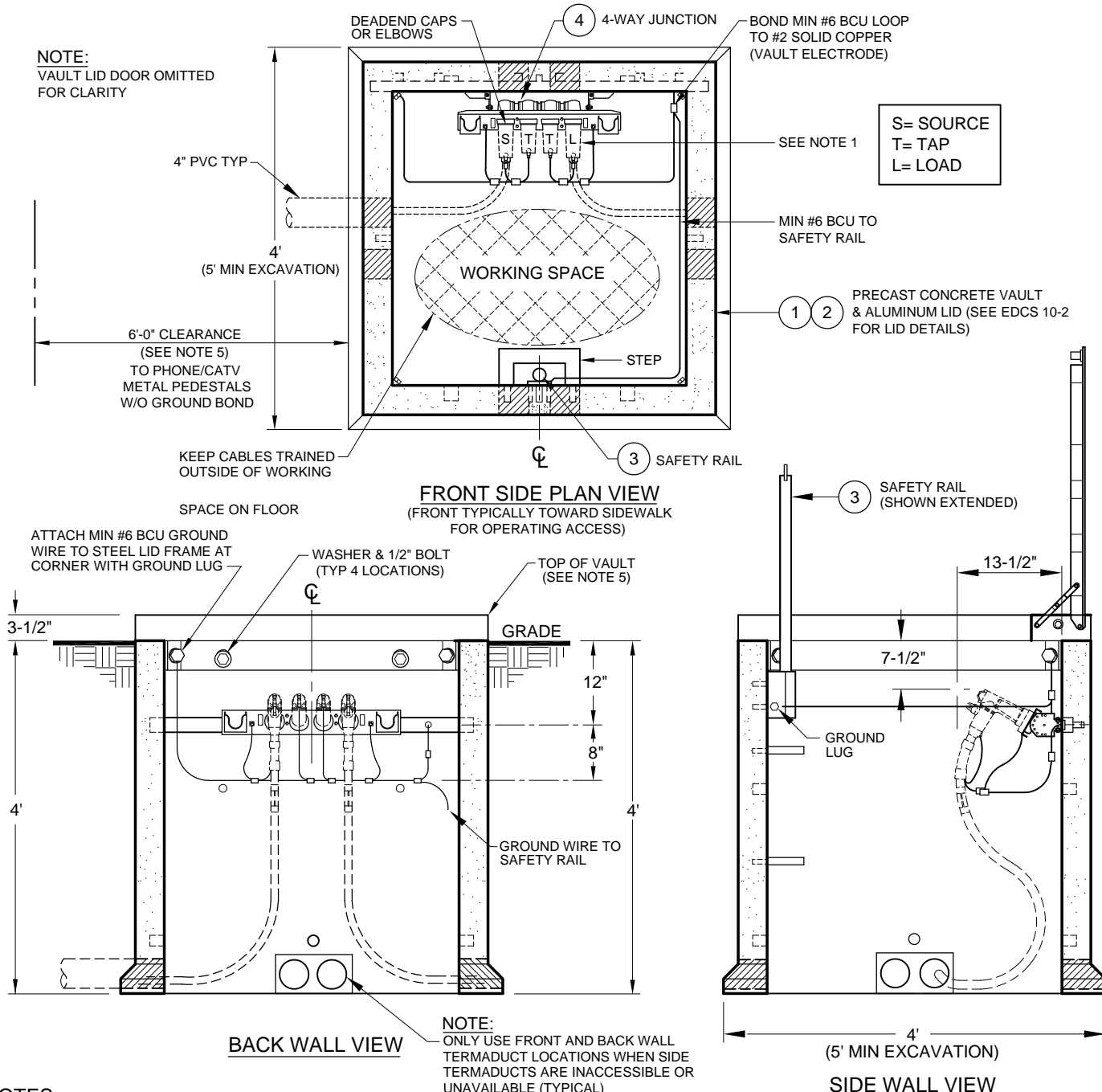
NOTE:

1. Refer to EDCS 10-1 for installation notes and grounding details between vault halves.
2. The 6x12 vault (Item #194-115-106) with ring and manhole cover (Item #194-115-115) are recommended where high-speed, or heavy traffic is expected.

4X4 VAULT INSTALLATION

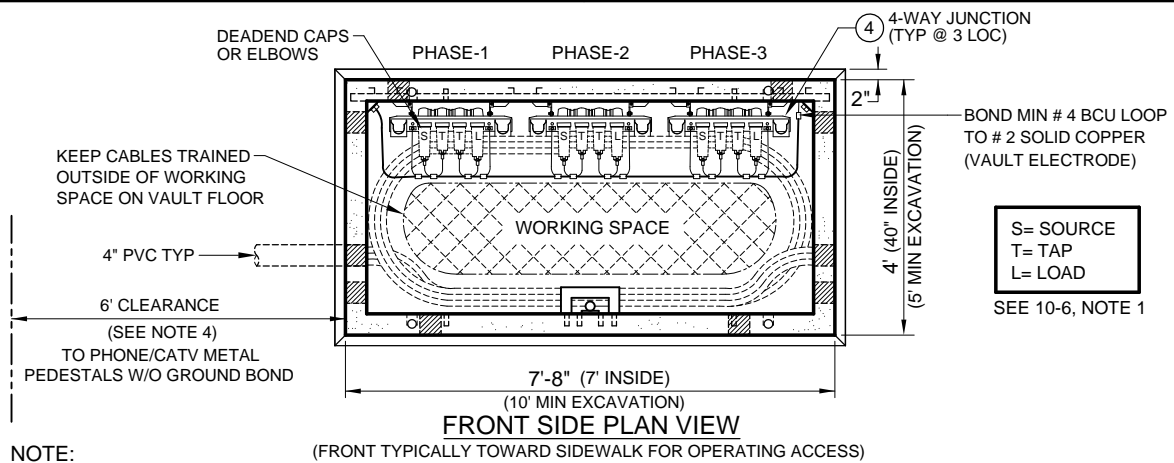
(PREFERRED INSTALLATION)

NOTE:
VAULT LID DOOR OMITTED FOR CLARITY

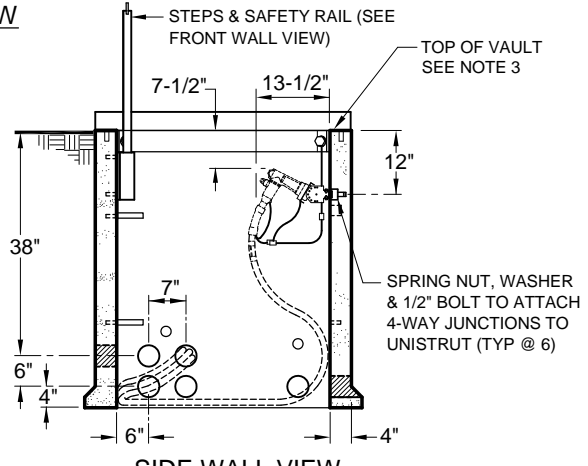
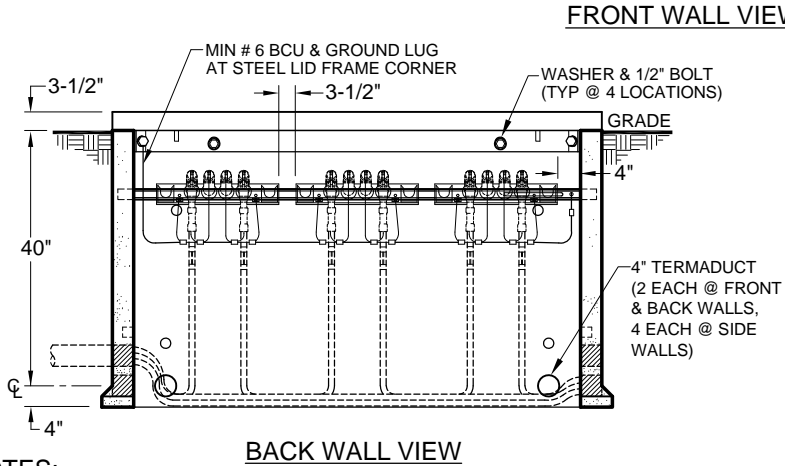
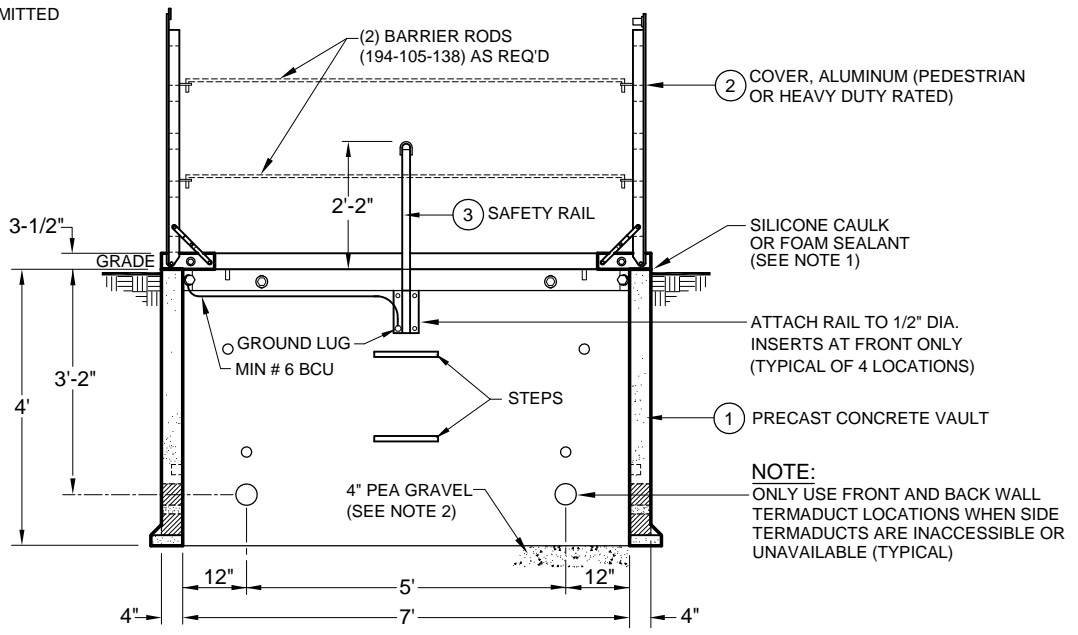


NOTES:

1. All sources and loads will be terminated as shown. These will be indicated on job construction prints. Source, Tap, Tap, Load is the preferred termination configuration. In congested 4x7 (3 phase) vaults, this sequence can be rearranged as necessary to keep cables from crossing each other, as long as Source & Load are not located in the center two bushings.
2. Use foam sealer (Item #100-106-965) between vault lid ($\pm 3"$) and concrete vault when raising vault lid to meet grade, typical for sealing new or existing lids.
3. Use 3/8" dia. pea gravel, 4" thick inside vault for drainage in muddy or poor soil conditions (one ton will cover approximately 6 vaults).
4. Specify a pedestrian or heavy duty rated cover for flush mount applications (pedestrian lid is for pedestrian traffic only, heavy duty lid for off-street/incidental (unintentional) traffic locations only, e.g. sidewalks, residential driveways, parking lots, road shoulder etc., not in roadways or alleyways). See EDCS 10-2 for application limits and details for flush mounting in sidewalks.
5. NESC Rule 384C: Bond all above ground metallic supply and communication enclosures that are separated by 6 feet or less. Use minimum #6 bare copper wire direct buried a minimum 18" below grade, to a suitable bolted or screw connection that can be temporarily opened when locating cables. Treat open ground connections as energized!



NOTE:
VAULT LID DOORS OMITTED FOR CLARITY



NOTES:

1. Use foam sealer (Item #100-106-965) between vault lid and concrete vault when raising lid (+/- 3") to meet grade, typical for sealing new or existing lids.
2. Use 3/8" dia. pea gravel, 4" thick inside vault for drainage in muddy or poor soil conditions (one ton will cover approximately 2-1/2 vaults).
3. Specify a pedestrian or heavy duty rated cover for flush mount applications (pedestrian lid is for pedestrian traffic only, heavy duty lid for off-street/incidental (unintentional) traffic locations only, e.g. sidewalks, residential driveways, parking lots, road shoulder etc., not in roadways or alleyways). See EDCS 10-3 for flush mounting in sidewalks.
4. NESC Rule 384C: Bond all above ground metallic supply and communication enclosures that are separated by 6 feet or less. Use minimum #6 bare copper wire direct buried a minimum 18" below grade, to a suitable bolted or screw connection that can be temporarily opened when locating cables. Treat open ground connections as energized!

ELECTRIC DISTRIBUTION CONSTRUCTION STANDARDS

CUID EXAMPLE:
E.VLT4X7&H20-3PH-4WAY



APPROVED AS OF:
2-9-2016

15KV 200-AMP 3-PHASE VAULT 4X7

10-7 PG. 1/1

CSU CONCRETE MIXES

ELECTRIC T&D UNDERGROUND

MIX #1	MIX #2	MIX #3
DUCT ENCASEMENT CONCRETE	ALL POURED-IN-PLACE EQUIPMENT PADS (WHERE ADEQUATE SUPPORT STRENGTH IS NEEDED)	FLOWABLE FILL MIX
SLUMP: 6" MAXIMUM AGGREGATE: 3/4" MINIMUM STRENGTH: 2000 PSI MAXIMUM WATER/CEMENT: 0.85 LBS/LB MINIMUM CEMENT/YD: 453 LBS/YD TYPE II CEMENT	SLUMP: 6" MAXIMUM AGGREGATE: 3/4" MINIMUM STRENGTH: 2000 PSI MAXIMUM WATER/CEMENT: 0.85 LBS/LB MINIMUM CEMENT/YD: 453 LBS/YD TYPE II CEMENT MAXIMUM AIR ENTRAINMENT: 6% +/- 0.5%	FOR FLOWABLE FILL SPECIFICATION: REFERENCE COLORADO SPRINGS "CITY STANDARD SPECIFICATIONS MANUAL" SECTION 206 "COMPACTION OF UTILITY TRENCHES" OR CDOT "SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" SECTION 206 "EXCAVATION AND BACKFILL FOR STRUCTURES".

NOTE:

ANY CONCRETE MIX CONTAINING FLY ASH OR ADDITIVES, MUST BE APPROVED BY CSU ENGINEERING STANDARDS.

**CONCRETE MIX ESTIMATOR
FOR CONCRETE ENCASED DUCT BANKS**

6" DUCT BANK STRUCTURE	MINIMUM TRENCH WIDTH	REQUIRED CONCRETE HEIGHT	TYPICAL BUCKET WIDTH *	CONCRETE QUANTITY (CUBIC YARDS)								
				TRENCH LENGTH								
				LINEAL FOOT	50'	100'	150'	200'	250'	300'	350'	400'
2 CONDUITS	21-1/4"	12"	18" (20" - 22")	0.0532	2.66	5.32	7.98	10.64	13.30	15.96	18.62	21.28
			24" (26" - 28")	0.0719	3.60	7.19	10.79	14.38	17.98	21.57	25.17	28.76
4 CONDUITS	21-1/4"	21"	18" (20" - 22")	0.0898	4.49	8.98	13.47	17.96	22.45	26.94	31.43	35.92
			24" (26" - 28")	0.1220	6.10	12.20	18.30	24.40	30.50	36.60	42.70	48.80
6 CONDUITS	29-7/8"	21"	30" (32" - 34")	0.1400	7.00	14.0	21.0	28.0	35.0	42.0	49.0	56.0

* ADD 2"- 4" FOR ACTUAL BUCKET TRENCH WIDTH

QUANTITY BASED ON MAXIMUM BUCKET
TRENCH WIDTH (SEE NOTE 2)

**FLOWABLE FILL MIX ESTIMATOR
FOR FILLING TRENCH ABOVE CONCRETE ENCASED DUCT BANKS**

6" DUCT BANK STRUCTURE	MINIMUM TRENCH WIDTH	REQUIRED CONCRETE HEIGHT	TYPICAL BUCKET WIDTH *	FLOWABLE FILL QUANTITY (CUBIC YARDS)								
				TRENCH LENGTH								
				LINEAL FOOT	50'	100'	150'	200'	250'	300'	350'	400'
2 OR 4 CONDUITS	21-1/4"	36"	18" (20" - 22")	0.204	10.20	20.40	30.60	40.80	51.0	61.20	71.40	81.60
			24" (26" - 28")	0.260	13.0	26.0	39.0	52.0	65.0	78.0	91.0	104.0
6 CONDUITS	29-7/8"	36"	30" (32" - 34")	0.315	15.75	31.50	47.25	63.0	78.75	94.50	110.25	126.0

* ADD 2"- 4" FOR ACTUAL BUCKET TRENCH WIDTH

QUANTITY BASED ON MAXIMUM BUCKET
TRENCH WIDTH (SEE NOTE 3)

CONCRETE NOTES:

- The Concrete Mix and Flowable Fill Mix Estimator charts are based on typical CSU concrete encased trench configurations. Flowable fill (Mix #3) is commonly used to backfill trenches when native soil is unsuitable, or for quick trench closure (see EDCS 11-2).
- The formula for estimating cubic yards of Concrete Mix: $CU. YD. = \frac{L' \times [(W' \times H') - (N \times 0.196)]}{27}$
(where "N" = number of 6" ducts)
- The formula for estimating cubic yards of Flowable Fill is: $CU. YD. = \frac{L' \times W' \times H'}{27}$



ITEM NUMBER	COLORADO SPRINGS UTILITIES TYPE	FORM DESIGNATION	NAMEPLATE VOLTAGE (VOLTS)	TEST CURRENT (AMPS)	PHASE	SELF-CONTAINED	TRANSFORMER RATED (CL20)	NAMEPLATE COLOR	NOTES
102-301-000	1	1S	120	15	SINGLE	Y		WHITE	AMR METER
102-301-001	1C	1S	120	15	SINGLE	Y		WHITE	MV-90 METER WITH TRILLIANT CELL MODULE
102-301-070	3C	2S	VARIABLE	30	SINGLE	Y		WHITE	MV-90 METER WITH TRILLIANT CELL MODULE
102-301-069	3M	2S	VARIABLE	30	SINGLE	Y		WHITE	AMR METER
102-301-065	5	2S	240	30	SINGLE	Y		WHITE	AMR METER
102-301-067	5D	2S	240	30	SINGLE	Y		YELLOW	AMR DISCONNECT METER
102-301-066	5E	2S	240	50	SINGLE	Y		GREEN	CLASS 320 AMP (CL320) AMR METER
102-301-064	5EN	2S	240	50	SINGLE	Y		BLUE/ GREEN DOT	CLASS 320 AMP (CL320) AMR NET METER
102-301-063	5L	2S	240	30	SINGLE	Y		WHITE	AMR METER WITH LOAD PROFILE CAPABILITY
102-301-068	5N	2S	240	30	SINGLE	Y		BLUE	AMR NET METER
102-301-015	10	12S	120	30	SINGLE	Y		WHITE	AMR NETWORK METER
102-301-016	10D	12S	120	30	SINGLE	Y		YELLOW	AMR NETWORK DISCONNECT METER
102-301-014	10L	12S	120	30	SINGLE	Y		WHITE	AMR METER WITH LOAD PROFILE CAPABILITY
102-301-017	10N	12S	120	30	SINGLE	Y		BLUE	AMR NETWORK NET METER
102-301-072	11	12S	VARIABLE	30	POLY	Y		WHITE	AMR NETWORK METER
102-301-073	11C	12S	VARIABLE	30	POLY	Y		WHITE	MV-90 METER WITH TRILLIANT CELL MODULE
102-301-018	11M	12S	VARIABLE	30	POLY	Y		WHITE	AMR NETWORK METER
102-301-040	22	16S	VARIABLE	30	POLY	Y		WHITE	AMR METER
102-301-045	22M	16S	VARIABLE	30	POLY	Y		WHITE	AMR METER
102-301-041	22C	16S	VARIABLE	30	POLY	Y		WHITE	MV-90 METER WITH TRILLIANT CELL MODULE
102-301-055	52	3S	240	2.5	POLY		Y	RED	AMR METER
102-301-056	52M	3S	240	2.5	POLY		Y	RED	AMR METER
102-301-057	55	3S	120	2.5	SINGLE	Y		WHITE	CAPACITOR BANK MONITOR METER
102-301-135	60	45S	VARIABLE	2.5	POLY		Y	RED	AMR METER
102-301-130	60M	45S	VARIABLE	2.5	POLY		Y	RED	AMR METER
102-301-131	60C	45S	VARIABLE	2.5	POLY		Y	RED	MV-90 METER WITH TRILLIANT CELL MODULE
102-301-085	69C	9S	69	2.5	POLY		Y	RED	MV-90 METER WITH TRILLIANT CELL MODULE
102-301-096	72	9S	VARIABLE	2.5	POLY		Y	RED	AMR METER
102-301-097	72M	9S	VARIABLE	2.5	POLY		Y	RED	AMR METER
102-301-098	72C	9S	VARIABLE	2.5	POLY		Y	RED	MV-90 METER WITH TRILLIANT CELL MODULE

Changed from 120 to 240

240

Deleted
102-301-019 -
Type 10C Meter

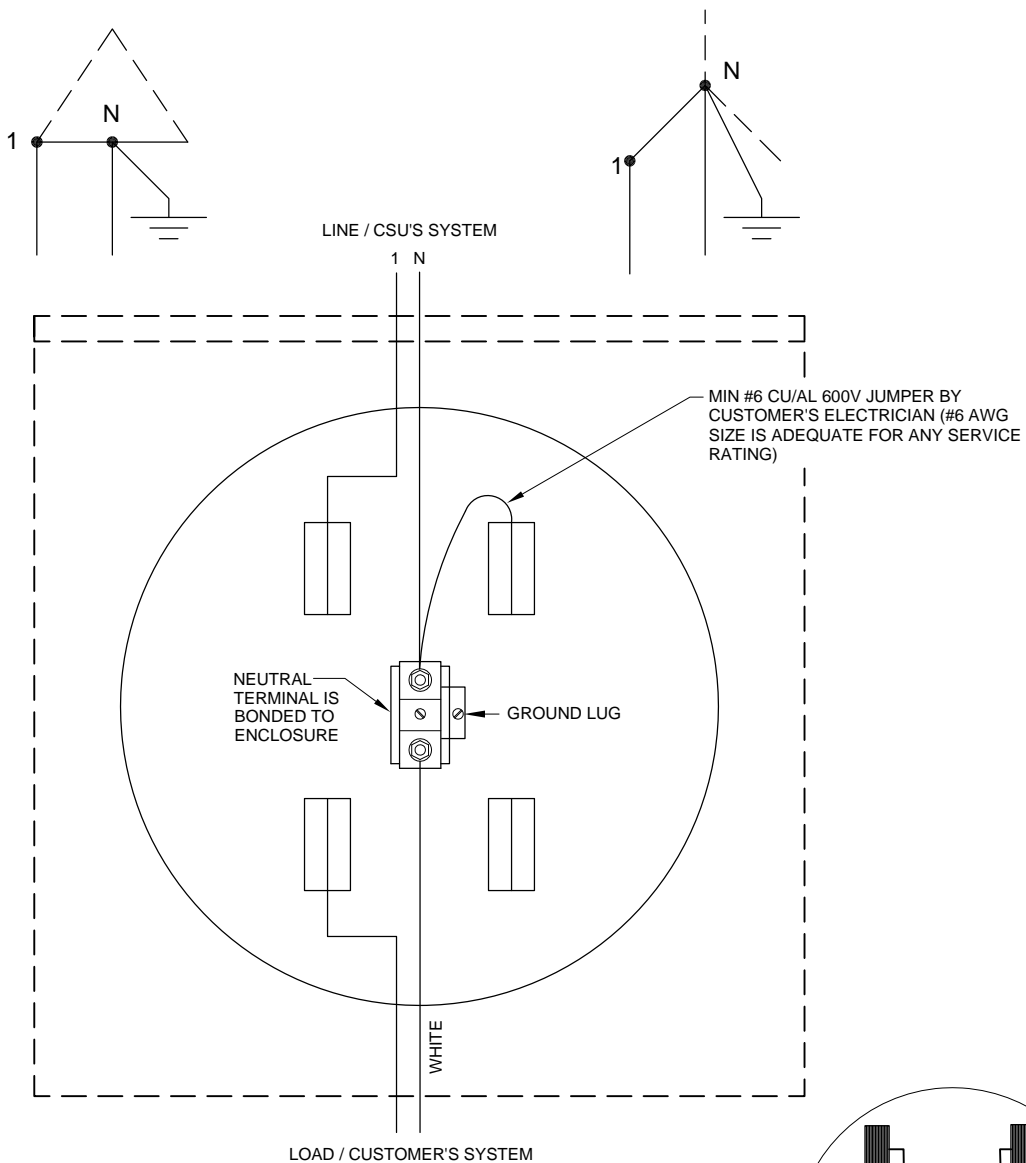
Colorado Springs Utilities Type Abbreviations:

- C- MV-90 Meter
- E- CL320
- N- Net Metering Capability
- D- Internal Disconnect Capability
- M- Multi-Function Register (TOU & kW/kVA/PF) & Extended Memory
- L- AX meter with Load Profile Capability

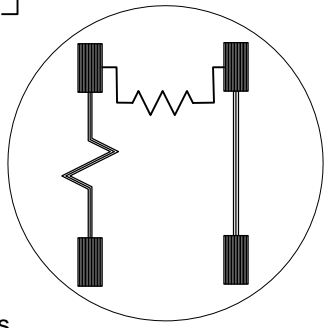
ELECTRIC DISTRIBUTION CONSTRUCTION STANDARDS

APPROVED AS OF: 8-26-2016	METER TYPES- SELF CONTAINED (CLASS 200) & TRANSFORMER RATED (CLASS 20)	14-6	PG.1/1
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SINGLE PHASE, 2 WIRE, 120 VOLT

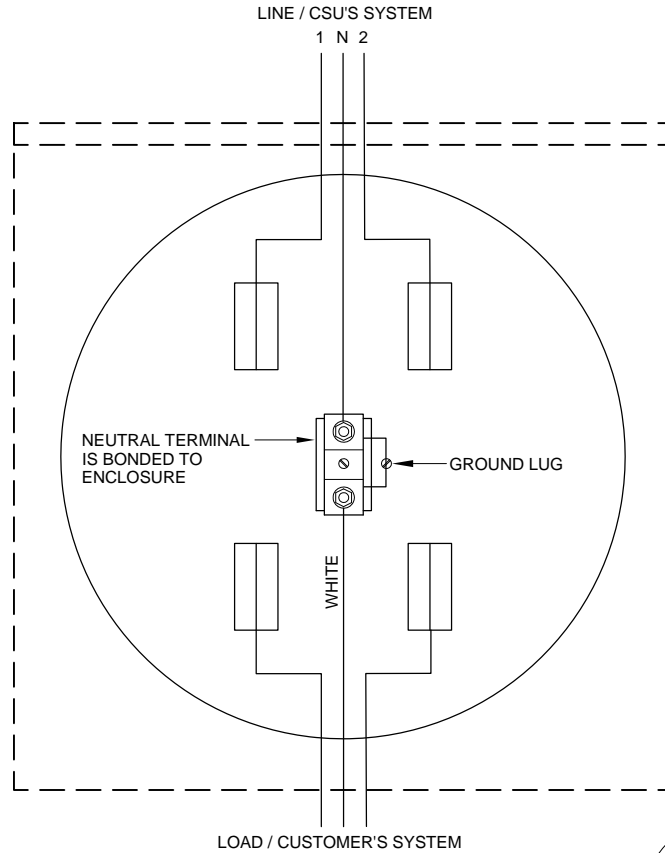
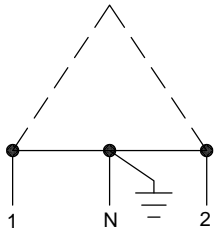


NOTES:

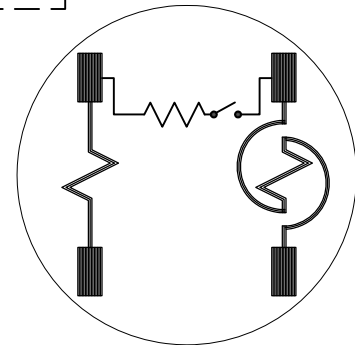
1. See Drawings 16 & 17 in the Electric Line Extension & Service Standards Manual for typical secondary grounding requirements.
2. Wire Size Range:
 - 2.1 100 amp socket: Lugs suitable for #6 - #2/0 stranded CU/AL conductors.
 - 2.2 200 amp socket: Lugs suitable for #2 - 350 kcmil CU/AL conductors.
 - 2.3 Ground Lug: Capable of accepting up to #2 solid CU/AL conductor.
3. Approximate Dimensions:
 - 3.1 100 amp socket: 3-5/16"(D) x 8"(W) x 11-1/2"(H).
 - 3.2 200 amp socket: 4-3/8"(D) x 11"(W) x 15-1/2"(H).
4. Knockouts: Three on bottom and one each on both sides and back; knockouts are concentric type with maximum diameter of 2" for 100 amp sockets and 2-1/2" for 200 amp sockets.
5. If the meter socket is fed from an upstream (supply side) breaker or disconnect, where the neutral is already bonded to the grounding electrode system, do not connect the neutral ground lug (NEC 250).
6. EEL form type 1S, CSU type 1, 1C.

Deleted Note 5: "For overhead services, meter sockets are furnished with a hub sized as needed, available hub sizes are 1-1/4", 1-1/2", 2" and 2-1/2"."





SINGLE PHASE, 3 WIRE, 240 VOLT

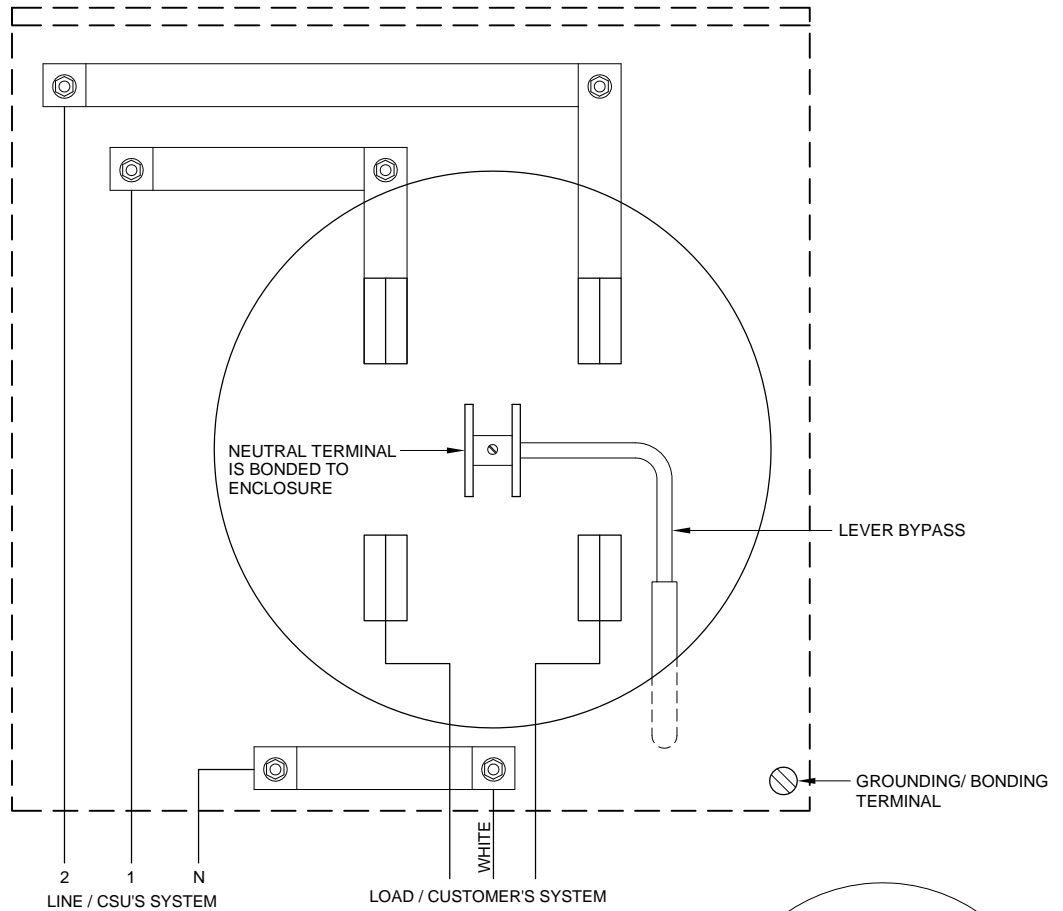
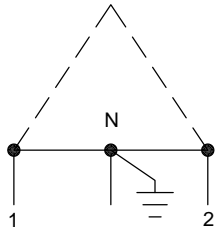


INTERNAL
METER CONNECTIONS

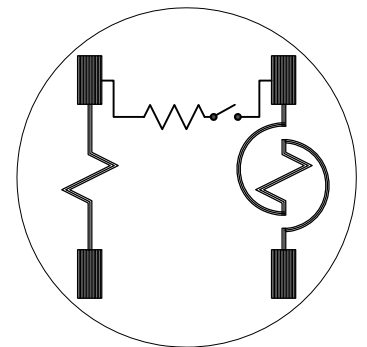
NOTES:

1. See Drawings 16 & 17 in the Electric Line Extension & Service Standards Manual for typical secondary grounding requirements.
2. Wire Size Range:
 - 2.1 100 amp socket: Lugs suitable for #6 - #2/0 stranded CU/AL conductors.
 - 2.2 200 amp socket: Lugs suitable for #2 - 350 kcmil CU/AL conductors.
 - 2.3 Ground Lug: Capable of accepting up to #2 solid CU/AL conductor.
3. Approximate Dimensions:
 - 3.1 100 amp socket: 3-5/16"(D) x 8"(W) x 11-1/2"(H).
 - 3.2 200 amp socket: 4-3/8"(D) x 11"(W) x 15-1/2"(H).
4. Knockouts: Three on bottom and one each on both sides and back; knockouts are concentric type with maximum diameter of 2" for 100 amp sockets and 2-1/2" for 200 amp sockets.
5. If the meter socket is fed from an upstream (supply side) breaker or disconnect, where the neutral is already bonded to the grounding electrode system, do not connect the neutral ground lug (NEC 250).
6. EEI form type 2S, CSU types 3C, 3M, 5, 5D, 5L, 5N.

Deleted Note 5: "For overhead services, meter sockets are furnished with a hub sized as needed, available hub sizes are 1-1/4", 1-1/2", 2" and 2-1/2"."



SINGLE PHASE, 3 WIRE, 240 VOLT (320 AMP)

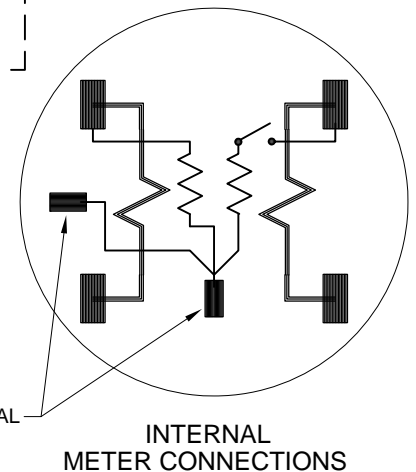
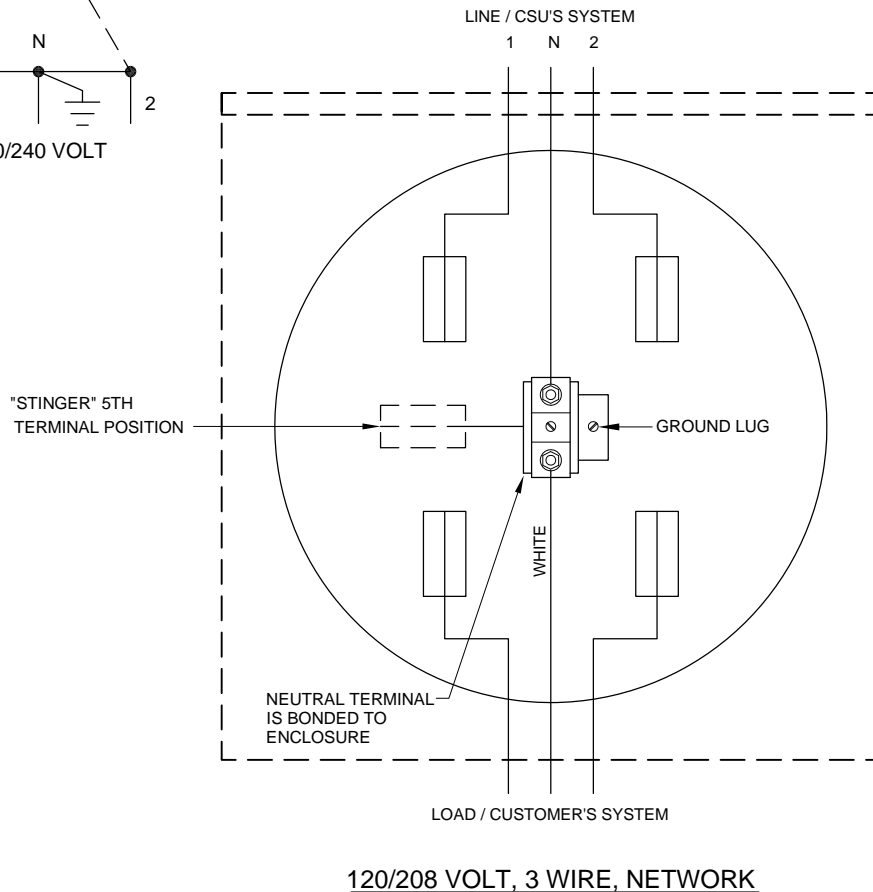
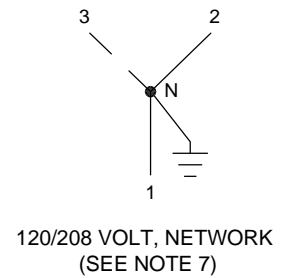
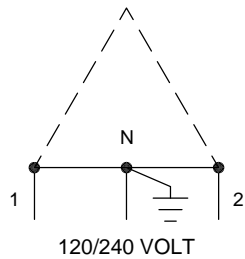


NOTES:

1. See Drawings 16 & 17 in the Electric Line Extension & Service Standards Manual for typical secondary grounding requirements.
2. Wire Size Range:
 - 2.1 Lugs suitable for #2 - 600 kcmil CU/AL conductors.
 - 2.2 Ground Lug: Capable of accepting up to #1/0 CU/AL conductor.
3. Approximate Dimensions:
 - 3.1 320 amp socket (OH): 4-3/8"(D) x 10-1/2"(W) x 26"(L)
 - 3.2 320 amp offset socket (UG): 6"(D) x 17"(W) x 30"(L)
4. Knockouts: Three on bottom and one each on both sides and back; knockouts are concentric type with a maximum diameter of 3-1/2".
5. To accommodate the 4" riser, a 3" to 4" adapter will be required to transition to the meter socket.
6. If the meter socket is fed from an upstream (supply side) breaker or disconnect, where the neutral is already bonded to the grounding electrode system, do not connect the neutral ground lug (NEC 250).
7. EEI form type 2S, 2SE, CSU types 5E, 5EN.

Deleted part of note 5: "For overhead services, meter sockets are furnished with a hub sized as needed, available hub sizes are 1-1/4", 1-1/2", 2", 2-1/2" and 3"."



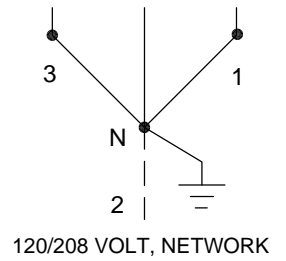
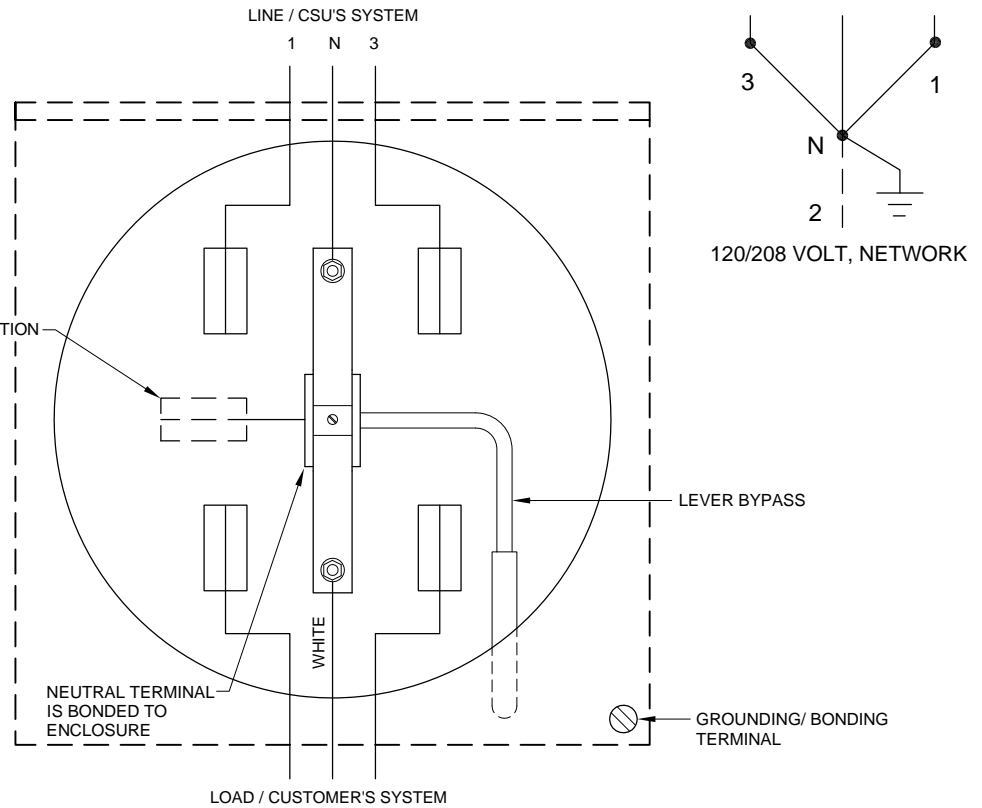
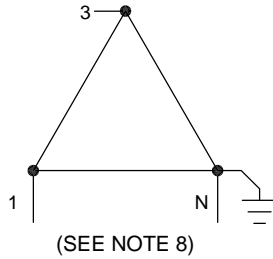
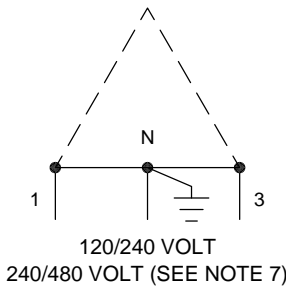


ALTERNATE POSITIONS OF
MOVABLE POTENTIAL TERMINAL

NOTES:

1. See Drawings 16 & 17 in the Electric Line Extension & Service Standards Manual for typical secondary grounding requirements.
2. A fifth terminal (stinger) in the 9 o'clock position is required for 120/208 volt service.
3. Wire Size Range:
 - 3.1 100 amp socket: Lugs suitable for #6 - #2/0 stranded CU/AL conductors.
 - 3.2 200 amp socket: Lugs suitable for #2 - 350 kcmil CU/AL conductors.
 - 3.3 Ground Lug: Capable of accepting up to #2 solid CU/AL conductor.
4. Approximate Dimensions:
 - 4.1 100 amp socket: 3-5/16"(D) x 8"(W) x 11-1/2"(H).
 - 4.2 200 amp socket: 4-3/8"(D) x 11"(W) x 15-1/2"(H).
5. Knockouts: Three on bottom and one each on both sides and back; knockouts are concentric type with a maximum diameter of 2" for 100 amp sockets and 2-1/2" for 200 amp sockets.
6. If the meter socket is fed from an upstream (supply side) breaker or disconnect, where the neutral is already bonded to the grounding electrode system, do not connect the neutral ground lug (NEC 250).
7. EEL form type 12S, CSU types 10, 10D, 10L, 10N.

Deleted Note 6: "For overhead services, meter sockets are furnished with a hub sized as needed, available hub sizes are 1-1/4", 1-1/2", 2" and 2-1/2"."



120/208 VOLT, 3 WIRE, NETWORK
SINGLE PHASE, 3 WIRE, 120/240 VOLT
SINGLE PHASE, 3 WIRE, 240/480 VOLT (SEE NOTE 7)
THREE PHASE, 3 WIRE, DELTA (SEE NOTE 8)
277/480 VOLT, 3 WIRE, NETWORK

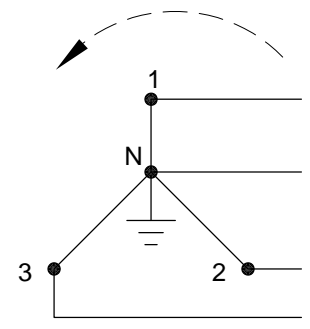
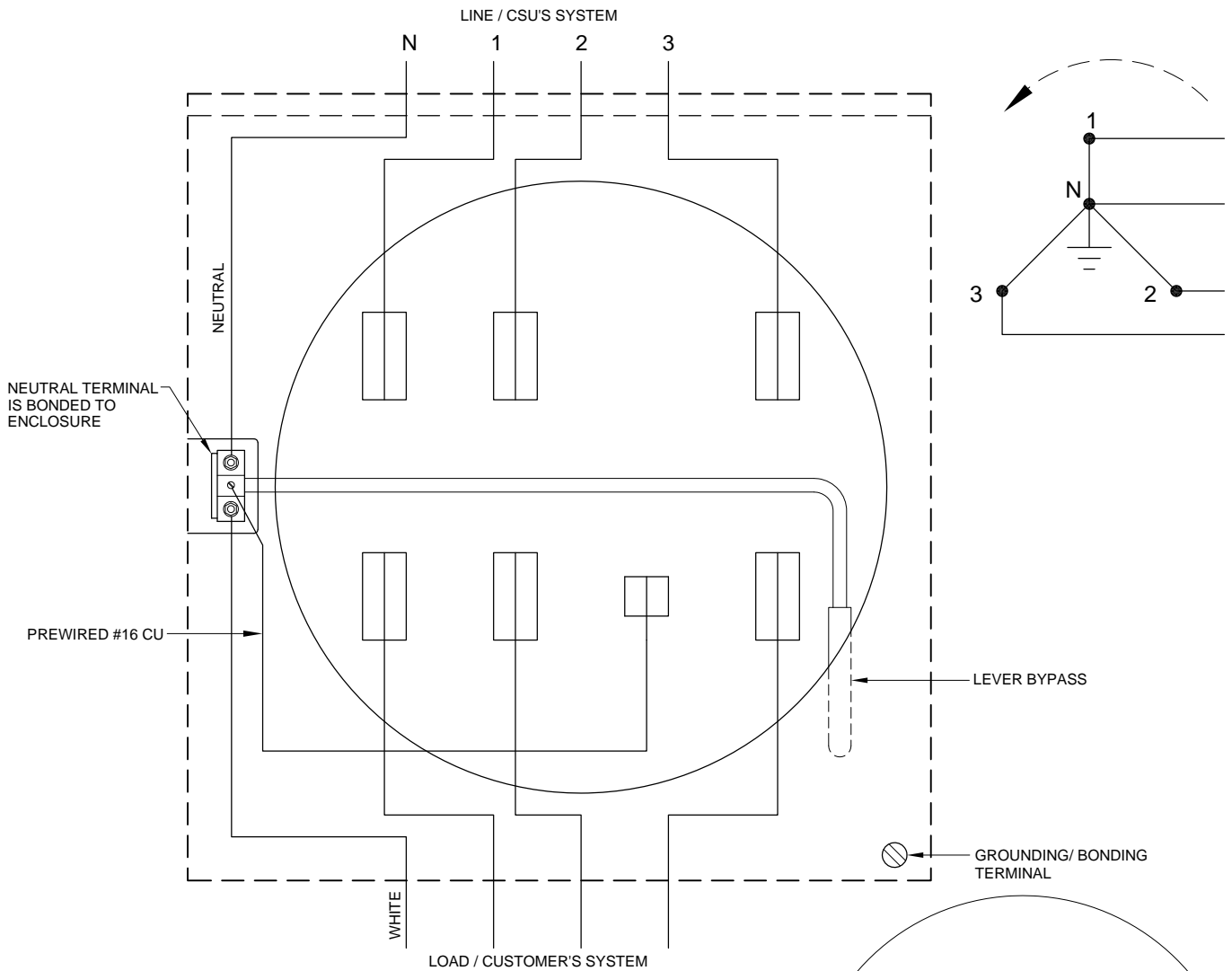
ALTERNATE POSITIONS OF
MOVABLE POTENTIAL TERMINAL

INTERNAL
METER CONNECTIONS

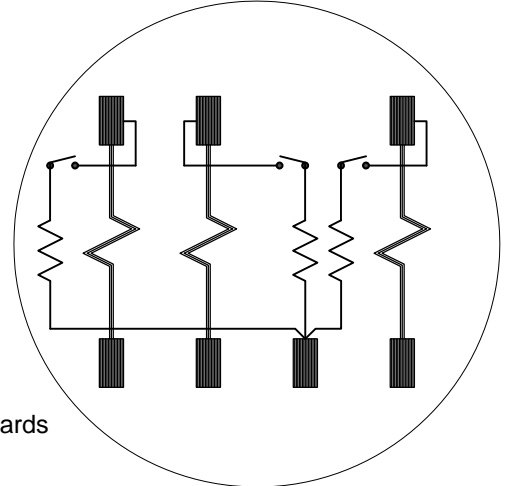
NOTES:

1. See Drawings 16 & 17 in the Electric Line Extension & Service Standards Manual for typical secondary grounding requirements.
2. A fifth terminal (stinger) in the 9 o'clock position is required for 120/208 volt service.
3. Wire Size Range: Lugs suitable for #2 - 350 kcmil CU/AL conductors.
 - 3.1 Ground Lug: Capable of accepting up to #2 solid CU/AL conductor.
4. Approximate Dimensions: 5"(D) x 13"(W) x 19"(H).
5. Knockouts: Three on bottom and one each on both sides and back; knockouts are concentric type with a maximum diameter of 3".
6. Single phase, 3 wire, 240/480 volt wye connection is for limited use.
7. Two phase, 3 wire, 277/480 volt wye connection is for limited use.
8. Corner grounded Delta services for maintenance reference only; voltage is not available for new installations.
9. If the meter socket is fed from an upstream (supply side) breaker or disconnect, where the neutral is already bonded to the grounding electrode system, do not connect the neutral ground lug (NEC 250).
10. EEI form type 12S, CSU types 11, 11M.

Deleted Note 6: "For overhead services, meter sockets are furnished with a hub sized as needed, available hub sizes are 1-1/4", 1-1/2", 2" and 2-1/2"."



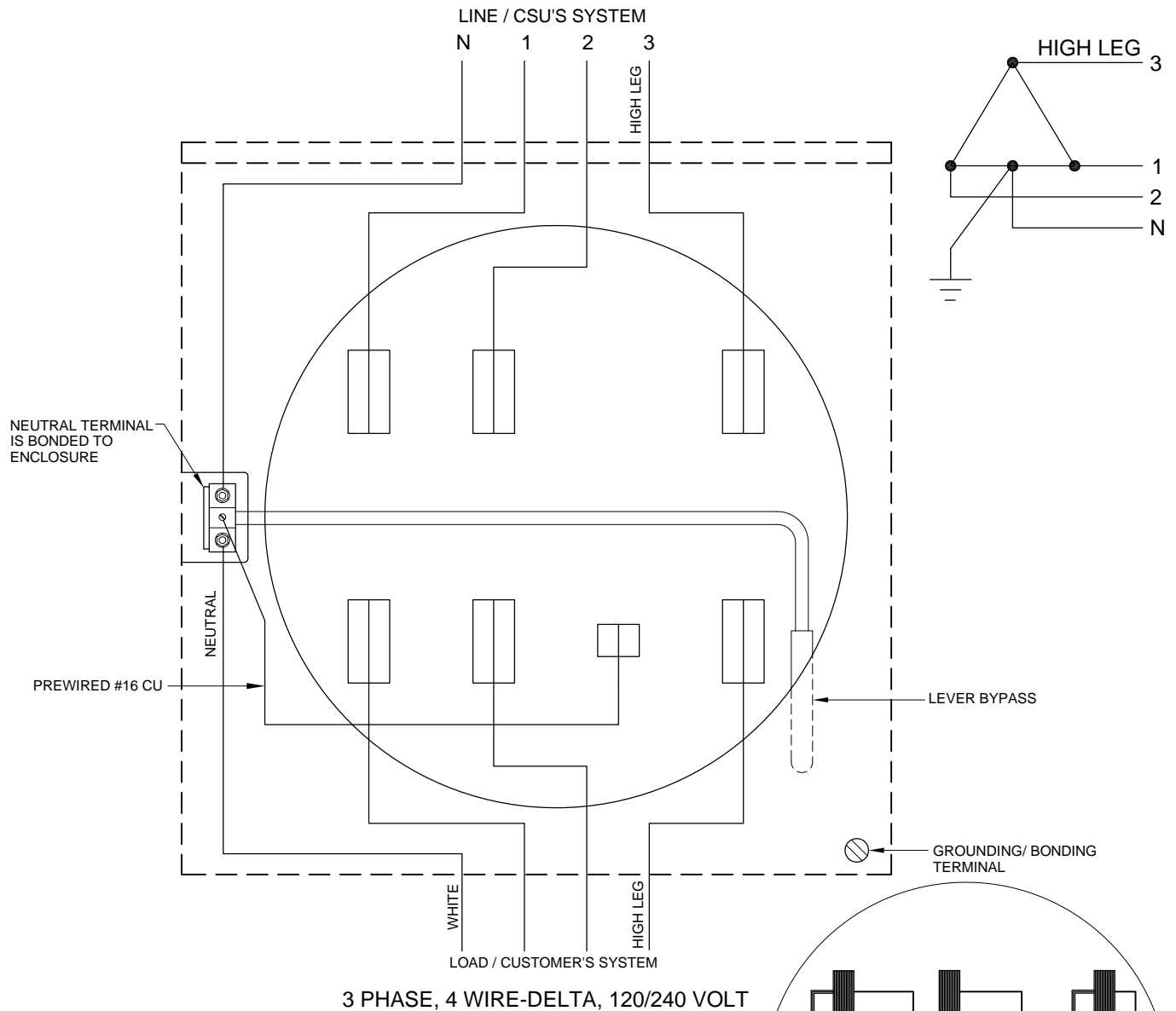
3 PHASE, 4 WIRE-WYE, 120/208 & 277/480 VOLT



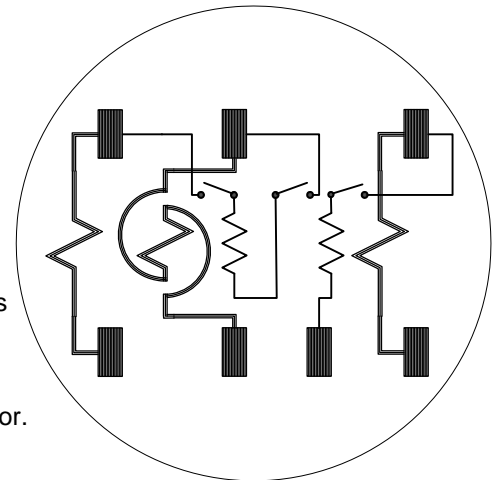
NOTES:

1. See Drawings 16 & 17 in the Electric Line Extension & Service Standards Manual for typical secondary grounding requirements.
2. Wire Size Range: Lugs suitable for #2 - 350 kcmil CU/AL conductors.
 - 2.1 Ground Lug: Capable of accepting up to #2 solid CU/AL conductor.
3. Approximate Dimensions: 5"(D) x 13"(W) x 19"(H).
4. Knockouts: Three on bottom and one each on both sides and back; knockouts are concentric type with a maximum diameter of 3".
5. If the meter socket is fed from an upstream (supply side) breaker or disconnect, where the neutral is already bonded to the grounding electrode system, do not connect the neutral ground lug (NEC 250).
6. EEI form type: 16S, CSU type 22, 22C, 22M.

Deleted Note 5: "For overhead services, meter sockets are furnished with a hub sized as needed, available hub sizes are 1-1/4", 1-1/2", 2", and 2-1/2"."



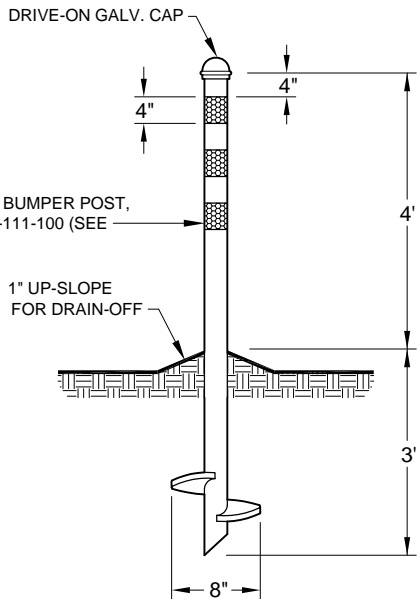
3 PHASE, 4 WIRE-DELTA, 120/240 VOLT



NOTES:

1. See Drawings 16 & 17 in the Electric Line Extension & Service Standards Manual for typical secondary grounding requirements.
2. Wire Size Range: Lugs suitable for #2 - 350 kcmil CU/AL conductors.
2.1 Ground Lug: Capable of accepting up to #2 solid CU/AL conductor.
3. Approximate Dimensions: 5"(D) x 13"(W) x 19"(H).
4. Knockouts: Three on bottom and one each on both sides and back; knockouts are concentric type with a maximum diameter of 3".
5. "High Leg" conductor of delta must be marked at weatherhead and connected to the right-side terminal as shown.
6. If the meter socket is fed from an upstream (supply side) breaker or disconnect, where the neutral is already bonded to the grounding electrode system, do not connect the neutral ground lug (NEC 250).
7. EEI form type: 16S, CSU types 22, 22C, 22M.

Deleted Note 5: "For overhead services, meter sockets are furnished with a hub sized as needed, available hub sizes are 1-1/4", 1-1/2", 2", and 2-1/2"."



1 SCREW-IN BUMPER POST, ITEM #194-111-100 (SEE NOTE 1)

1" UP-SLOPE FOR DRAIN-OFF

THREE BANDS OF 4" REFLECTIVE TAPE SPACED 4" APART (ITEM #100-136-012)

FILL WITH 3500 PSI CONCRETE MIX AND VIBRATE TO ELIMINATE AIR POCKETS, ROUND TOP FOR DRAINAGE.

1 4" OR 6" IPS X 6' - 6" STEEL GRC PIPE, ITEM #194-218-114 (SEE NOTE 2)

2"-3" UP-SLOPE FOR DRAIN-OFF

3500 PSI CONCRETE (SEE NOTE 4)

CONCRETE-FILLED PIPE BUMPER POST

THIS IS NON-PREFERRED POST AND WILL BE USED ONLY WHEN SCREW-IN BUMPER POST CANNOT BE USED.

NOTES:

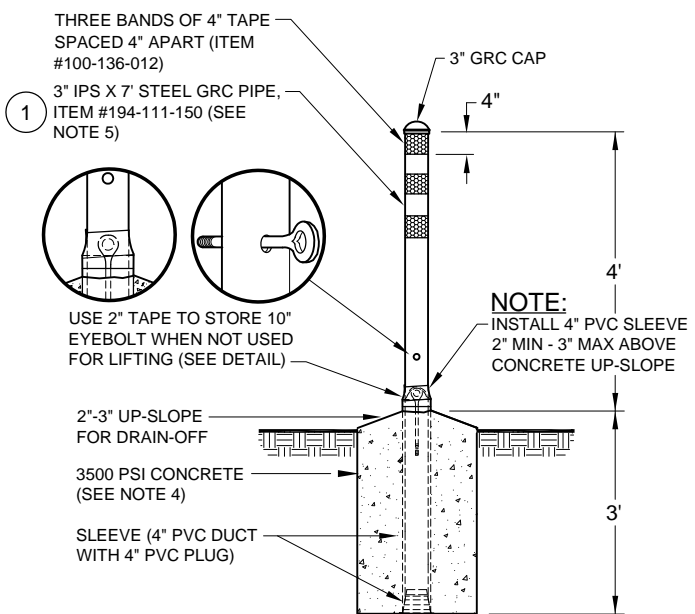
1. Bumper posts to be installed plumb and level across the tops from one to another when two are used.
2. Use scrap 4" or 6" GRC pipe and paint with two coats of silver or yellow paint, unless conduit piece is new.
3. Dig 20" x 36" hole- conduit to be centered in hole.
4. Concrete for anchoring posts to be 3500 psi T&D Mix #2, approximately 8.3 Cu.Ft./Pole (see EDCS 11-1, pg 5).

SCREW-IN BUMPER POST

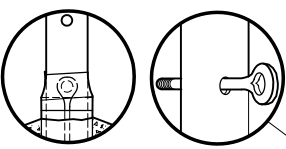
THIS IS THE PREFERRED POST TO BE USED (USE CONCRETE-FILLED BUMPER POST IF USE IS IMPRACTICAL DUE TO PROXIMITY TO BURIED LINES OR SUBSTRUCTURES).

NOTES:

1. Barricade post to be installed plumb and level across the tops from one to another when two are used.
2. Post is galvanized- no painting required.
3. Post can be filled with sack mix of concrete.
4. Post requires 3,000-4,000 ft-lbs. installation torque.
5. Use bands of reflective tape (Item #100-136-012) on top of posts to warn motorists, cyclists, etc. The first band should be no lower than 8" from the top of the post.



1 3" IPS X 7' STEEL GRC PIPE, ITEM #194-111-150 (SEE NOTE 5)



USE 2" TAPE TO STORE 10" EYEBOLT WHEN NOT USED FOR LIFTING (SEE DETAIL)

NOTE: INSTALL 4" PVC SLEEVE 2" MIN - 3" MAX ABOVE CONCRETE UP-SLOPE

2"-3" UP-SLOPE FOR DRAIN-OFF

3500 PSI CONCRETE (SEE NOTE 4)

SLEEVE (4" PVC DUCT WITH 4" PVC PLUG)

REMOVABLE CAPPED-PIPE BUMPER POST

THIS POST IS USED BETWEEN PERMANENT POSTS WHEN THE DISTANCE BETWEEN THE PERMANENT POSTS EXCEED 6' AND POST PLACEMENT MAY INTERFERE WITH EQUIPMENT OPERATION.

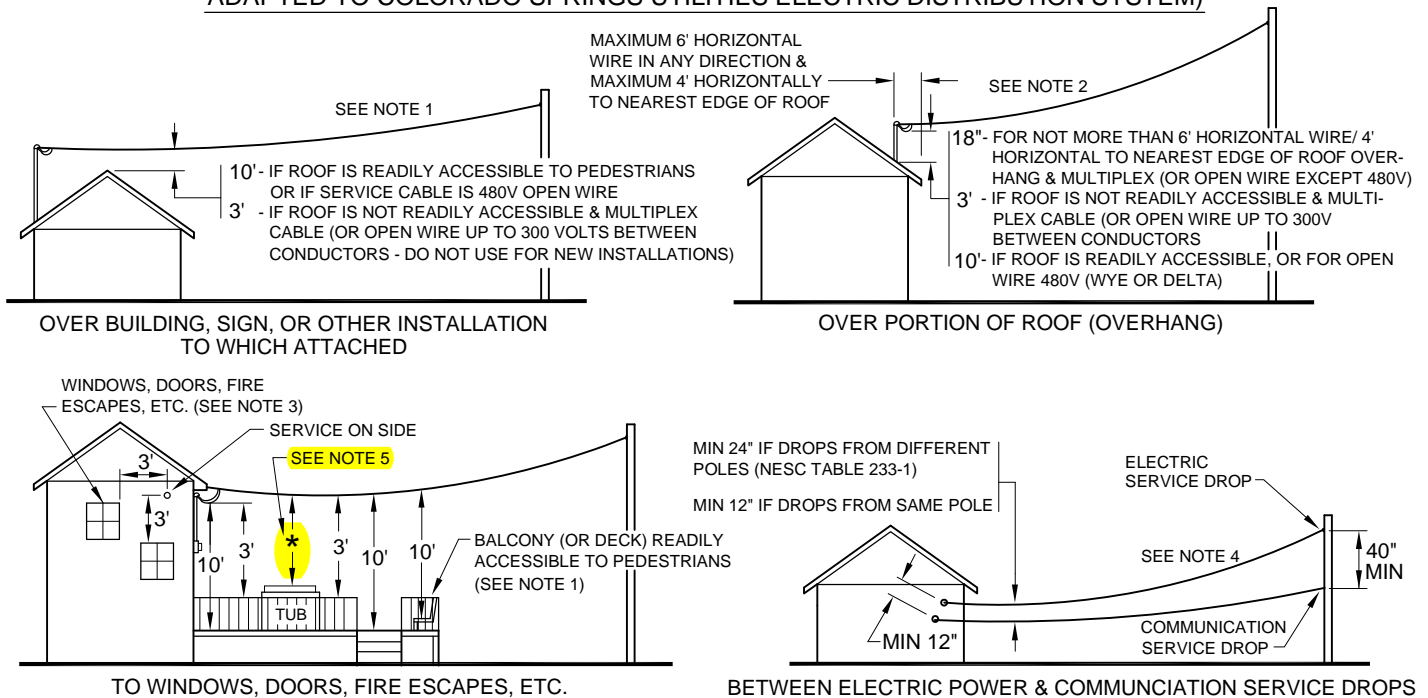
5. For removable post (Item #194-111-150) assemble with scrap 4" PVC duct sleeve, 10"x 1/2" eyebolt, 4" PVC pipe plug, 2" black tape and 4" orange reflective tape as shown.
6. Use bands of reflective tape on top of posts to warn motorists, cyclists, etc. (Item #100-136-012). The first band should be no lower than 4" from the top of the post.
7. Intermediate posts across at least one side (preferably the front) of the apparatus shall be of the removable type, all others can be permanent.

GUID EXAMPLE:

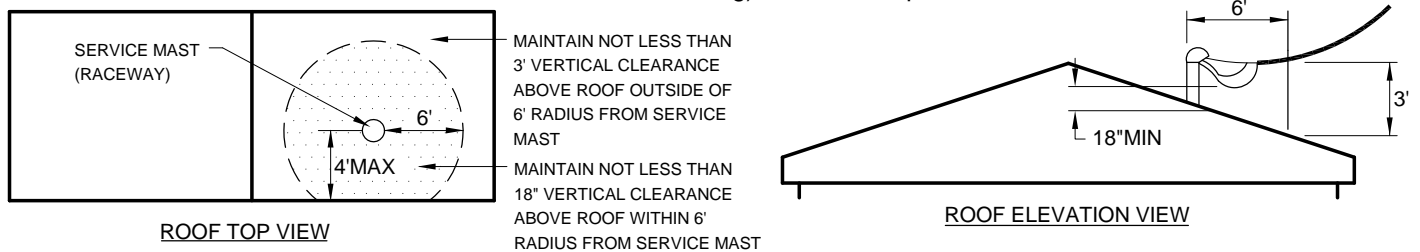
E.BUMPER-POST-SCREW-IN



**MINIMUM CLEARANCES OF 600 VOLT SERVICE DROPS TO BUILDINGS, SIGNS,
AND OTHER INSTALLATIONS TO WHICH ATTACHED (NESC RULE 234C3 & 235C1
ADAPTED TO COLORADO SPRINGS UTILITIES ELECTRIC DISTRIBUTION SYSTEM)**



1. If a roof or balcony is not readily accessible and the service cable is multiplex (up to 600 volts) or is insulated open wire (up to 300 volts between conductors, i.e. not including 400 volt wye or delta), the clearance may be a minimum of 3 feet per NESC 234C3d(1) Exception-1 (NEC 230-24a Exception-2 also requires 3' minimum for up to 300 volts between conductors and a roof slope of at least 4" in 12" to be considered not accessible to pedestrians). NESC defines a roof or balcony readily accessible if it can be casually accessed through a doorway, window, ramp, stairway, or permanently mounted ladder by a person, on foot, who neither exerts extraordinary physical effort nor employs special tools or devices to gain entry. (A permanently mounted ladder is not considered a means of access if its bottom rung is 8' or more from the ground or from a permanently installed accessible surface). NESC shall govern from the Utility's pole to the drip loop at the customer's service entrance; NEC shall govern from that drip loop into the building.
2. Where not more than 6 feet, measured horizontally, of a service drop passes over a roof to terminate at a service mast located not more than 4 feet, measured horizontally, from the nearest roof edge, and the cable is either multiplex (up to 600 volts), or is insulated open wire (up to 300 volts between conductors, i.e. not including 480 volt wye or delta), the clearance above the roof may be a minimum of 18" (NEC 230-24a Exception-3 allows the same 18" clearance for services up to 300 volts between conductors and not more than 4 feet of overhang)- see Roof Top View below:



3. A clearance of 3 feet in any direction from windows, doors, fire escapes, or similar locations is required, except it does not apply to: a) multiplex cable above the top of a window, or b) windows that do not open (NEC 230-9 requires the same 3' of clearance except above the top level of a window; service conductors are not allowed below windows or openings through which materials may be moved, e.g. in farm or commercial buildings).
4. A spacing of not less than 12" is required between electric service drops of 0-600 volts running above and parallel to communication service drops. This applies to any point in the span as well as at the building attachment. Other clearances apply at the pole. If these are run from different support structures, NESC Table 233-1 requires 24" spacing. Communication cables should be installed below power supply conductors whenever possible.
5. NESC 234E2 Note 2 states: Spas (including whirlpools, hot-tubs, or other similar installations not suitable for swimming) are not considered as swimming pools covered by Rule 234E, Table 234-3. Please refer to Regional Building Department for the clearance over Spas since NEC does not have same exception as NESC and considers Spas as a swimming pool.

CAUTION: ALL NESC VERTICAL CLEARANCES APPLY TO THE CONDUCTORS AT MAXIMUM FINAL SAG. ALLOW FOR 1.0 FOOT OF ADDITIONAL SAG FOR INCREASE FROM INITIAL SAG TO MAXIMUM FINAL CONDITIONS FOR COLORADO SPRINGS UTILITIES STANDARD SAG/TENSIONS OF SERVICE DROP CONDUCTORS (SLACK SPANS).

ELECTRIC DISTRIBUTION CONSTRUCTION STANDARDS

APPROVED AS OF:
8-30-2016

CLEARANCE OF SERVICE DROPS TO BUILDINGS, SIGNS, ETC. (ATTACHED)



Typical Parallel Clearance Matrix for Colorado Springs Underground Utilities (Separate Trenches):

(All dimensions are in feet) All separations shown are the clear horizontal distance between two objects measured surface to surface

Colorado Springs Utilities (Underground):	Potable Water	Non-Potable Water	Waste-water	Storm Sewer	Gas mains 150 psig (MAOP)	Gas main	Gas Service	Electric Primary up to 34.5kV	Electric Secondary (0-480 Volt)
Potable Water	X	10	10	10	10	6	3	10	3
Non-Potable Water	10	X	10	10	10	6	3	10	3
Wastewater	10	10	X	10*	10	6	3	10	3
Storm Sewer	10	10	10*	X	10	6	3	10	3
Gas mains 150 psig (MAOP)	10	10	10	10	X	6	6	10	10
Gas main	6	6	6	6	6	X	3	6	3
Gas Service	3	3	3	3	6	3	X	3	3
Electric Primary up to 34.5kV	10	10	10	10	10	6	3	X	3
Electric Secondary (0-480 Volt)	3	3	3	3	10	3	3	3	X

Typical Crossings Clearance Matrix for Colorado Springs Underground Utilities:

(All dimensions are in feet) All separations shown are the clear vertical distance between two objects measured surface to surface

Colorado Springs Utilities (Underground):	Potable Water	Non-Potable Water	Waste-water	Storm Sewer	Gas mains 150 psig (MAOP)	Gas main	Gas Service	Electric Primary up to 34.5kV	Electric Secondary (0-480 Volt)
Potable Water	X	1.5**	1.5**	1.5**	5	1	1	1	1
Non-Potable Water	1.5**	X	1.5**	1.5**	5	1	1	1	1
Wastewater	1.5**	1.5**	X	1.5	5	1	1	1	1
Storm Sewer	1.5**	1.5**	1.5**	X	5	1	1	1	1
Gas mains 150 psig (MAOP)	5	5	5	5	X		5	5	5
Gas main	1	1	1	1		X	1	1/5***	1
Gas Service	1	1	1	1	5	1	X	1	1
Electric Primary up to 34.5kV	1	1	1	1	5	1/5***	1	X	0
Electric Secondary (0-480 Volt)	1	1	1	1	5	1	1	0	X

All private telecommunication and fiber optic cables when being installed in a separate trench and which is paralleling Colorado Springs Utilities infrastructure (Electric, Gas, Water and Wastewater) must maintain a minimum radial distance of 5' (feet) from any Colorado Springs Utilities infrastructure (Electric, Gas, Water and Wastewater).

- These clearance matrix table dimensions are for separate trenches. Joint trench between Electric and Gas requires a 1' radial separation.
- See the Gas Line Extension and Service Standards 2.02c for certain exceptions.
- See Water & Wastewater Line Extension and Service Standards, latest edition.
- Clearance to other CSU utilities (telecommunication, fiber optics, etc.) or high voltage underground transmission cables shall be determined on a case by case basis by Field Engineering.
- Storm Sewer clearances must be verified by City Engineering.
- Larger clearances than shown may be required – clearances must meet all requirements set forth in all four of the Colorado Springs Utilities Line Extension and Service Standards, Colorado Springs City Codes, NEC, and NESC, latest editions.
- Additional support structures may be required at crossings.

~~8- Note: All private telecommunication and fiber optic cables must maintain a minimum radial distance of 5' (feet) from any Colorado Springs Utilities infrastructure (Electric, Gas, Water and Wastewater).~~

~~9- *Note: All utilities must also be outside of 45 degree excavation envelope above the wastewater line – see Wastewater Line Extension and Service Standards, Wastewater Construction Detail C1-7~~

~~10- **Note: These utilities require a sleeve when crossing under another utility.~~



ELECTRIC DISTRIBUTION CONSTRUCTION STANDARDS

APPROVED AS OF:
8-24-2016

CLEARANCES OF UG ELECTRIC CONDUIT/CABLE FROM OTHER FACILITIES

18-304 PG.3/3

***Note: 1' separation from electric primary to plastic pipe gas main and 5' separation from electric primary to metallic gas main.

**MAXIMUM AVAILABLE SECONDARY FAULT CURRENTS
FOR MINIMUM IMPEDANCES OF COLORADO SPRINGS UTILITIES TRANSFORMERS**

The following tables provide Colorado Springs Utilities 1997 minimum impedances, typical X/R ratios, and maximum available secondary fault currents from distribution transformers for use in the selection of customers service entrance equipment short circuit interrupting rating. These values are based on Colorado Springs Utilities Alliance partner Asea Brown Boveri's (ABB) recommendations on minimum impedance for modern distribution transformers with allowances for manufacturing tolerances on any tap; many values of impedance tabulated here are above ANSI minimums.

Single Phase Padmount or Overhead, 120/240 Volt Secondary

SIZE (KVA)	120 VOLT FAULTS					240 VOLT FAULTS			
	FULL LOAD AMPS	%R	%X	MIN. %Z	MAX. AVAILABLE FAULT CURRENT (RMS SYMMETRIC AMPS)	%R	%X	MIN. %Z	MAX. AVAILABLE FAULT CURRENT (RMS SYMMETRIC AMPS)
10	42	1.5	1.2	1.9	4,400	1.0	1.0	1.4	3,000
15	63	1.5	1.2	1.9	6,600	1.0	1.0	1.4	4,500
25	104	0.8	1.4	1.6	12,744	0.9	1.3	1.3	8,077
50	208	1.5	1.2	1.9	21,700	1.0	1.0	1.4	14,800
75	313	1.5	1.2	1.9	32,600	1.0	1.0	1.4	22,100
100	417	1.5	1.2	1.9	43,400	1.0	1.0	1.4	29,500
167	696	1.5	2.0	2.5	55,700	1.0	1.0	1.4	49,300

Approximate Minimum Length of Springs Utilities Residential Secondary Cable (Twin Concentric or Triplex) to Limit Available 120 and 240 Volt Fault Current to 10,000 amps rms symmetrical (Fault current interrupt rating of all new or upgraded molded case breakers must be 22 kA per Region Building Department. This table may be used to calculate the fault current of an existing service when the transformer is upgraded. See note 2):

SINGLE PHASE TRANSFORMER SIZE (kVA)	MINIMUM LENGTH OF OVERHEAD OR UNDERGROUND 600 VOLT ALUMINUM CABLE FOR COLORADO SPRINGS UTILITIES STANDARD CONDUCTOR SIZES:						
	#4 AL	#2 AL	#1/0 AL TWIN CON.	#4/0 AL TWIN CON.	350 AL TWIN CON.	#4/0 AL TRIPLEX	350 AL TRIPLEX
15 & BELOW	0'	0'	-	-	-	-	-
25	5'	10'	10'	20'	30'	15'	25'
50	15'	20'	20'	50'	70'	40'	70'
75	20'	30'	25'	80'	120'	65'	120'
100	25'	35'	-	-	-	-	-
167	25'	40'	-	-	-	-	-

NOTES:

1. On commercial new installations, designers should provide electrical contractors the maximum available fault current considering not only the initial size transformer, but also that of the next larger and/or next smaller kVA size for possible future changeouts. Notice in particular the 3-phase 300 & 500 kVA sizes have higher available fault current than larger kVA units because of ANSI impedance differences.
2. Replacement of failed transformers or other operating/maintenance changeouts of transformers should be done with the same kVA rating or else all service entrance equipment verified to have adequate interrupting ratings for the fault current available from a new kVA size.

**COLORADO SPRINGS UTILITIES
ELECTRIC LINE EXTENSION/SERVICE INSTALLATION
PHONE NUMBERS & CONTACT INFORMATION**

Deleted Customer Contract Administration (Line Extensions) & Temporary Service Applications

P L A N N I N G

- Utilities Development Services** 668-8111
- Utility Data Management (FIMS)**
- Land Base Maps & Plat Maps 668-83328779
- Electric and Street Light GIS Data..... 668-4405
- Utilities Addressing Plan (UAP) and Utilities Design CAD Files (UDCF) 668-8340
- Underground Utility Line Locations**
- Before you dig (All Utilities, ex: Springs Utilities, phone, cable) - Call 3 business days before digging.....811
- Utilities Locating Dispatch (For Colorado Springs Utilities gas, electric, water and wastewater)
- Main Number.....668-7205

D E S I G N

Design of Electric Line Extensions & Street Lights (Field Engineering)

North Area Main Number.....668-59283574 South Area Main Number 668-5564

**North Workcenter Field Engineering
7710 Durant Drive, Colorado Springs, CO 80947-2150/ Fax: 719-668-4998**

Name	Title	Office	Cell
Tim Benedict	Field Engineering Supervisor	719-668-3574	719-661-5505
Anne Aldrich	Project Engineer	719-668-8707	719-499-6260
J.C. Butterfield	Field Engineer	719-668-5618	719-650-3485
Janis Iverts	Field Engineer	719-668-4983	719-351-4527
Todd Sturtevant	Field Engineer	719-668-3556	719-440-9975
Ben Schmitt	Field Engineer	719-668-4462	719-233-9302
Tim Wendt	Field Engineer	719-668-4962	719-237-7968

**South Workcenter Field Engineering
1521 Hancock Expressway, Colorado Springs, CO 80947-1812/ Fax: 719-668-5956**

Name	Title	Office	Cell
Dan Skokan	Field Engineering Supervisor	719-668-4978	719-659-1973
Dee Dee Brook	Field Engineer	719-668-4510	719-499-6174
Tony Colvin	Field Engineer	719-668-5768	719-648-0869
Rob Estes	Field Engineer	719-668-5904	719-649-3228
Ginny Halvorson	Field Engineer	719-668-5567	719-491-8420
Mary Hoaglund	Project Manager	719-668-4083	719-650-9151
Cindy-Lou Hyde	Field Engineer	719-668-5887	719-661-3880
Kennedy Knutson	Field Engineer	719-668-5572	719-396-1723

Street Light Requests Outside City Limits:

SERVICE AREA MAP CONTACTS



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 7710 DURANT DRIVE, P.O. BOX 1103,
 MAIL CODE 2150
 COLORADO SPRINGS, CO 80947-2150
 MAIN PHONE: 668-4985
 FIELD ENGINEERING FAX: 668-4998

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 SUPERVISOR
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 661-5505

ANNE ALDRICH
 PROJECT ENGINEER
 668-8707
 499-6260

BEN SCHMITT
 668-4462
 233-9302

TIM WENDT
 668-4962
 237-7968

TODD STURTEVANT
 668-3556
 440-9975

J.C. BUTTERFIELD
 668-5618
 650-3485

CINDY-LOU HYDE
 668-5887
 661-3880

MARY HOAGLUND
 668-4083
 650-9151

SOUTH WORK CENTER
 1521 HANCOCK EXPRESSWAY,
 P.O. BOX 1103, MAIL CODE 1812
 COLORADO SPRINGS, CO
 80947-1812

MAIN PHONE: 668-5564
 FIELD ENGINEERING FAX: 668-5956

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 PROJECT MANAGER
 668-4083
 650-9151

DEE DEE BROOK
 668-4510
 499-6174

GINNY HALVORSON
 668-5567
 491-8420

ROB ESTES
 668-5904
 649-3228

ELECTRIC/WATER/GAS EMERGENCY (ONLY): 668-8800
 DISPATCH 668-8800
 CUSTOMER SERVICE 448-4800
 ADDRESS: 111 S. CASCADE,
 COLORADO SPRINGS, CO 80903
 HOURS: M-F 7am-7pm / SAT 8am-12pm
 CALL BEFORE U-DIG: 811