



# SERVICE AND METERING GUIDE

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**FORTIS**  
ALBERTA

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## 1. Scope

- 1.1. This publication covers most of the possible Customer projects encountered on the FortisAlberta system. While FortisAlberta will endeavour to follow practices in this Guide, these practices will not appropriately cover every situation that may arise, and it may be necessary to apply for special permission.
- 1.2. All Customer supplied electrical equipment shall conform to CSA Standards. Customer projects shall comply with the Alberta Safety Codes Act, and associated regulations. Customer projects that do not meet the requirements covered in this guide shall abide by “Section 6.0, Non-Standard Services”. Customer service entrance or switch-gear equipment will not be energized until its design, construction, location and application are acceptable to both the inspection authority and FortisAlberta.

## 2. Purpose

- 2.1. This publication is for use by FortisAlberta’s Customers concerned with electrical installations within the FortisAlberta service area. The information within supersedes all information previously provided by FortisAlberta on the subject. Comments and questions can be submitted by e-mail to the Customer Interaction (CI) Group – ([fortisnewconnects@fortisalberta.com](mailto:fortisnewconnects@fortisalberta.com)).
- 2.2. Customers should apply for service early in the planning stage of a project to help ensure that FortisAlberta can meet the Customers project time schedule. Customers are encouraged to call FortisAlberta toll-free at 310-WIRE (9473) for any inquires related to their projects.

## 3. Disclaimer

### 3.1. Use of FortisAlberta Engineering and Construction Standards

- 3.1.1. In accordance with FortisAlberta’s Engineering Practices Policy (EPP), FortisAlberta Engineering and Construction Standards are developed and used only for FortisAlberta designs and construction and for FortisAlberta distribution Facilities only.
- 3.1.2. FortisAlberta’s expectation is that designs and construction by other (Third-Party) for any electrical system or distribution facilities adjoining or attaching or otherwise affecting FortisAlberta distribution Facilities shall, as a minimum, meet FortisAlberta Engineering and Construction Standards.
- 3.1.3. Use of FortisAlberta Engineering and Construction Standards by any Third- Party is done at the Third-Party’s own risk and liability.
- 3.1.4. Any copies of FortisAlberta Engineering and Construction Standards so provided are copyright protected and no further copies for any other use, modification, amendments or changes are permitted.
- 3.1.5. FortisAlberta requires that any Third-Party retain the use of a Professional Engineer to assess the completeness of the Third-Party’s design and construction to meet the minimum requirements.
- 3.1.6. Review and or comment by FortisAlberta on any Third-Party design or construction does not relieve the Third-Party from full responsibility and liability for the Third-Party’s design and

construction.

- 3.1.7. By requesting and or accepting copies of FortisAlberta Engineering and Construction Standards, the Third-Party automatically accepts the terms and conditions of this disclaimer.

#### 4. Glossary

**CEC:** Canadian Electrical Code, Part One (CSA Standard No. C22.1 - Latest Edition) [B1].

**CSA:** Canadian Standards Association.

**CT Cabinet:** The enclosure supplied and installed by the Customer for the housing of FortisAlberta current transformers.

**Conductor:** A wire or cable, or other form of metal, installed for the purpose of conveying electric current from one piece of electrical equipment to another or to ground.

**Distribution Connection Point:** An electrical line, at secondary or primary voltage (120 V up to 25 kV) which is used to serve multiple Customers.

**Farm:** These services are generally single-phase 120/240 volt self-contained services supplying farming operations in rural areas that contains a residence and on which agricultural activities are conducted with the intent of deriving revenue.

**Grounded:** Connected effectively with the general mass of the earth through a grounding path of sufficiently low impedance and having an ampacity sufficient at all times, under the most severe conditions liable to arise in practice, to prevent any current in the grounding conductor from causing a harmful voltage to exist;

- a) between their grounding conductors and neighbouring exposed conducting surfaces that are in good contact with the earth; or
- b) between the grounding conductors and neighbouring surfaces of the earth itself.

**Grounding:** A permanent and continuous conductive path to the earth with sufficient ampacity to carry any fault current liable to be imposed on it, and of sufficient low impedance to limit the voltage rise above ground and to facilitate the operation of the protective devices in the circuit.

**Hazardous location:** Premises, building, or parts thereof in which;

- a) an explosive gas atmosphere is present, or may be present, in the air in quantities that require special precautions for the construction, installation, and use of electrical equipment,
- b) dusts are present, or may be present, in the form of clouds or layers in quantities to require special precautions for the construction, installation, and operation of electrical equipment.

**Inspection Authority:** Local municipality or the province, or an accredited agency authorized to sign-off electrical permits.

**Installed Capacity:** The rated capacity in kilo-volt-amperes (kVA) of the FortisAlberta transformer supplying the service.

**Instrument Transformers:** High accuracy current or voltage transformers approved by Measurement Canada for revenue metering.

- Instrument Transformer Enclosure:** The enclosure supplied and installed by the Customer for the housing of instrument transformers.
- Line Side:** The line side of the device or the equipment, is the side where the wires coming from the power source that deliver the electricity are connected. Basically, this is side where the power comes in.
- Load Side:** If the line side is the side with the power coming in, then the load side would be the side with the power going out. To the load.
- Lot Line Metering:** Metering that is located close to the front property line on a self-supporting structure.
- Meter box, Farm and Rural:** A meter mounting device that includes a meter socket and a secondary breaker, which is attached to a pole or stub.
- Meter, Instrument Type:** A 20 amp meter used in conjunction with instrument transformers (CT's and PT's).
- Meter, Network:** A two element meter designed for use on a 3-wire network service obtained from two phase wires and a neutral of a three phase, 4-wire, wye system.
- Meter Pedestal:** A meter mounting device that includes a meter socket and in some cases a breaker that is self-supporting.
- Meter, Self-Contained:** A meter rated for carrying the total current (200 amp) and line voltage of the circuit to be metered.
- Meter Socket:** A meter mounting device for the purpose of installing FortisAlberta's self-contained 200 amp meter or instrument 20 amp meter.
- Multiple Meter Installation:** Any installation where a building has several meters fed from one service entrance, such as apartment buildings, shopping centres, office buildings, warehouse or light industrial complexes.
- Multiple Customer Metering System (MCMS):** A instrument metering system which can meter 8 to 12 Customers in large complexes.
- Padmount Metering:** Metering installed on a pad mounted transformer
- Point of Service Termination (Electrical Connection Point):** The electrical connection point at which FortisAlberta's supply service conductors are connected to the conductors or apparatus of a Customer.
- Residential:** These services are generally single-phase 120/24 volt self-contained services to individual houses, apartment buildings or condominium complexes.
- Service Box:** An approved assembly consisting of an enclosure that can be locked or sealed, containing either fuses and a switch, or a circuit breaker, and of such design that it is possible to operate either the switch or circuit breaker to the open position by manual means when the box is closed.
- Service Disconnect and Main:** An approved metal box or cabinet containing either service fuses and a service switch or a circuit breaker and of such design that either the switch or circuit breaker may be manually operated when the box is closed.

**Service Entrance (SE) Cable:** two or more insulated (medium to low voltage) wires wrapped in one jacket.

**Service Entrance (SE) Wire:** A single insulated medium of low voltage electrical conductor(s).

**Service Entrance:** Means all that portion of the Customer's installation from the service box or its equivalent up to and including the point at which the supply authority makes connection.

**Service Connection Point (Service Entry Point):** The point at which the Customer's facilities physically connect to FortisAlberta's electrical distribution system to permit the Customer to obtain electricity. For an underground supply service, this could also be described as the specific point that FortisAlberta's civil work ends and the Customer's begins.

**Service, Supply:** Any one set of conductors run by a supply authority from its mains to a Customer's service.

**Service, Temporary:** Service for a limited period of time (generally less than one year). (Example: Construction sites).

**Service, Three Phase/4-Wire:** All services are supplied as three phase conductors and a grounded neutral conductor to the service entrance, and on to the meter.

**Single Phase Commercial:** These services are generally single phase 120/240 volt self-contained services supplying typical businesses.

**Three Phase C & I Services:** These Commercial and Industrial services are three phase services, which may use 120/208 volt self-contained metering or up to 2400/4160 volt instrument metering typically supplying industrial Customers. This includes oil and gas lease sites.

**Utility Right of Way:** is land set aside (through registered easement) to allow electricity, gas, water, sewer, telephone and cable companies to provide service. To protect equipment such as underground powerlines, transformers, poles or overhead lines, no obstructions (sheds, foliage, fences, etc.) are permitted on this land. This restriction helps prevent hazards that could cause serious injuries.

## 5. FortisAlberta's Requirements

### 5.1. General

5.1.1. This section covers FortisAlberta's general requirements for electrical installations and revenue metering, which shall be met before electrical service will be provided.

5.1.2. Exceptions to any requirements in this Guide must be approved in writing by FortisAlberta Metering Standards, on a site by site basis. Failure to comply with these requirements will mean electrical service will not be provided.

FortisAlberta Metering Standards Contact Details
<a href="mailto:meteringstandards@fortisalberta.com">meteringstandards@fortisalberta.com</a>

5.1.3. FortisAlberta and/or Third-Party expenses incurred to correct service installation deficiencies not meeting the requirements outlined in this guide, or the requirements of the local municipality or authority having jurisdiction may be passed on to the Customer.

5.1.4. The requirements outlined in this document apply to the construction of all new installations and installations where the existing service entrance equipment, secondary conductors or metering equipment is upgraded or relocated.

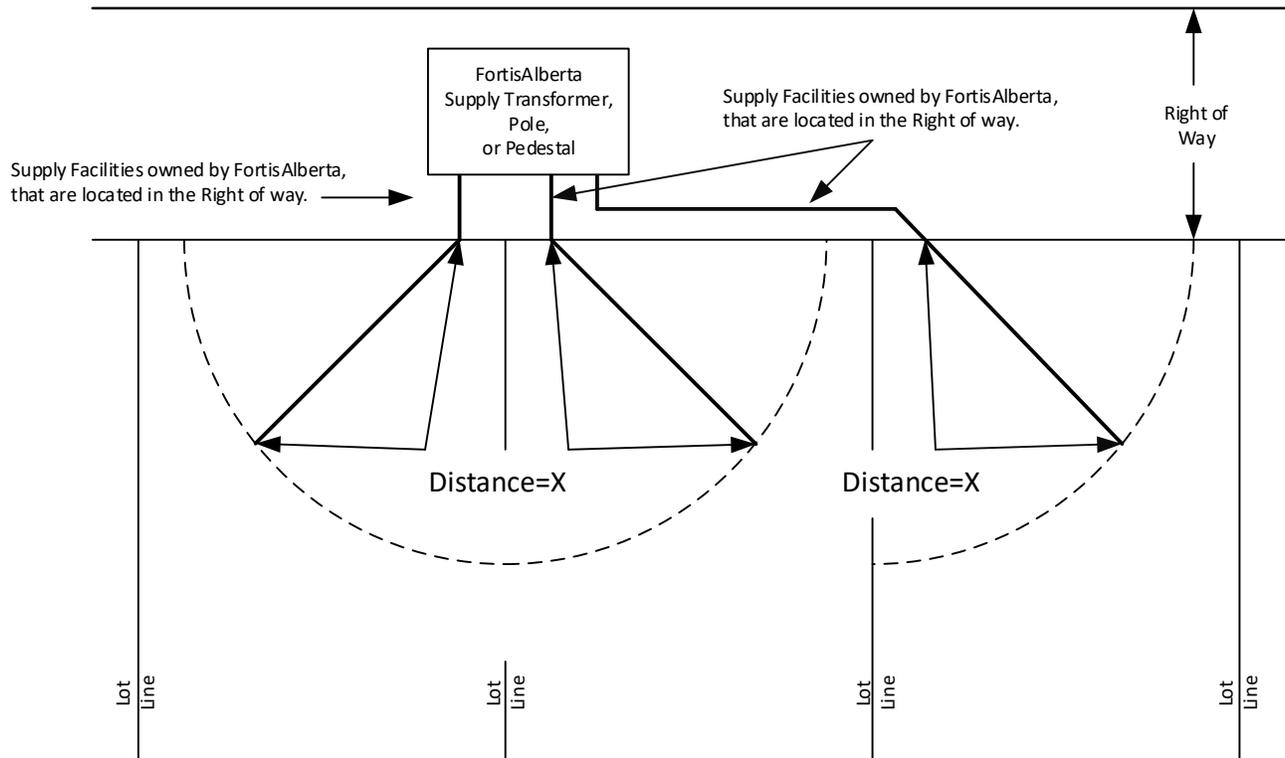
5.2. Metering Location & Height

5.2.1. The meter must be located as near as practical and not more than:

- 60 m for overhead services
- 90 m for underground services

from the front property line or FortisAlberta supply service transformer if it is located on Customer property. For all residential lots or acreages with service drops exceeding *60 m for overhead services or 90 m for underground services* on Customer property, Lot Line Metering must be installed as per [Section 5.3](#).

5.2.2. The meter cannot be recessed into walls, enclosed, boxed-in or otherwise obstructed to impede the installation and/or removal, reading and testing of meters.



**NOTES:**

1. An additional 5 m of secondary cable is permitted to reach the height of any required connection.
2. Max. cable or conductor length to metering

Where;

X= 60 m for overhead service entrance

X= 90 m for underground service entrance

Figure 1 – Meter location

- 5.2.3. Junction boxes or splitter boxes are not allowed ahead of the meter for residential, rural metering installations.
- 5.2.4. A Customer meter socket cannot be mounted on any FortisAlberta owned Facility or structure, nor within a 4 m radius of any FortisAlberta owned Facilities or structures.
- 5.2.5. Level on both the horizontal and vertical planes.
- 5.2.6. Free of severe or continual vibration.
- 5.2.7. FortisAlberta meters must be in a clean and readily accessible area. Not in areas that are hazardous to anyone installing or working on the metering equipment or reading the meter. Hazardous locations are defined as any area involving moving machinery, dust, vibration, fumes, water/moisture, extreme heat or restricted workspaces.
- 5.2.8. FortisAlberta metering shall be located far enough away from biologically sensitive areas such as poultry/livestock facilities to reduce the chances of an infectious disease being carried onto or transport from farms by FortisAlberta employee or contractors, equipment, or vehicles.
- 5.2.9. FortisAlberta meters must be located upstream from any Customer step down transformer. Exceptions to this rule will be given for developments that include a mix of commercial and residential service of differing supply voltages where metering provisions would require meters to be installed downstream of a Customer step down transformer.
- 5.2.10. FortisAlberta meters cannot be located in carports, breezeways or under sundecks or balconies.
- 5.2.11. Meters shall be mounted in accordance with the heights outlined in [Table 1](#). The minimum height as specified must be maintained when a permanent structure such as a deck is built in the clear access area of the meter.
- 5.2.12. FortisAlberta meters must be located 1 m meter away from any vapor producing outlets such as natural gas meters, drier vents, furnace exhaust vents, hot water tank exhaust vents (refer to Drawing [SMG 2.16.4, page 2](#)).

**Table 1 Meter Mounting Height Requirements**

	Outdoor (Above Final Grade)	Indoor (Above Floor)
* Residential Self-contained Meters	1.5 m (59") min. 1.8 m (71") max.	0.65 m (25.5") min.  1.8 m (71") max.
* Multi Customer Metering System		1.5 m (59") min. 1.8 m (71") max. <i>(Developments must be 24 units or larger)</i>
* Commercial Self-contained Meters	1.5 m (59") min. 1.8 m (71") max.	0.65 m (25.5") min. 1.8 m (71") max.

\*Measurements are to the centre line of the meter

### 5.3. Lot Line Metering

- 5.3.1. Lot Line Metering shall be installed for all residential lots or rural subdivisions where the **overhead service** drop feeding the Customer meter exceeds 60 m on Customer property. The meter must be located on a pedestal or suitable metering structure 1.5 m or less inside the front property line and shall be installed a minimum of 4 metres away from FortisAlberta's supply service poles. An Exception to this rule maybe granted if terrain conditions present issues.
- 5.3.2. Lot Line Metring shall be installed for all residential lots or rural subdivisions where the **underground service** drop feeding the customer meter exceeds 90 m on Customer property. The meter must be located on a pedestal or suitable metering structure 1.5 m or less inside the front property line and shall be installed a minimum of 4 metres away from FortisAlberta's supply service poles. Exception to this rule maybe granted if terrain conditions present issues.

*This "Lot Line Metering" removes any restrictions on secondary conductor length, but not voltage drop requirements of [Section 5.13](#). A breaker panel is not required at the Lot Line Metering location unless there is a decrease in conductor size or branch circuit(s) are connected at the meter pedestal. (refer to Drawing [SMG 2.1, page 2](#) and [SMG 2.1, page 3](#))*

### 5.4. Safety Codes Act and Associated Regulations

- 5.4.1. FortisAlberta shall not connect or allow connection of a Customer's service to the electrical utility system unless all the following criteria are met:
- The point of attachment of supply or Customer service conductors shall be located such that the clearance of supply conductors or Customer service conductors shall meet the vertical ground clearance requirement as specified in Canadian Electrical Code Rule 6-112 [B1].
  - The metering equipment and location is acceptable to FortisAlberta.
  - The Customer's service panel covers are in place.  
*Note - All covers for an electrical service entrance box are to be in place, so that there are no exposed energized conductors or parts.*
  - The Customer's service is grounded as per Section 10 of the current Canadian Electrical Code [B1].
  - The FortisAlberta has assurance from the owner or the owner's agent that the installation is ready for connection and no obvious hazards should result.
  - FortisAlberta has received a copy of a valid electrical permit or authorization (see [Annex A.1, Electrical Service, Connection Authorization Form](#)) issued by the inspection authority having jurisdiction.

*Note - A valid permit only requires having the information that includes the Safety Codes Officer's name, the safety codes officer's designation number, and the agency to which he is employed with, including the applicable intended purpose, (i.e. "service connection").*

*Note - Federal Jurisdiction, (i.e. National Parks, First Nations, Military Bases), are not required to have a permit unless determined by the authority of that jurisdiction, but the installation must still abide by all the requirements of FortisAlberta out lined in this guide.*

### 5.5. Access to Metering Equipment

- 5.5.1. FortisAlberta staff shall have reasonable access to all metering equipment for the purpose of changing, testing and reading. Where FortisAlberta is not given ready access to the metering equipment due to locked doors, FortisAlberta may request a key. A lockbox may be installed by FortisAlberta for the purpose of keeping the key on site. FortisAlberta is absolved from all

liability if the lock box is damaged or stolen.

#### 5.6. CSA Approved Device and Meter Socket Requirement

- 5.6.1. Meter sockets and any additions to such (e.g. isolated neutral blocks, additional lugs, etc.) must be CSA approved. Any additions to the meter socket shall be supplied by the manufacturer of the meter socket.

#### 5.7. Service Entrance Equipment Requirements

- 5.7.1. All service entrance equipment shall comply with the following:

- All service entrances shall be designed and constructed such that metered and un-metered conductors are not run in the same conduit or raceway.
- All service entrance equipment requires hinged doors over all bare electrical parts. Hinged doors shall open either left or right to not less than 90 degrees for outer and inner doors. The only exception to the direction of opening is for horizontal mounted splitter boxes for which the doors must open downward.
- All hinged doors that are ahead of the metering point require sealing screws. Barriers are required between all metered and un-metered conductors and between sections reserved for Customer use and those for FortisAlberta's use.
- All distribution panels approved to be located ahead of FortisAlberta's metering shall have provisions for sealing with a wire seal in opposing corners of every removable cover section.

#### 5.8. Customer Owned Poles

- 5.8.1. Customer owned secondary poles shall meet the following requirements:

- Poles shall be a maximum 60 m from the front property line or transformer pole located on Customer property.
- Pole setting depth must be a minimum 10% of the height of the pole plus 0.6 m.

- 5.8.2. FortisAlberta will supply, install, own and maintain an overhead secondary powerline that is no longer than 60 m on Customer property.

- 5.8.3. A Customer owned meter socket must be mounted on a Customer owned pole.

#### 5.9. Electrical Equipment Room Requirements

- 5.9.1. The preferred location for electrical rooms in which FortisAlberta metering is installed should be on ground level if possible, with outdoor access and in all cases shall comply with the following:

- Working Space - A minimum of 1 m working space by 2.2 m high is required in front of all electrical equipment and to the sides and back where access is required (additional requirements are listed in Canadian Electrical Code Rule 2-308 and 2-314 [B1]). Electrical rooms are not to be in a bathroom or stairway.
- Entrance and Exit - A minimum passageway of 1 m wide by 2.2 m high shall be maintained as an entrance or exit from all electrical areas (additional requirements are listed in Canadian Electrical Code Rule 2-310 [B1]).

- Proximity to Other Equipment - It is not permissible to mount water, sewer, gas or other pipes or equipment foreign to the electrical installation directly above electrical equipment or to encroach on minimum working space around electrical equipment.
- Hazardous Locations - Electrical equipment cannot be in areas that are hazardous to anyone working on electrical equipment or to the metering equipment itself. This would include moving machinery, dust, vibration, fumes, water, humidity and H<sub>2</sub>S. This is also extended to areas where FortisAlberta employees, contractors and vehicles may pose a hazard by transporting viruses or contaminants.
- Illumination and Ventilation - All electrical rooms or areas shall have adequate illumination and ventilation to carry out all work safely (as per Canadian Electrical Code Rule 2-318 & 2-322 [B1]).

#### 5.10. Customer Instrumentation and Protection

- 5.10.1. Customer instrumentation including metering circuits, transfer relays, fire alarms, and step-down transformers shall be connected on the load side of the FortisAlberta meter. These circuits cannot be connected into FortisAlberta metering circuits and all equipment shall be mounted independent of the cabinets reserved for FortisAlberta use. Electronics built into the main breaker, lightning arrestors and passive type surge suppressors are permitted to be in the main breaker section of the Customer's switchgear and connected ahead of the FortisAlberta meter.

#### 5.11. Service Disconnect and Reconnects

- 5.11.1. All disconnects and reconnects shall have prior approval of FortisAlberta and in the absence of an electrical permit, the reconnection may be completed after the "[Reconnection Authorization Form](#)" (see [Annex A.1](#)) has been signed, as required. Electricians must print the form and complete three copies, one each for the Customer, the electrician, and FortisAlberta. The signed copy left for FortisAlberta must be left in the meter socket or in a location agreeable to FortisAlberta prior to connection.
- 5.11.2. The disconnection and reconnection of an existing electrical service by a qualified electrician which has completed Measurement Canada Quality Assurance training, is limited to services no greater than 200 amps and 300 volts (L-L). The disconnection requires prior approval from FortisAlberta and can be done at the meter. When the disconnection is completed by cutting the hot wires at the weatherhead, the reconnection must be completed by FortisAlberta.
- 5.11.3. All other disconnects and reconnects shall be completed by FortisAlberta.

#### 5.12. Modifications to Existing Services

- 5.12.1. Customers planning the following modification and/or additions to their electrical system must comply with present day requirements for:
  - Increase in load
  - Increase in service entrance conductor size
  - Installation of back-up power supplies
  - Installation of a transfer switch
- 5.12.2. To ensure accuracy of metering installations, only FortisAlberta staff who are trained under

federal regulations S-A-01 [B2] (Criteria for the Accreditation of Organizations to Perform Inspections Pursuant to the Electricity and Gas Inspection Act and the Weights and Measures Act) are authorized to install, remove or handle meters. All meter recertification costs and/or damages associated with removal, installation or handling of meters by unauthorized persons will be the responsibility of the person(s) responsible.

Table 2 Standard FortisAlberta Supply Voltages

Service Voltage	Phase and Wire and Connection	Maximum Padmount Transformer	Maximum Overhead Transformer
120/240	Single-phase, 3-wire	167 KVA***	167 KVA***
240/480	Single-phase, 3-wire	50 KVA	100 KVA
120/208	Three-phase, 4-wire, wye	1000 KVA	150KVA
277/480	Three-phase, 4-wire, wye	3000 KVA	150KVA
347/600	Three-phase, 4-wire, wye	4000 KVA	150KVA
2400/4160	Three-phase, 4-wire, wye	2500 KVA	*
14400/24940	Three-phase, 4-wire, wye	**	**

\* Not Available

\*\* Primary Service Only

\*\*\* 100 KVA and over subject to approval

**5.13. Customer Owned Secondary Conductor Voltage Drop Requirements**

- 5.13.1. Must follow all requirements per Canadian Electrical Code Rule 8-102 [B1].
- 5.13.2. Customer service entrance conductors must be sized to limit the voltage drop, between the points at which FortisAlberta supply service makes its final connection to the Customer's service entrance conductors and to the line side of the Customer's main service, to a maximum of 3%.

**5.14. Three-Phase Services**

- 5.14.1. FortisAlberta supply service transformers shall come with provision for a 4-wire, solidly grounded wye service, per Canadian Electrical Code Rule 10-206 and 10-210 [B1]. For a 4-wire solidly grounded system, the grounded conductor shall be connected directly to the supply service transformer X<sub>0</sub> bushing (not the grounding bus of the padmounted transformer or the case ground of a padmounted or overhead transformer), and be one continuous length, run into the meter or main breaker and bonded to the ground electrode at one point only at the Customers service as per Canadian Electrical Code Rule 10-210 [B1]. Any variation from this, unless otherwise arranged and approved in writing by FortisAlberta shall result in the service not being energized.
- 5.14.2. For 3-wire services, the grounded conductor must be insulated when neutral currents are present (where line to neutral loads are served). When no neutral currents are present the bare bonding conductor in the armoured cable can be used as the grounded conductor on the line side of the supply service, if it is sized according to the Canadian Electricals Code Rule 10-208

(2) and Table 16 [B1]. For either case the grounded conductor (neutral) shall be connected to the X<sub>0</sub> bushing of the supply service transformer.

- 5.14.3. If the Customer elects to use a 4-wire armoured cable with a bare bonding conductor, the bonding conductor shall be cut off and insulated at the supply service transformer end.
- 5.14.4. With the grounding conductor grounded at the main service disconnect, there shall be no other connection to the non-current carrying conductive parts of electrical equipment on the supply side or the load side of the grounding connection. All neutrals shall be isolated from ground. The use of an isolated neutral block is necessary for the metering point (self-contained or instrument type).
- 5.14.5. Refer to Drawing [SMG 2.13.5, page 1](#) and [SMG 2.13.5, page 2](#) for three-phase overhead oilfield and irrigation service details.

#### 5.15. Neutral Grounding Resistors (NGR)

- 5.15.1. The Customer must advise FortisAlberta when considering the installation of an NGR. NGRs are not permitted on services with self-contained meters without written permission from FortisAlberta Metering Standards. The Customer shall provide FortisAlberta with the rating and location of the grounding resistor.
- 5.15.2. Refer to Drawing [SMG 2.13.1](#) through [SMG 2.13.4](#) for three-phase underground service details.

#### 5.16. Services That Do Not Require Metering

- 5.16.1. FortisAlberta requires all services to be metered, with an exception for some applications such as emergency warning sirens, security cameras, and small cell antennas.

#### 5.17. Self-Contained Metering

5.17.1. The maximum limits for self-contained metering are:

- 200 amps per phase and/or,
- 600 volts phase to phase and/or,
- 130 HP continuous duty motor load at 480 volts phase to phase (Canadian Electrical Code Rule 28-106 and 28-704 [B1]),
- All Customers, including Micro-Generation Customers, connecting to FortisAlberta's distribution system shall have a maximum export output which will not exceed 170 amps (85% of 200 amps). Overload damages and repair costs to FortisAlberta's supply system shall be charged to the service account holder.

- 5.17.2. Self-contained metering shall be used on all services wired for a 200 amp service entrance or less, with an exception for services supplied by a dedicated padmount transformer, were the Customer has the option to pay for metering attached to the transformer. Padmount metering will be quoted as Optional Facilities.
- 5.17.3. Junction boxes are not permitted ahead of the FortisAlberta metering.
- 5.17.4. If service requirements exceed the above maximum limits, refer to the [Section 5.18](#), Instrument Metering. Any service found exceeding the above maximum limits at any time shall be re-wired to instrument metering at the Customer's expense or the service will be disconnected.

Table 3 – Standard Self-Contained Socket Connections

Self-Contained Meters (Up to 200 amps)						
Voltage	Phase	Wire	Connection	Socket	Figure	Remarks
120	1	2		4 JAW	<a href="#">Figure 2</a>	Neutral on right side of socket
120/240	1	3		4 JAW	<a href="#">Figure 3</a>	
240/480	1	3		4 JAW	<a href="#">Figure 3</a>	
120/208	2	3	Network	5 JAW	<a href="#">Figure 4</a>	5 <sup>th</sup> jaw at 9 o'clock
120/208 Y	3	4	Star	7 JAW	<a href="#">Figure 5</a> <a href="#">Figure 6</a>	Single meter sites - Hot meter Multi-meter sites shall have Cold meter
277/480 Y	3	4	Star	7 JAW	<a href="#">Figure 5</a>	Cold meter
347/600 Y	3	4	Star	7 JAW	<a href="#">Figure 5</a>	Cold meter

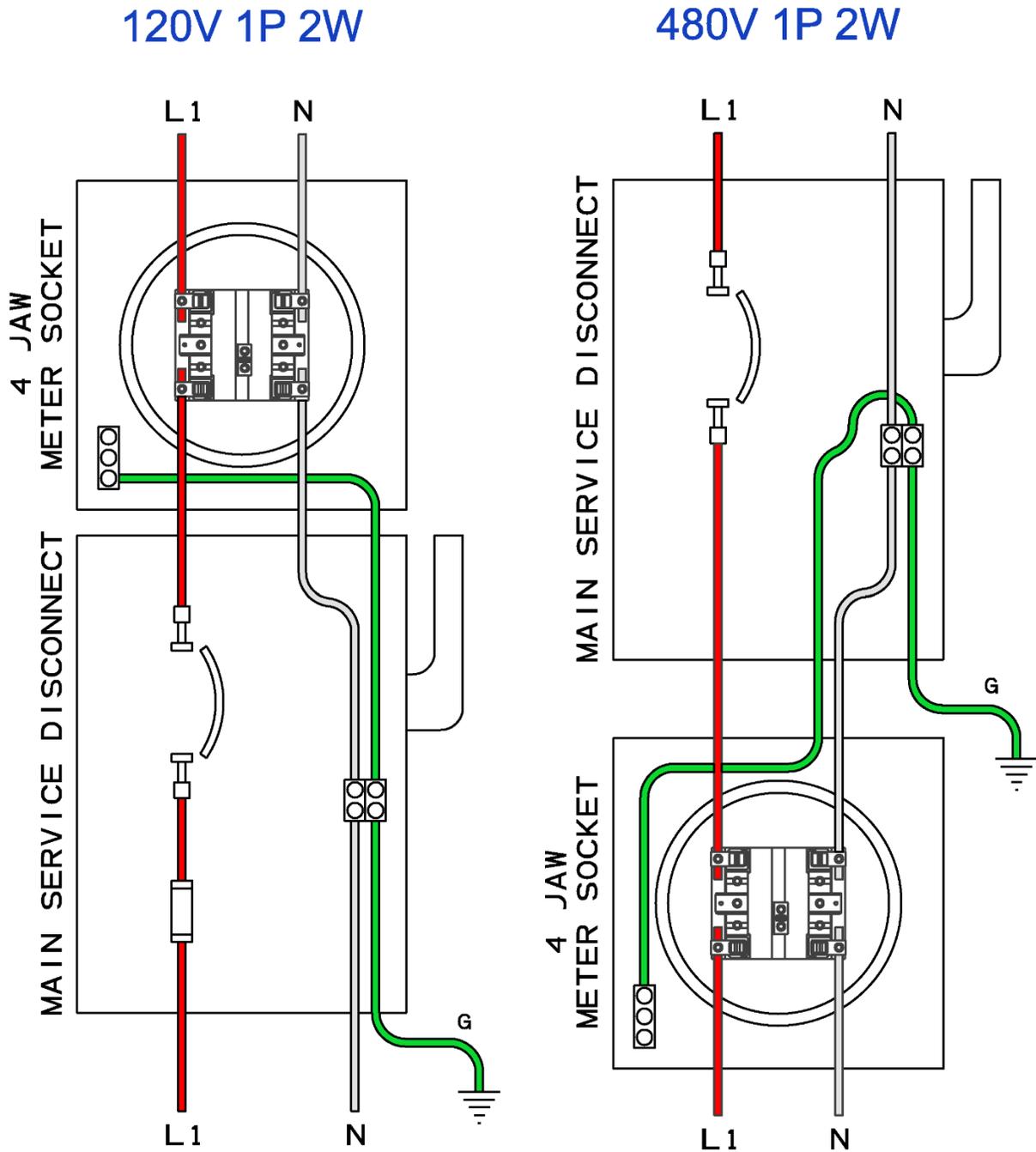


Figure 2 – Single-Phase, 2-Wire Circuit, 120 V (left) and 480 V (right) Self-Contained Meter Socket and Service Box Connection.

**120/240V 1P 3W**

**240/480V 1P 3W**

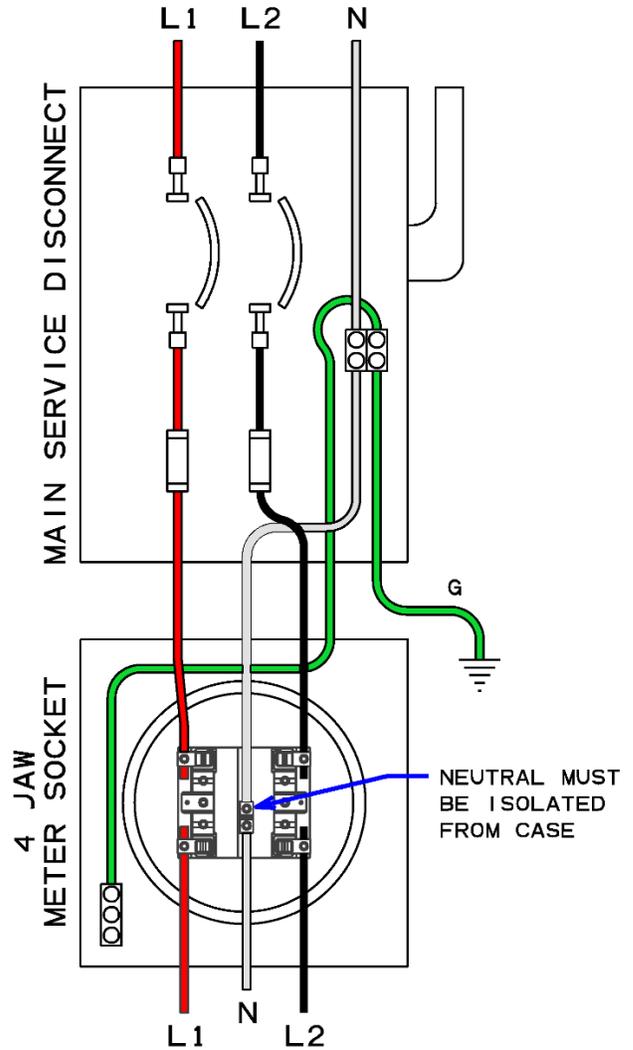
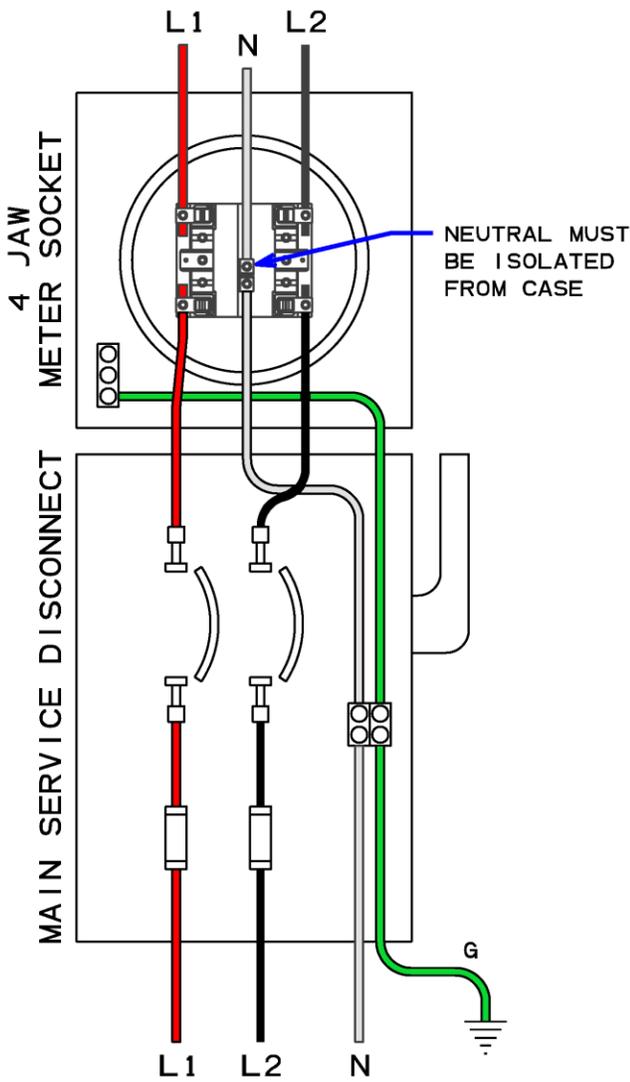


Figure 3 – Single-Phase, 3-Wire Circuit, 120/240 V (left) or 240/480 V (right) Self Contained Meter Socket and Service Box Connection.

## 120/208V 2P 3W NETWORK

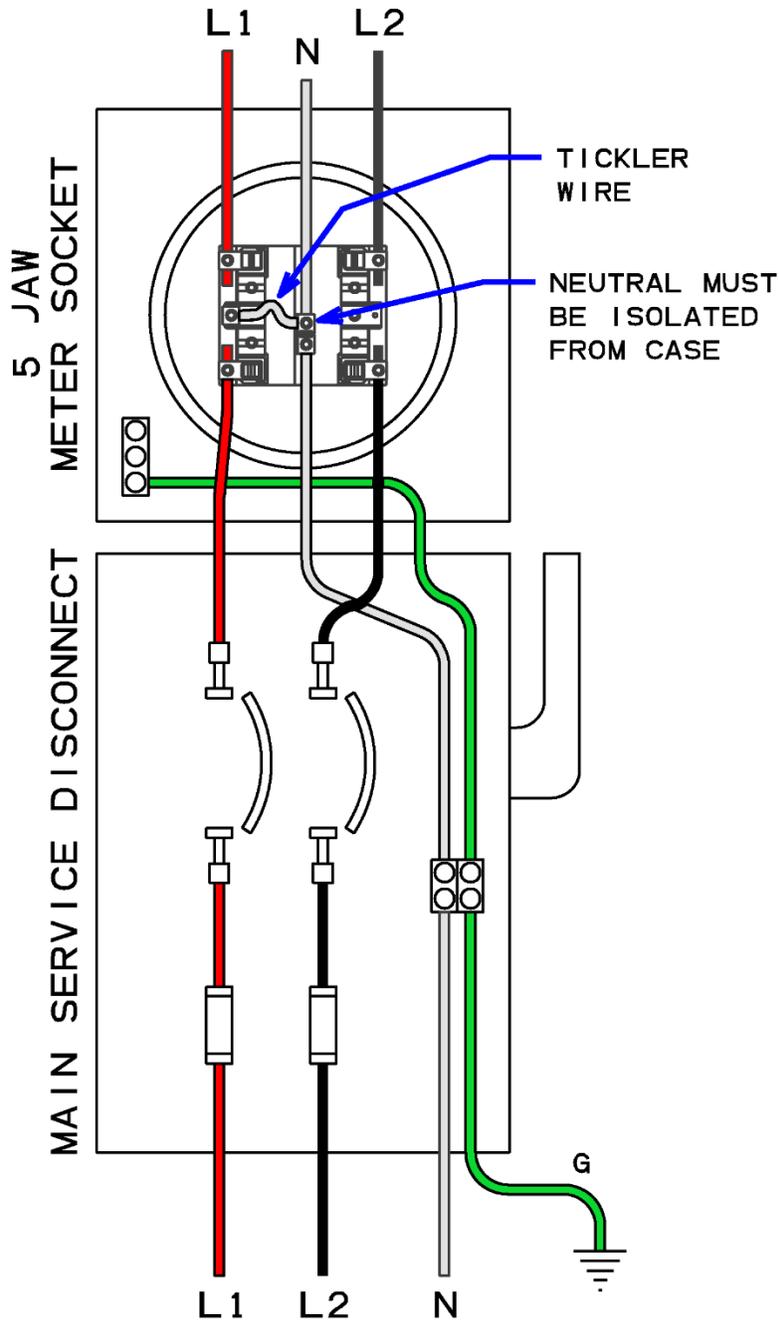


Figure 4 – 3-Wire, Network Circuit, 120/208 V Self Contained Meter Socket and Service Box Connection.

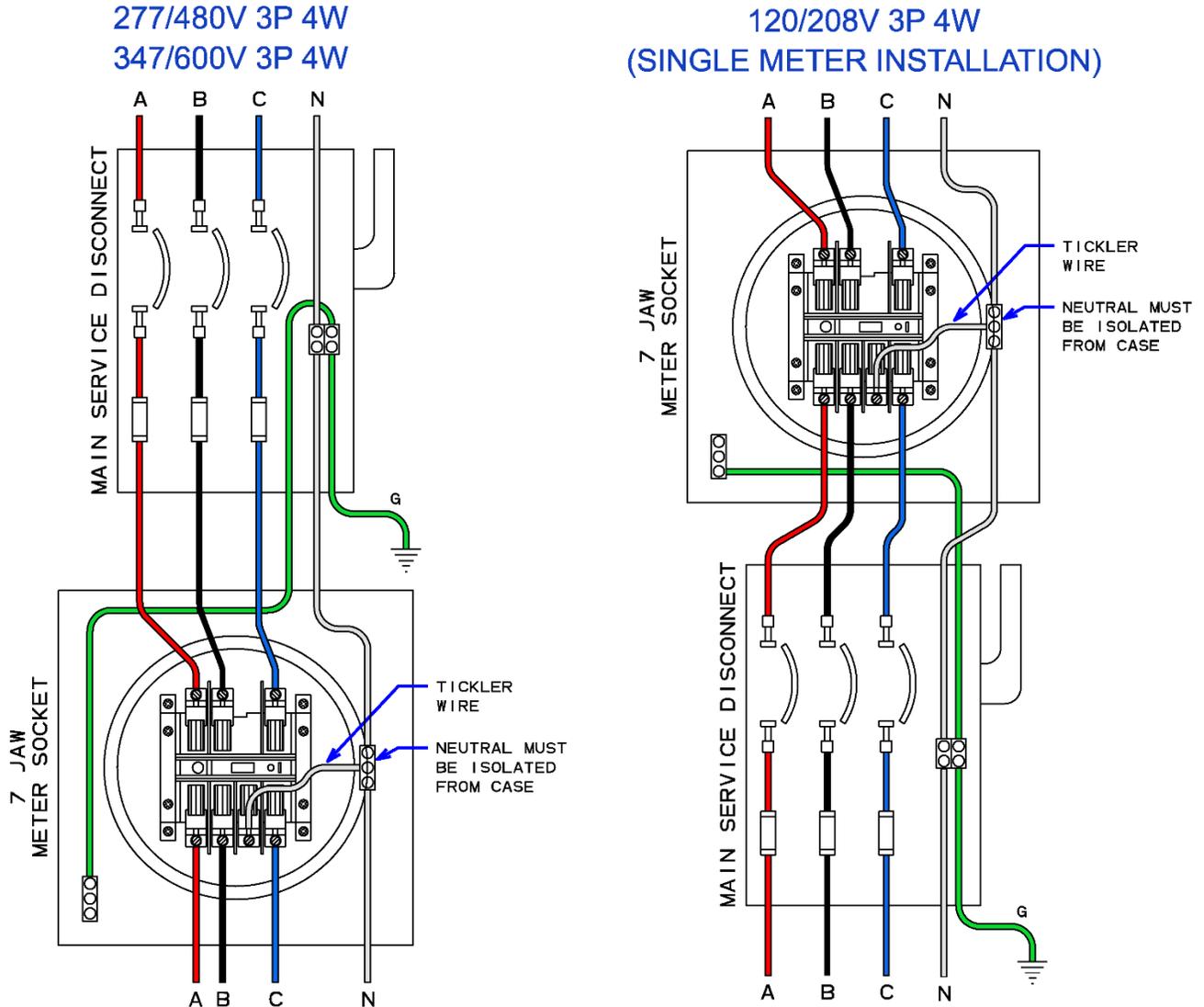


Figure 5 – Three Phase, 4-Wire, Circuit, 277/480 or 347/600 V (left), 120/208 V (right) Self Contained Meter and Service Box Connection

## 120/208V 3P 4W MULTI METER INSTALLATION

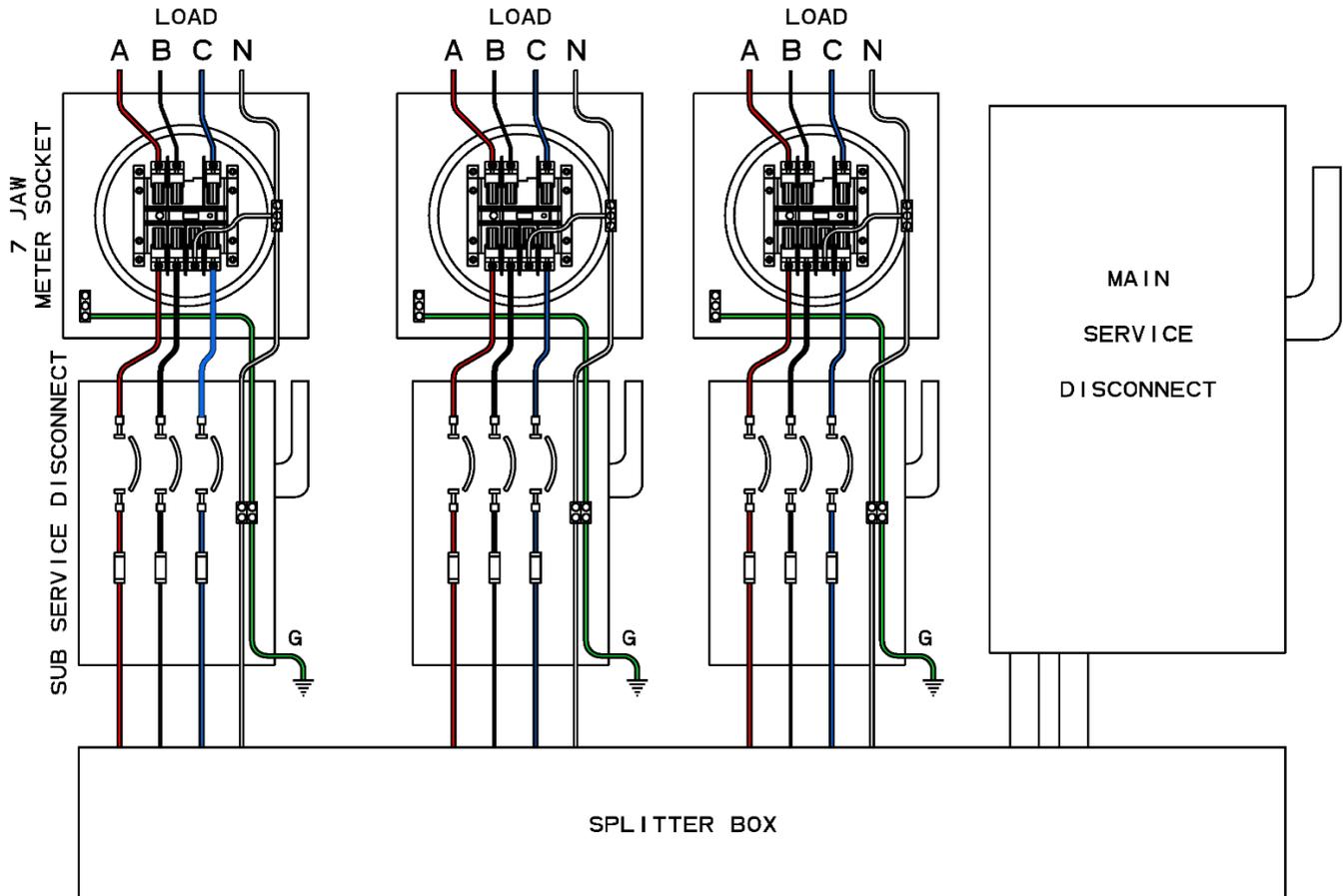


Figure 6 – Three Phase 4-Wire, 120/208 V, Multi Meter Installation

### 5.17.5. Self-Contained Metering, Customer Requirements

- 5.17.5.1. The Customer is required to supply a meter socket complete with a screw type sealing ring for FortisAlberta use. Sockets with bypass switches will not be accepted.
- 5.17.5.2. The Customer is responsible to make all connections within the meter socket. The main service neutral shall be connected to the neutral socket lug within the meter socket.
- 5.17.5.3. All neutral connections after the main service disconnect shall be isolated from ground (Canadian Electrical Code Rule 10-208-d and 10-210 [B1]). In the case of meter sockets located after the main disconnect an isolated neutral block shall be used. NGR's are only permitted on services with a self-contained meter with written permission.
- 5.17.5.4. For single phase 240/480 V services the meter socket shall be located after the main breaker and have the neutral brought in and isolated from the case. A bonding conductor must be connected to the meter enclosure.

### 5.18. Instrument Metering

5.18.1. Instrument transformer type metering is required on all services exceeding:

- 200 amps per phase and/or,
- 600 volts phase-to-phase and/or,
- exceeding 130 HP continuous duty motor load at 480 volts phase to phase (Canadian Electrical Code Rule 28-106 and 28-704 [B1]).

5.18.2. For all services that require instrument metering and are supplied from a dedicated padmount transformer, padmount metering will be installed by FortisAlberta. For services supplied from an overhead transformer or a shared padmount transformer, instrument metering shall be installed meeting the requirements outlined below.

5.18.3. Both the instrument meter socket and instrument transformer enclosure must be located:

- Both indoors or both outdoors.
- In the same room (indoors).
- Within a maximum length of 7 m of 35 mm (1 ¼") conduit between the meter socket and the instrument transformer enclosure.

5.18.4. The use of "LB" style fittings is permitted only when there is no other means to route the conduit.

#### 5.18.5. Connection of Instrument Metering Equipment

5.18.5.1. The Customer is responsible to make all connections to the current transformer primaries (bars). These connections shall be properly secured, and conductors shall be shaped or formed and supported so that no tension is applied to the current transformers.

5.18.5.2. For switchgear using bus bars, the neutral bus bar shall be run into the instrument transformer enclosure from the main service disconnect and have a hole tapped for a #10-32 screw, otherwise there shall be a 25 mm (1") wide by 6.3 mm (¼") copper extension brought into the instrument transformer enclosure and have a hole tapped for a #10-32 screw.

5.18.5.3. When insulated conductors are used instead of bus bars, an approved isolated neutral block shall be provided on one of the neutral conductors within the instrument transformer enclosure and have a screw type connection for a 14 AWG potential wire for the metering.

5.18.5.4. Unless an NGR is installed, all three-phase services will be supplied as 4-wire solidly grounded-wye. The grounded conductor required by Canadian Electrical Code Rule 10-210 [B1] shall be run from the X<sub>0</sub> bushing of the supply service transformer to the bonding point in the main service disconnect. When the neutral is not required beyond the bonding point, FortisAlberta will except a minimum size of #6 AWG white insulated conductor run from the bonding point to an isolated neutral block in the instrument transformer enclosure for all indoor metering installations (refer to [Figure 7](#)).

5.18.5.5. FortisAlberta shall make all connections to potential transformers, currents transformer secondary terminals, fuse blocks and instrument meter socket (refer to [Figure 8](#)).

#### 5.18.6. Conduit Requirements

5.18.6.1. A metal conduit, 35 mm (1 ¼") diameter and having a maximum length of 7 m is required between the instrument transformer enclosure and meter socket. This conduit shall be

terminated with lock nuts and bushings. If LB's or similar conduit fittings must be used due to tight spaces, they shall be sealable with a wire seal and be clearly visible.

5.18.6.2. The conduit is for exclusive use of FortisAlberta. When it is necessary to route metering secondary conductors through compartments other than those reserved for FortisAlberta's use, a conduit (rigid PVC or EMT) shall run the full length through each compartment.

5.18.7. Grounding of Sockets and CT Cabinets

5.18.7.1. Each meter socket and CT cabinet shall be bonded to the system ground.

5.19. Instrument Meter Socket Specifications

5.19.1. Only FortisAlberta approved instrument meter sockets are to be used. Currently approved meter sockets are:

Table 4 - Approved Instrument Meter Sockets

Phase and Dimension	Voltage	Wire Connection	Socket Configuration	Manufacture	Catalogue Number	Figure	Notes
Single Phase 51 H x 31 W cm (20 H x 12 W) in	120/240 240/480	3-Wire	6 Jaw c/w Test Switch	Thomas & Betts	CT106-SWL		See Application Note (a)
				Meter Device	602-C3040C6-953		See Application Note (a)
Single Phase Residential 201-400 A 111 <sub>H</sub> x33.8 <sub>W</sub> cm (44 <sub>H</sub> x13 <sub>W</sub> ) in <small>[Note: Service drop 60 m or less in length]</small>	120/240	3-Wire	6 Jaw c/w Test Switch & CT compartment to mount miniature window CT's only	Thomas & Betts	FA4B-6T <i>No secondary splices or terminations allowed inside this unit. Source Bottom Entry only</i>		See Application Note (b)
Three Phase 51 <sub>H</sub> x31 <sub>W</sub> cm (20 <sub>H</sub> x12 <sub>W</sub> ) in	120/208, 277/480, 347/600, Over 600	4-Wire, Wye	13 Jaw c/ w Test Switch	Thomas & Betts	CT113-SWL		See Application Note (c)
	120/208, 277/480, 347/600, Over 600	4-Wire, Wye	13 Jaw c/ w Test Switch	Meter Device	602-C3040C-13-603		See Application Note (c)

Application Notes

- a) Used with an instrument transformer enclosure for residential, commercial and industrial indoor or outdoor installations.
- b) Designed to be mounted on the outside of a building, feed underground via bottom entry and short load leads out the back. No splices or terminations are allowed inside this unit. Can also be used for Lot Line Metering by using a splitter box mounted on the backside to

- facilitate connections to an underground service entrance cable drop to a building. Must be mounted so as the bottom is a minimum of 71 cm (28") to 101 cm (40") above finished grade.
- c) Used with an instrument transformer enclosure for commercial and industrial indoor or outdoor installations.

Table 5 - Instrument Meter and CT Cabinet Mounting Heights

	Location	
	Outdoor	Indoor
Instrument Meter Socket Height  <i>(Measured to horizontal centre of meter)</i>	1.5 m (59") min.  1.8 m (71") max.	0.95 m (37.5") min.  1.8 m (71") max.
	Outdoor	Indoor
Instrument CT Cabinet Height	0.9 m (35.5") Cabinet bottom min.  2 m (79") Cabinet top max.	15 mm (6") Cabinet bottom min.  2 m (79") Cabinet top max.

Table 6 - Required Instrument Transformer Enclosure Sizes

Type of Service			Service Size	Instrument Transformer Enclosure Size (mm / in.) Min. sizes			Current Transformers Supplied by FortisAlberta			Notes
Voltage	Phase	Wire	Amps	H	W	D	Gauge	Bar Type	Window Type	
120/240	1	3	200-400	610 24"	610 24"	254 10"	16	2-2 Wire		
*120/240	1	3	200-400	610 24"	610 20"	254 8"	18/16	2-2 Wire		See SMG. 2.1, page 3 of 3  Continuous Hinge with 3-Point Latch, Type 4 c/w Pad Lockable Handle
**120/240	1	3	200-400	Part of FA4B-6T Microelectric Socket 1,111 x 338 x 214 43 3/4 x 13 5/16 x 8 7/16 (h/w/d)			16	—	2	
120/240	1	3	401-800	760 30"	760 30"	254 10"	16	2-2 Wire		
120/208Y	3	4	200-600	760 30"	760 30"	254 10"	16	3-2 Wire		
120/208Y	3	4	601-1500	Distribution Centers c/w bus bars				3-2 Wire		
277/480Y	3	4	200-600	760 30"	760 30"	254 10"	16	3-2 Wire		
277/480Y	3	4	601-1500	Distribution Centers c/w bus bars				3-2 Wire		

Type of Service			Service Size	Instrument Transformer Enclosure Size (mm / in.) Min. sizes				Current Transformers Supplied by FortisAlberta		Notes
347/600Y	3	4	200-600	914 36"	914 36"	254 10"	16	3-2 Wire		
347/600Y	3	4	601-1200	Distribution Centers c/w bus bars				3-2 Wire		
347/600Y	3	4	1201-3000	Distribution Centers c/w bus bars				3		
Over 600 volts Y	3	4	All	Distribution Centers c/w bus bars				3-2 Wire		

Notes: Instrument transformer enclosure size are minimum dimensions.

\* Lot Line Metering only, used with a CT106-SWL socket.

\* \* Designed for residential use (line supply via bottom, load centre back into house).

5.19.2. CT Enclosure Doors

5.19.2.1. The instrument transformer enclosure shall be equipped with vertically hinged door(s), which are non-removable in the closed position and equipped with stops to prevent the doors from accidentally dropping off the hinges in the open position.

5.19.2.2. These door(s) shall be equipped with a latch and have provisions for securing the door with a FortisAlberta padlock.

5.19.3. Cover Plates

5.19.3.1. Cover plates are not acceptable on instrument transformers cabinets.

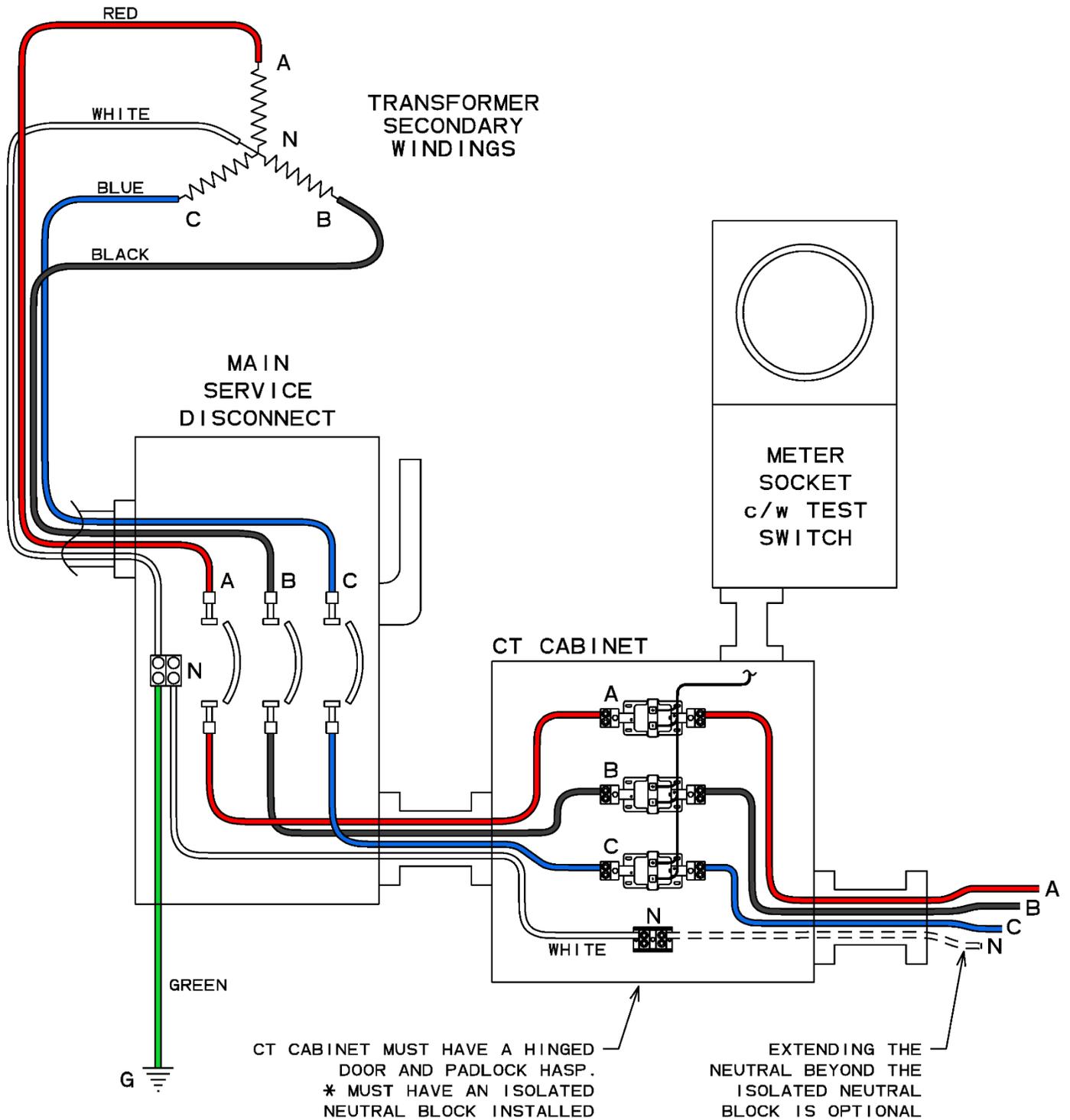


Figure 7 - 3 Phase 4-Wire Y Instrument Metering Wiring Detail

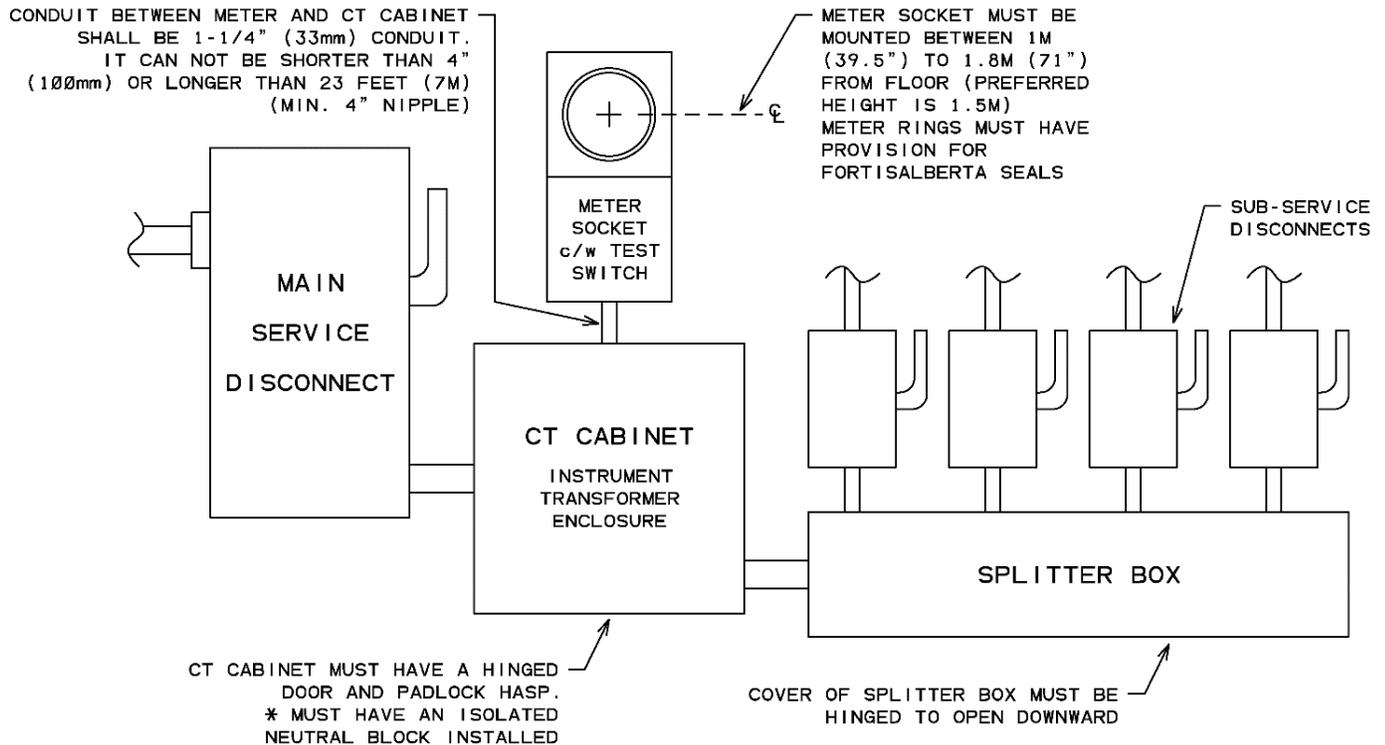


Figure 8 – Instrument Metering Layout

5.19.4. Indoor instrument transformer enclosures.

5.19.4.1. Indoor instrument transformer enclosures shall be:

- Mounted so the bottom of the enclosure is 152 mm (6") minimum above the floor.
- Mounted so the top of the enclosure is a maximum of 2 m (78") above the floor.
- Maintain 112 mm (4") vertical separation from the bottom of the meter socket.

5.19.4.2. For instrument transformer cabinet sizes, refer to [Table 6](#).

5.19.5. Outdoor Instrument Transformer Enclosures shall be (refer to Drawing [SMG 2.16.4, page 2](#)):

- Mounted so the bottom of the enclosure is 0.5 m (20") minimum above the final grade.
- Mounted so the top of the enclosure is a maximum of 2 m (78") above the final grade.

5.19.5.1. A separate instrument transformer enclosure is required for each instrument transformer service.

5.19.5.2. For instrument transformer cabinet sizes, refer to [Table 6](#).

5.19.6. Current Transformers (CT's)

5.19.6.1. Refer to Drawing [SMG 2.16.5](#) for 2-wire current transformer dimensions drawings.

## 6. Non-Standard Services

### 6.1. For services where requirements of this guide cannot be met, the Customer must:

- Submit equipment drawings, specifications and site plans to FortisAlberta Metering Standards for approval before ordering and installing service entrance equipment or associated equipment.
- Drawings submitted shall clearly show all equipment related to the metering, including service entrance equipment and metering enclosures. These drawings should show elevations and enclosure sizes. In some cases, a hand drawn sketch that clearly shows the layout and dimensions is all that is needed.
- FortisAlberta Metering Standards will evaluate the submitted documents and issue a ruling on the non-standard service. An approval letter shall be received back before the service can be considered approved.

### 6.2. In case of a dispute, FortisAlberta staff will not honour verbal conversations. Prints and/or a letter approved by Metering Standards is required prior to non-standard services being energized. Any approval is only for the service in question and is not a general approval for future services.

FortisAlberta Metering Standards Contact Details
<a href="mailto:meteringstandards@fortisalberta.com">meteringstandards@fortisalberta.com</a>

## 7. Project Overview

Section 7 summarizes the general responsibilities and expectations for both the Customer and FortisAlberta. Sections 8 to 11 will address the service requirements and responsibilities for the various types of services that FortisAlberta offers.

### 7.1. FortisAlberta Service Options:

- i. Overhead or aerial, for residential or commercial services.
- ii. Underground or padmount for residential or commercial services.
- iii. Single phase underground secondary for residential services.
- iv. Single phase rural pole or pedestal metering for rural residential or commercial services.

### 7.2. Definitions

7.2.1. **Service Connection Point (Service Entry Point):** The point at which the Customer's facilities physically connect to FortisAlberta's electrical distribution system to permit the Customer to obtain electricity. For an underground supply service, this could also be described as the specific point that FortisAlberta's civil work ends and the Customer's begins.

7.2.2. **Point of Service Termination (Electrical Connection Point):** The electrical connection point at which FortisAlberta's supply service conductors are connected to the conductors or apparatus of a Customer.

7.3. Service Types

7.3.1. **Overhead Service**, service is fed from an aerial service conductor from a supply service pole. Typical installations include residential homes and small commercial applications.

Customer's Responsibilities	FortisAlberta's Responsibilities	Service Connection Point (Service Entry Point)	Point of service (Electrical Connection Point)
<p>Complete all work on Customer's property, the building, including installation of the weatherhead and service attachment.</p> <p>Install secondary poles (Customer owned), as required.</p>	<p>Complete all work on road and/or Utility Right of Way.</p> <p>If required, FortisAlberta will supply, install, own and maintain an overhead secondary powerline that is no longer than 60 m on Customer property.</p> <p>Make the final connection at the supply service transformer or Customer supplied weatherhead</p> <p>Supply, install, own and maintain all high-voltage Facilities, including poles, conductors, transformers and switches.</p>	<p>Secondary terminals of the supply service transformer, weatherhead on pole or building.</p>	<p>Secondary terminals of the supply service transformer, weatherhead on pole or building.</p>
<p>When required, Install Instrument Transformers and meter socket.</p>	<p>When required, supply instrument transformers.</p> <p>Supply and install revenue metering equipment.</p>		
<p>When required, supply, install and maintain a secondary powerline that exceeds the length of secondary power line supplied by FortisAlberta.</p>	<p>Install and maintain all supply service poles, anchors, and downhauls with high-voltage (primary) conductors attached on the line side of the point of service.</p>		
	<p><i>Note: FortisAlberta owns and maintains all Facilities including poles, anchors, and downhauls on the line side of the point of service with primary conductors attached, overhead secondary conductors, and revenue metering equipment.</i></p>		

7.3.2. **Underground or Padmount Commercial Service**, service is fed from a pad or ground mounted transformer located on private property. Typical installations include medium to large commercial applications, large homes, and multi family sites.

Customer's Responsibilities	FortisAlberta's Responsibilities	Service Connection Point (Service Entry Point)	Point of service (Electrical Connection Point)
<p>Completes civil work on Customer's property. This typically includes all trenching, ducting, pull boxes, concrete bases for any padmount equipment, grounding, and bollards.</p> <p>Install bollards, as required.</p>	<p>Complete all work on road and/or Utility Right of Way.</p>	<p>Property Line for residential sites.</p>	<p>Property line for residential sites.</p> <p>Secondary bushing of the supply service transformer for all other installations.</p>
<p>Supply and install service entrance cable.</p> <p>Terminate all service entrance cable at the secondary bushings of the padmounted transformer.</p>	<p>Supply, install and terminate all primary cable.</p> <p>Supply, install, and terminates all padmount equipment.</p>		
<p>When required, install instrument transformers.</p>	<p>When required, supply Instrument transformers</p> <p>Supply and install revenue metering equipment.</p>		
<p><i>Note: The Customer owns and maintains all secondary works on private property.</i></p>	<p><i>Note: FortisAlberta owns and maintains all Facilities including transformers, switching cubicles, primary cables, and revenue metering equipment.</i></p>		

7.3.3. **Underground secondary service**, service is fed from pad mounted transformer or pedestal installed on road or Utility Right of Way. Typical installations include single phase residential and small to medium commercial application.

Customer's Responsibilities	FortisAlberta's Responsibilities	Service Connection Point (Service Entry Point)	Point of service (Electrical Connection Point)
Complete civil work on private property. This typically includes all trenching, ducting, pull boxes, and grounding.	Complete all work on road and/or Utility Right of Way.	Property line for residential sites.	Property line for residential sites.  Secondary terminal of the supply service transformer or pedestal for all other installations.
Supply and install secondary cable.	Terminate all secondary cables at the padmount transformer or pedestal.		
When required, install instrument metering.	When required, supply instrument metering.  Supply and install revenue metering equipment.		
<i>Note: The Customer owns and maintains all secondary works on private property.</i>	<i>Note: FortisAlberta owns and maintains all revenue metering equipment.</i>		

7.3.1. **Rural pole or pedestal meter service**, this is rural single-phase secondary service with pole or pedestal metering supplied, installed and maintained by FortisAlberta. This service can be supplied by an overhead or pad mounted transformer. Typical installations include rural farm and small commercial applications.

Customer's Responsibilities	FortisAlberta's Responsibilities	Service Connection Point (Service Entry Point)	Point of service (Electrical Connection Point)
<p><b>For overhead service:</b></p> <p>Supply, install, and maintain all overhead service entrance secondary conductors, hardware and poles on Customer's property, from each service entrance to the metering/supply service transformer pole or metering point.</p> <p><i>Note: The Customer owns and maintains poles and anchors with only secondary conductors attached past the metering point.</i></p>	<p>Complete all work on road and/or Utility Right of Way.</p> <p>Install and maintain all supply service transformers, poles, anchors, and downhauls with high-voltage (primary) conductors attached on the line side of the metering point.</p> <p>Supply, install and maintain the rural service box and meter.</p> <p>Terminate the Customers service entrance conductors at the metering point.</p> <p><i>Note: FortisAlberta owns and maintains all poles, anchors, and downhauls on the line side of the metering point with primary conductors attached, overhead service conductors, and revenue metering equipment.</i></p>	<p>Secondary terminals of the supply service transformer, weatherhead on pole or building</p>	<p>Secondary terminals of the supply service transformer, weatherhead on pole or building</p>
<p><b>For underground services:</b></p> <p>Complete civil work for secondary cable systems on Customer's property. This typically includes all trenching and ducting up to the metering point.</p> <p><i>Note: The Customer owns and maintains all secondary cable and ducting systems on private property after the metering point.</i></p>	<p>Complete all work on road and/or Utility Right of Way.</p> <p>Supply, install and maintain the primary (and when required secondary supply) service cable up to the metering point.</p> <p>Supply, install and maintain the rural service metering pedestal.</p> <p>Terminate the Customers service entrance cable at the metering point.</p> <p><i>Note: FortisAlberta owns and maintains all revenue metering equipment.</i></p>	<p>Secondary terminal of the supply service box.</p>	<p>Secondary terminal of the supply service box.</p>

## 8. Residential Services

### 8.1. General Requirements

- 8.1.1. All single residential services must have the “self-contained” or “instrument” metering located outdoors and shall be connected on the line side of the supply service disconnect.
- 8.1.2. Metering equipment is required to meet the General Requirements outlines in [Section 5.0](#) in addition to the following.

Meters shall be installed on:

- The outside wall of a house or a suitable building, or
- A separate suitable pedestal or treated 6”x6” post, as in the case of Lot Line Metering, refer to Drawing [SMG 2.1, page 2](#).

### 8.2. Overhead Service Supplied by an Overhead Transformer

#### 8.2.1. The Customer Shall:

- Supply and install a CSA approved meter socket within 60 m of the front property line or supply service transformer pole.
- Supply, install and maintain a metallic service entrance mast complete with weatherhead, clevis insulator and service entrance conductors. The service mast or clevis insulator complete with bolt, shall be securely fastened to the building.
- Note: Screw type insulators (service knobs) will not be accepted on new or upgraded construction.
- Supply and install service pole, if required.
- For Customer pole metering, supply, install and maintain the metering pole (refer to Drawing [SMG 4.1](#)).

#### 8.2.2. FortisAlberta Shall:

- Supply and install the meter.
- Supply, install and maintain up to 60 m of supply service conductor with any one span being a maximum of 35 m.
- Connect the Customer supplied service entrance conductors to either the:
  - secondary terminals of the transformer, or
  - wire harness at the supply service transformer pole, or
  - supply service conductors.
- Own and maintain all conductors and Facilities required for an electrical supply service up to the line side of the final connection at the transformer’s secondary terminals or the Customer owned service entrance conductors.

- 8.2.3. Rural residential services that require pole metering to be supplied and installed by FortisAlberta will incur an optional facility charge. The metering pole will be located on or adjacent to (within 1.0 m) the Customers property line (*This option is only available for rural residential services*). Refer to [Section 9.1](#) and [Section 9.2](#) for additional requirements for this option. No more than 2 single meter sockets can be installed on a FortisAlberta owned pole (refer to Drawing [1635](#)). If the supply service pole is located on the road allowance, the Customer owned service entrance conductors can not cut across the adjacent private property.

8.3. Underground Service Supplied by an Overhead Transformer

8.3.1. The Customer Shall:

- Supply and install a CSA approved meter socket within 90 m of the front property line or supply service transformer pole.
- Supply and install the service entrance conduit.
- Provide all trench excavation on Customer property, lease property and all backfilling of any trenching.
- Provide an open trench approximately 1 m deep x 1 m diameter at the base of the pole located below the supply service transformer for mounting the conduit (refer to Drawing [2624, page 1](#) and [2624, page 2](#)).
- Supply, install, and maintain the appropriate length of underground service entrance cable up to the base of the supply service pole and leave enough cable to reach the transformer secondary terminals (A FortisAlberta representative will advise the Customer of the required length). [Table 7](#) outlines the acceptable service entrance conductor sizes by voltage and transformer size.

Table 7 – Single Phase Service

120/240 V	240/480 V	Secondary Terminals
15 kVA	25 kVA	Clamp type terminal for #6 - 2/0 conductor size
25 kVA	50 kVA	Clamp type terminal for #2 - 350 MCM conductor size
50, 75, 100 and 167 kVA	75 and 100 kVA	Single barrel or double barrel mechanical terminal for 1/0 – 750 MCM

- Where required, supply the appropriate length of 2 or 4 inch rigid PVC conduit up to the supply service transformer at the pole. (A FortisAlberta representative will advise the Customer of the required length).
- Supply the weatherhead (when the conduit is extended to the base of the supply service transformer pole).

Note – FortisAlberta shall accept only 2 and 4 inch conduit sizes for underground services.

8.3.2. Application of Service Entrance Riser Way and Standoff Brackets

8.3.2.1. For **urban** applications, all Customer service entrance cables shall be installed in rigid PVC conduit to the base of the supply service transformer pole. The conduit shall be secured to the pole via FortisAlberta supplied standoff brackets and straps.

8.3.2.2. For **rural** applications where:

- Multiple services will be fed from a single overhead transformer or the Customer uses single conductor type USEI service entrance cable or there is an existing communication conduit sharing the pole, the cable shall be installed in conduit to the base of the supply

service transformer pole. The conduit shall be secured to the pole via FortisAlberta supplied standoff brackets and straps.

- Where type USEB service entrance or armored cable is used and there will only be a single service fed from an overhead supply service transformer, the first 10 feet of cable will require conduit. The conduit shall be sized appropriately for the installation (this will be the only exception to the 2 and 4 inch guideline). The Customer will pull the cable through the rigid PVC conduit and secure it to the pole via Customer supplied straps. The remaining service entrance or armored cable shall be coiled and secured to the pole with appropriately sized cable straps (weatherhead is not required), bagged, and secured to the pole.

8.3.2.3. If the Customer chooses to use multi conductor armored cable, then the last 2 m of the cable must be stripped of the armor exposing the PVC inner jacket. The PVC jacket shall then be covered with color coded heat shrink tubing or weatherhead when required.

- The conductor intended to be used as the neutral shall be clearly identifiable via white vinyl tape or heat shrink tubing.
- WARNING - the PVC colour coded insulation used for TECK 90 (copper) cables is not suitable for UV exposure and will deteriorate over time breaking down the insulation and exposing the conductor.

8.3.2.4. No person except FortisAlberta personnel shall climb the supply service transformer pole (*or any Facility owned by FortisAlberta*).

8.3.2.5. FortisAlberta shall complete the final connection to the supply service conductors or transformer.

8.3.2.6. For Lot Line Metering, supply and install Lot Line Metering apparatus (refer to Drawing [SMG 2.1, page 2](#)).

8.3.3. FortisAlberta Shall:

- Supply and install the meter.
- Where applicable, supply and install standoff brackets and mounting hardware suitable for 2 or 4 inch conduit.
- Where required, assemble the conduit riser way, pull in the cable, install weatherhead and mount the riser way.
- Where only 10 ft of conduit is required, FortisAlberta shall secure the remainder of the cable to the supply service pole using Customer supplied cable straps.
- Connect the Customer supplied service entrance conductors to either the:
  - secondary terminals of the transformer; or
  - wire harness at the supply service transformer pole; or
  - supply service conductors.
- Own and maintain all conductors and Facilities required for an electrical supply service up to the final connection at the transformer's secondary terminals or the Customer owned service entrance conductors.

#### 8.4. Underground Service Supplied by a Padmount Transformer

8.4.1. The Customer Shall:

- Supply and install a CSA approved meter socket, (where padmount metering is not opted for) within 90 m of the front property line or supply service transformer.
- For Lot Line Metering, supply and install Lot Line Metering apparatus (refer to Drawing [SMG 2.1, page 2](#)).
- If the Customer service is supplied with a dedicated supply service transformer FortisAlberta will install padmount metering on the transformer.
- Provide all trench excavation on Customer property, lease property and all backfilling of any trenching.
- Supply and install the service entrance conduit (optional).
- Supply, install and maintain the appropriate length of service entrance cable up to the property line and leave enough cable to reach the supply service transformer or pedestal secondary terminals.
- Supply the transformer terminal connectors.
  - If the Customer service is supplied with a dedicated transformer the Customer will install and connect the underground service entrance cable at the supply service transformers secondary terminals or padmount meter. FortisAlberta will give the Customer a written Guarantee of Isolation (GOI) when the supply service transformer is deenergized and grounded before they can enter the supply service transformer enclosure. The Customer may then proceed to connect the underground service entrance cable to the supply service transformers secondary terminals (refer to Drawing [SMG 4.3](#)). When multiple cables (per phase) are installed, all cables shall be supported with the clamping mechanism located below the secondary terminals of the supply service transformer.
- Own and maintain all cabling and facilities required for electrical service up to the load side of the final connection to the supply service transformer or pedestal secondary terminals when the transformer is located on private property.

Note: If the supply service transformer or pedestal is not within the Customer property the Customer should contact FortisAlberta and their Municipality to determine whether they can install underground service entrance cable past their property line.

#### 8.4.2. FortisAlberta Shall:

- Supply and install the meter (where padmount metering is not opted for).
- Connect the Customer supplied service entrance cable into the pedestal.
- When required, perform splicing of the Customer's service entrance cable to the FortisAlberta supply service cable stubbed at the property line.
- Own and maintain all conductors and Facilities required for an electrical supply service in the Utility Right of Way up to the Customers property line.

#### 8.5. Multiple Residential Service Sites (*Duplex to Sixplex*)

8.5.1. All multiple residential services shall be designed and constructed for individually metered units and residences. The meters and equipment for multiple residential services are required to meet the requirements of [Section 5.0](#) in addition to the following:

#### 8.5.2. Meter Location:

- All meter sockets shall be identified by address or unit number with a permanent legible label on all meter sockets (refer to [Section 5.17](#)).

**8.5.3. Duplex to Sixplex:**

- In the case of a duplex to sixplex (2-6 units), the meters shall be located outdoors and be connected on the line side of the service disconnect.
- A ganged meter socket (2-6 units) must be used (no splitter boxes allowed) and must have Lexan barrier shields to protect flash points resulting from misaligning socket covers during insertion of same. All sections shall be equipped with provisions for FortisAlberta seals to prevent tampering.

**8.6. Multiple Customer Metering System****8.6.1. Individual Metering Service Type Selection:**

- When individually metering suites within a new building under construction is required, two choices may be available from FortisAlberta:
  - i. Meter Centers using traditional socket meters may be used to meter the individual residential or commercial suites requiring 200 amp services or less.
  - ii. Alternatively, the building owner can choose to install FortisAlberta's Multi Customer Metering System (MCMS) solution to meter the individual suites.
- A Multiple Customer Metering System can be used in apartment and condominium and small commercial buildings where the developer decides not to use the traditional meters for the building.
- Each unit consists of a main meter head and shorting box connected to "mini" window type current transformers on the branch circuits to the suites.
- The Customer may make the request for Multiple Customer Meter System installation with FortisAlberta early in the project. FortisAlberta will consider the Customers request, with approval granted on a site-specific and case by case basis.

**9. Rural Services****9.1. Overhead Rural Service Supplied by a Pole Mounted Transformer**

9.1.1. FortisAlberta supplied pole metering will be limited to single phase rural services only.

**9.1.2. The Customer Shall:**

- Supply, install and maintain all overhead service entrance conductors.
- Supply and install a service pole or support structure 4 m away from the FortisAlberta supply service pole if branch circuits are required for multiple Customer owned facilities.
- Supply and install a service box (complete with service entrance single point ground) on their own building, pole or support structure which shall be a minimum of 4 m from FortisAlberta's service pole. The FortisAlberta supplied pole metering shall not be considered part of the Customer service entrance equipment (Canadian Electrical Code [B1]).
- Ground the service entrance as per Canadian Electrical Code Rule 10-210 [B1].
- Supply and bring the main service entrance conductor to the FortisAlberta supplied rural meter box or supply transformer pole. The Customer owned main service entrance conductors shall be coiled and left at the base of the service pole for connection by FortisAlberta.

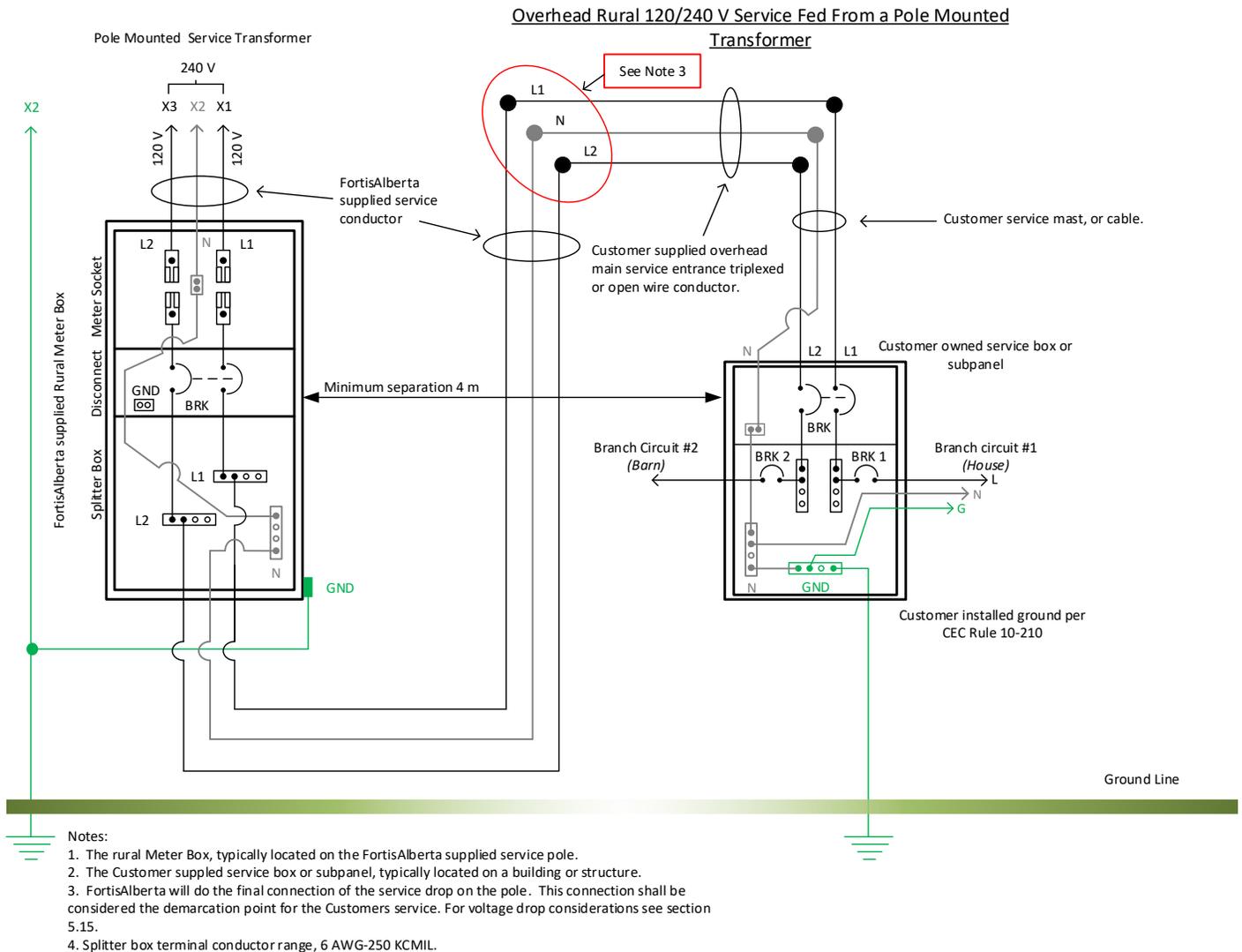


Figure 9 – Example, wiring schematic for an overhead rural 120/240 V service fed from a pole mounted transformer to a Customer owned service box or subpanel

9.1.3. FortisAlberta Shall:

- Supply, install and maintain the supply service poles, meter and the rural meter box, and were required provide and install up to 60 m of overhead secondary supply service conductors with any one span being a maximum of 35 m.
- Attach and complete all final connections to the Customers main service entrance conductors (*including terminations in meter box*). No person except FortisAlberta personnel shall climb the supply service transformer pole (*or any Facility own by FortisAlberta*).
- Own and maintain all conductors and Facilities required for an electrical supply service up to and including the rural meter box.

9.2. Underground Rural Service Supplied by a Pole Mounted Transformer

- 9.2.1. FortisAlberta supplied pole metering will be limited to single phase rural services only.

**9.2.2. The Customer Shall:**

- Provide all trench excavation on Customer property, lease property and all backfilling of any trench.
- Supply and install mechanical protection for the Customers main service entrance cable in the form of rigid PVC conduit. Terminating the conduit in the bottom of the FortisAlberta supplied rural meter box, securing to the service pole and extending to 300mm below the ground line.
- Supply, install and maintain the Customer owned main service entrance cable into the FortisAlberta supplied rural meter box, but do not connect it. FortisAlberta will do the final connection to the terminal lugs of the meter box.
- Supply and install a service pole or support structure 4 m away from the FortisAlberta supplied service pole if branch circuits are required for multiple Customer owned facilities.
- Supply and install a service box (complete with service entrance single point ground) on their own building, pole or support structure which shall be a minimum of 4 m from FortisAlberta's service pole. The FortisAlberta supplied pole metering shall not be considered part of the Customer service entrance equipment (Canadian Electrical Code [B1]).
- Ground the service entrance per Canadian Electrical Code Rule 10-210 [B1].

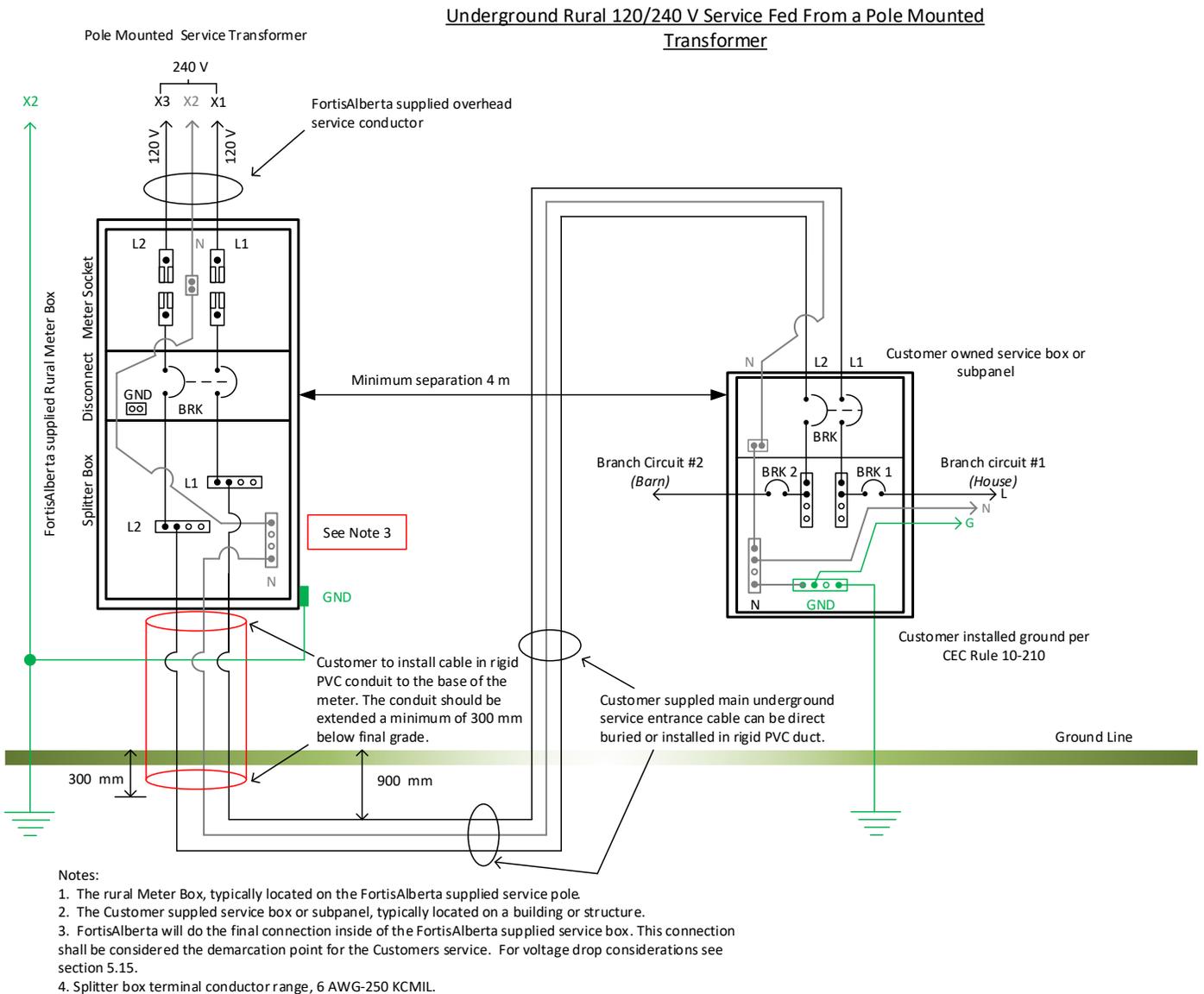


Figure 10 - Example, wiring schematic for an underground rural 120/240 V service fed from a pole mounted transformer to a Customer owned service box or subpanel.

9.2.3. FortisAlberta Shall:

- Supply, install and maintain all supply service poles, and were required provide and install up to 60 m of overhead secondary supply service conductors with any one span being a maximum of 35 m.
- Supply and install the meter and the rural meter box (refer to Drawing [SMG 5.2](#)).
- Connect the Customer supplied main service entrance cable in the rural meter box.
- Own and maintain all conductors and Facilities required for an electrical supply service up to and including the rural meter box.

**9.3. Underground Rural Service Supplied by a Dedicated Padmount Transformer**

9.3.1. FortisAlberta supplied pedestal metering will be limited to single phase rural services only.

9.3.2. The Customer Shall:

- Provide all trench and excavation on Customer property, lease property and all backfilling of any trench.
- Supply, install and maintain the Customer owned main service entrance cable up to the FortisAlberta metering pedestal or padmount metered transformer, but do not connect it. FortisAlberta will do the final connection to the terminal lugs of the metering pedestal or padmount metered transformer.
- Supply and install a service pole or support structure 4 m away from the FortisAlberta supplied metering pedestal or padmount metered transformer if branch circuits are required for multiple Customer owned facilities.
- Supply and install a service box (complete with service entrance single point ground) on their own building, pole or support structure which shall be a minimum of 4 m from FortisAlberta's metering pedestal or padmounted metered transformer. The FortisAlberta supplied pedestal meter or metered transformer shall not be considered part of the Customer service entrance equipment (Canadian Electrical Code [B1]).
- Ground the service entrance per Canadian Electrical Code Rule 10-210 [B1].

Underground Rural 120/240 V Service Fed From a Pedestal Meter

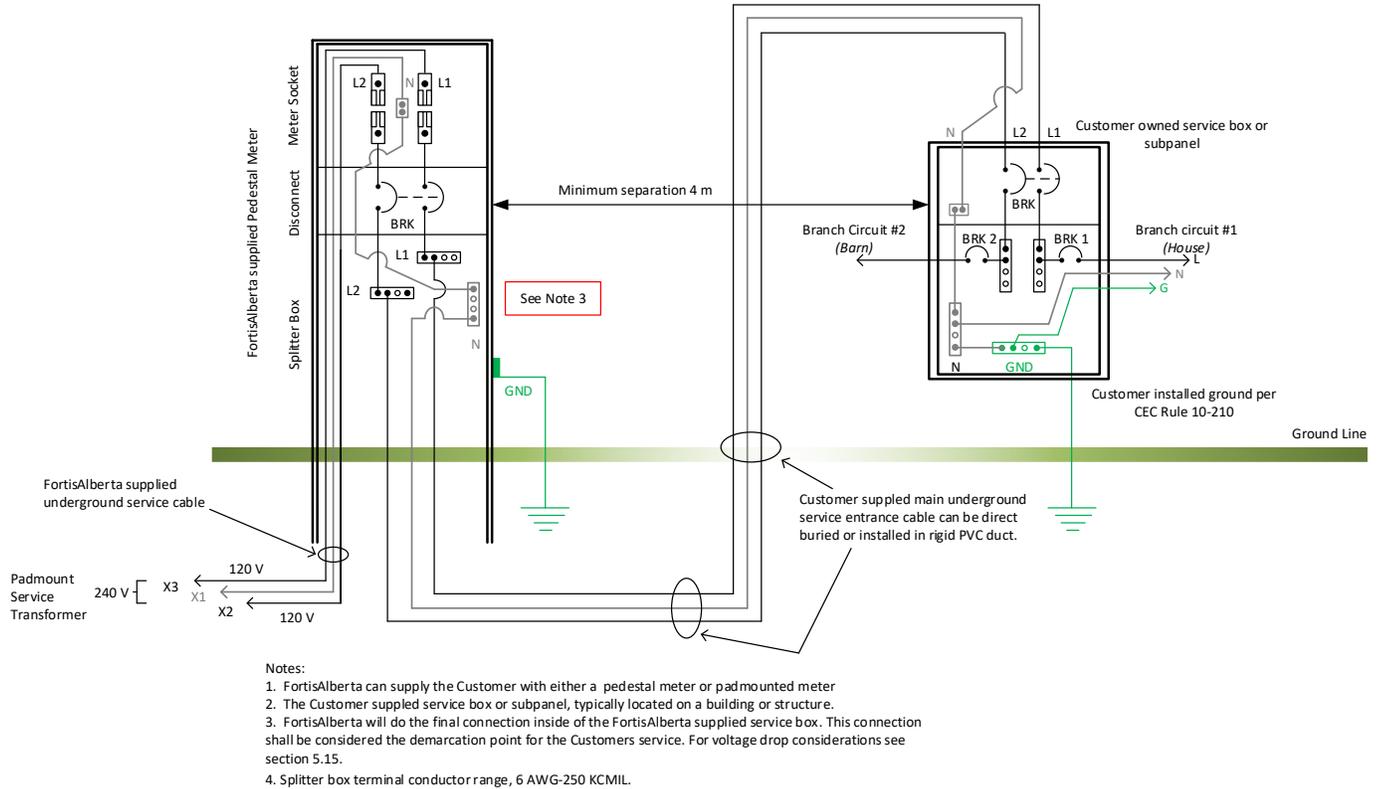


Figure 11 - Example wiring schematic for an underground rural 120/240 V service fed from a pedestal meter to a Customer owned service box or sub panel.

9.3.3. FortisAlberta Shall:

- Supply and install the meter and the metering pedestal or padmount metered transformer.
- Inspect the installation of the Customer supplied underground service entrance cable into the secondary compartment (refer to Drawing [SMG 2.1, page 1](#)).
- Connect the Customer supplied main service entrance cable in the metering pedestal or metered transformer.
- Own and maintain all conductors and Facilities required for an electrical supply service up to and including the rural meter pedestal or padmount metered transformer.

**10. Transfer Switches and Standby Generators**

10.1. General Requirements

The following requirements are the Customers responsibility in addition to the standard requirements for each type of service. These requirements apply to all services with a standby generator:

- Maintenance and repair of the switching equipment.
- Supply circuit from the standby plant to the transfer switch cannot be run overhead to the pole where the switch is mounted. It is to be either an underground circuit or a plug-in type connection.
- Service entrance conductors on the load side of the generator cannot be attached to the supply service transformer pole.
- The standby service structure and the generator shall not be installed within a 4 m radius of the supply service transformer pole. No generator cables shall be attached to the FortisAlberta owned supply service pole.
- If a transfer switch is comprised of two molded case breakers they shall be tied together mechanically (inter-locked) to prevent both breakers from being closed at the same time.
- The size and type of switch shall not have an ampacity rating less than the transformer rating.
- The enclosure shall have provisions for a FortisAlberta padlock.
- The double throw transfer switch shall be attached to the standby service structure and shall never be installed on FortisAlberta's pole or equipment.
- Source circuits from FortisAlberta and the Customer's standby must be run in separate conduits.
- An electrical permit or a signed [Connection Authorization Form](#) for the installation is required before FortisAlberta can complete the connection.

#### 10.1.1. The Customer Shall:

- Supply and install weatherproof double throw transfer switch, and
- supply and install the standby service structure (i.e. pole stub, building) to support the double throw transfer switch.

#### 10.1.2. FortisAlberta Shall:

- Verify all connections in the double throw transfer switch (refer to Drawing [SMG 6.0.1](#) and [SMG 6.0.2](#)).
- Install warning sticker (item no. 491-1925) on transfer switch and warning label (Item no. 491-0315) indicating standby plant exists on the rural meter box.
- Lock the Customer supplied weatherproof double throw transfer switch door.

### 10.2. Overhead Standby Generator Service Supplied by an Overhead Transformer

#### 10.2.1. The Customer Shall:

- Supply, install and maintain the service entrance conductors from the standby service up to the supply service transformer secondary bushing.
- Make the connection at the standby service structure.

#### 10.2.2. FortisAlberta Shall:

- Connect the Customer supplied service entrance conductors to either the:
  - secondary terminals of the transformer, or
  - wire harness at the supply service transformer pole, or
  - supply service conductors.
- Own and maintain all conductors and Facilities required for electrical supply service up to the

connection at the transformer's secondary terminals.

### 10.3. Underground Standby Generator Service Supplied by an Overhead Transformer

#### 10.3.1. The Customer Shall:

- Supply and install the conduit up the supply service pole to the rural meter box.
- Supply, install and maintain the service entrance cable from the supply service transformer pole to the standby service structure.
- Connect the service entrance cable at the standby service structure.

#### 10.3.2. FortisAlberta Shall:

- Supply and install the meter and the rural meter box (refer to Drawing [SMG 5.2](#)).
- Connect the Customer supplied service entrance cable to the metering point.
- Own and maintain all conductors and Facilities required for an electrical supply service up to and including the rural meter box.

### 10.4. Underground Standby Generator Service Supplied by a Padmount Transformer

#### 10.4.1. The Customer Shall:

- Supply, install and maintain the underground service entrance cable from the metering pedestal to the double throw transfer switch.
- Connect the underground service entrance cable at the double throw transfer switch.

#### 10.4.2. FortisAlberta Shall:

- Supply, install and maintain the meter and the metering pedestal.
- Inspect the installation of the service entrance cable into the secondary compartment (refer to Drawing [SMG 2.1](#), [page 1](#) or [SMG 5.2](#)).
- Connect the service entrance cable to the load side of the metering point.
- Own and maintain all conductors and Facilities required for electrical supply service up to the load side of the terminal block (splitter section) of the padmount transformer or pedestal meter.
- Own and maintain all conductors and Facilities required for an electrical supply service up to and including the rural meter pedestal or padmount meter.

## 11. Commercial Services

The following applies to Single and Three Phase Commercial, Industrial, Oil & Gas, Irrigation, Bare land, and Apartment Building services.

### 11.1. Overhead Services Supplied by an Overhead Transformer

#### 11.1.1. The Customer Shall:

- Supply and install a CSA approved meter socket within 60 m of the front property line or supply service transformer pole.
- Supply, install and maintain a rigid metallic service entrance mast complete with weatherhead, clevis insulator and service entrance conductors. The service mast or clevis insulator complete with bolt, shall be securely fastened to the building.

- Note: Screw type insulators (service knobs) will not be accepted on new or upgraded construction.
- For Customer pole metering, supply and install metering pole (refer to Drawing [SMG 4.1](#)).

#### 11.1.2. FortisAlberta Shall:

- Supply and install the meter.
- Supply install and maintain up to 60 m of supply service conductors with any one span being a maximum of 35 m.  
NOTE: FortisAlberta will not supply any service pole(s) for Commercial, Industrial, Oil & Gas, Irrigation, Bare land, and Apartment Building services.
- Connect the Customer supplied service entrance conductors to either the;
  - secondary terminals of the transformer, or
  - wire harness at the supply service transformer pole, or
  - supply service conductors.
- When required for single phase services, supply and install the meter and the rural meter box (refer to Drawing [SMG 5.2](#)).
- Connect the Customer supplied service entrance conductors at the pole metering point.
- Own and maintain all conductors and Facilities required for an electrical supply service up to and including the rural meter box.
- Own and maintain all conductors and Facilities required for an electrical supply service up to the final connection at the transformer's secondary terminals or the Customer owned service entrance conductors.

#### 11.2. Underground Service Supplied by an Overhead Transformer

##### 11.2.1. The Customer Shall:

- Supply and install a CSA approved meter socket, (where padmount metering is not opted for) within 90 m of the front property line or supply service transformer.
- Supply and install the service entrance conduit.
- Provide all trench excavation on Customer property, lease property and all backfilling of any trench.
- Provide an open trench approximately 1 m deep x 1 m diameter at the base of the pole located below the supply service transformer for mounting the conduit (refer to Drawing [2624, page 1](#) and [2624, page 2](#)).
- Supply, install and maintain the appropriate length of service entrance cable up to the base of the supply service pole and leave enough cable to reach the transformer secondary terminals (A FortisAlberta representative will advise the Customer of the required length). Maximum transformer and cable sizes are as follows

Table 8 – Single Phase Service

120/240 V	240/480 V	Secondary Terminals
15 kVA	25 kVA	Clamp type terminal for #6 - 2/0 conductor size
25 kVA	50 kVA	Clamp type terminal for #2 - 350 MCM conductor size
50, 75, 100 and 167 kVA	75 and 100 kVA	Single barrel or double barrel mechanical terminal for 1/0 – 750 MCM

Table 9 – Three Phase Service

Transformer size	Secondary Terminals
30-75 kVA	clamp type terminal for #6 – 4/0
150 kVA	clamp type terminal for #2 - 350 MCM

Table 8 and 9 outline the acceptable service entrance conductor sizes by voltage and transformer sizes.

- Where required, supply the appropriate length of 2 or 4 inch rigid PVC conduit to run up the supply service transformer pole (A FortisAlberta representative will advise the Customer of the required length).
- Supply the weatherhead (when the conduit is extended to the base of the supply service transformer).

Note – FortisAlberta shall accept only 2 and 4 inch conduit sizes for underground services.

#### 11.2.2. Application of Service Entrance Riser Way and Standoff Brackets

11.2.2.1. For **urban** applications, all Customer service entrance cable shall be installed in rigid PVC conduit to the base of the supply service transformer pole. The conduit shall be secured to the pole via FortisAlberta supplied standoff brackets and straps.

11.2.2.2. For **rural** applications where:

- Multiple services will be fed from a single overhead transformer or the Customer uses single conductor type USEI service entrance cable or there is an existing communication conduit sharing the pole, the cable shall be installed in conduit to the base of the supply service transformer. The conduit shall be secured to the pole via FortisAlberta supplied standoff brackets and straps.
- Where type USEB service entrance or armored cable is used and there will only be a single service fed from an overhead transformer, the first 10 feet of cable will require conduit. The conduit shall then be sized appropriately for the installation (this will be the only exception to the 2 and 4-inch guideline). The Customer will pull the cable through the rigid PVC conduit and secure it to the pole via Customer supplied straps. The

remaining service entrance or armored cable shall be coiled and secured to the pole with appropriately sized cable straps (weatherhead is not required), bagged, and secured to the pole.

11.2.2.3. If the Customer chooses to use multi conductor armored cable, then the last 2 m of the cable must be stripped of the cable armor exposing the PVC inner jacket. The PVC jacket shall then be covered with color coded heat shrink tubing or weatherhead when required.

- The conductor intended to be used as the neutral shall be clearly identifiable via white vinyl tape or heat shrink tubing.
- WARNING - the PVC colour coded insulation used for TECK 90 (copper) cables is not suitable for UV exposure and will deteriorate over time breaking down the insulation and exposing the conductor.

11.2.2.4. No person except FortisAlberta personnel shall climb the supply service transformer pole (*or any Facility owned by FortisAlberta*).

11.2.2.5. FortisAlberta shall complete the final connection to the supply service conductors or transformer.

11.2.2.6. For Lot Line Metering, supply and install Lot Line Metering apparatus (refer to Drawing [SMG 2.1, page 2](#)).

11.2.3. FortisAlberta Shall:

- Supply and install the meter.
- Where applicable, supply and install standoff brackets and mounting hardware suitable for 2 or 4 inch conduit.
- Where required, assemble the conduit riser way, pull in the cable, install weatherhead and mount the riser way.
- Where only 10 ft of conduit is required, FortisAlberta shall secure the remainder of the cable to the supply service pole using Customer supplied cable straps.
- Connect the Customer supplied service entrance conductors to either the:
  - secondary terminals of the transformer, or
  - wire harness at the supply service transformer pole, or
  - supply service conductors.
- Own and maintain all conductors and Facilities required for an electrical supply service up to the line side of the final connection at the transformer's secondary terminals or the Customer owned service entrance conductors.

### 11.3. Underground Service Supplied by a Padmount Transformer

11.3.1. All underground primary cable installations need to follow the procedures and requirements outlined in "Customer Installed Pre-cast Bases, Grounding and Ducting Process". *The application of ducting systems for primary cables is not within the scope of this document, for additional information regarding the installation of ducting systems, see [Annex C](#).*

**11.3.2. The Customer Shall:**

- Contact FortisAlberta to arrange an on-site meeting with a FortisAlberta design representative prior to any construction. Supply the FortisAlberta representative with a preliminary site plan complete with building locations, transformer location and duct location.
- FortisAlberta shall review the site plan and provide approval of the utility service details prior to the start of any construction.
- Provide all trench excavation on Customer property.
- Do a soil bearing capacity calculation to ensure that the combined weight of the supply service transformer and concrete pad does not result in slumping of the precast concrete base.
- Supply and install a CSA approved meter socket, (where padmount metering is not opted for) within 90 m of the front property line or supply service transformer.
- Supply, install and maintain the appropriate length of underground service entrance cable up to the property line and leave enough cable to reach the supply service transformer or pedestal secondary terminals.
- Supply the transformer terminal connectors.
  - If the Customer service is supplied with a dedicated transformer the Customer will install and connect the underground service entrance cable at the supply service transformers secondary terminals or padmount meter. FortisAlberta will give the Customer a written Guarantee of Isolation (GOI) when the supply service transformer is deenergized and grounded before they can enter the supply service transformer enclosure. The Customer may then proceed to connect the underground service entrance cable to the supply service transformer's secondary terminals (refer to Drawing [SMG 4.3](#)). When multiple cables (per phase) are installed, all cables shall be supported with the clamping mechanism located below the secondary terminals of the supply service transformer.
- Maintain a clear operating area around the precast concrete base (refer Drawing [SMG 7.1](#)).
- Own and maintain all cables and facilities required for electrical service up to the load side of the final connection to the supply service transformer or pedestal secondary terminals when the transformer is located on private property.

**11.3.3. FortisAlberta Shall:**

- Determine location of point of entry to Customer's property.
- Review the Customers site plans relating to the utility service and provide approval for construction.
- Determine the offsite facilities needed based on the preliminary plan. FortisAlberta shall also provide the type of grounding system that is required (single ring or three ring).
- Pull primary cables through duct from property line to transformer location.
- Install transformer on pad and perform all primary connections.
- Issue a "Guarantee of Isolation" upon request.
- Inspect installation and connection of the underground service entrance cable into the transformer secondary compartment.
- Supply and install the meter.
- For Lot Line Metering, supply, install, terminate and maintain the underground service cable in the Utility Right of Way.

- If the supply service transformer is located on private property FortisAlberta shall own and maintain all primary cabling and Facilities required for an electrical service up to the primary bushings of the transformer.
- If ground testing and report was not done by the Customer, FortisAlberta shall test Customer grounds and upgrade if necessary, at Customer's expense.
- Reserve the right to inspect the installation of any Customer installed facilities.

#### 11.4. Multiple Customer Metering System

11.4.1. For Multiple Customer Metering Systems see [section 8.6](#).

#### 11.5. Metering Requirements for less than 300 V Services

11.5.1. Single meter commercial services rated less than 300 V (L – L) are required to meet the following:

- Meter shall be located outdoors on either:
  - the outside wall of a suitable building with a clear area free of vents (refer to Drawing [SMG 2.16.4, page 2](#)), or
  - a separate suitable stand-alone metering structure located a minimum distance of 4 m from the supply service transformer pole or concrete pad.
- Meter shall be connected on the line side of the service disconnect.
- Meter shall be mounted with the centre line of the meter at a height specified in [Table 1](#). The minimum height as specified must be maintained when final grade is reached.

#### 11.6. Metering Requirements for Greater than 300 V Services

11.6.1. The metering equipment for services exceeding 300 V (L – L) are required to meet the following:

- Located indoors; except for oilfield and irrigation services, where the meter may be located on the outside wall of a suitable building with an clear area free of vents (refer to Drawing [SMG 2.16.4, page 2](#)), and connected downstream of the main breaker, or outdoors on a stand-alone metering structure 4 m minimum away from the supply service transformer pole (refer to Drawing [SMG 2.13.5, page 1](#) and [SMG 2.13.5, page 2](#)).
- For irrigation services, the metering shall not be located on the irrigated land area and shall have a service disconnect located ahead of the meter on all services (refer to Drawing [SMG 2.13.5, page 1](#) and [SMG 2.13.5, page 2](#)).
- Mounted with the centre line of the meter at a height specified in [Table 1](#).
- Equipped with provisions for FortisAlberta to seal all service entrance equipment ahead of the metering point.

#### 11.7. Instrument Metering Requirements

11.7.1. The Customer Shall Supply:

- A CSA approved instrument meter socket or combination unit as specified in [Section 5.19](#).
- An instrument transformer enclosure size referenced in [Table 6](#), Instrument Transformer Enclosures (Indoor and Outdoor) and mount it as per [Table 5](#) for Indoor and Outdoor applications.

- A 35 mm (1 ¼ inch) conduit between the instrument transformer enclosure and the meter socket complete with lock nuts and bushings. If rigid PVC conduit is used, the socket requires a bond wire.
- Maintain a minimum vertical separation between the bottom of the socket and the top of the instrument transformer of 80 mm by using a 4 inch nipple, when the socket is directly above the instrument enclosure.
- Install an isolated neutral block in the instrument transformer enclosure (3 phase services only and only one parallel conductor needs to be attached).
- All hardware, bus work, terminations and/or cable required for primary connections to the current transformers.
- Plywood must be installed 19 mm (3/4") behind all instrument transformer enclosures which do not have an interior plate or back pan, when mounted on cement or block wall.

#### 11.7.2. The Customer Shall Mount and Install:

- All current transformers, in the following manner:
  - Screwed to the back panel of the instrument enclosure using #10 or #12 self-tapping screws such that the nameplates can be easily read.
  - All four (4) mounting holes on the instrument transformer base shall be utilized so that the nameplates are clearly visible when the enclosure is open.
  - Positioned with the primary polarity mark toward the source of supply and in an arrangement that will not obstruct access to the secondary terminals (refer to "Single-Phase instrument Transformer Enclosure Layout" – Drawing [SMG 7.6.1](#) and "Three-Phase Instrument Transformer Enclosure Layout" – Drawing [SMG 7.6.2](#)).
  - Instrument transformers shall not be mounted with bolts unless holes are threaded.

#### 11.7.3. FortisAlberta Shall Supply:

- Current transformers
- Potential transformers (Services over 600 V)
- Fuse Blocks and fuses for the potential circuit

#### 11.7.4. FortisAlberta Shall:

- Mount the fuse block and fuses.
- Wire out the instrument transformer secondaries to the meter and fuse blocks.
- Supply and install the meter.

11.7.4.1. The instrument transformers will be made available to the Customer by contacting FortisAlberta toll-free at 310-WIRE (9473). Instrument transformers will be shipped to the Customer via courier. The meter, fuses and fuse blocks will be the responsibility of FortisAlberta personnel.

Note - CTs and meters remain the property of FortisAlberta and the Customers shall provide FortisAlberta with reasonable access to such equipment for meter reads and maintenance.

**12. Metering Signal Service Offer****12.1. Availability of Metering Signals**

- 12.1.1. FortisAlberta shall provide Metering Signals to Customers, upon request. These signals are in the form of energy (kWh) and or reactive energy (kVARh - standard or kVAh in limited applications) pulses for use as an energy management tool. Incremental costs incurred by FortisAlberta for providing these signals will be the responsibility of the Customer. FortisAlberta shall not supply an End-of-Interval (EOI) pulse under any circumstances.

**12.2. Process**

- 12.2.1. Upon receipt of a formal request for a metering signal quote at 310-WIRE (9473), FortisAlberta shall develop a cost breakdown for the Metering Signal Service Offer. The quote will clearly identify technical issues, specifications and any other additional cost factors, which will be at the Customer's expense.
- 12.2.2. Once all the technical issues are addressed, FortisAlberta shall forward the offer to the Customer. This will include the quotation letter, a copy of "Technical Specifications - Schedule "B", a site schematic (if applicable) and a copy of "Conditions for Metering Signals - Schedule "A".
- 12.2.3. Upon receipt of the Customer's acceptance and payment, FortisAlberta shall install the service.
- 12.2.4. The signal will be terminated in a junction box to be in or attached to the metering equipment. All equipment up to, and including this termination, will remain the property of FortisAlberta.

**12.3. Radio Frequency (RF) Communication Installation**

- 12.3.1. FortisAlberta cannot guarantee good reception via wireless communication devices at any site and the Customer agrees to this potential limitation by accepting the offer. Any communication circuit troubleshooting time, requiring FortisAlberta's Field Metering Technologist to stay on site beyond the time assigned for the installation the communication equipment, will be billed to the Customer separately.
- 12.3.2. The installation of any communication equipment or cabling on the Customer premises will be done before hand or in conjunction at the same time as the FortisAlberta Field Metering Technologist installing the FortisAlberta end signal equipment; otherwise additional costs may be incurred.
- 12.3.3. The typical lead time required for the installation will be four to six weeks from the receipt of the signed agreement and payment.



Figure 12 – RF Communication

12.4. Basic Digital Pulse and Wireless Signals Specification

- Output Signals – Watt-hour and/or Var-hour \*
- Meter Output – Form C, KYZ, 3-wire dry type contact per signal
- Maximum Pulse Rate – 10 pulses per second per channel
- Operating Temperature – -40 degrees to +65 degrees Celsius 5-95% relative humidity non-condensing

12.4.1. Equipment and process compatibility issues can result because of the use of digital pulse signals in this circuit. These issues can be excessive or insufficient pulses (Wh\* or VAR\*) to monitor or operate Customer equipment, pulse delays resulting in load monitoring skew, mismatched rating specifications (listed above) or being non-compatible with Customer equipment. Investigation and correction of these issues will reside with the Customer and not FortisAlberta.

12.5. Communication Specifications

12.5.1. The communication equipment and cabinet mounted on FortisAlberta facilities are the responsibility of FortisAlberta. Any maintenance, repair, troubleshooting and modifications to the communication equipment located on Customer facilities will be the responsibility of the Customer.

12.6. Disclaimer

12.6.1. The Customer acknowledges that the metering signal(s) provided to the Customer pursuant to the agreement are not used for measuring the Customer’s electricity consumption or calculating charges for the Customer’s electricity consumption. The metering signal(s) are provided solely for the Customer’s internal use to assist the Customer in monitoring their energy consumption. The Customer further acknowledges that FortisAlberta assumes absolutely no liability whatsoever for any inaccuracy with respect to the information obtained from the metering signals or for the Customer’s use of the metering signal(s).

12.6.2. FortisAlberta has no influence regarding a retailer reducing higher registered demand peaks or higher energy consumptions which are inadvertently set as a result of metering signal equipment failure.

### 13. Temporary Services

The following applies to temporary services for Residential, Single and Three Phase Commercial, Industrial, Oil & Gas, Irrigation, Bare land, and Apartment Building services.

#### 13.1. General Requirements

##### 13.1.1. The Customer Shall:

- Supply, install and maintain the temporary pole or temporary stub to support the meter socket.
- Supply and install meter socket and secondary protection including grounds.
- Provide a valid electrical permit or a signed [Connection Authorization Form](#).
- These requirements are in addition to the standard requirements for each type of service.

#### 13.2. Overhead Services Supplied by an Overhead Transformer

##### 13.2.1. The Customer Shall:

- Supply, install and maintain the temporary pole.
- Supply install and maintain the overhead service entrance conductors from the temporary pole to the supply service transformer pole. Coil wire at base of temporary pole or mast.

##### 13.2.2. FortisAlberta Shall:

- Supply and install the meter.
- Connect the Customer supplied service entrance conductors to either the:
  - secondary terminals of the transformer, or
  - wire harness at the supply service transformer pole, or
  - supply service conductors.
- Own and maintain all conductors and Facilities required for an electrical supply service up to the line side of the final connection at the transformer's secondary terminals or the Customer owned service entrance conductors.
- Refer to Drawing [SMG 9.2](#).

#### 13.3. Underground Services Supplied by an Overhead Transformer

##### 13.3.1. The Customer Shall:

- Supply, install and maintain the temporary stub pole.
- Supply install and maintain the underground service entrance cable from the temporary stub pole to the supply service transformer pole.
- Supply and install the meter socket and conduit.

##### 13.3.2. FortisAlberta Shall:

- Supply and install the meter.
- Connect the Customer supplied service entrance conductors to either the:
  - secondary terminals of the transformer, or
  - wire harness at the supply service transformer pole, or
  - supply service conductors.
- Own and maintain all conductors and Facilities required for an electrical supply service up to

the line side of the final connection at secondary terminal of the transformer, pedestal or the Customer owned service entrances cable.

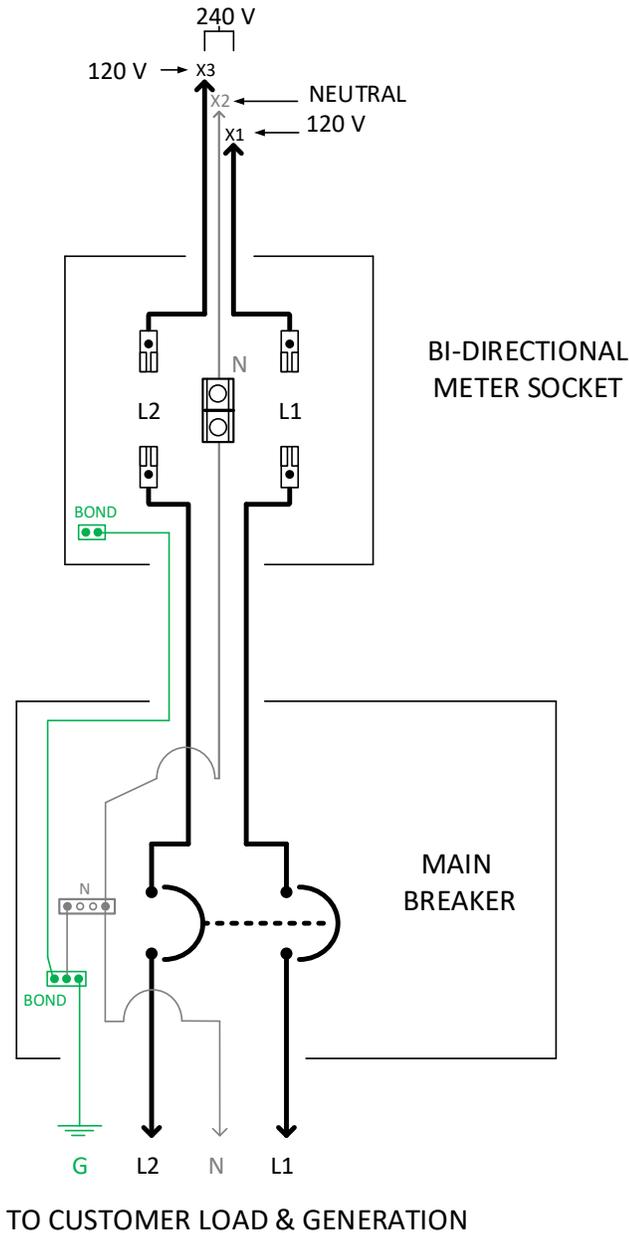
- Refer to Drawing [SMG 9.3](#).

#### **14. Micro-Generation**

- 14.1. The Customer shall contact FortisAlberta at 310-WIRE (9473) to begin the process and follow the Alberta Utilities Commission [B3] Micro-Generator Application Guide, in order to complete the required steps for the application of service.
- 14.2. FortisAlberta shall either approve or reject the Customer application based upon the service qualifying as a Micro-Generator under Alberta Utilities Commission Rule 024 [B3].
- 14.3. The Customer must comply with FortisAlberta's technical interconnection requirements for a Distributed Energy Resource.
- 14.4. For new services, the Customer shall supply and install their service equipment according to all relevant sections of this publication. For existing services, the Customer is not required to make any modification to their metering equipment.
- 14.5. Once the service is approved as a Micro-Generator, FortisAlberta shall supply and install a bi-directional meter to measure service load and export power.

**120/240 V, 3-WIRE SINGLE PHASE (OVERHEAD OR UNDERGROUND) MICRO-GENERATION METER SOCKET CONNECTIONS**

TO FORTISALBERTA NETWORK  
120/240 V LINE



**Note:**

1. The meter socket *must* be grounded

Figure 13 – 120/240V 3-Wire Single Phase (Overhead or Underground) Micro-Generation Meter Socket Connections

**TYPICAL SLD FOR A MICROGENERATION SITE**

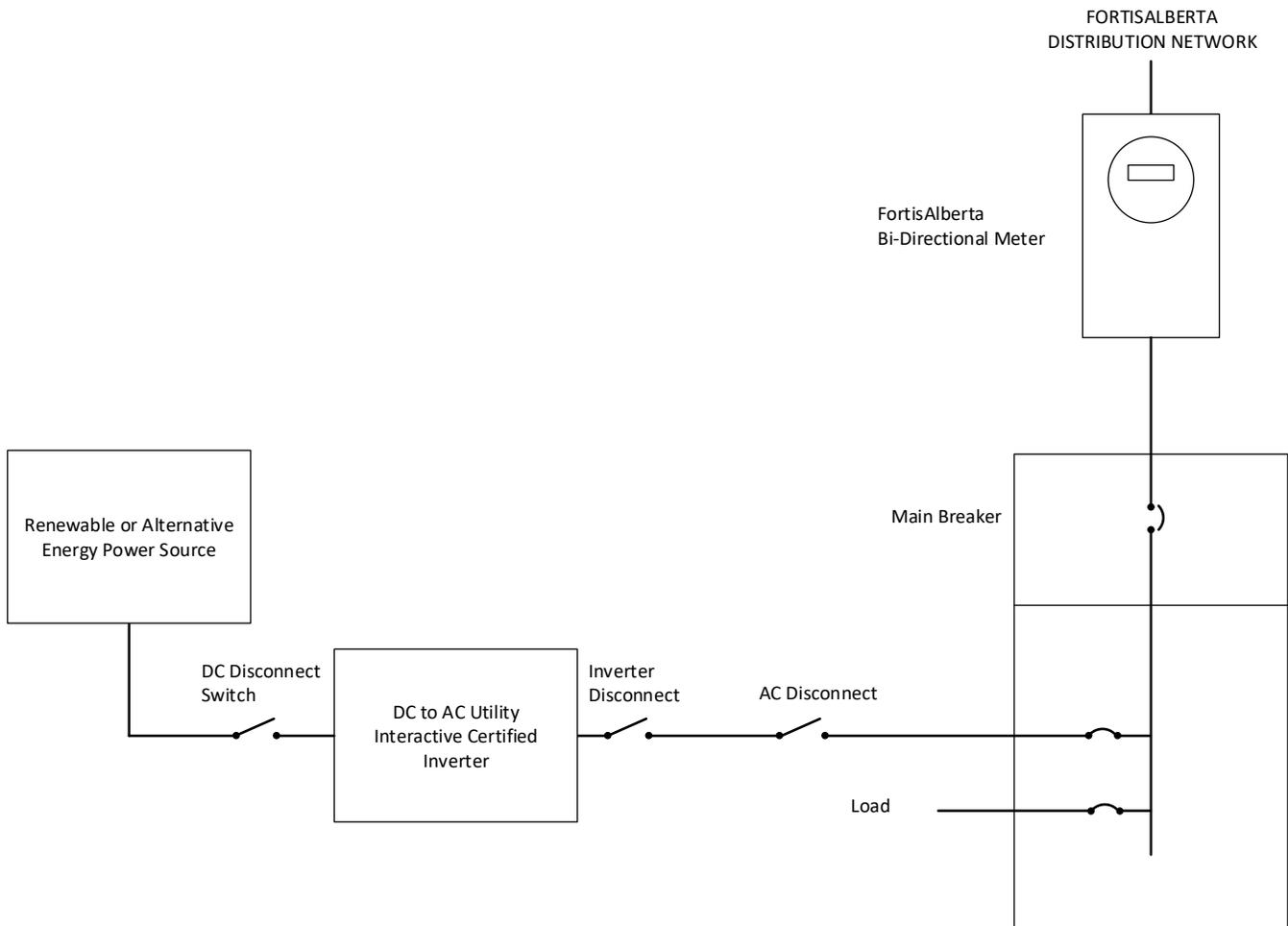


Figure 14 – Typical SLD for a Micro-Generation Site

14.6. Secondaries from Micro-Generation generating unit.

14.6.1. Inverter and induction type generators that comply with FortisAlberta Technical Interconnection Requirements for DER less than 150 kW DER-01 [B5] or FortisAlberta Technical Interconnection Requirements for DER 150 kW and Greater DER-02 [B6] posted on FortisAlberta.com may have secondary cables for the Micro-Generation generating units to the existing load transformer once approved by FortisAlberta.

## 15. Material Specifications

### 15.1. Single Phase Pre-Cast Concrete Bases

15.1.1. Pre-cast concrete bases are used for mounting padmount transformers. These bases shall meet the following requirements:

Description	Approved Suppliers	FortisAlberta Drawing No. or Cat. No.
Precast concrete base for single phase mini-padmount transformer <i>(FortisAlberta item # 755-0505)</i>		IT 755-0505
	D&M Concrete	BIP A3500 TB1
	Eagle Builders	755-0505
	H.O. Concrete	MK101A
	Knelsen Precast	405095
	LaFarge	9218
	Pretech	TF1001-L1

**15.2. Three Phase Pre-Cast Concrete Bases**

15.2.1. Pre-cast concrete bases are used for mounting padmount transformers. These bases shall meet the following requirements:

Description	Approved Suppliers	FortisAlberta Drawing No. or Cat. No.
Pre-cast concrete base for three phase padmount transformers for all 500 kVA and below Radial and Loop feed <i>(FortisAlberta item # 755-0507)</i>		IT 755-0507
	D&M Concret	
	Eagle Builders	IT 755-0507
	Knelsen Precast	405101
	LaFarge	9219
	Proform	
	Westcon Precast	W2-02
Pre-cast concrete transformer pad for three phase 750 kVA to 3000 kVA Radial and Loop feed <i>(FortisAlberta item # 755-0512)</i>		IT 755-0512
	D&M Concrete	
	Eagle Builders	IT 755-0512
	Knelsen Precast	405105
	LaFarge	9214
	Westcon Precast	W3-02
Pre-cast concrete transformer pad for 1000 kVA to 20,000 kVA with 4.16 kV secondary and 4,000 KVA, 600 V secondary <i>(FortisAlberta item # 755-0516)</i>		IT 755-0516
	Lafarge	9213

**15.3. Pre-Cast Bumper Post**

15.3.1. Pre-cast concrete bumper posts are used to protect pad mounted equipment from vehicular damage. These posts shall meet the following requirements.

Description	Approved Suppliers	FortisAlberta Drawing No. or Cat. No.
Pre-cast bumper post, 16" x 16" x 27.5" precast concrete base, 4" I.D. x 6.5' galvanized concrete filled steel pipe, complete with yellow PVC protective sleeve, two red reflective warning stripes and ½" x 2" grounding stud <i>(FortisAlberta item # 515-0802)</i>	Knelsen Precast	412113
	Lafarge	9340

15.4. Conduit Materials

Description	Approved Suppliers	FortisAlberta Drawing No. or Cat. No.
*PIPE, nominal size 2 inches, rigid PVC, belled end, per CSA Standard C22.2 No. 211.2 latest revision.	Any electrical distributor	
*PIPE, nominal size 4 inches, rigid PVC, belled end, per CSA Standard C22.2 No. 211.2 latest revision.	Any electrical distributor	
For use on road crossings: PIPE, High density polyethylene 4" IPS SDR 11.0 Polytubes HDPE pipe PE-3408 12.2M pipe, M.O.P. =160 PSI for conduit. Pipe coloring should be black. <i>(FortisAlberta item # 632-3010)</i>  Or  PIPE, trenchless raceway, 4", PVC, 20' <i>(FortisAlberta item # 632-3015)</i>	Polytubes	PE-3408
	Carlton	BG440SP-020
BRACKET, Standoff, multipurpose, for mounting multiple conduits on a pole, aluminum. <i>(FortisAlberta item # 589-0450)</i>	Aluma-Form	6B-CSO-P13/16
BRACKET, 4 way "T-slot", 12-inch-long <i>(FortisAlberta item # 589-0455)</i>	Aluma-Form	4WT-12
	Hubbell	C4WT-12
	Maclean	M4WT-12
Strap kit, 2 inch <i>(FortisAlberta item # 631-1108)</i>	Aluma-Form	STK-2
	Hubbell	CSTK2
	Maclean	MSTK-2
Strap kit, 4 inch <i>(FortisAlberta item # 631-1110)</i>	Aluma-Form	STK-4
	Hubbell	CSTK4
	Maclean	MSTK-4

**15.5. Grounding Material**

15.5.1. The following material is required to install the ground grid around padmount transformers:

Description	Approved Suppliers	FortisAlberta Drawing No. or Cat. No.
#4 bare copper conductor, stranded (FortisAlberta item # 531-0220)	Any electrical distributor	
#2/0 bare copper conductor, stranded (FortisAlberta item # 531-0202)	any electrical distributor	
For use on transformer grounding: <ul style="list-style-type: none"> <li>Sectional ground rods, 3/4" x 4', tapered at both ends (FortisAlberta item # 557-1421)</li> <li>Coupling for sectional ground rods (FortisAlberta item # 557-1525)</li> </ul>		SKT 1499
	Erico	61344 613440
		CC34
	Erico	CC34
Ground rod connector for use with sectional ground rods (FortisAlberta item # 557-1311)		SKT. 1499
	Burndy/Hubbell	GRC3426
Ground connector for padmount transformers (FortisAlberta item # 553-0611)	Burndy/Hubbell	EQC26CG14
	H-J International	AS1358-001
	Penn-Union	HGSE020-SBHL1
Connector, parallel groove, compression type, copper, for #4 copper str. conductor (FortisAlberta item # 553-0152)	Burndy/Hubbell	YC4C4
	Homac	CC44
	IlSCO	ULT-5
	Kearney/Eaton	302-82
Connector, parallel groove, compression type, copper, for #2/0 copper str. conductor (FortisAlberta item # 553-0155)	Burndy/Hubbell	YGHC26C26
	IlSCO	ELT-2
	Thomas and Betts	CTP2020

**Annex A (Normative)****1. Basic Drawing Requirements (applies to all drawings)**

- A. Title block (name building owner, date, drawing/project number, drawing revision number, civic address of building).
- B. Name & phone number of the Project Manager for the specific application.
- C. Language: English.
- D. Scale or Dimensions (where applicable): Metric.
- E. Scale Size (where applicable): Riser drawing is a single line schematic and is normally not to scale.
- F. Legend of symbols, line style & weights, color, and nomenclature.
- G. Two-dimensional format that minimizes the number of crossovers of lines representing the electrical circuits.
- H. Text size and style: when printed/plotted to designed paper size, the font is a minimum of 10 points and is a common legible font style.
- I. Line style and thickness appropriate to clearly illustrate different objects and area of interest.
- J. Line and text color: colors should not be confusing and clearly illustrate different objects and area of interest. Note that color scheme shall be clearly legible when the drawing is printed/plotted out on white paper in black ink.
- K. White space management: the drawing objects and text shall have enough space between the different objects and area of interest as not to compress or clutter the drawing.
- L. Produced in a CAD software with a final non-secure PDF format output.
- M. Certified standards that have been applied.
- N. Drawings issued for FortisAlberta Review
- O. Must be stamped “issued for Review (IFR)” and signed by an Engineer.

NOTE: IFR documents should be reviewed and signed by an Engineer to help ensure completeness and compliance of submission and help avoid delays due to multiple submissions and reviews.

- P. Drawings Issued for FortisAlberta Acceptance:
  - Must be Authenticated and should be stamped “Issued For Construction (IFC)”; and
  - Must include signing block or stamp indicating FortisAlberta’s Review and Acceptance of the electric distribution system.

- NOTE: once FortisAlberta has Accepted the engineering drawings these plans are deemed “final” and frozen.

## **2. Project Specific Drawing Orientation Requirements**

- A. Building elevation separation from bottom to top of the drawing with each floor clearly labelled.
- B. Separate buildings separated horizontally across the drawing with each building clearly labelled.
- C. Common electrical wiring raceways/risers kept together on the drawing and uniquely identified.
- D. Each electrical panel clearly identified.
- E. Each room clearly identified.
- F. Electrical schematic captures all the electrical branches and their unique nomenclature with their main control points (switches, circuit breakers, fuses, transformers, existing meters) for the building electrical service entrance to each end load/generator to be metered.
- G. Correct electrical connectivity and topology with source, loads, and generators.
- H. Electrical control points (switches, circuit breakers, fuses, transformers, existing meters) ampacity rating, operating voltage, phasing, and circuit wiring configuration (eg. 100A, 347/600V, three phase, 4-wire, grounded wye).
- I. Generators and large motors (>3HP).
- J. Location of known hazardous materials within the building clearly identified.

**A.1 Forms**

Title	# of pages	Attachment
<u>Form</u> – Connection Authorization Form	1	Connection Authorization Form
<u>Form</u> - Reconnection Authorization Form	2	Reconnection Authorization Form, page 1 of 2 Reconnection Authorization Form, page 2 of 2

**A.2 Placement of Facilities**

Title	# of pages	Attachment
<u>Drawing</u> – Commercial Service Location of Padmount Transformers	1	SMG 7.1
<u>Drawing</u> – Service Guard Post and Rail Bill of Material for Above-Noted Drawing	3	1302, page 1 of 2 1302, page 2 of 2 1302 BOM
<u>Drawing</u> - Secondary Conduit Standoff Bracket	2	2624, page 1 of 2 2624, page 2 of 2

**A.3 Pre-Cast Concrete Bases**

Title	# of pages	Attachment
<u>Drawing</u> – Precast Concrete Pad for Single Phase Mini-Padmount Transformer Up to 167 KVA	1	Item 755-0505
<u>Drawing</u> – Precast Concrete Base for Three Phase Transformer for All 500 kVA and Below	1	Item 755-0507
<u>Drawing</u> - Precast Concrete Transformer Pad for 3-Phase 750 kVA to 3000 kVA	1	Item 755-0512
<u>Drawing</u> - Precast Concrete Transformer Pad for 1000 kVA to 20,000 kVA	1	Item 755-0516

**A.4 Material**

Title	# of pages	Attachment
<u>Drawing</u> – 2-Wire Current Transformer Dimension Specification	1	SMG 2.16.5
<u>Drawing</u> – Service Secondary Connectors	1	SMG 4.3
<u>Drawing</u> - Sectional Ground Rods and Associated Material	1	SKT 1499

### A.5 Padmount Transformer Civil and Grounded

Title	# of pages	Attachment
<u>Bill of Material</u> – Padmount Transformer Civil and Grounding	1	Xmer Civil & Grounding
<u>Drawing</u> – 1 PH Low Profile Padmount Transformer General Arrangement	3	1226, page 1 of 2 1226, page 2 of 3 1226, page 3 of 3
<u>Drawing</u> - Three Phase Radial Feed Transformer General Arrangement and Grounding Detail	4	1315, page 1 of 3 1315, page 2 of 4 1315, page 3 of 4 1315, page 4 of 4

### A.6 Single Phase Service

Title	# of pages	Attachment
<u>Drawing</u> – Customer Owned Pole Mount To Underground Service	1	SMG 4.1
<u>Drawing</u> – Single Phase Rural Underground Service	1	SMG 5.2
<u>Drawing</u> – Single Phase Metering Pedestal	1	SMG 2.1, page 1 of 3
<u>Drawing</u> – Lot Line Metering (Self Contained 200 A)	1	SMG 2.1, page 2 of 3
<u>Drawing</u> – Lot Line Metering (Instrument Type 400 or 600 A)	1	SMG 2.1, page 3 of 3
<u>Drawing</u> - Outdoor Instrument Type 1 Phase, 3 Wire, 400A	1	SMG 2.16.4, page 1 of 2
<u>Drawing</u> - Outdoor Instrument Type 1 Phase, 3 Wire, 400A	1	SMG 2.16.4, page 2 of 2
<u>Drawing</u> – Single Phase Standby Overhead Service	1	SMG 6.0.1
<u>Drawing</u> – Single Phase Standby Underground Service	1	SMG 6.0.2
<u>Drawing</u> – Single-Phase Instrument Transformer Enclosure Layout	1	SMG 7.6.1
<u>Drawing</u> – Customer Owned Temporary/Permanent Overhead Service Structure	1	SMG 9.2
<u>Drawing</u> – Customer Owned Temporary/Permanent Underground services Structure	1	SMG 9.3
<u>Drawing</u> – Single-Phase Pole Dual Metering For Two Services Bill of Material for Above-Noted Drawing	2	1635 1635 BOM

### A.7 Three Phase Service

Title	# of Pages	Attachment
<u>Drawing</u> – 3 Phase Service (Padmount Metering)	1	SMG 2.13.1
<u>Drawing</u> – 3 Phase Padmount Metering With Outdoor NGR	1	SMG 2.13.2
<u>Drawing</u> – 3 Phase Padmount Metering and Indoor NGR	1	SMG 2.13.3
<u>Drawing</u> – 3 Phase Service With Indoor Metering and NGR	1	SMG 2.13.4
<u>Drawing</u> – Three Phase Oilfield and Irrigation Overhead Service	2	SMG 2.13.5, page 1 of 2 SMG 2.13.5, page 2 of 2
<u>Drawing</u> – Three Phase Instrument Transformer Enclosure Layout	1	SMG 7.6.2

**Annex B** (Informative)

## Bibliography

[B1] Canadian Electrical Code, Part One (CSA Standard No. C22.1 - 18)

[B2] Federal Regulations S-A-01

[B3] AUC Rule 024: Rules Respecting Micro-Generation

[B4] ASTM D 1556, Standard Test method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

[B5] FortisAlberta Technical Interconnection Requirements for DER less than 150 kW DER-01

[B6] FortisAlberta Technical Interconnection Requirements for DER 150 kW and Greater DER-02

**Annex C (Informative)**

## Conduit Systems

C.1 Trenching and Backhoe

- **All proposed cable routing and duct work for primary cable installation on behalf of FortisAlberta is subject to written approval by FortisAlberta before construction approval.**
- As a Customer, you cannot do any excavation work in the Utility Right of Way but must complete all trenching on your property.
- Underground service lines must be kept a minimum of 1.0 m from the edge of the property line.
- The Customer's contractor must not trench within 1.0 m of any FortisAlberta wood pole, anchor, transformer, switching cubical ground grid (2.0 m from the edge of the concrete base, and from 300 mm of the bollard when installed), power pedestal, or energized cable without prior consultation with FortisAlberta. The facilities must be located first using hydro excavating or hand digging before determining where the mechanical excavation limits end.
- Ensure that the top of the duct is a minimum of 1,000 mm to a maximum of 1,200 mm below finished grade for normal trenching and 1,500 mm for road crossings. Service cable shall be set on undisturbed soil that is free from rocks, debris, and sudden grade changes. If large lumps of clay and soil have hardened due to dry or freezing, and when a backhoe has been used for electrical service installation, a 100 mm layer of sand must be placed below the cable.
- For all service installations, a 100 mm layer of sand must be placed above the cable.
- A marker tape must be installed above the sand bed
- Install a marker ball at splices and to mark the end of the conduit on property line.
- The Customer must backfill all trenches with material that is free of stones and items with sharp edges.
- Backfill must be placed in uniform lifts not exceeding 300 mm and compacted to a minimum of 95% at a 5% moisture content of Standard Proctor Density (SPD) for silty and clay soils and; a minimum of 70% relative density for cohesionless, free draining materials (such as sands and gravels) REF; ASTM D1556 [B4]
- Backfill material over cable can be the material trenched with a mechanical trencher if the inspector deems it suitable. Soil with high thermal resistivity that contains large amounts of organic, peat, black loam, sod, hardened clay, stones, straw, snow, or frozen material will not be acceptable. All backfill material is subject to the inspector's approval. Sand or clean backfill material must be substituted for unusual backfill.
- The trench must take the most direct route to the meter base location.
- Some work may be required over energized primary or secondary cable. This may involve crossing or over trenching the cables. Mechanical excavation is allowed up to 3.0 m from the energized facilities i.e. switching cubical or riser pole (FortisAlberta will trench the rest of the way). The facilities must first be located using hydrovac or hand digging before determining where the mechanical excavation limits end.
- FortisAlberta will allow a contractor to over trench up to 5.0 m of energized facilities by hand or hydrovac. Follow Alberta One-Call procedures and contact 310 Wire (9473) before starting work.

- Exposed energized cables cannot be left unattended. If the excavation is narrow or small, the primary cable must be covered with soil bags or some other suitable temporary method. Contact FortisAlberta for more details.
- **Under no circumstances must energized primary cables be moved or handled in any way.**

### C.2 Service Ducts

- FortisAlberta reserves the right of final approval for the location of facilities before granting construction approval.
- It is recommended that permanent commercial services be in duct.
- For residential installations, FortisAlberta highly recommends installing any cable that will ultimately end up under driveways or laneways, in duct.
- Duct must be installed where primary cable is deemed inaccessible by FortisAlberta. All ducts must be equipped with bell collars to avoid damaging the cable.
- The installation of primary service cable under buildings is not permitted.
- The Customer will provide all conduits (rigid PVC, DB2, HDPE or various trenchless race way duct approved by FortisAlberta), pull boxes, and manholes required for installing the electrical services on the Customer's property.
- The Customer cannot install ducts into an energized manhole or handhole of a vault.
- Conduit sizes requirements for primary (high voltage) cables depend on cable size and number of cables to be installed in the duct. FortisAlberta offers two sizes 4 inch and 6 inch for duct systems.
- When FortisAlberta conduits have been stubbed to the property line, Customers must first confirm that the conduit exposed is the correct one, and then connect their service entrance conduit to FortisAlberta's conduit if provided. Contact 310 Wire (9473) to arrange for conduit verification.
- If pulling lengths exceed the maximum pulling tension of the cable, a pull box must be installed.

### C.3 Duct Bends

- All bends and elbows must be made of rigid, thick-walled PVC (schedule 40), DB2 bends are not acceptable
- All bends and elbows that have a pull tension in excess of 750 lb. shall be encased in a minimum of 76 mm of concrete throughout the radius of the bend. Ducts encased in concrete shall be separated from each other by at least 25 mm of concrete. The concrete mixture shall have a compressive strength of 17.2 MPA (2500 psi) minimum.
- An additional 10 ft. horizontal section of rigid, thick-walled PVC must be attached to the bend.
- The primary duct must be aligned directly underneath the primary transformer bushings and centered within the base opening. The conduit bends must exit the earth at 90 degrees, cut-off at 100 mm above the bottom of the base, and a bell end or collar installed at the end of the duct to avoid damage to the cable.
- All spare bends are to be capped (taped or covered by some other suitable method) to prevent material falling into them.
- Primary ducts entering switching cubicles must be identified (i.e. identify the piece of equipment the

pipe services).

- Precast concrete pad must be removed before inserting additional ducts into existing pads.



## Connection Authorization Form

### ELECTRICAL SERVICE CONNECTION AUTHORIZATION FOR AN ACCREDITED CORPORATION

This document serves as confirmation to the electrical utility supply authority that the electrical service referenced below has been constructed and complies with applicable codes, standards and regulations under the Alberta Safety Codes Act.

#### ELECTRICAL UTILITY INFORMATION

Name of Electrical Utility [ ] Service Point Location [ ]

#### ACCREDITED CORPORATION INFORMATION

Name of Accredited Corporation [ ] Accreditation Number [ ]

#### Billing Location:

Customer Name [ ] Phone [ ] Fax [ ]

Billing Address [ ] Postal Code [ ]

#### ELECTRICAL SERVICE INFORMATION

#### Service Location:

County, M.D. or I.D. [ ] Nearest Town, Village or Hamlet [ ]

Subdivision [ ] Civic Address [ ]

Lot No. [ ] Blk. No. [ ] Plan No. [ ] LSD or Pt. of [ ] Sec. [ ] Twp. [ ] Rge. [ ] W. of [ ]

#### Service Site Contact:

Customer's Construction Site Representative [ ] Tel: [ ] Fax: [ ]

#### Service Technical Details:

Voltage (phase to phase) [ ] Number of Phases [ ] Current Rating [ ]

System Grounding Method [ ] Approx. Completion Date (D/M/Y) [ ]

Comments \_\_\_\_\_  
\_\_\_\_\_

#### COMPLIANCE DECLARATION

The electrical service installation covered by this authorization has been constructed and complies with applicable codes, standards and regulations under the Alberta Safety Codes Act. I certify the service equipment is ready for connection by the electric utility supply authority. I am authorized by my corporation to sign this document.

Accredited Corporation Representative (print name) \_\_\_\_\_

Signature \_\_\_\_\_ Date (D/M/Y) \_\_\_\_\_

Accredited Corporation Representative's Phone [ ] Fax [ ]

**RECONNECTION AUTHORIZATION FORM**

*All sections of this form must be completed.*

**SECTION A – OWNER/TENANT DECLARATION**

Name: \_\_\_\_\_ Customer I.D.\* \_\_\_\_\_

*\*FortisAlberta Inc. PLT to confirm*

Address: \_\_\_\_\_

Site ID Number: \_\_\_\_\_

City/Town: \_\_\_\_\_ Province: Alberta Postal Code: \_\_\_\_\_

Telephone: Residential: \_\_\_\_\_ Cell: \_\_\_\_\_ Business: \_\_\_\_\_

I, the undersigned, in consideration of FortisAlberta Inc. reconnecting the electrical service, hereby: (1) represent and warrant to FortisAlberta Inc. that I have powers and authority of ownership; (2) acknowledge that I have read the Temporary Disconnection/Reconnection of Electrical Service Procedure; (3) acknowledge that I have instructed FortisAlberta Inc. to reconnect the electrical service; (4) acknowledge and agree that FortisAlberta Inc. assumes no liability, obligation nor responsibility for the adequacy and/or safety of the work performed on the electrical service and/or for any loss, damage and/or injury that may result from reconnection of the service; (5) on behalf of myself and my heirs, representatives and successors, remise, release and forever discharge FortisAlberta Inc. and its officers, directors, employees, agents, representatives, insurers and successors (collectively, the "Releasees") of and from any and all actions, causes of action, claims, counterclaims, demands, damages, costs, expenses and compensation of any kind which I have, or may have in the future, in any way resulting or arising from the work performed on the electrical service and/or reconnection of the electrical service; and (6) covenant and agree to indemnify and hold harmless the Releasees for all losses, damages, costs and expenses which may be suffered as a result of the work performed on the electrical service and/or reconnection of the electrical service.

Date: \_\_\_\_\_ Owner/Tenant Signature: \_\_\_\_\_

*PLEASE NOTE: FortisAlberta Inc. and its customers are bound by the current customer terms and conditions of distribution access service, a copy of which is available on the FortisAlberta website (www.FortisAlberta.com).*

**SECTION B – SERVICE DETAILS**

*This section shall be completed by the person performing the work. Both old and new service type must be checked.*

Category of Service: Residential  Farm  Commercial

Type of Service: Overhead  Underground

OLD: Rating: Single Phase  Three Phase  Amperage: \_\_\_\_\_

Description of service equipment damaged and/or replaced (*check as required*):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ Service Mast Damage   
Meter Socket Damage   
Main Switch Damage

NEW: Rating: Single Phase  Three Phase  Amperage: \_\_\_\_\_

**SECTION C – ELECTRICIAN/OWNER DECLARATION**

*This section shall be completed and signed by the person performing the work.*

Electrician\*\*: \_\_\_\_\_ Registration Number: \_\_\_\_\_

*Owner/Tenant to confirm\*\*\**

Address: \_\_\_\_\_

City/Town: \_\_\_\_\_ Province: Alberta Postal Code: \_\_\_\_\_

Telephone: Residential: \_\_\_\_\_ Cell: \_\_\_\_\_ Business: \_\_\_\_\_

\*\* Check this box if the work was performed by the owner described in Section A:

I, the undersigned, hereby certify to FortisAlberta Inc. and to the owner that:

- (1) only repair work to correct the damage identified above has been performed on this electrical service; and
- (2) no change was made to the ratings and/or characteristics of the electrical installation (*strike this line if not applicable*); and
- (3) the work referenced above has been completed and conforms in all aspects with applicable codes, standards and regulations including, without limiting the generality of the foregoing, the *Safety Codes Act* of Alberta.

Date: \_\_\_\_\_ Signature: \_\_\_\_\_

\*\*\* *PLEASE NOTE: The owner/tenant is responsible for confirming the electrician's registration number. It is in the owner/tenant's best interests to confirm the electrician's registration number.*

**Purpose:**

This procedure outlines the actions to be taken by owners and electrical contractors when performing planned or unplanned repair work on electrical services.

**Scope:**

This procedure applies to all owners and all electrical contractors, their employees and sub contractors when working on electrical services that are or will be supplied from FortisAlberta Inc. Electrical contractors are responsible for ensuring the information in this procedure is communicated to their employees and sub-contractors.

**Permit:**

A permit in the electrical discipline is required to install, alter or add to an electrical system. Some exceptions apply, as per the Safety Codes Act (Alberta), Permit Regulation, section 8(2).

**Definitions:*****In this procedure:***

- electrician means a person who holds a trade certificate or equivalent in the electrician trade acceptable under the Apprenticeship and Industry Training Act (Alberta);
- owner includes a lessee, a person in charge, a person who has care and control and a person who holds out that the person has the powers and authority of ownership or who for the time being exercises the powers and authority of ownership;
- permit issuer means a safety codes officer or a person designated to issue permits pursuant to section 44 of the Safety Codes Act (Alberta);
- planned/unplanned work (no permit required) means electrical repair work on customer-owned equipment where the failed equipment must be repaired or replaced without modifying the ratings or characteristics of the electrical installation; and
- planned/unplanned work (permit required) means electrical repair work on customer-owned equipment where the failed equipment must be replaced and modifies the ratings or characteristics of the electrical installation.

**Procedures:**

All planned or unplanned work must be carried out by a qualified electrician or as required under article 9(1) of the Permit Regulation document AR 204/2007. It is in the owner's best interests to confirm the electrician's registration number.

***Disconnection of Service***

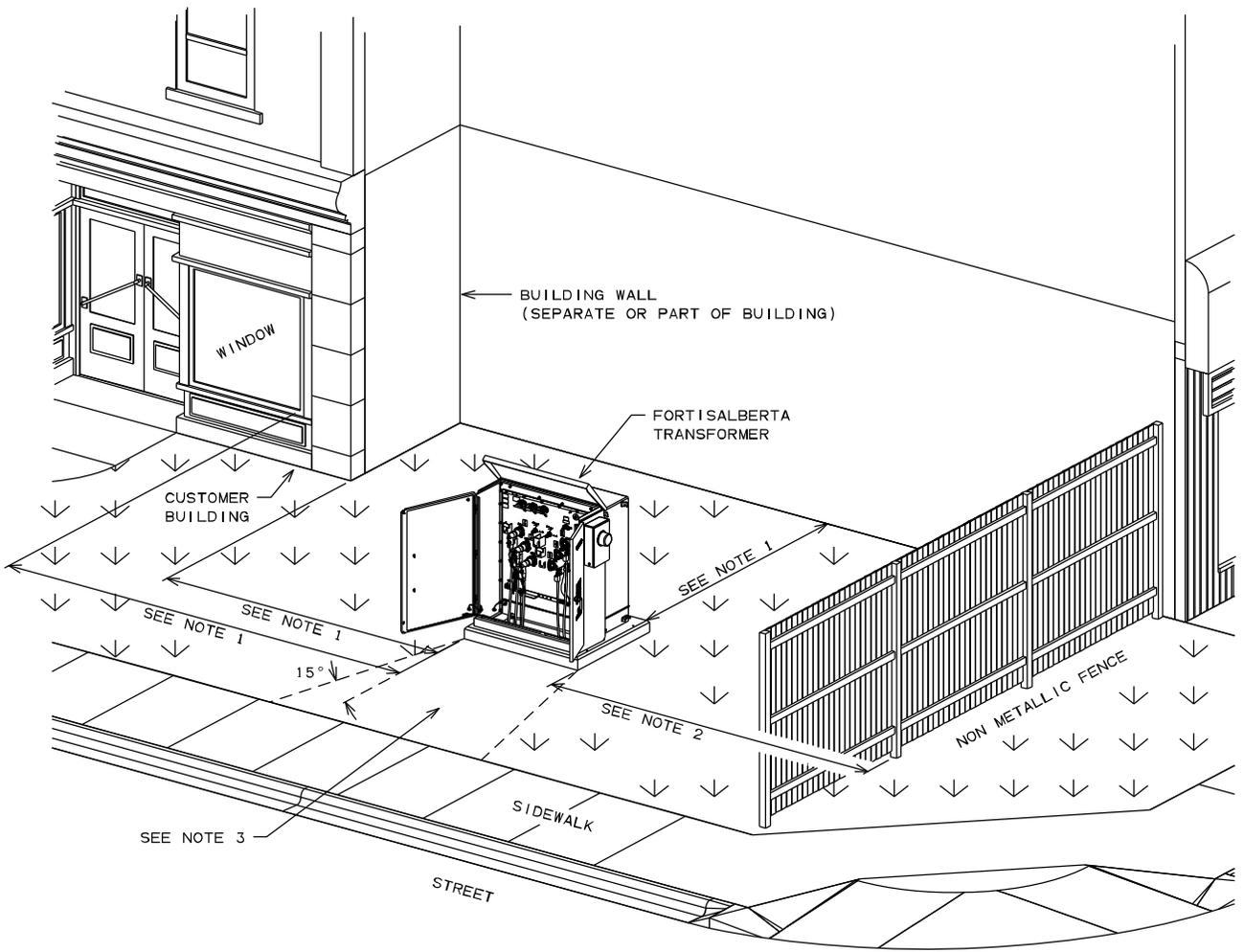
- The disconnection of service must be arranged with FortisAlberta Inc. by contacting 310 WIRE (i.e., 310 9743).
- An electrician may request FortisAlberta Inc.'s permission for such electrician to temporarily disconnect a customer's service for maintenance. FortisAlberta Inc. may, at its discretion, grant such permission if the electrician has: (1) identified the customer name and meter number of the service to be disconnected along with expected reconnection date and time; (2) confirmed that the electrician has been trained by FortisAlberta Inc. in the disconnection of electrical service; and (3) acknowledged that such disconnection by the electrician and maintenance by the electrician are at the electrician's sole risk.

***Reconnection of Service***

- Reconnection of service must be arranged with FortisAlberta Inc. by contacting 310 WIRE (i.e., 310 9743).
- An electrician who disconnected the service by removing the meter, may re-install the same meter after receiving prior approval from Fortis Alberta and installing a contractor meter seal. Should the disconnection be completed by the electrician at the weatherhead, Fortis Alberta MUST do the reconnection.
- For planned/unplanned work on an electrical service where the ratings of the equipment has been modified and requires a permit, the permit must be provided to FortisAlberta Inc. prior to the reconnection.
- Should it be impractical to obtain a permit (i.e., weekend, statutory holiday or after normal hours) for unplanned work, FortisAlberta Inc. may, at its discretion, reconnect without a permit. In this case, the owner and the electrician must sign a Reconnection Authorization Form releasing FortisAlberta Inc. from any and all liability for loss, damage or injury which may be suffered as a result of the reconnection.
- When service is reconnected without a permit from an approved permit issuer, the electrician or owner must obtain a permit and forward same to FortisAlberta Inc. on the next business day where practical (otherwise, as soon as possible thereafter).
- Failure to obtain a permit and forward same to FortisAlberta Inc. as noted above may result in customer notification and disconnection of service.
- For planned/unplanned repair work on an electrical service where the ratings of the equipment has not been modified, and a permit is not required, FortisAlberta Inc. may, at its discretion, reconnect service without a permit if the owner and, if applicable, the electrician sign a Reconnection Authorization Form releasing FortisAlberta Inc. from any liability for loss, damage or injury which may be suffered as a result of the reconnection.

Prior to requesting a reconnect, the electrician or owner must ensure the main switch at the customer panel is placed in the open position, properly wired and enclosed.

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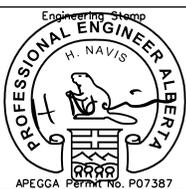
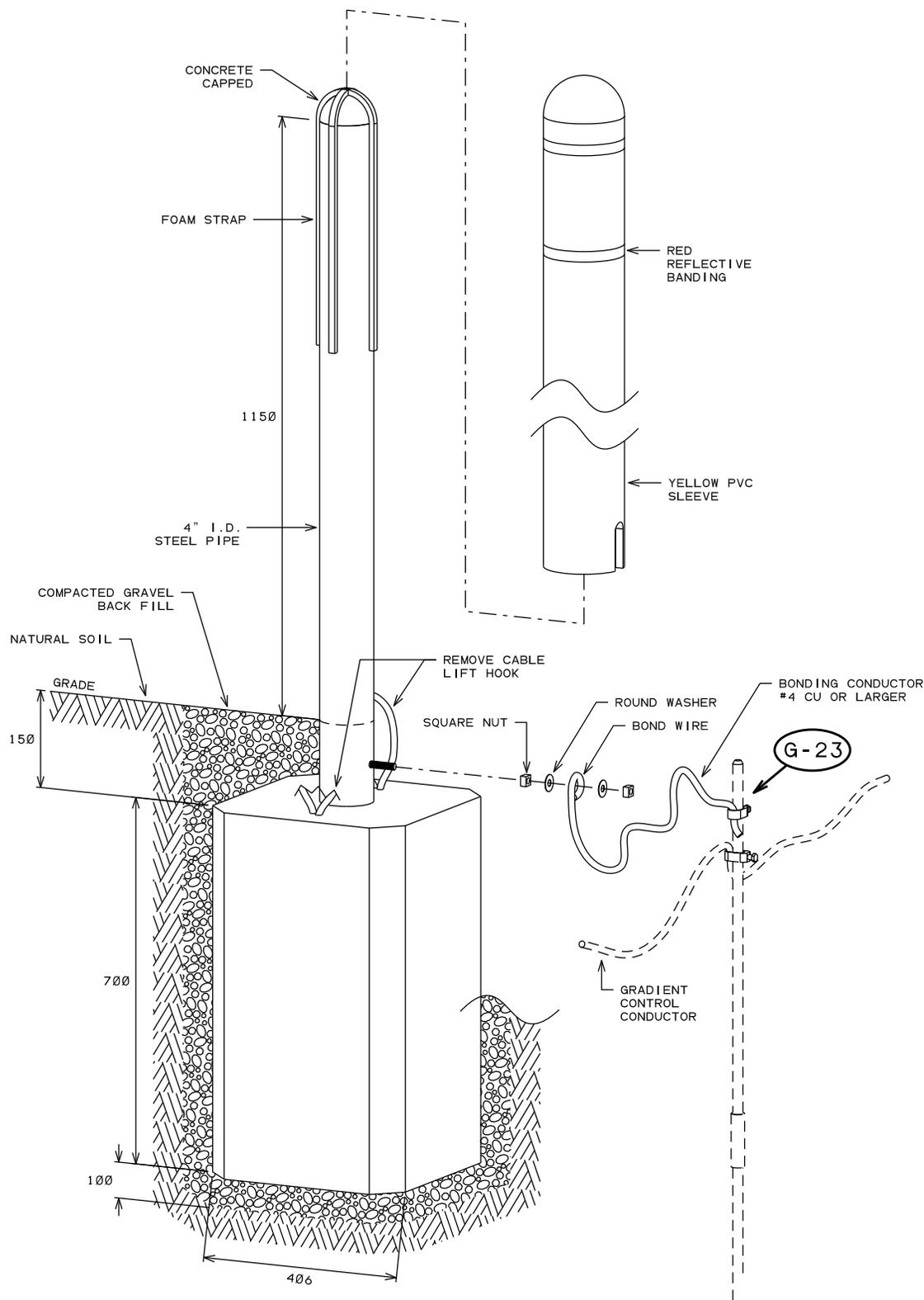


**NOTE:**

- 1 - FOR ALL SINGLE PHASE AND THREE PHASE TRANSFORMERS LESS THAN OR EQUAL TO 3MVA (WITH CURRENT LIMITING FUSING):
  - AS MEASURED FROM THE DECK EDGE OF THE CONCRETE PAD, THERE SHALL BE A MINIMUM OF 4.0m WORKING SPACE CLEARANCE ON THE TRANSFORMER DOOR SIDE AND A MINIMUM OF 1.5m (FOR OPERATIONAL REASONS), ON ALL OTHER SIDES
- FOR ALL THREE PHASE TRANSFORMERS 4MVA AND ABOVE (WITHOUT CURRENT LIMITING FUSING):
  - AS MEASURED FROM THE DECK EDGE OF THE CONCRETE PAD, THERE SHALL BE A MINIMUM OF 4.0m WORKING SPACE CLEARANCE ON THE TRANSFORMER DOOR SIDE AND AT LEAST 4.0m FROM ANY COMBUSTIBLE SURFACE OR MATERIAL ON A BUILDING AND AT LEAST 6.0m FROM ANY WINDOW, DOOR, OR VENTILATION INLET OR OUTLET ON A BUILDING, EXCEPT WHERE A WALL OR BARRIER WITH NON-COMBUSTIBLE SURFACES, OR MATERIAL (AS PER CAN/ULC-S114) IS CONSTRUCTED BETWEEN THE TRANSFORMER AND ANY DOOR, WINDOW, VENTILATION OPENING, OR COMBUSTIBLE SURFACE.
  - IF A BARRIER USING A NON-COMBUSTIBLE SURFACE IS TO BE USED (BLAST WALL) MINIMUM DISTANCE TO THE TRANSFORMER PAD SHALL BE 1.5m
- 2 - ADDITIONAL CLEARANCE MAY BE REQUIRED BETWEEN METALLIC OBJECTS (SUCH AS A FENCE) AND THE TRANSFORMER TO REDUCE SAFETY HAZARDS (STEP AND TOUCH POTENTIAL). IF METALLIC OBJECTS ARE REQUIRED CLOSER THAN 5M TO THE TRANSFORMER UNIT, THE UTILITY SHALL BE ALERTED AND THE HAZARD SHALL BE ASSESSED
- 3 - THE GRADE MUST BE LESS THAN 9.5° (1:6 GRADE) FOR THE 4m CLEAR AREA IN FRONT OF THE TRANSFORMER
- 4 - THE TOP OF THE TRANSFORMER MUST NOT BE BLOCKED OR COVERED
- 5 - THE AREA IMMEDIATELY IN FRONT OF THE TRANSFORMER MUST BE KEPT FREE OF ALL OBSTRUCTIONS
- 6 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES

<p><b>NO STAMP NEEDED</b></p>	<p>Engineering Stamp</p> <p>Description</p> <ul style="list-style-type: none"> <li>- REVISED NOTE 1 FROM 3M TO 4M FROM A COMBUSTIBLE WALL</li> <li>- REVISED NOTES TO PROVIDE INFORMATION REGARDING CLEARANCES FROM A METALLIC FENCE</li> <li>- UPDATED TRANSFORMER PAD DRAWING</li> </ul>	<p>Revision Date (YY/MM/DD)</p> <p>18-02-22</p>	<p>Date Created (YY/MM/DD)</p> <p>09-07-15</p>	<p><b>COMMERCIAL SERVICES LOCATION OF PADMOUNT TRANSFORMERS</b></p>	
		<p>REVISION Checked</p> <p><i>NS</i></p>	<p>ORIGINAL Design / Checked</p> <p><i>SM</i></p>		
		<p>REVISION Approved</p> <p><i>HN</i></p>	<p>ORIGINAL Approved</p> <p><i>D.M.</i></p>	<p><b>FORTIS ALBERTA</b></p>	
				<p>Drawing Number</p> <p>SMG 7.1</p>	<p>Sheet</p> <p>1 / 1</p>

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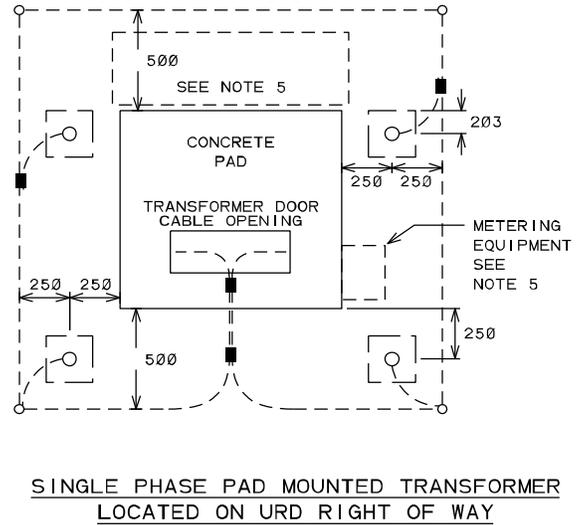
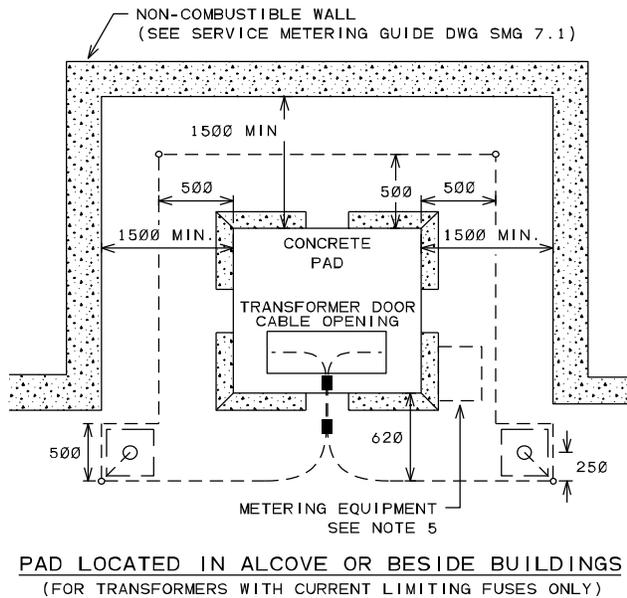
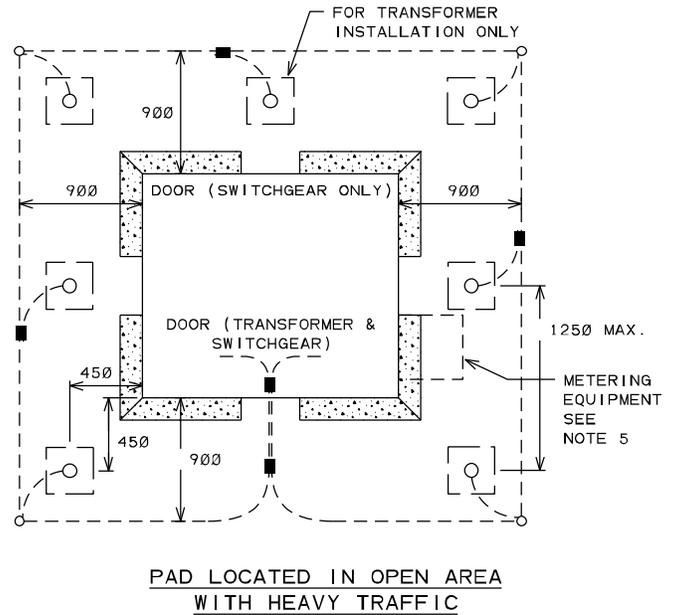
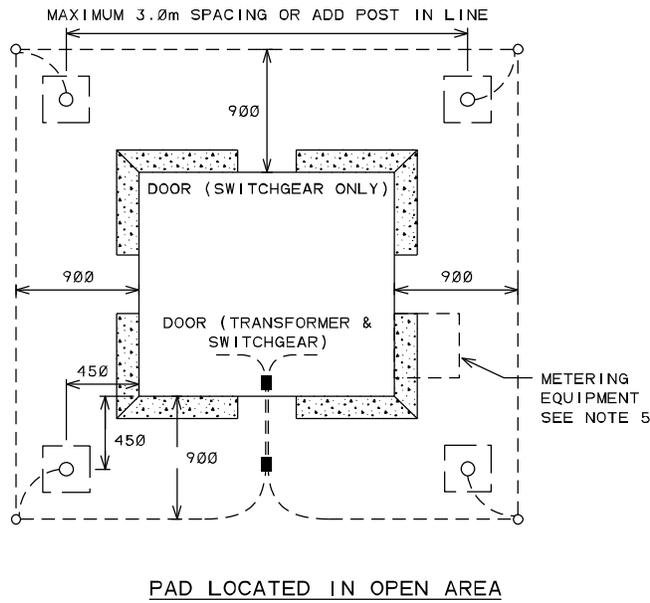


Description - UPDATED GROUND ROD CONNECTION	Revision Date (YY/MM/DD) 20-01-27	Date Created (YY/MM/DD) 09-07-15
	REVISION Checked <i>NS</i>	ORIGINAL Design / Checked <i>gm</i>
	REVISION Approved <i>HN</i>	ORIGINAL Approved <i>D.M.</i>

SERVICE GUARD POST	
Drawing Number	Sheet
1302	1 / 2

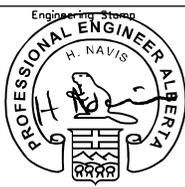


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**NOTE:**

- 1 - WHERE THE TRANSFORMER IS LOCATED IN AN AREA EXPOSED TO VEHICLE DAMAGE, THE GUARD POSTS MUST BE SUPPLIED BY THE CUSTOMER
- 2 - AS MEASURED FROM THE EDGE OF THE CONCRETE SWITCHGEAR/ TRANSFORMER PAD, THERE SHALL BE A MINIMUM OF 4M WORKING SPACE CLEARANCE ON THE SWITCHGEAR/ TRANSFORMER DOOR SIDE AND A MINIMUM OF 1.5M ON ALL OTHER SIDES
- 3 - FOR GROUND GRID DETAILS, SEE DRAWING 1226 FOR SINGLE PHASE OR 1315 FOR THREE PHASE TRANSFORMER APPLICATIONS FOR GROUND GRID DETAILS, SEE DRAWING 1593 FOR PAD MOUNT SWITCH APPLICATIONS
- 4 - THE REQUIREMENTS FOR GUARD POSTS, INCLUDING THE NECESSITY LOCATION AND INSTALLATION MUST BE CONFIRMED WITH FORTISALBERTA PRIOR TO CONSTRUCTION
- 5 - IF THERE IS A SECONDARY PEDESTAL/ METERING EQUIPMENT ATTACHED TO THE SWITCHGEAR/TRANSFORMER PAD, THE GUARD POST & GROUND GRID SHOULD BE EXTENDED IN SUCH A WAY TO PROTECT THE PERIPHERAL EQUIPMENT ALSO
- 6 - POST ENCASUREMENT TO BE COMPACTED ALL AROUND WITH SUITABLE BACK FILL OR GRAVEL
- 7 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES



Engineering Stamp H. NAVIS PROFESSIONAL ENGINEER ALBERTA	Description - RELOCATED THE TAIL BOND CONNECTION OF THE GRID AS IT ENTERS THE VAULT SUCH THAT IT IS CLEAR THAT THERE IS A CONNECTION INSIDE OF THE VAULT - UPDATED SERVICE AND METERING GUIDE LOOKUP - REVISED NOTE 2 CLEARANCE CHANGED FROM 3M TO 4M
--	--

Revision Date (YY/MM/DD) 16-09-13	Date Created (YY/MM/DD) 09-07-15
REVISION Checked <i>KJS</i>	ORIGINAL Design / Checked <i>JM</i>
REVISION Approved <i>HN</i>	ORIGINAL Approved <i>D.M.</i>

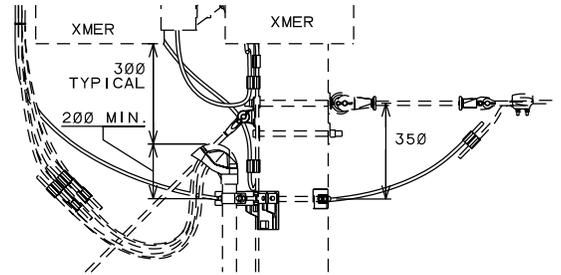
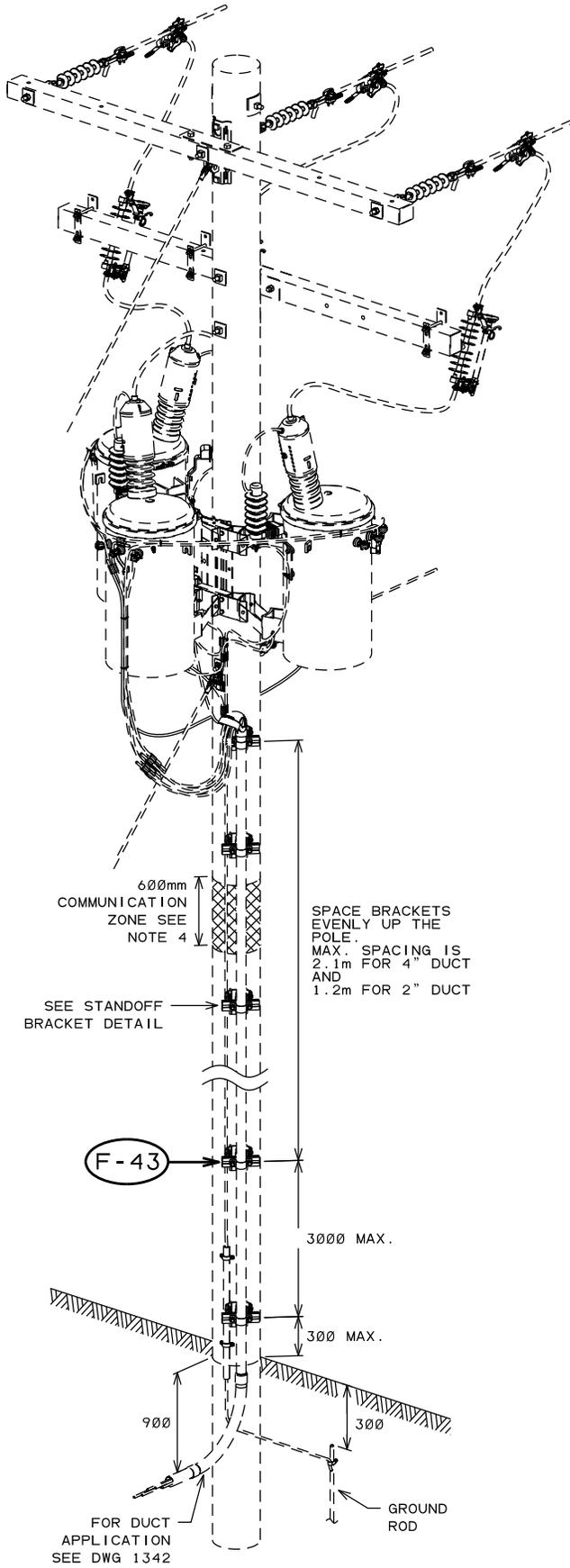
<b>SERVICE GUARD POST</b>	
<b>FORTIS ALBERTA</b>	Drawing Number 1302
	Sheet 2 / 2

Item #	Description	UI	-1	-	-	-	-	-	-	-	-	-
5141104	NUT, SQUARE, 1/2 INCH, UNC 13, GALV		2									
5142102	WASHER, ROUND, 9/16" HOLE, 1-3/8" RIM		2									
5150802	POST, BUMPER, HEAVY DUTY		1									
5310220	CONDUCTOR, STR, #4, CU.	M	1									
5530645	CONNECTOR, GRD ROD, MAX 3/4" ROD		1									

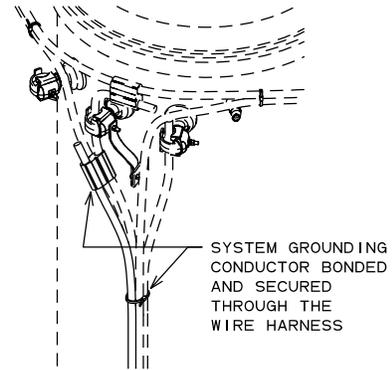
REMARKS:

Bill of material is for one guard post only, order additional guard posts where required.

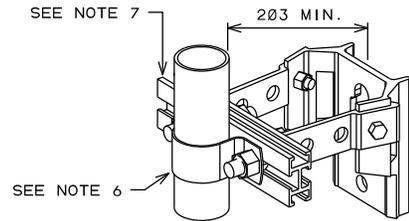
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WEATHER HEAD / NEUTRAL DETAIL



REDUNDANT GROUND DETAIL



STANDOFF BRACKET DETAIL



Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
- UPDATED GROUND ROD	20-01-27	09-08-31
REVISION Checked	ORIGINAL Design / Checked	
HN	AS	AM
REVISION Approved	ORIGINAL Approved	
HN	DM	

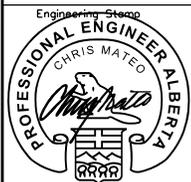
**SECONDARY CONDUIT STANDOFF BRACKET**



Drawing Number	Sheet
2624	1 / 2

NOTE:

- 1 - BURIAL DEPTH OF UNDERGROUND CABLE TO THE SERVICE POLE MUST BE 900mm OR GREATER. THE CUSTOMER TO LEAVE A 1m DEEP BY 1m WIDE TRENCH AT THE SERVICE POLE FOR MOUNTING THE CONDUIT
- 2 - ENOUGH SLACK SHOULD BE LEFT IN THE CABLE BELOW GROUND AT THE TRANSFORMER POLE TO ALLOW FOR SETTLING AND MOVEMENT OF THE EARTH
- 3 - FOR OPERATIONAL REASONS 2/3 OF THE POLE MUST BE FREE FOR CLIMBING. SEE SECTION 4.2 OF THE SERVICE AND METERING GUIDE FOR THE APPLICATION OF CONDUIT AND STANDOFF BRACKETS
- 4 - ON POLES JOINTLY USED FOR SUPPLY AND COMMUNICATION PLANTS PROTECTIVE CONDUIT SHALL BE PROVIDED AND EXTENDED AT LEAST 1m ABOVE THE COMMUNICATION PLANT
- 5 - THE REQUIRED CABLE LENGTH AT THE POLE SHALL BE MEASURED FROM POLE BASE TO THE TRANSFORMER SECONDARY TERMINALS
- 6 - FOR MOUNTING ON STANDOFF BRACKETS, FORTIS WILL SUPPORT TWO CONDUIT SIZES; 2 INCH AND 4 INCH
  - THE CUSTOMER TO SUPPLY 40 FEET OF RIGID PVC PIPE
  - FORTIS TO SUPPLY STANDOFF BRACKETS, 4 WAY T-SLOT BRACKETS AND CONDUIT STRAPS
- 7 - TO AVOID CREATING A LADDER, CUT T-SLOT BRACKET TO SIZE OF CONDUIT PLUS STRAP
- 8 - FOR DIRECT MOUNTING OF THE CONDUIT TO THE POLE THE CABLE SHALL BE INSTALLED IN THE FIRST 10-FOOT SECTION OF CONDUIT AND MOUNTED ON THE POLE. THE REMAINDER OF THE CABLE SHALL BE COILED UP AND SECURED TO THE POLE AT THE TOP OF THE FIRST 10-FOOT SECTION OF THE CONDUIT. THE REMAINING STRAPS TO BE LEFT AT THE POLE TEMPORARILY ATTACHED TO THE POLE AT A HEIGHT NO HIGHER THAN THE TOP OF THE 10-FOOT SECTION OF CONDUIT. ALL CONDUIT STRAPS MUST BE METAL, PLASTIC STRAPS ARE NOT ACCEPTABLE
- 9 - THE BONDING CONDUCTOR IN TECK 90 CABLE IS INTENDED TO BE USED AS AN EQUIPMENT-BONDING CONDUCTOR. WHERE ARMoured CABLES ARE INSTALLED AS THE CUSTOMERS SERVICE ENTRANCE; THE BONDING CONDUCTOR CAN BE USED AS THE SYSTEM GROUNDED CONDUCTOR ON THE LINE SIDE OF THE SERVICE WHEN NO NEUTRAL CURRENTS (ON BALANCED LOAD) ARE PRESENT. AS PER PART 1 OF THE CANADIAN ELECTRICAL CODE
- 10 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES

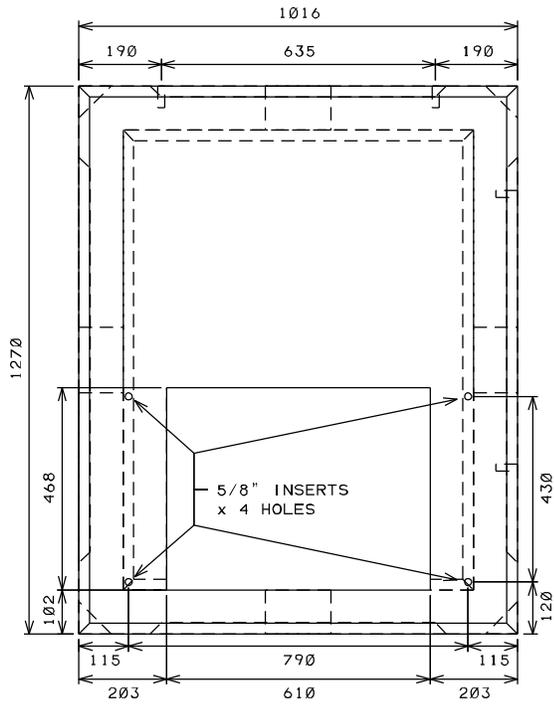


Description
- ADDED NOTE TO INCLUDE ALL SUPPLY CABLE WHICH INCLUDES THE NEUTRAL PER CSA C22.3 NO.1 RULE 4.2.4.2 - ADDED THIS PAGE TO THIS STRUCTURE

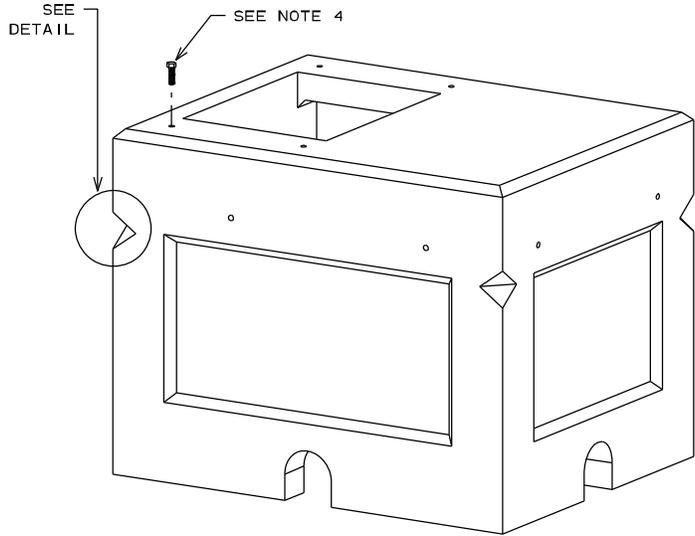
Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
	18-10-18
REVISION Checked	ORIGINAL Design / Checked <i>HN</i>
REVISION Approved	ORIGINAL Approved <i>CM</i>

<h2>SECONDARY CONDUIT STANDOFF BRACKET</h2>					
	<table border="1" style="width: 100%;"> <tr> <td>Drawing Number</td> <td>Sheet</td> </tr> <tr> <td style="text-align: center;">2624</td> <td style="text-align: center;">2 / 2</td> </tr> </table>	Drawing Number	Sheet	2624	2 / 2
Drawing Number	Sheet				
2624	2 / 2				

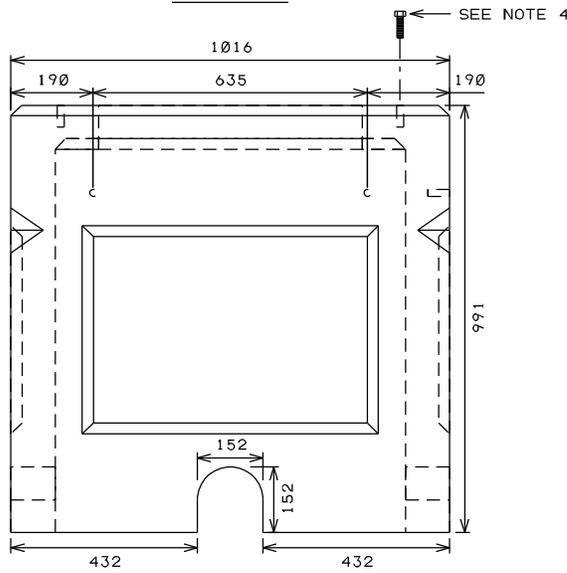
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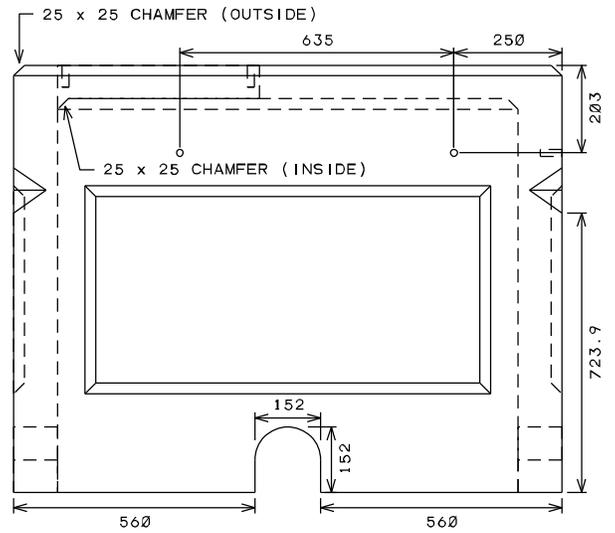
**TOP VIEW**



**ISOMETRIC VIEW**



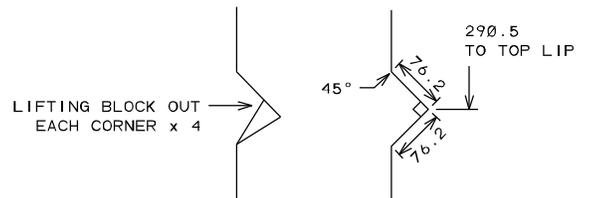
**FRONT VIEW**



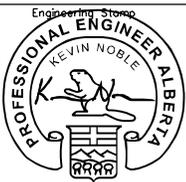
**SIDE VIEW**

**NOTE:**

- 1 - CONCRETE TO BE SULPHATE RESISTANT CONFORMING TO CSA A23.4 "PRECAST CONCRETE", 6% ±1% AIR ENTRAINMENT
- 2 - MAXIMUM SUPERIMPOSED LOAD IS 1000KG ON THE PERIMETER OF THE PRECAST BASE
- 3 - THE FINISHED MASS OF THE PRECAST BASE SHALL BE INDICATED ON THE BASE
- 4 - ALL INSERTS ARE TO BE FILLED WITH ONE 5/8" x 1-3/4", HOT DIPPED GALVANISED STEEL BOLT
- 5 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES



**LIFTING BLOCK OUT DETAIL**

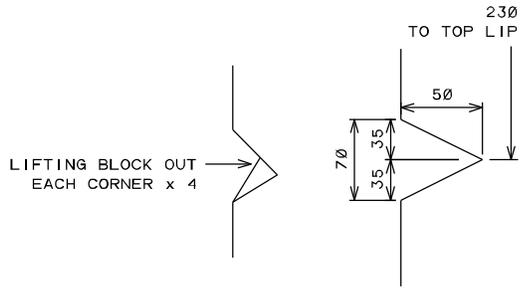


Description - UPDATED NOTES - ADDED 5/8" x 1-3/4", HOT DIPPED GALVANISED STEEL BOLT	Revision Date (YY/MM/DD) 15-11-12	Date Created (YY/MM/DD) 12-10-26
	REVISION Checked <i>NS</i>	ORIGINAL Design / Checked <i>NS</i>
	REVISION Approved <i>KW</i>	ORIGINAL Approved <i>HN</i>

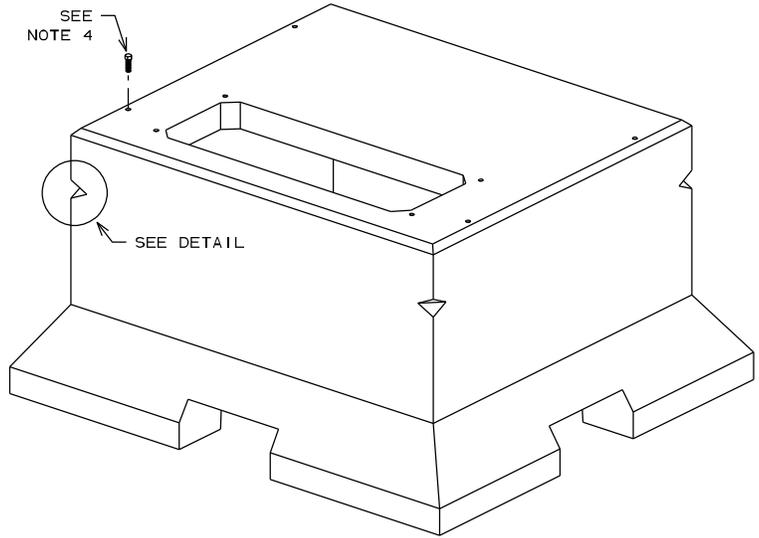
**PRECAST CONCRETE PAD FOR SINGLE PHASE MINI-PADMOUNT TRANSFORMER UP TO 167kVA**

<b>FORTIS ALBERTA</b>	Drawing Number	Sheet
	755-0505	1 / 1

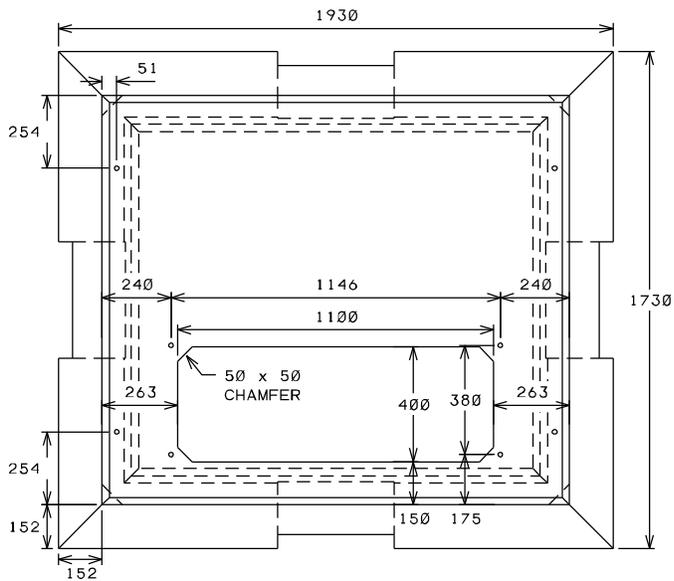
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LIFTING BLOCK OUT DETAIL



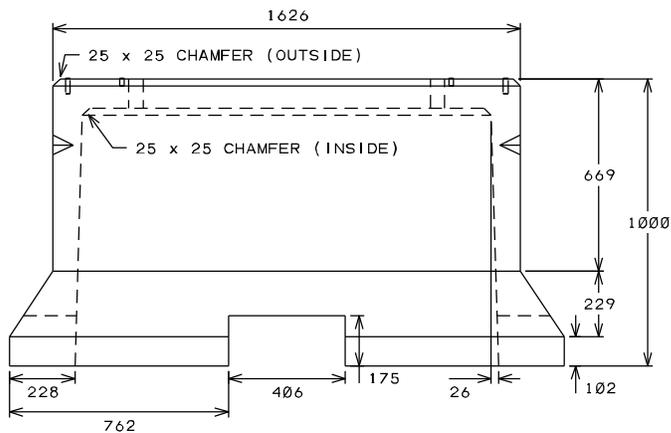
ISOMETRIC VIEW



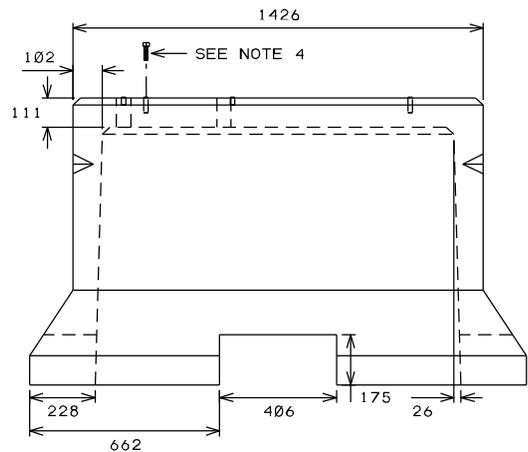
TOP VIEW

NOTE:

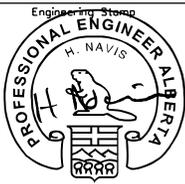
- 1 - CONCRETE TO BE SULPHATE RESISTANT CONFORMING TO CSA A23.4 "PRECAST CONCRETE", 6% ±1% AIR ENTRAINMENT
- 2 - MAXIMUM SUPERIMPOSED LOAD IS 3,300KG ON THE PERIMETER OF THE PRECAST BASE
- 3 - THE FINISHED MASS SHALL BE INDICATED ON THE PRECAST BASE
- 4 - ALL INSERTS ARE TO BE FILLED WITH ONE 5/8" x 1-3/4", HOT DIPPED GALVANISED STEEL BOLT
- 5 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES



FRONT VIEW



SIDE VIEW



Description  
- CORRECTED NOTE 2, THE LOAD SHOULD BE 3,300KG NOT 1000KG

Revision Date (YY/MM/DD)  
16-09-13

Date Created (YY/MM/DD)  
10-03-02

REVISION Checked *JS*

ORIGINAL Design / Checked *JS*

REVISION Approved *HN*

ORIGINAL Approved *D.M.*

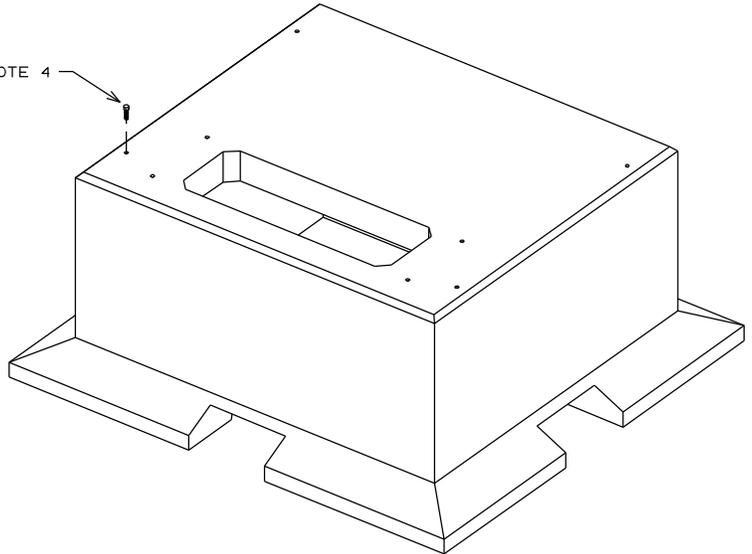
PRECAST TRANSFORMER PAD  
FOR 3-PHASE 500kVA  
AND BELOW



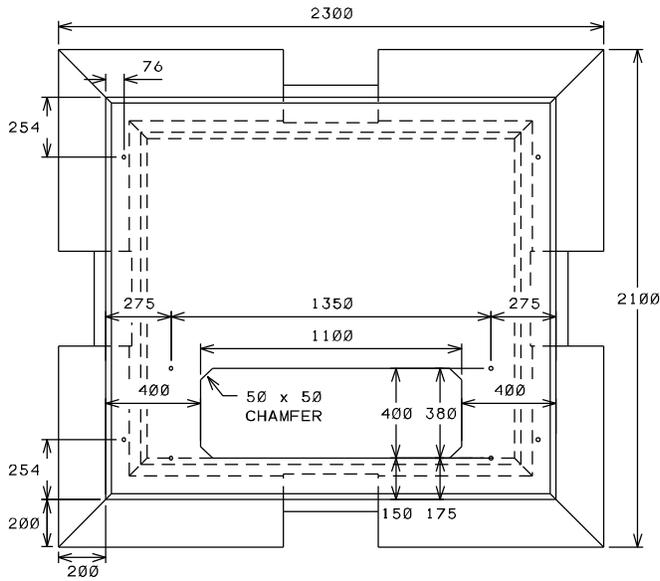
Drawing Number	Sheet
755-0507	1 / 1

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SEE NOTE 4



**ISOMETRIC VIEW**

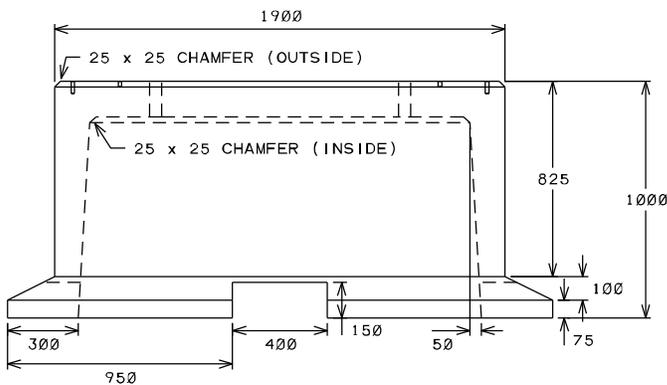


**TOP VIEW**

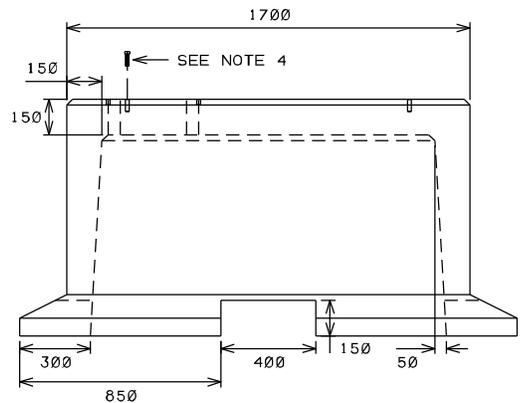
**\* APPLICATION \***  
**FOR TRANSFORMERS WITH**  
**208-600V SECONDARIES**

NOTE:

- 1 - CONCRETE TO BE SULPHATE RESISTANT CONFORMING TO CSA A23.4 "PRECAST CONCRETE", 6% ±1% AIR ENTRAINMENT
- 2 - MAXIMUM SUPERIMPOSED LOAD IS 9,000KG ON THE PERIMETER OF THE PRECAST BASE
- 3 - THE FINISHED MASS SHALL BE INDICATED ON THE PRECAST BASE
- 4 - ALL INSERTS ARE TO BE FILLED WITH ONE 5/8" x 1-3/4", HOT DIPPED GALVANISED STEEL BOLT
- 5 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES



**FRONT VIEW**



**SIDE VIEW**



Description  
 - CORRECTED NOTE 2. THE LOAD SHOULD BE 9,000KG NOT 1000KG

Revision Date (YY/MM/DD)  
 16-09-13

Date Created (YY/MM/DD)  
 04-07-02

REVISION Checked *KJS*

ORIGINAL Design / Checked *KJS*

REVISION Approved *HN*

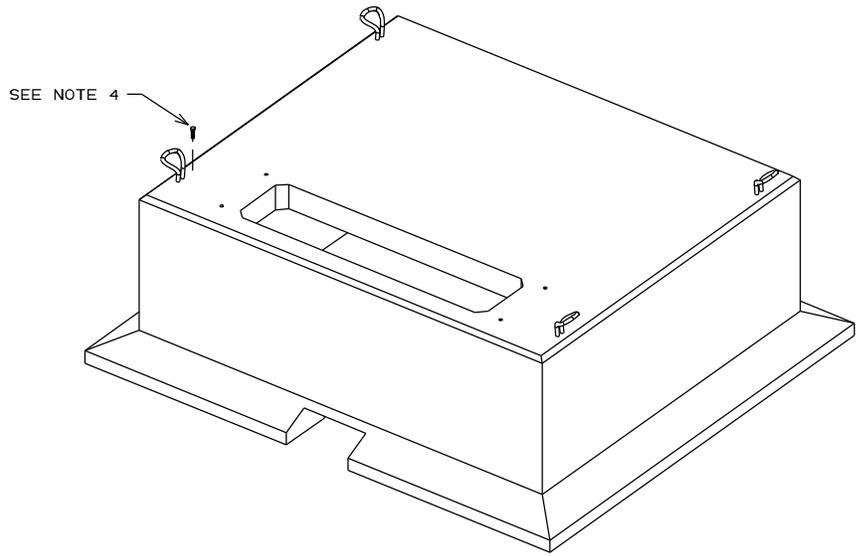
ORIGINAL Approved *KS*

**PRECAST TRANSFORMER PAD**  
**FOR 3-PHASE**  
**750kVA TO 3,000kVA**

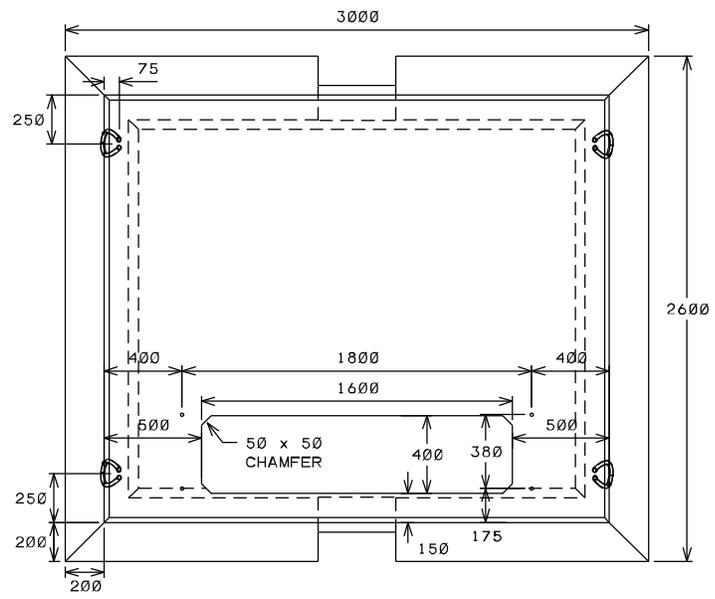


Drawing Number	Sheet
755-0512	1 / 1

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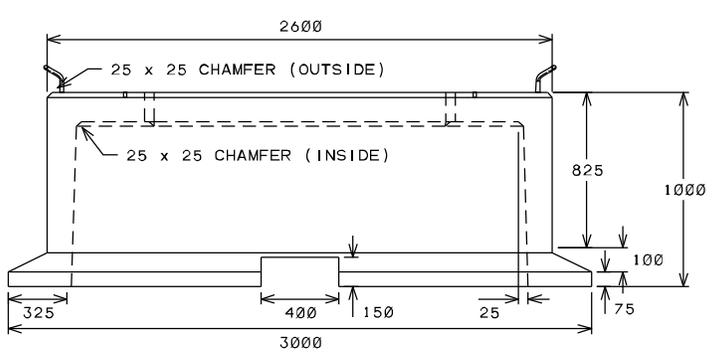
ISOMETRIC VIEW



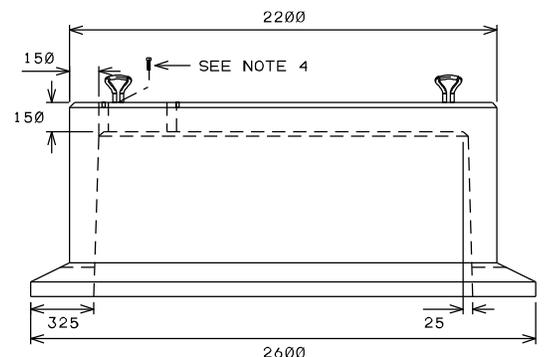
TOP VIEW

**\* APPLICATION \***  
 FOR ALL TRANSFORMERS WITH 4.16kV  
 SECONDARIES, AND 4000kVA  
 TRANSFORMERS WITH 600V SECONDARIES

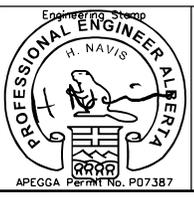
- NOTE:
- 1 - CONCRETE TO BE SULPHATE RESISTANT CONFORMING TO CSA A23.4 "PRECAST CONCRETE", 6% ±1% AIR ENTRAINMENT
  - 2 - MAXIMUM SUPERIMPOSED LOAD IS 30,000kg ON THE PERIMETER OF THE PRECAST BASE
  - 3 - THE FINISHED MASS AND THE MAXIMUM SUPERIMPOSED LOAD SHALL BE INDICATED ON THE PRECAST BASE
  - 4 - ALL INSERTS ARE TO BE FILLED WITH ONE 5/8" x 1-3/4", HOT DIPPED GALVANISED STEEL BOLT
  - 5 - MIN. ALLOWABLE SOIL BARING CAPACITY = 125kPa
  - 6 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES



FRONT VIEW



SIDE VIEW



Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
	REVISION Checked	ORIGINAL Design / Checked
	REVISION Approved	ORIGINAL Approved

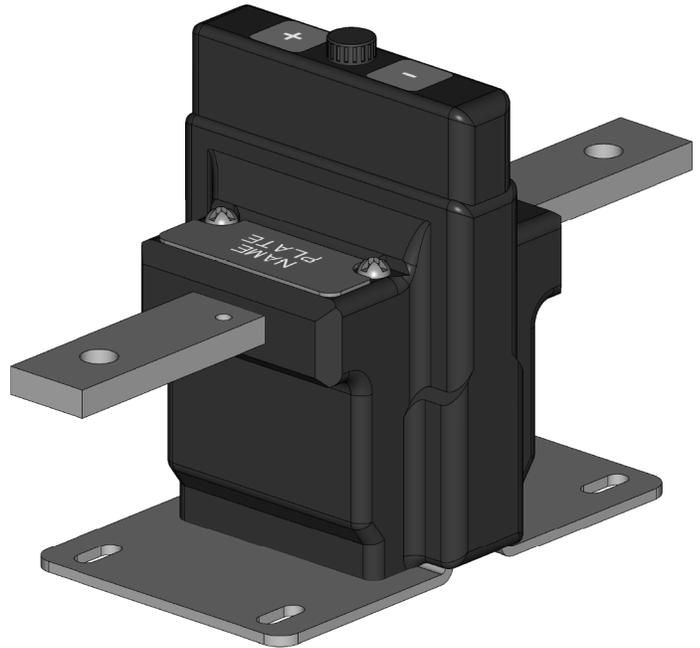
Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
19-05-16	19-05-16
Checked	Checked
Checked	Checked
Approved	Approved
Approved	Approved

**PRECAST TRANSFORMER PAD  
 FOR 3-PHASE  
 1,000kVA TO 20,000kVA**

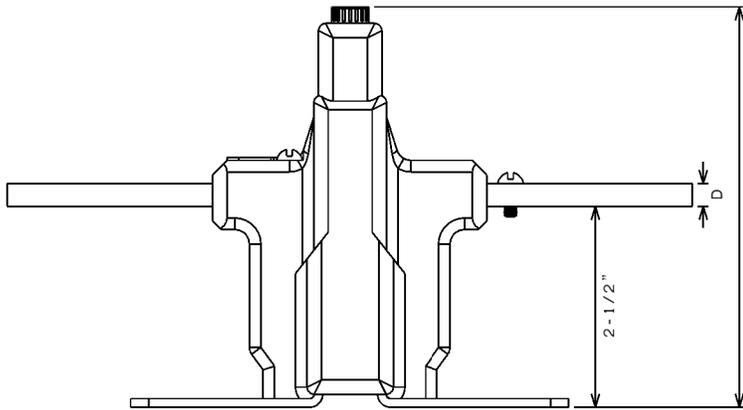
<b>FORTIS ALBERTA</b>	Drawing Number	Sheet
	755-0516	1 / 1

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SHOWN IS A TYPICAL  
2 WIRE CURRENT TRANSFORMER,  
5 TO 1200 AMPERES

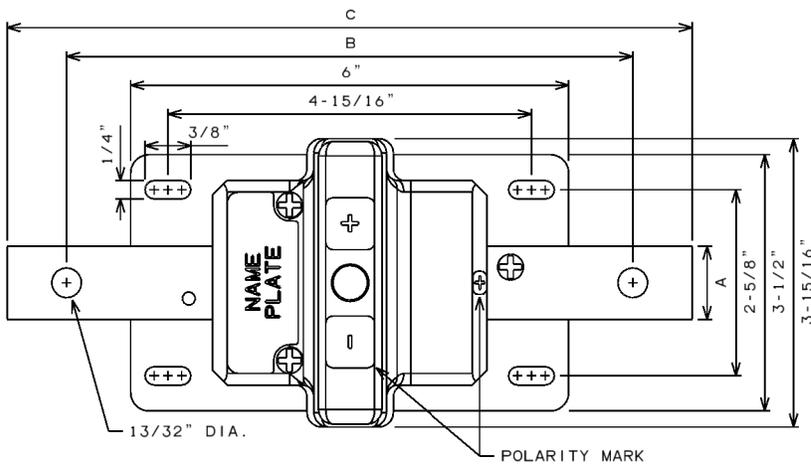


PRIMARY BAR DIMENSIONS				
CAPACITY AMPS.	A	B	C	D
5-400 AMPS.	1"	7-3/4"	9-3/8"	5/16"
500-1200 AMPS.	2"	10-1/2"	11-1/2"	3/8"

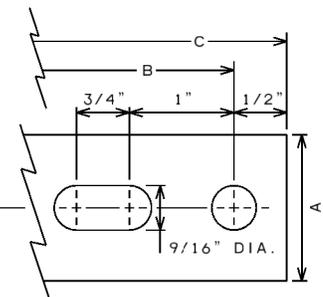


FRONT DETAIL

ISOMETRIC DETAIL



TOP DETAIL



500-1200 AMPS

<p>NO STAMP NEEDED</p>	<p>Description - REMOVED STAMP</p>	<p>Revision Date (YY/MM/DD) 15-12-09</p>	<p>Date Created (YY/MM/DD) 15-11-12</p>	<p>2 WIRE CURRENT TRANSFORMER DIMENSION SPECIFICATION</p>
		<p>REVISION Checked <i>AS</i></p>	<p>ORIGINAL Design / Checked <i>AS</i></p>	
		<p>REVISION Approved <i>HN</i></p>	<p>ORIGINAL Approved <i>KN</i></p>	
<p><b>FORTIS ALBERTA</b></p>		<p>Drawing Number SMG 2.16.5</p>	<p>Sheet 1 / 1</p>	

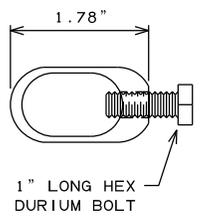
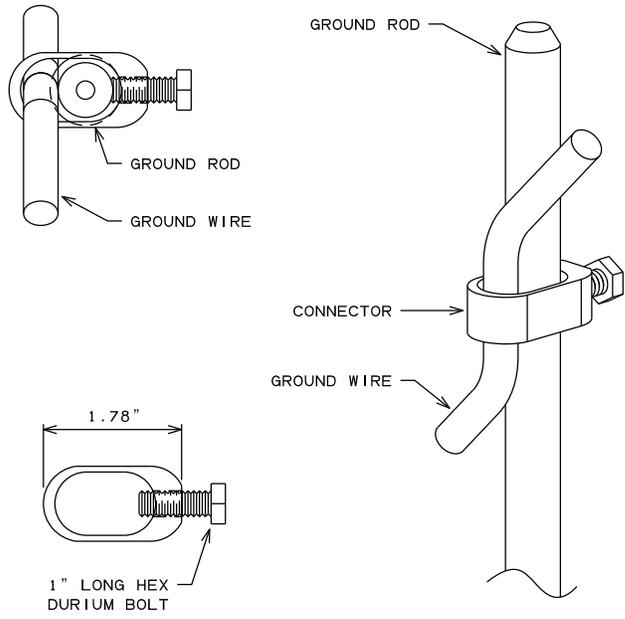
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LINE VOLTAGE	PHASE	kVA	TERMINAL CONFIGURATION
120 / 240	1	UP TO 167 kVA INCLUSIVE	
120 / 208 277 / 480 347 / 600 2400 / 4160	3 3 3 3	75 TO 300 kVA INCLUSIVE 75 TO 1000 kVA INCLUSIVE 75 TO 1000 kVA INCLUSIVE 1000 TO 5000 kVA INCLUSIVE	
347 / 600	3	1500 TO 2000 kVA INCLUSIVE	
120 / 208 277 / 480 347 / 600 2400 / 4160	3 3 3 3	500 TO 1000 kVA INCLUSIVE 1500 TO 3000 kVA INCLUSIVE 2500 TO 3000 kVA INCLUSIVE 7500 TO 10000 kVA INCLUSIVE	

- NOTE:
- 1 - CUSTOMER MUST SUPPLY ALL SECONDARY CONNECTORS
  - 2 - ALL TRANSFORMER TERMINAL PADS ARE DRILLED WITH 14.3mm DIAMETER HOLES EXCEPT WHERE OTHERWISE SHOWN
  - 3 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES

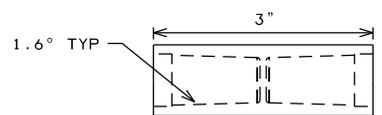
<p>Engineering Stamp</p> <p style="font-size: 2em; transform: rotate(-45deg); opacity: 0.5;">NO STAMP NEEDED</p>	<p>Description</p> <p>- REMOVED STAMP</p>	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	<p>SERVICE SECONDARY CONNECTORS</p>	
		15-12-09	07-08-02		
		REVISION Checked <i>NS</i>	ORIGINAL Design / Checked <i>NS</i>		
REVISION Approved <i>HN</i>	ORIGINAL Approved <i>NS</i>	<p><b>FORTIS ALBERTA</b></p>		Drawing Number	Sheet
				SMG 4.3	1 / 1

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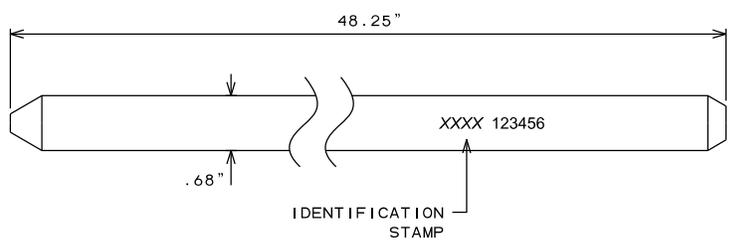
MATERIAL: COPPER ALLOY  
ITEM NUMBER #557-1311

GROUND ROD CONNECTOR DETAIL



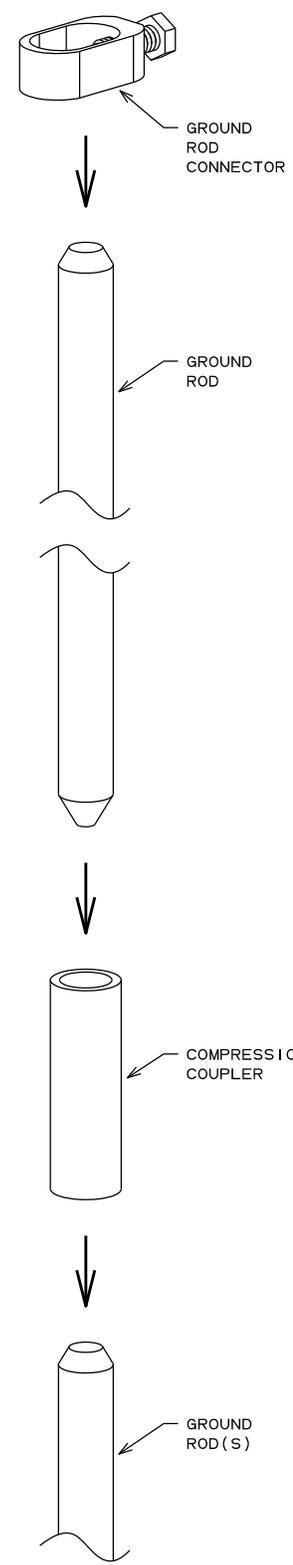
MATERIAL: SILICON BRONZE  
ITEM NUMBER #557-1525

COMPRESSION COUPLER DETAIL

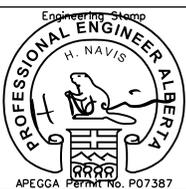


MATERIAL: COPPER CLAD STEEL  
ITEM NUMBER #557-1421

GROUND ROD DETAIL



CONNECTION ASSEMBLY



Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
		20-01-27
	REVISION Checked	ORIGINAL Design / Checked <i>NS</i>
	REVISION Approved	ORIGINAL Approved <i>HN</i>

SECTIONAL GROUND RODS AND ASSOCIATED MATERIAL



Drawing Number	Sheet
SKT 1499	1 / 1

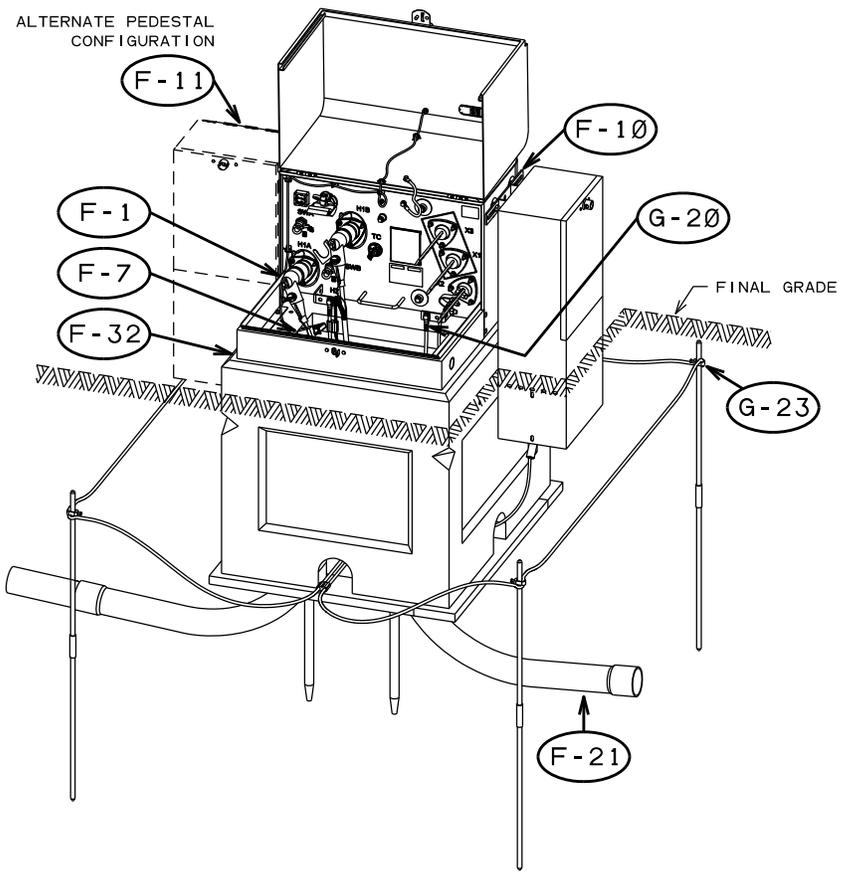
## CIVIL AND GROUNDING METHOD FOR 1-PH &amp; 3-PH X'

Item #	Description	UI	-1	-2	-3	-4	-5	-6	-7	-8
5310202	WIRE, COPPER, STR, SD BARE, 2/0	M			17	81	20	81	22	81
5310220	CONDUCTOR, STR, #4, CU.	M	25	60						
5530155	CONNECTOR, PARALLEL GROOVE, 1 TO 2/0				2	12	2	12	2	12
5571311	CONNECTOR, FOR 5/8" TO 3/4" GND. ROD		4	4	4	4	4	4	4	4
5571421	ROD, GRD, SECT, 3/4 X 4' CU-CLAD TAPERED		8	8	16	16	16	16	16	16
5571525	COMPRES. COUPLING, SECT. CU-CLAD GRD ROD			4	12	12	12	12	12	12
7550505	BASE, PRECAST FOR MINI:PAD TRANSFORMER		1	1						
7550507	PAD, PRECAST CONCRETE, TRANS, 75-500KVA				1	1				
7550512	PAD, PRECAST CONCRETE, TRANS, 750-3000KVA						1	1		
7550516	PAD, PRECAST CONCRETE, TRANS, 1-20 MVA								1	1

## REMARKS:

- Option 1 is for all single-phase transformers with multi-grounded neutral; see structure drawing 1226 for grounding detail.
- Option 2 is for all single-phase transformers without a multi-grounded neutral; see structure Drawing 1226 for grounding detail.
- Option 3 is for all three phase transformers 75-500 kVA with a multi-grounded neutral; see structure drawing 1315 (BOM ref. 1315-1) for grounding details.
- Option 4 is for all three phase transformers 75-500 kVA and without a multi-grounded neutral; see structure drawing 1315 (BOM ref. 1315-2) for grounding detail.
- Option 5 is for all three phase transformers 750-3000 kVA with a multi-grounded neutral; see structure drawing 1315 (BOM ref. 1315-4) for grounding detail.
- Option 6 is for all three phase transformers 750-3000 kVA without a multi-grounded neutral; see structure drawing 1315 (BOM ref. 1315-5) for grounding detail.
- Option 7 is for all three phase transformers 100-5000 kVA, 4.16 kV secondary and 4000 kVA transformers with 600 V secondary with a multi-grounded neutral; see structure drawing 1315 (BOM ref. 1315-6) for grounding details.
- Option 8 is for all three phase transformers 1000-7500 kVA, 4.16 kV secondary and 4000 5VA transformers with 600 V secondary without a multi-grounded neutral; see structure drawing 1315 (BOM ref. 1315-7 or 1315-8) for grounding details.
- Customer to contact a FortisAlberta representative to determine the type of grounding that is required.

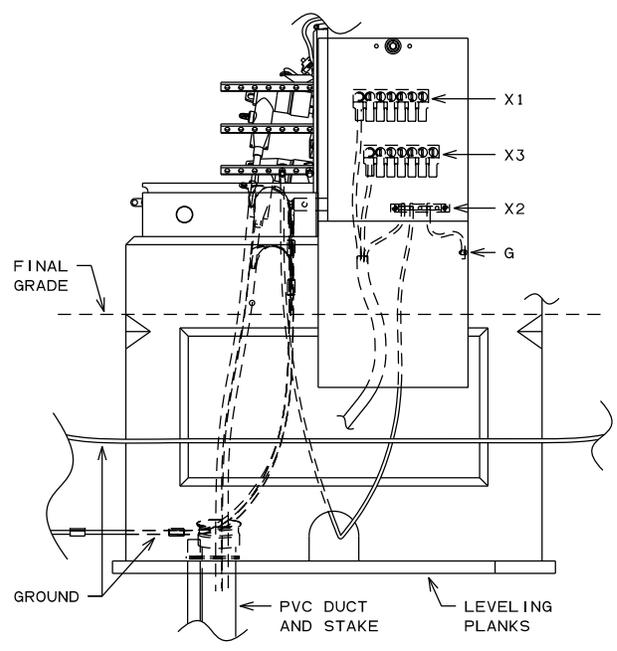
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ISOMETRIC VIEW



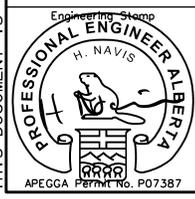
SINGLE LINE SYMBOL



POWER PEDESTAL DETAIL

NOTE:

- 1 - FOR INSTALLATION OF ELBOW TERMINATOR, SEE DISTRIBUTION CONSTRUCTION AND OPERATIONS STANDARDS S30-02
- 2 - DE-ENERGIZE TRANSFORMER BEFORE DISCONNECTING GROUND X2
- 3 - EQUIPMENT PADS ARE NOT TO BE PLACED ON SOILS THAT ARE IN CLASS 7 SOIL (WET, PEAT, ORGANICS) WITHOUT SPECIAL FOUNDATIONS BEING REQUIRED
- 4 - WHERE METALLIC GUARD POSTS, RAILS, OR SIMILAR BARRIERS ARE USED (FOR GUARD POST DIMENSIONS SEE DWG 1302) TO PROVIDE MECHANICAL PROTECTION FOR PADMOUNTED EQUIPMENT, GRADIENT CONTROL PROTECTION SHALL BE PROVIDED TO MAINTAIN SAFE TOUCH AND STEP POTENTIALS AS REQUIRED
- 5 - LEAVE 2m OF EACH CONDUCTOR TAIL FOR CONNECTION TO EQUIPMENT CASE
- 6 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES

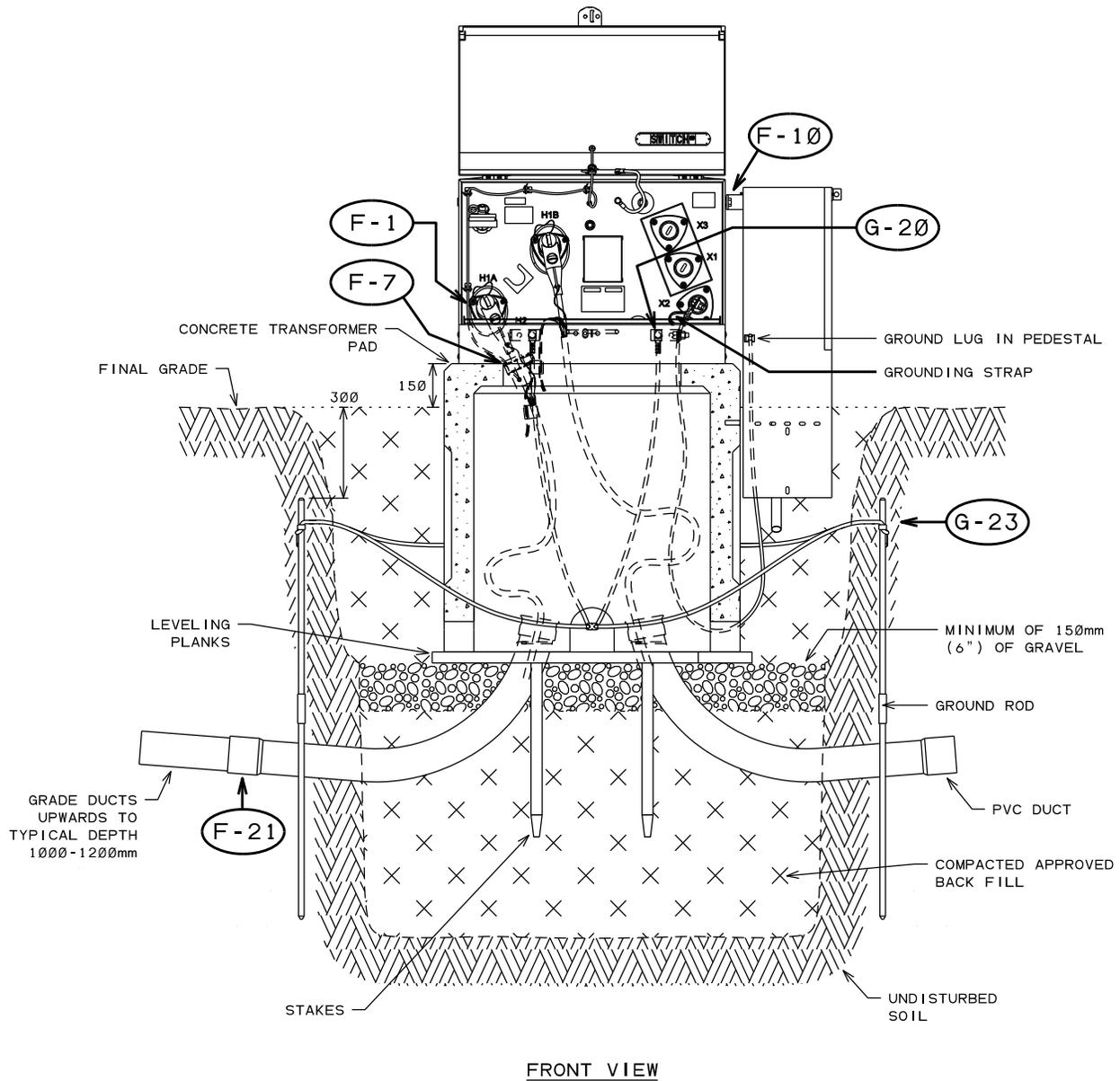


Description	- UPDATED GROUNDS
	- ADDED ASSEMBLY REFERENCE F-32
	- ADDED BELL ENDS TO DUCT
	- REMOVED "OPTIONAL" TEXT FROM WOOD PLANK NOTE

Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
20-01-27	03-08-06
REVISION Checked <i>AS</i>	ORIGINAL Design / Checked <i>AS</i>
REVISION Approved <i>HN</i>	ORIGINAL Approved <i>AS</i>

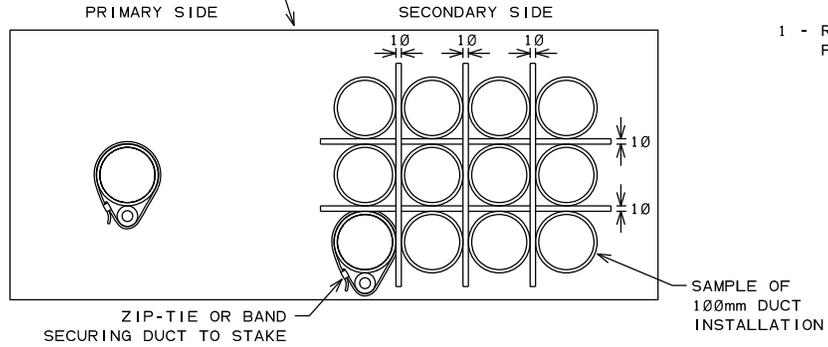
<b>1PH LOW PROFILE PADMOUNT TRANSFORMER GENERAL ARRANGEMENT</b>	
	Drawing Number 1226
Sheet 1 / 3	

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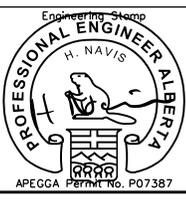
**FRONT VIEW**

**TOP VIEW OF TRANSFORMER CABLE ENTRANCE**



**MULTIPLE DUCT PLACEMENT**

**NOTE:**  
1 - REFER TO DRAWING 1303 FOR PLACEMENT OF EQUIPMENT



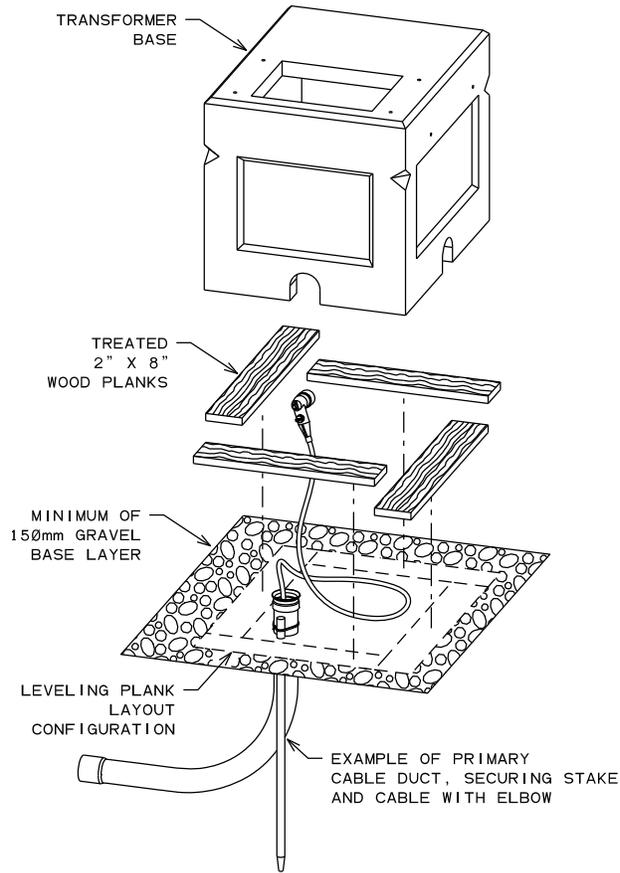
Description - UPDATED GROUNDS - ADDED BELL ENDS - REMOVED "OPTIONAL" TEXT FROM WOOD PLANK NOTE	Revision Date (YY/MM/DD) 20-01-27	Date Created (YY/MM/DD) 16-10-03
	REVISION Checked <i>AS</i>	ORIGINAL Design / Checked <i>AS</i>
	REVISION Approved <i>HN</i>	ORIGINAL Approved <i>HN</i>

**1PH LOW PROFILE PADMOUNT TRANSFORMER GENERAL ARRANGEMENT**

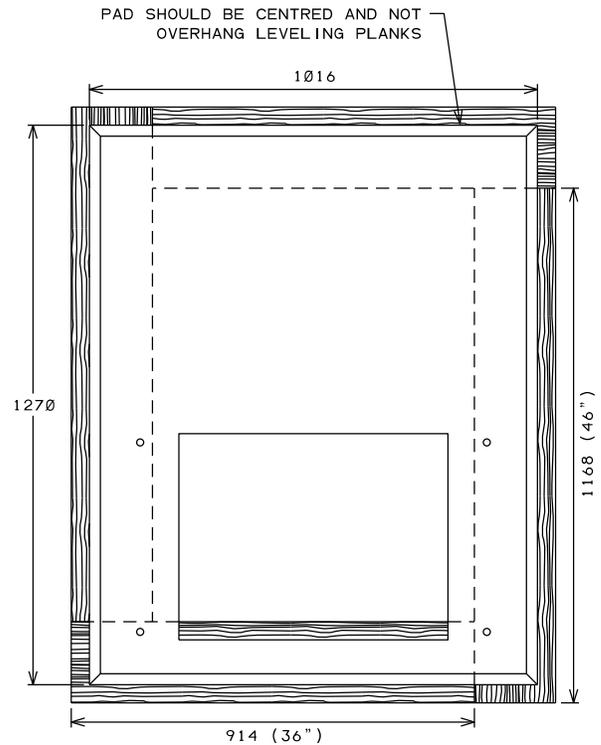


Drawing Number	Sheet
1226	2 / 3

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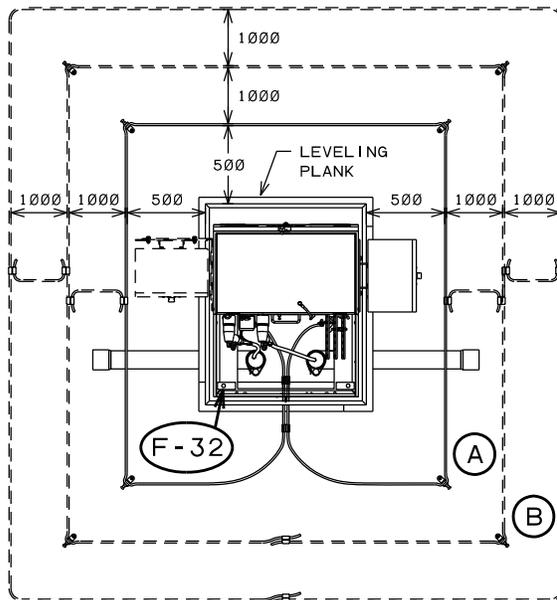
**LEVELING PLANK INSTALLATION DETAIL**



**LEVELING PLANK OVERVIEW DETAIL**

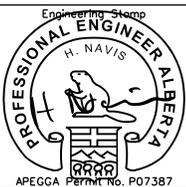
NOTE:

- 1 - GROUND REQUIREMENT (GRADIENT CONTROL) FOR 1 PHASE EQUIPMENT WITH A MULTI-GROUNDED NEUTRAL
- 2 - IF A MULTI-GROUNDED NEUTRAL SYSTEM IS NOT PRESENT INSTALL ADDITIONAL GRADIENT CONTROL CONDUCTOR BY RELOCATING THE GROUND RODS 1500mm FROM THE EQUIPMENT PAD AND INSTALLING AN ADDITIONAL TWO GRADIENT CONTROL LOOPS AROUND THE EQUIPMENT (FOR A TOTAL OF 3 LOOPS) AS SHOWN
- 3 - CABLE MAY BE IN DUCT UNDER BOX PAD
- 4 - NUMBER OF DUCTS IS LIMITED BY THE SIZE OF THE OPENING TO THE SECONDARY COMPARTMENT OF A TRANSFORMER. 50mm, 75mm, 100mm, AND 150mm DUCTS MAY BE INSTALLED. WHEN FORTISALBERTA INSTALLS A TRANSFORMER, EITHER 100mm OR 150mm DUCTS WILL BE INSTALLED
- 5 - CABLE LARGER THAN 750MCM MUST BE APPROVED BY FORTISALBERTA
- 6 - ALL SECONDARY CONNECTOR LUGS SHALL BE SUPPLIED BY CUSTOMER. LUGS SHALL BE ONE HOLE MECHANICAL, AL/CU LUG, FITTED FOR TRANSFORMER PAD AND CABLE SIZE BUT NOT LARGER THAN 40mm IN WIDTH
- 7 - NUMBER OF CABLES IS LIMITED TO 6 PER PHASE
- 8 - IF ARMoured CABLE IS USED, ARMoured JACKET MUST BE STRIPPED DOWN TO DUCT
- 9 - LUGS CONNECTED TO THE TRANSFORMER SECONDARY PAD SHALL BE MADE ON TAP HOLES ON THE PHASE TERMINALS MARKED X<sub>1</sub> AND X<sub>3</sub>, NEUTRAL LUGS SHALL BE CONNECTED TO THE BOTTOM TERMINAL MARKED X<sub>2</sub>
- 10 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES (INCHES)



(A) - SEE NOTE 1      (B) - SEE NOTE 2

**PLAN VIEW**



Description  
 - ADDED BELL ENDS TO DUCT  
 - REMOVED "OPTIONAL" TEXT FROM WOOD PLANK DETAILS

Revision Date (YY/MM/DD)  
 20-01-27

Date Created (YY/MM/DD)  
 16-10-03

REVISION Checked *AS* ORIGINAL Design / Checked *AS*

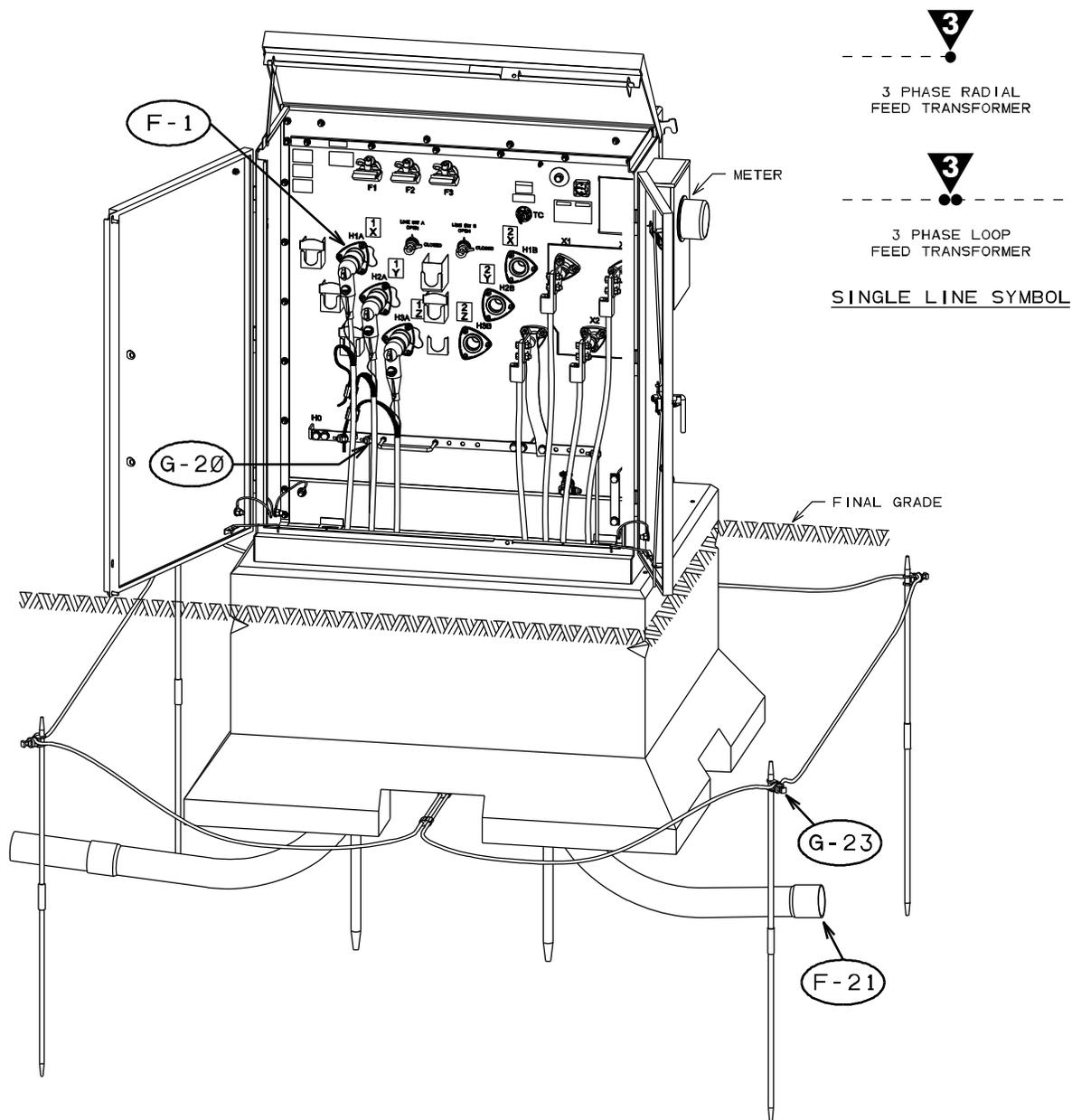
REVISION Approved *HN* ORIGINAL Approved *HN*

**1PH LOW PROFILE  
 PADMOUNT TRANSFORMER  
 GENERAL ARRANGEMENT**



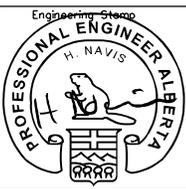
Drawing Number	Sheet
1226	3 / 3

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**NOTE:**

- 1 - FOR INSTALLATION OF ELBOW TERMINATOR, SEE DISTRIBUTION CONSTRUCTION AND OPERATIONS STANDARDS S30-02
- 2 - DE-ENERGISE TRANSFORMER BEFORE DISCONNECTING GROUND AT X0
- 3 - EQUIPMENT PADS ARE NOT TO BE PLACED ON SOILS THAT ARE IN CLASS 7 SOIL (WET, PEAT, ORGANICS) WITHOUT SPECIAL FOUNDATIONS BEING REQUIRED
- 4 - WHERE METALLIC GUARD POSTS, RAILS, OR SIMILAR BARRIERS ARE USED (FOR GUARD POST DIMENSIONS SEE DWG 1302) TO PROVIDE MECHANICAL PROTECTION FOR PADMOUNTED EQUIPMENT, GRADIENT CONTROL PROTECTION SHALL BE PROVIDED TO MAINTAIN SAFE TOUCH AND STEP POTENTIALS AS REQUIRED
- 5 - LEAVE 2m OF EACH CONDUCTOR TAIL FOR CONNECTION TO EQUIPMENT CASE
- 6 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES

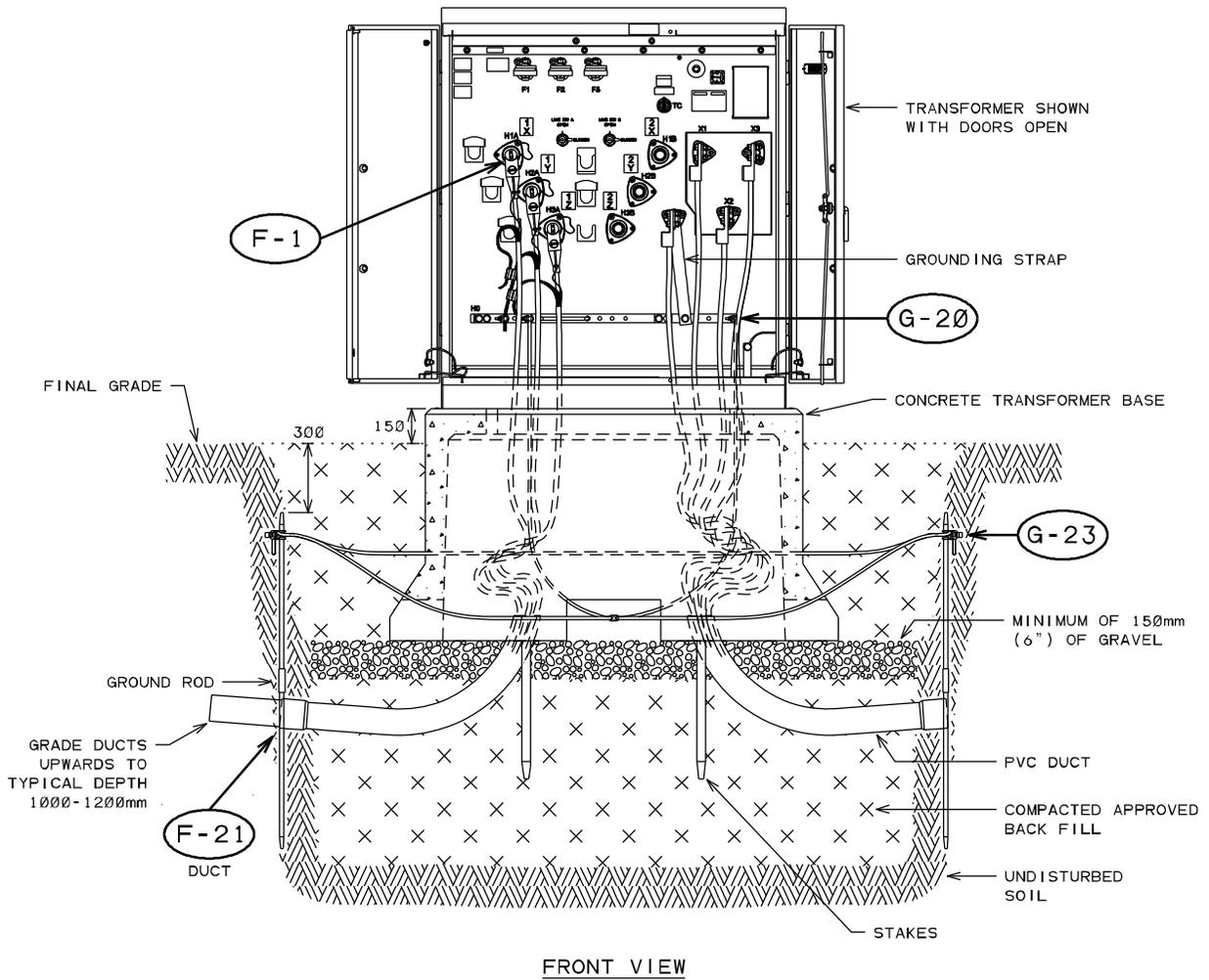


Description - CORRECTED DUCT PLACEMENT	Revision Date (YY/MM/DD) 17-12-07	Date Created (YY/MM/DD) 02-06-10
	REVISION Checked <i>NS</i>	ORIGINAL Design / Checked <i>NS</i>
	REVISION Approved <i>HN</i>	ORIGINAL Approved <i>NS</i>

**THREE PHASE  
PADMOUNT TRANSFORMER  
GENERAL ARRANGEMENT**

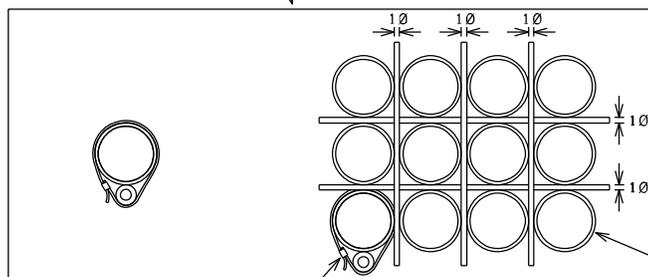
<b>FORTIS ALBERTA</b>	Drawing Number	Sheet
	1315	1 / 4

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FRONT VIEW

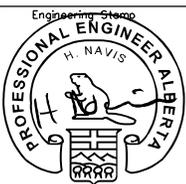
TOP VIEW OF TRANSFORMER CABLE ENTRANCE  
PRIMARY SIDE



MULTIPLE DUCT PLACEMENT

NOTE:

1 - REFER TO DRAWING 1303 FOR PLACEMENT OF EQUIPMENT



Description  
- CORRECTED DUCT PLACEMENT

Revision Date (YY/MM/DD)  
17-12-07

Date Created (YY/MM/DD)  
16-10-03

REVISION Checked *NS*

ORIGINAL Design / Checked *NS*

REVISION Approved *HN*

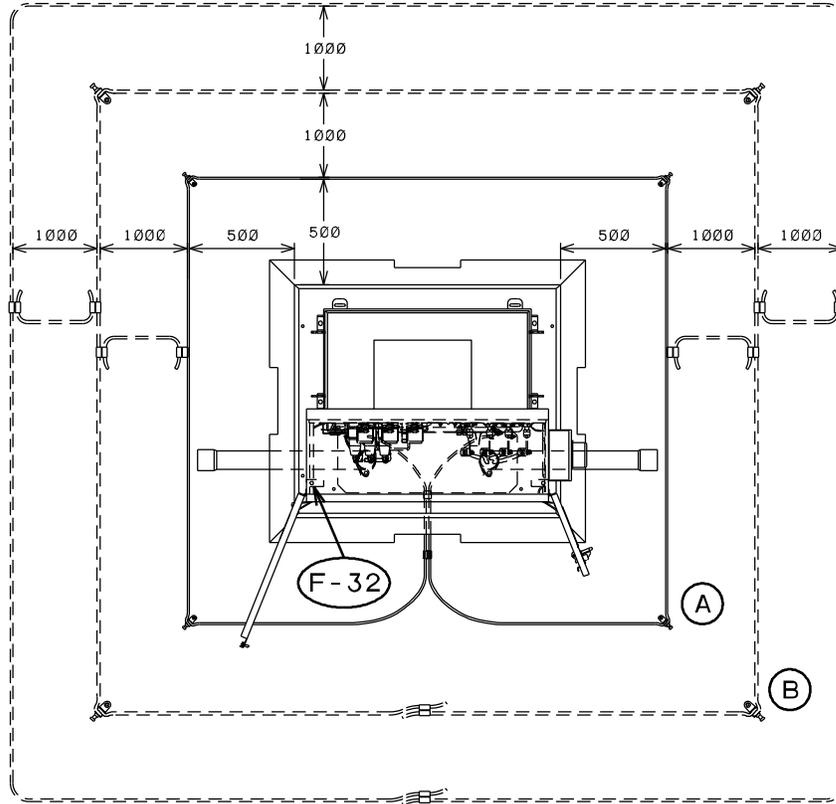
ORIGINAL Approved *HN*

THREE PHASE  
PADMOUNT TRANSFORMER



Drawing Number	Sheet
1315	2 / 4

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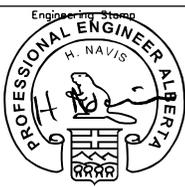


(A) = SEE NOTE 1      (B) = SEE NOTE 2

**PLAN VIEW**

**NOTE:**

- 1 - GROUNDING REQUIREMENT (GRADIENT CONTROL) FOR THREE PHASE EQUIPMENT WITH A MULTI-GROUNDED NEUTRAL
- 2 - IF A MULTI-GROUNDED NEUTRAL SYSTEM IS NOT PRESENT INSTALL ADDITIONAL GRADIENT CONTROL CONDUCTOR BY RELOCATING THE GROUND RODS TO 150mm FROM THE EQUIPMENT PAD AND INSTALLING AN ADDITIONAL TWO GRADIENT CONTROL LOOPS AROUND THE EQUIPMENT (FOR A TOTAL OF 3 LOOPS) AS SHOWN
- 3 - CABLE MAY BE IN DUCT UNDER BOX PAD
- 4 - NUMBER OF DUCTS IS LIMITED BY THE SIZE OF THE OPENING TO THE SECONDARY COMPARTMENT OF A TRANSFORMER. 50mm, 75mm, 100mm, AND 150mm DUCTS MAY BE INSTALLED. WHEN FORTISALBERTA INSTALLS A TRANSFORMER, EITHER 100mm OR 150mm DUCTS WILL BE INSTALLED
- 5 - CABLE LARGER THAN 75MCM MUST BE APPROVED BY FORTISALBERTA
- 6 - ALL SECONDARY CONNECTOR LUGS SHALL BE SUPPLIED BY CUSTOMER. LUGS SHALL BE ONE HOLE MECHANICAL, AL/CU LUG, FITTED FOR TRANSFORMER PAD AND CABLE SIZE BUT NOT LARGER THAN 40mm IN WIDTH
- 7 - NUMBER OF CABLES IS LIMITED TO 6 PER PHASE
- 8 - IF ARMoured CABLE IS USED, ARMoured JACKET MUST BE STRIPPED DOWN TO DUCT
- 9 - LUGS CONNECTION TO TRANSFORMER SECONDARY PAD SHALL BE MADE TO THE TERMINALS MARKED X<sub>1</sub>, X<sub>2</sub>, & X<sub>3</sub>, NEUTRAL LUGS SHALL BE CONNECTED TO THE TERMINAL MARKED X<sub>0</sub>
- 10 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES (INCHES)



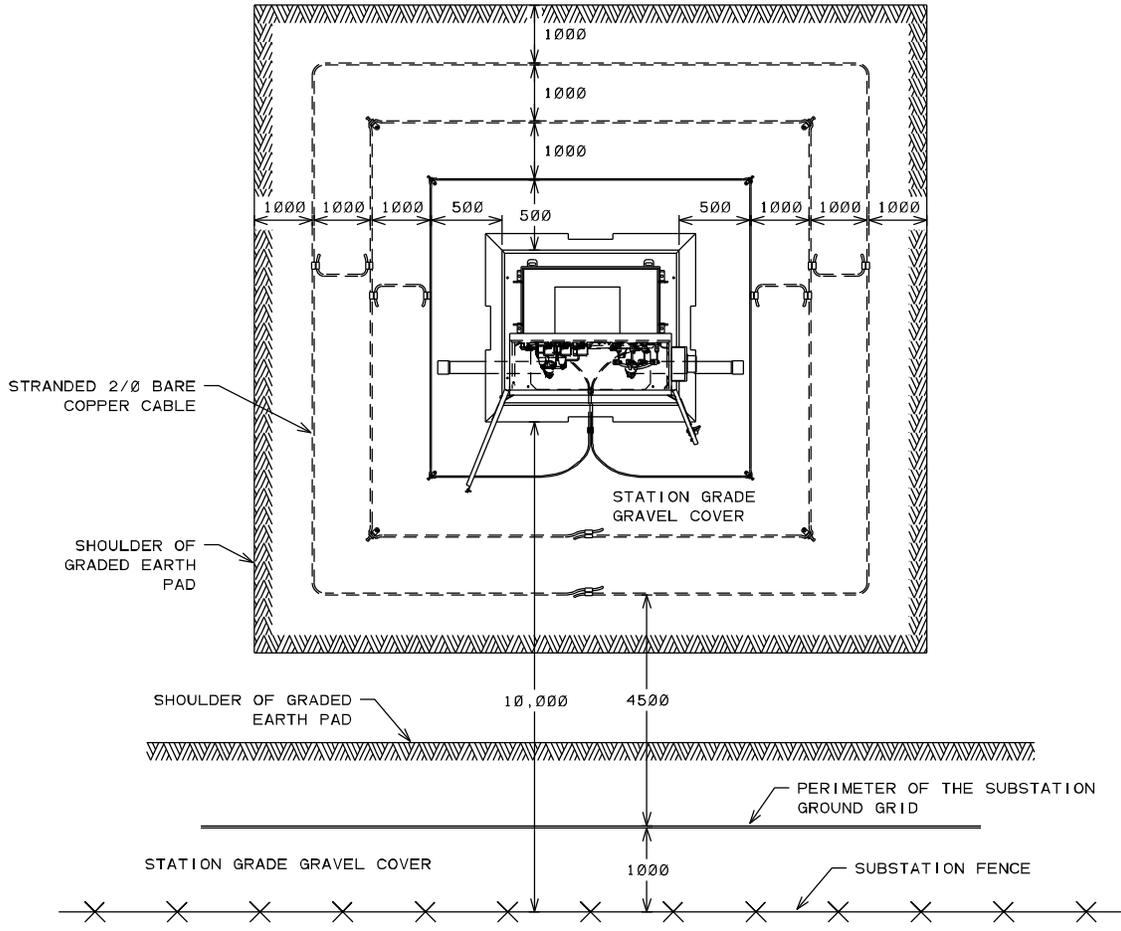
Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
		16-10-03
	REVISION Checked	ORIGINAL Design / Checked <i>(Signature)</i>
	REVISION Approved	ORIGINAL Approved <i>HN</i>

**THREE PHASE PADMOUNT TRANSFORMER**

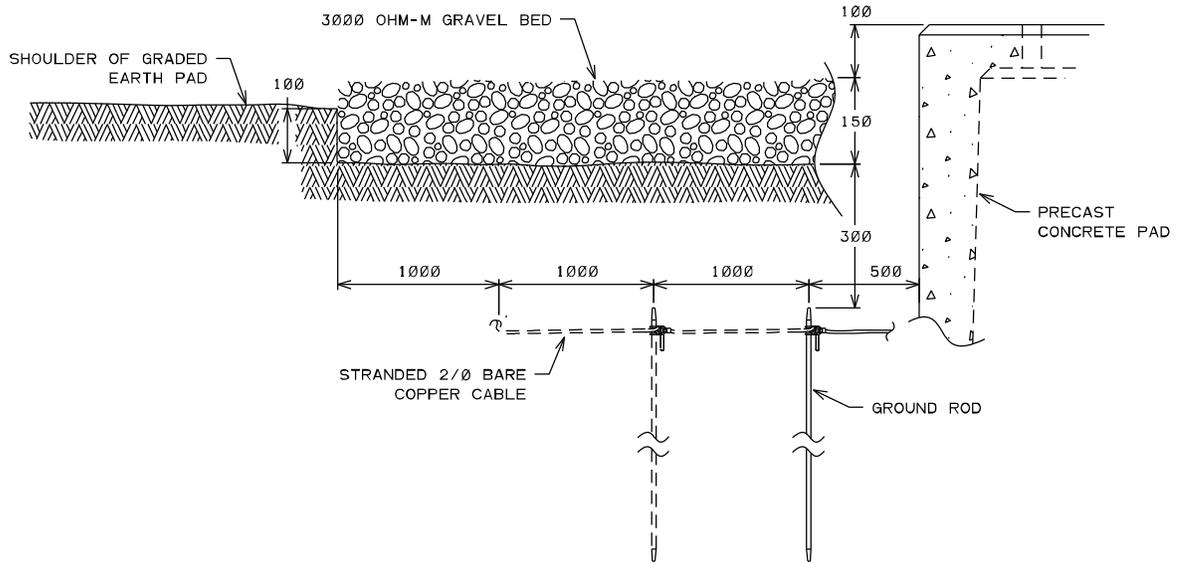


Drawing Number	Sheet
1315	3 / 4

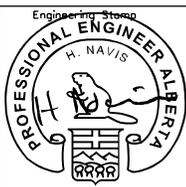
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STATION SERVICE PLAN VIEW



STATION SERVICE SIDE VIEW



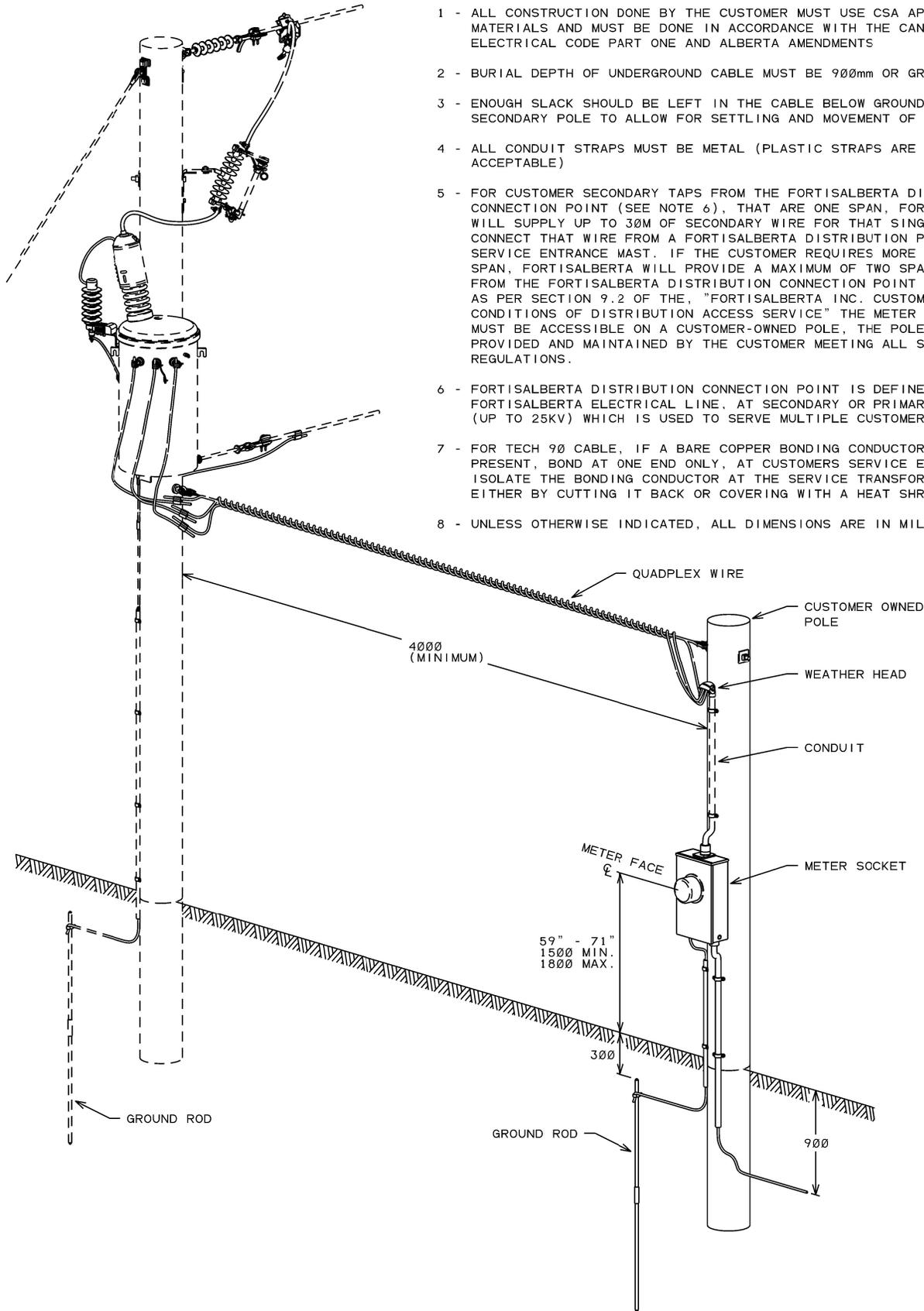
Engineering Stamp	Description
PROFESSIONAL ENGINEER ALBERTA H. NAVIS	

Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
	16-10-03
REVISION Checked	ORIGINAL Design / Checked <i>NS</i>
REVISION Approved	ORIGINAL Approved <i>HN</i>

**STATION SERVICE TRANSFORMER GENERAL ARRANGEMENT**

<b>FORTIS ALBERTA</b>	Drawing Number	Sheet
	1315	4 / 4

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NOTE:

- 1 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUST BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART ONE AND ALBERTA AMENDMENTS
- 2 - BURIAL DEPTH OF UNDERGROUND CABLE MUST BE 900mm OR GREATER
- 3 - ENOUGH SLACK SHOULD BE LEFT IN THE CABLE BELOW GROUND AT THE SECONDARY POLE TO ALLOW FOR SETTLING AND MOVEMENT OF THE EARTH
- 4 - ALL CONDUIT STRAPS MUST BE METAL (PLASTIC STRAPS ARE NOT ACCEPTABLE)
- 5 - FOR CUSTOMER SECONDARY TAPS FROM THE FORTISALBERTA DISTRIBUTION CONNECTION POINT (SEE NOTE 6), THAT ARE ONE SPAN, FORTISALBERTA WILL SUPPLY UP TO 30M OF SECONDARY WIRE FOR THAT SINGLE SPAN AND CONNECT THAT WIRE FROM A FORTISALBERTA DISTRIBUTION POLE TO THE SERVICE ENTRANCE MAST. IF THE CUSTOMER REQUIRES MORE THAN ONE SPAN, FORTISALBERTA WILL PROVIDE A MAXIMUM OF TWO SPANS (60M) FROM THE FORTISALBERTA DISTRIBUTION CONNECTION POINT (SEE NOTE 6). AS PER SECTION 9.2 OF THE, "FORTISALBERTA INC. CUSTOMER TERMS AND CONDITIONS OF DISTRIBUTION ACCESS SERVICE" THE METER LOCATIONS MUST BE ACCESSIBLE ON A CUSTOMER-OWNED POLE, THE POLE SHALL BE PROVIDED AND MAINTAINED BY THE CUSTOMER MEETING ALL STANDARDS AND REGULATIONS.
- 6 - FORTISALBERTA DISTRIBUTION CONNECTION POINT IS DEFINED AS THE FORTISALBERTA ELECTRICAL LINE, AT SECONDARY OR PRIMARY VOLTAGE (UP TO 25KV) WHICH IS USED TO SERVE MULTIPLE CUSTOMERS.
- 7 - FOR TECH 90 CABLE, IF A BARE COPPER BONDING CONDUCTOR IS PRESENT, BOND AT ONE END ONLY, AT CUSTOMERS SERVICE ENTRANCE. ISOLATE THE BONDING CONDUCTOR AT THE SERVICE TRANSFORMER END EITHER BY CUTTING IT BACK OR COVERING WITH A HEAT SHRINK TUBE
- 8 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES

Engineering Stamp

NO  
STAMP  
NEEDED

Description

- CHANGED MINIMUM DISTANCE TO CUSTOMER OWNED POLE
- UPDATED TECH 90 CABLE NOTE

Revision Date (YY/MM/DD)

20-06-03

Date Created (YY/MM/DD)

07-08-02

REVISION Checked *KJS*

ORIGINAL Design / Checked *KJS*

REVISION Approved *HN*

ORIGINAL Approved *KS*

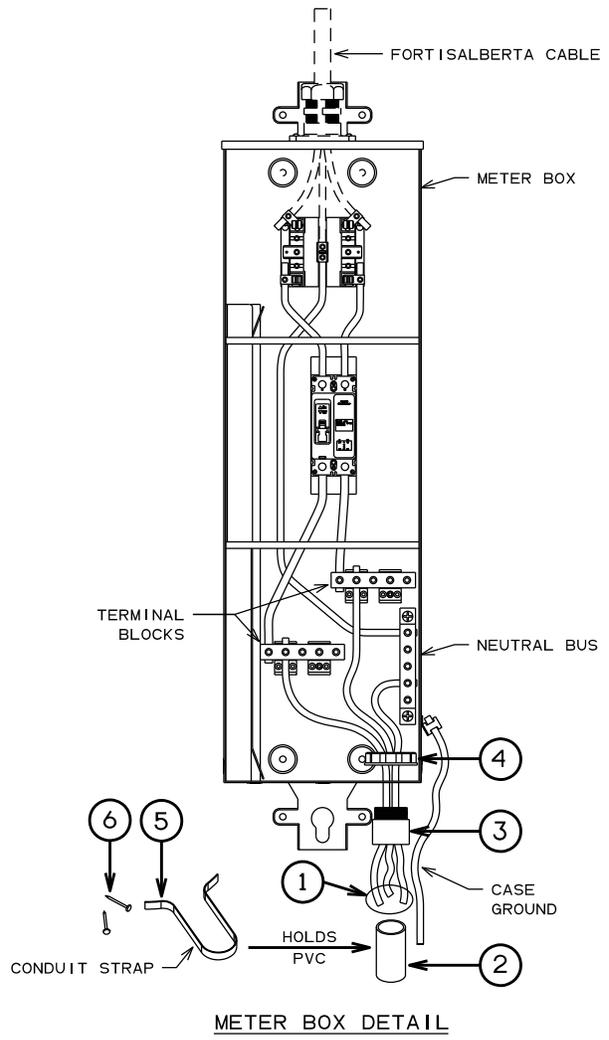
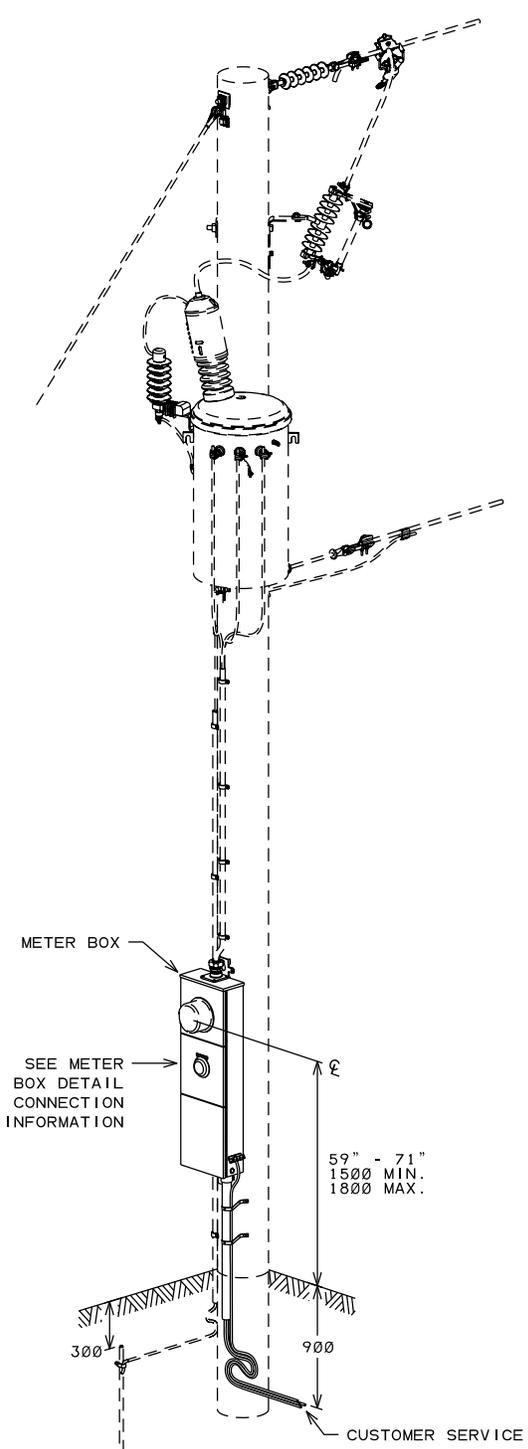
CUSTOMER OWNED POLE MOUNT TO UNDERGROUND SERVICE

**FORTISALBERTA**

Drawing Number  
SMG 4.1

Sheet  
1 / 1

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**BILL OF MATERIAL  
(CUSTOMER INSTALLED)**

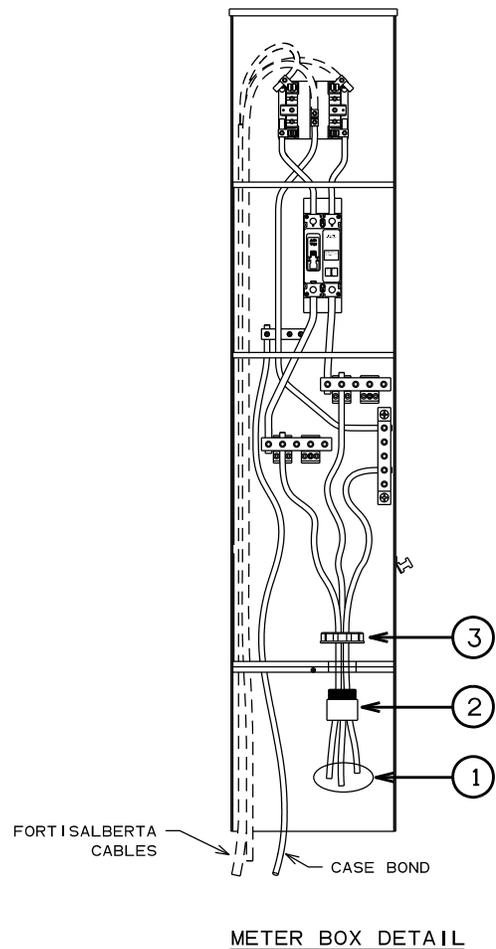
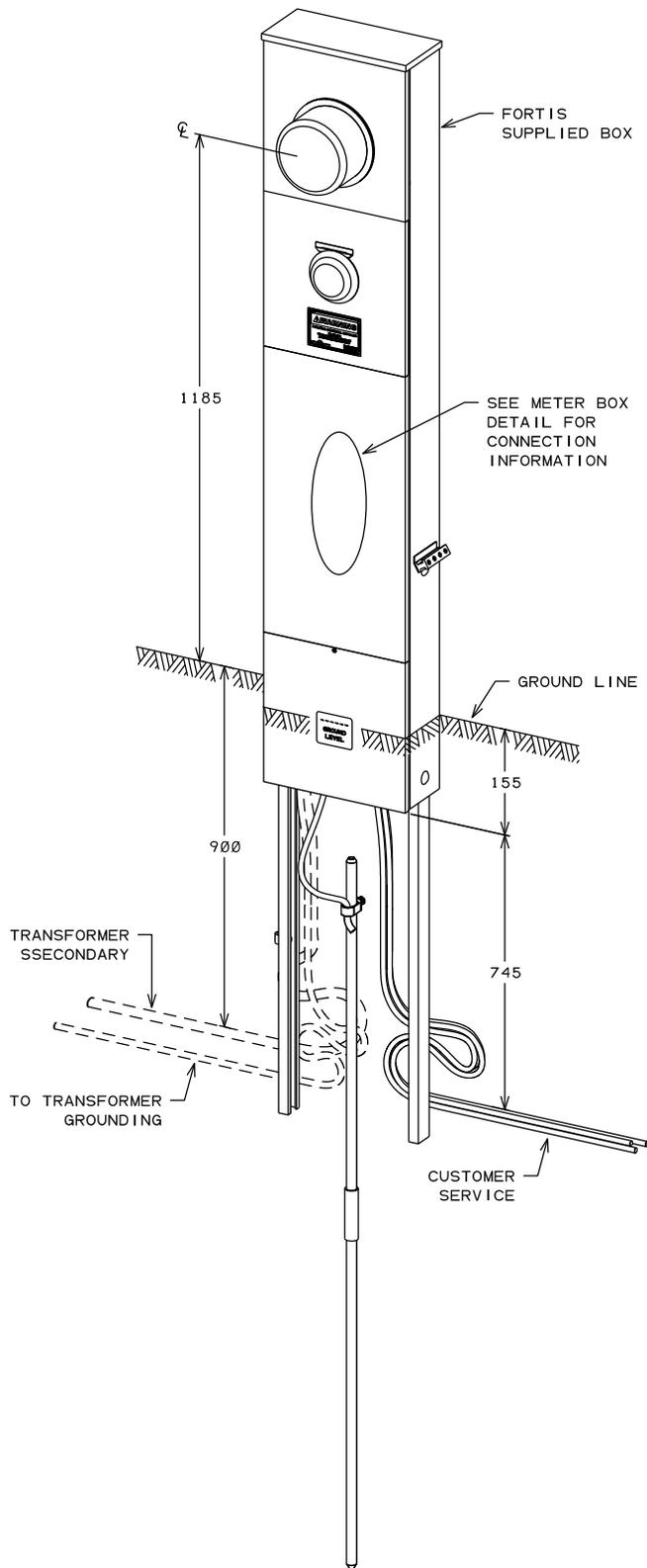
PART #	QUANTITY	DESCRIPTION
1	--	UNDERGROUND CABLE, TYPE USEB OR EQUIVALENT
2	1.5m	RIGID PVC PIPE
3	1	MALE ADAPTER
4	1	LOCK NUT
5	2	METAL PIPE STRAP FOR CONDUIT
6	4	NAILS, 3 1/2" COMMON

**NOTE:**

- 1 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUSTBE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART ONE AND ALBERTA AMENDMENTS
- 2 - BURIAL DEPTH OF UNDERGROUND CABLE MUST BE 900mm OR GREATER
- 3 - ENOUGH SLACK SHOULD BE LEFT IN THE CABLE BELOW GROUND AT THE TRANSFORMER POLE TO ALLOW FOR SETTLING AND MOVEMENT OF THE EARTH
- 4 - ALL CONDUIT STRAPS MUST BE METAL (PLASTIC STRAPS ARE NOT ACCEPTABLE)
- 5 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES.

<p style="font-size: 2em; font-weight: bold; transform: rotate(-45deg);">NO STAMP NEEDED</p> <p style="font-size: 0.8em;">APEGGA Permit No. P07387</p>	<p>Engineering Stamp</p> <p>Description</p> <ul style="list-style-type: none"> <li>- UPDATED GROUND</li> <li>- CHANGED DRAWING TITLE</li> </ul>	<p>Revision Date (YY/MM/DD)</p> <p>20-02-06</p>	<p>Date Created (YY/MM/DD)</p> <p>07-08-02</p>	<p style="font-size: 1.2em; font-weight: bold;">SINGLE PHASE RURAL UNDERGROUND SERVICE</p>	
		<p>REVISION Checked <i>NS</i></p>	<p>ORIGINAL Design / Checked <i>NS</i></p>		
		<p>REVISION Approved <i>HN</i></p>	<p>ORIGINAL Approved <i>JS</i></p>	<p style="font-size: 1.5em; font-weight: bold;">FORTISALBERTA</p>	
				<p>Drawing Number</p> <p style="font-size: 1.2em; font-weight: bold;">SMG 5.2</p>	<p>Sheet</p> <p style="font-size: 1.2em; font-weight: bold;">1 / 1</p>

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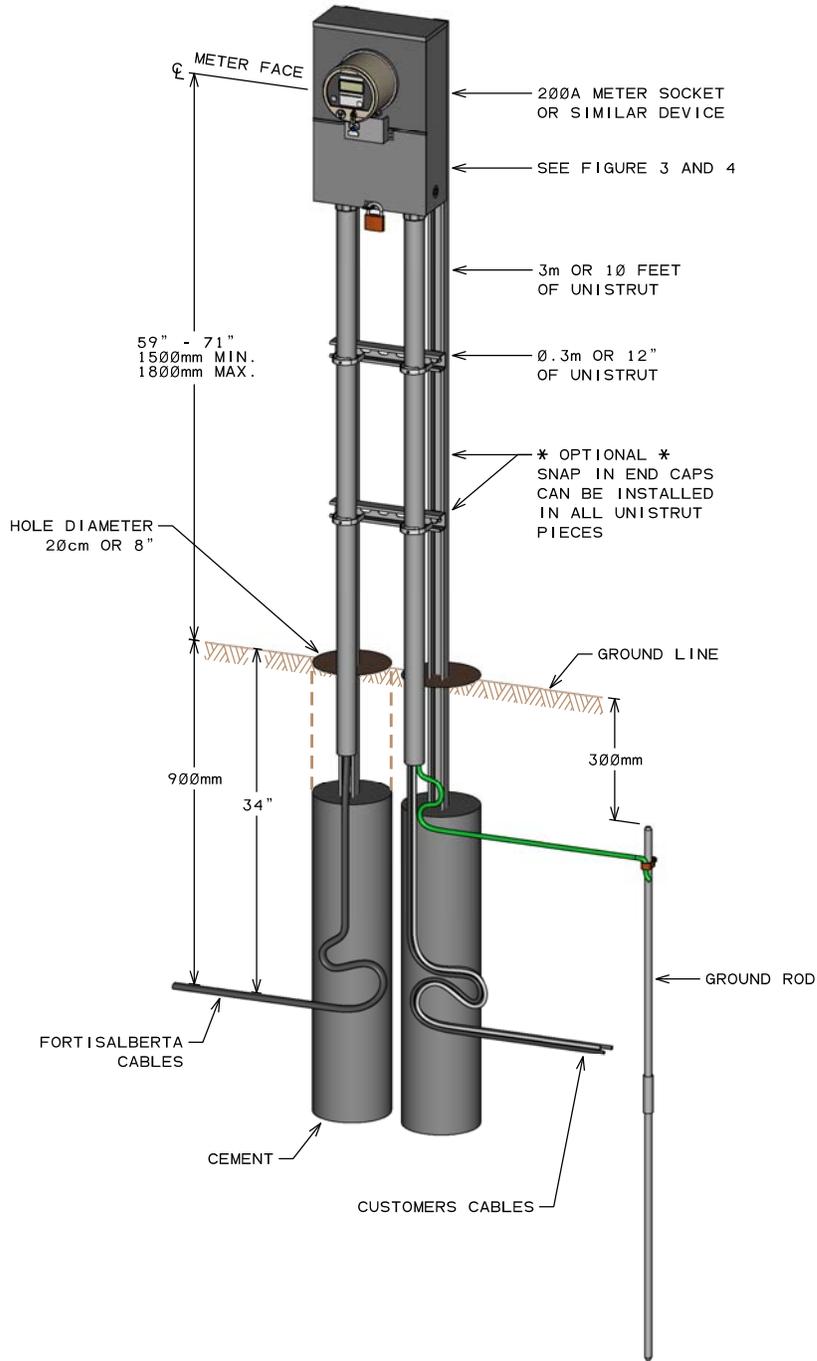


- NOTE:
- 1 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUST BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART ONE AND ALBERTA AMENDMENTS
  - 2 - CUSTOMER TO INSTALL A SEPERATE GROUND AT THERE SERVICE BOX
  - 3 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES

BILL OF MATERIAL (CUSTOMER INSTALLED)		
PART #	QUANTITY	DESCRIPTION
1	--	UNDERGROUND CABLE, TYPE USEB OR EQUIVALENT
2	1	NON -WATERTIGHT CONNECTOR
3	1	LOCK NUT

<p style="font-size: 2em; font-weight: bold;">NO STAMP NEEDED</p>	<p>Engineering Stamp</p> <p>Description</p> <ul style="list-style-type: none"> <li>- REMOVED REQUIREMENT FOR CUSTOMER SEPERATE GROUND/BOND CONDUCTOR</li> <li>- CUSTOMER IS REQUIRED TO BOND/GROUND AT THEIR SERVICE BOX</li> <li>- ADDED ARC FLASH WARNING DECAL</li> <li>- ADDED GROUND ROD</li> </ul>	<p>Revision Date (YY/MM/DD)</p> <p>20-01-27</p>	<p>Date Created (YY/MM/DD)</p> <p>15-11-12</p>	<p style="font-size: 1.5em; font-weight: bold;">SINGLE PHASE METERING PEDESTAL</p>		
	<p>REVISION Checked <i>NS</i></p>	<p>ORIGINAL Design / Checked <i>NS</i></p>				
	<p>REVISION Approved <i>Jed</i></p>	<p>ORIGINAL Approved <i>KN</i></p>				
<p>APEGGA Permit No. P07387</p>				<p style="font-size: 1.5em; font-weight: bold;">FORTIS ALBERTA</p>	<p>Drawing Number</p> <p style="font-size: 1.2em; font-weight: bold;">SMG 2.1</p>	<p>Sheet</p> <p style="font-size: 1.2em; font-weight: bold;">1 / 3</p>

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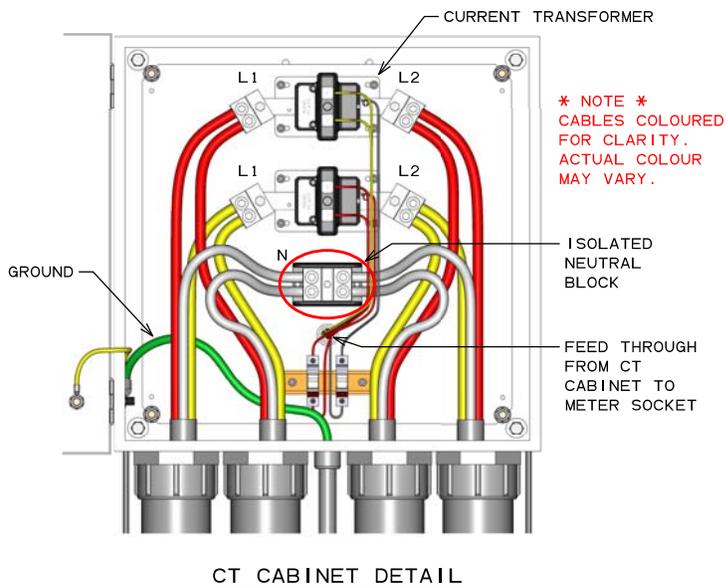
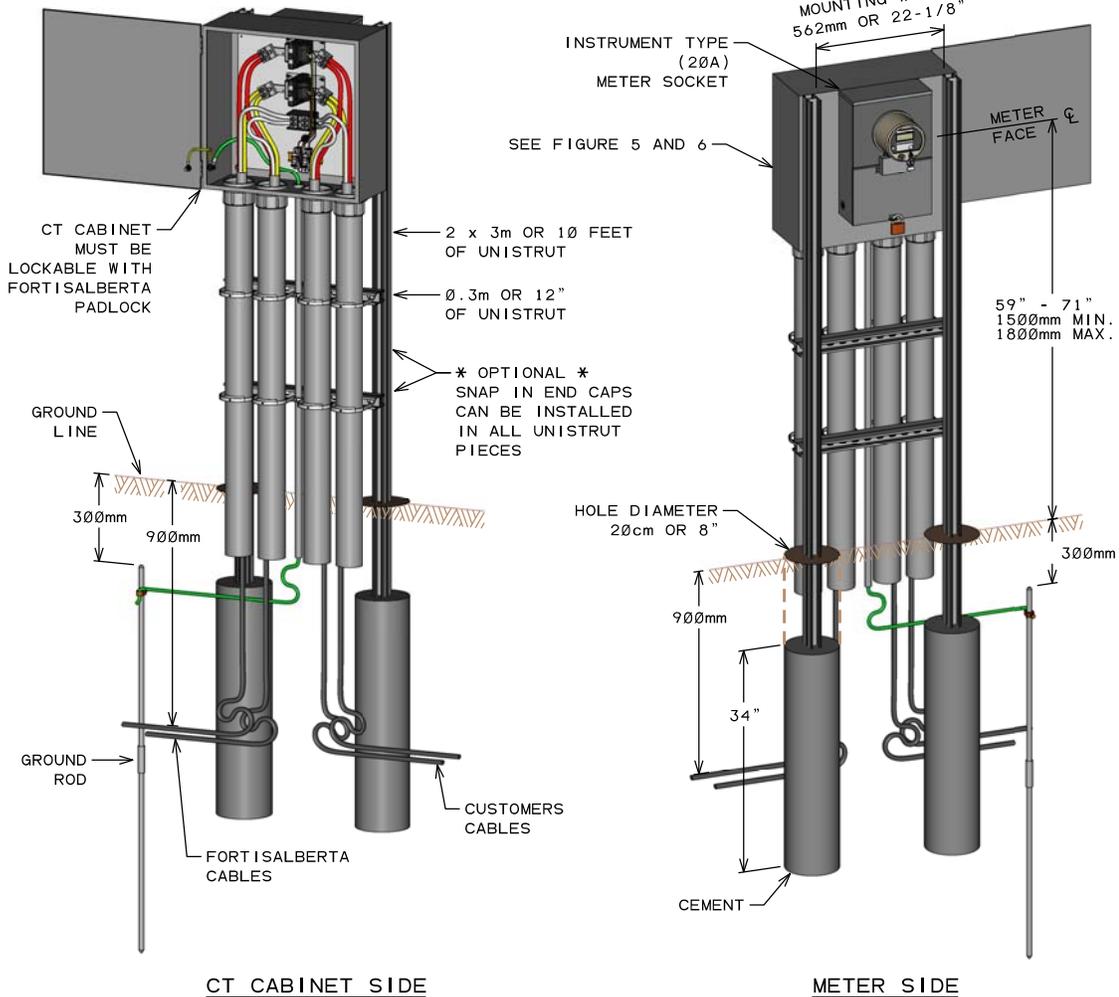


**LOT LINE METERING**

- THE METER MUST BE INSTALLED ON A PEDESTAL 1.5m INSIDE FRONT PROPERTY LINE
- CONDUCTOR REQUIREMENTS WILL DICTATE WHICH 200AMP SOCKET IS REQUIRED

<p style="font-size: 2em; font-weight: bold; transform: rotate(-45deg);">NO STAMP NEEDED</p> <p style="font-size: 0.8em;">APEGGA Permit No. P07387</p>	<p>Engineering Stamp</p> <p>Description</p> <ul style="list-style-type: none"> <li>- ADDED REFERENCE TO FIGURES 3 AND 4</li> <li>- UPDATED GROUND</li> </ul>	<p>Revision Date (YY/MM/DD)</p> <p>20-01-27</p>	<p>Date Created (YY/MM/DD)</p> <p>15-11-12</p>	<p style="font-size: 1.2em; font-weight: bold;">LOT LINE METERING (SELF CONTAINED 200A)</p>			
		<p>REVISION Checked <i>NS</i></p>	<p>ORIGINAL Design / Checked <i>NS</i></p>				
		<p>REVISION Approved <i>Jed</i></p>	<p>ORIGINAL Approved <i>KN</i></p>				
		<p><b>FORTISALBERTA</b></p>		<p>Drawing Number</p> <p style="font-size: 1.2em; font-weight: bold;">SMG 2.1</p>	<p>Sheet</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 20px;">2</td> <td style="width: 20px;">3</td> </tr> </table>	2	3
2	3						

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**\* NOTE \***  
**CABLES COLOURED FOR CLARITY. ACTUAL COLOUR MAY VARY.**

**LOT LINE METERING - INSTRUMENT TYPE (400AMP TO 600AMP MAX)**

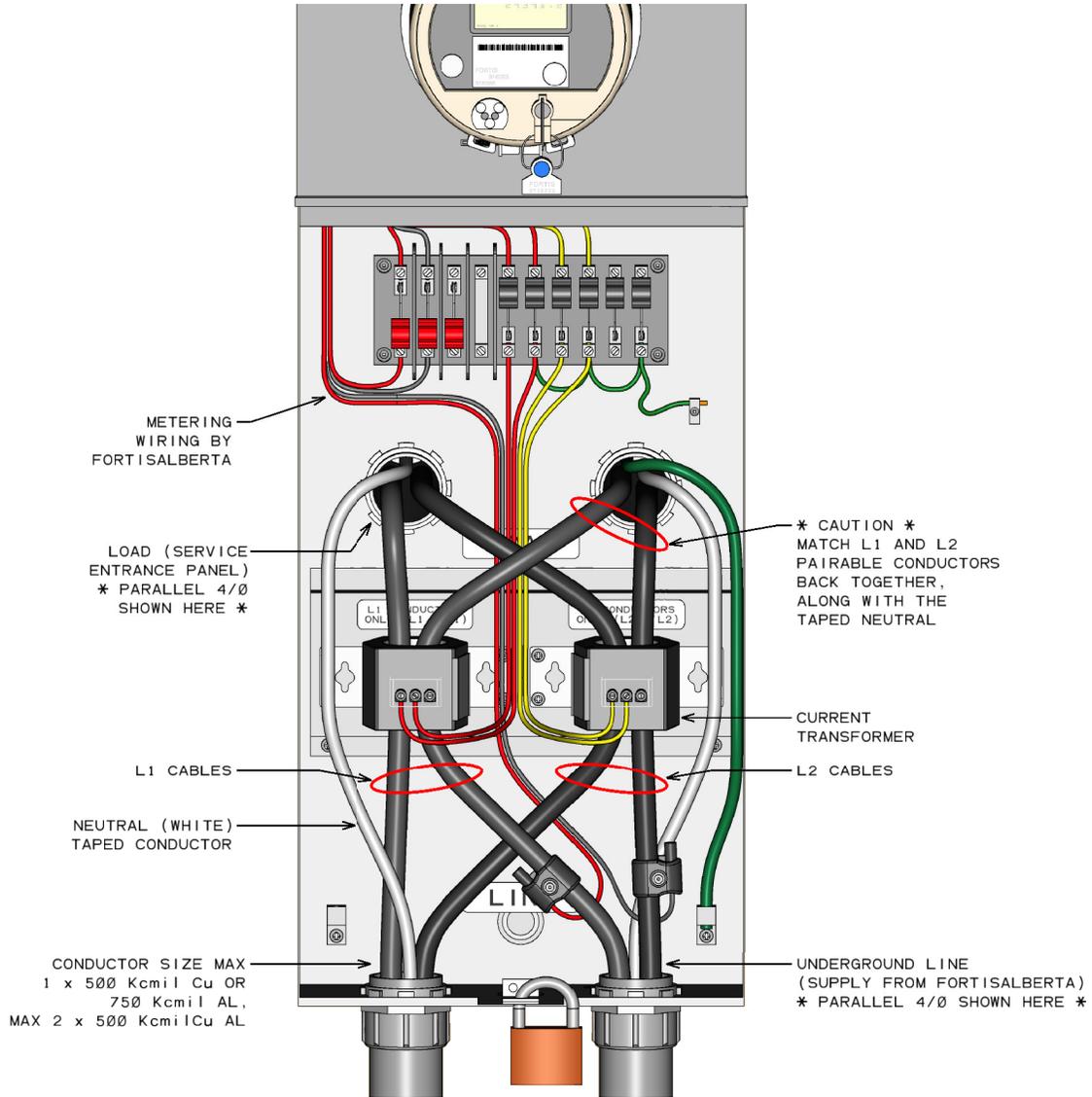
- THE METER MUST BE INSTALLED ON A PEDESTAL 1.5m INSIDE FRONT PROPERTY LINE
- SINGLE OR PARALLEL CONDUCTORS PERMITTED
- GROUND ROD OR PLATE IS REQUIRED FOR THIS STRUCTURE (DO NOT GROUND NEUTRAL HERE)

<p><b>NO STAMP NEEDED</b></p> <p>APEGGA Permit No. P07387</p>	<p>Engineering Stamp</p> <p>Description</p> <ul style="list-style-type: none"> <li>- ADDED REFERENCE TO FIGURE 5 AND 6</li> <li>- UPDATED GROUND</li> </ul>	<p>Revision Date (YY/MM/DD)</p> <p>20-01-27</p>	<p>Date Created (YY/MM/DD)</p> <p>15-11-12</p>	<p><b>LOT LINE METERING (INSTRUMENT TYPE 400A OR 600A)</b></p>	
	<p>REVISION Checked <i>NS</i></p>	<p>ORIGINAL Design / Checked <i>Jep</i></p>			
	<p>REVISION Approved <i>Jep</i></p>	<p>ORIGINAL Approved <i>KN</i></p>	<p><b>FORTIS ALBERTA</b></p>		<p>Drawing Number</p> <p>SMG 2.1</p>

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**OUTDOOR INSTRUMENT TYPE**

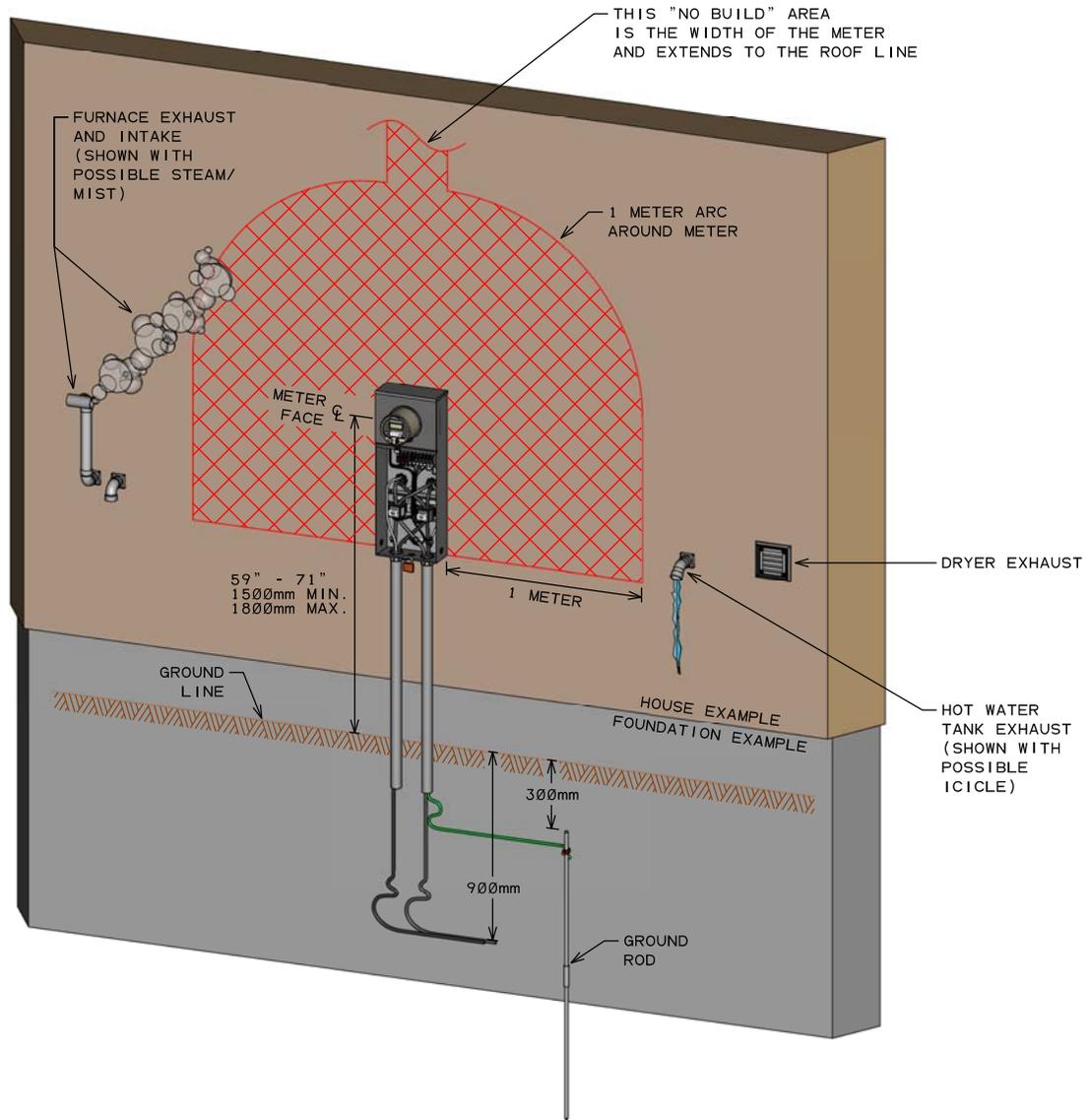
- DESIGNED FOR RESIDENTIAL USE WHERE MAIN BREAKER IS LOCATED INDOORS AND 7m (OR LESS) AWAY
- DESIGNED FOR CONDUCTOR SIZE MAXIMUM OF 1 x 750Kcmil AL OR 2 x 4/0
- USEB CABLE MUST BE SPLIT TO PASS THROUGH CT'S AND PAIRED BACK TOGETHER IN OUTGOING RACEWAY
- CASE MUST BE GROUNDED



**METER DETAIL**

<p><b>NO STAMP NEEDED</b></p>	<p><b>Engineering Stamp</b></p>	<p><b>Description</b></p> <ul style="list-style-type: none"> <li>- ADDED CABLE NOTE</li> <li>- FIXED SPELLING MISTAKE</li> </ul>	<p><b>Revision Date (YY/MM/DD)</b></p> <p>15-12-09</p>	<p><b>Date Created (YY/MM/DD)</b></p> <p>15-11-12</p>	<p><b>OUTDOOR INSTRUMENT TYPE 1 PHASE, 3 WIRE, 400A</b></p>
			<p><b>REVISION Checked</b> <i>JS</i></p>	<p><b>ORIGINAL Design / Checked</b> <i>JS</i></p>	
			<p><b>REVISION Approved</b> <i>HN</i></p>	<p><b>ORIGINAL Approved</b> <i>KN</i></p>	
<p><b>FORTIS ALBERTA</b></p>		<p><b>Drawing Number</b></p> <p>SMG 2.16.4</p>	<p><b>Sheet</b></p> <p>1 / 2</p>		

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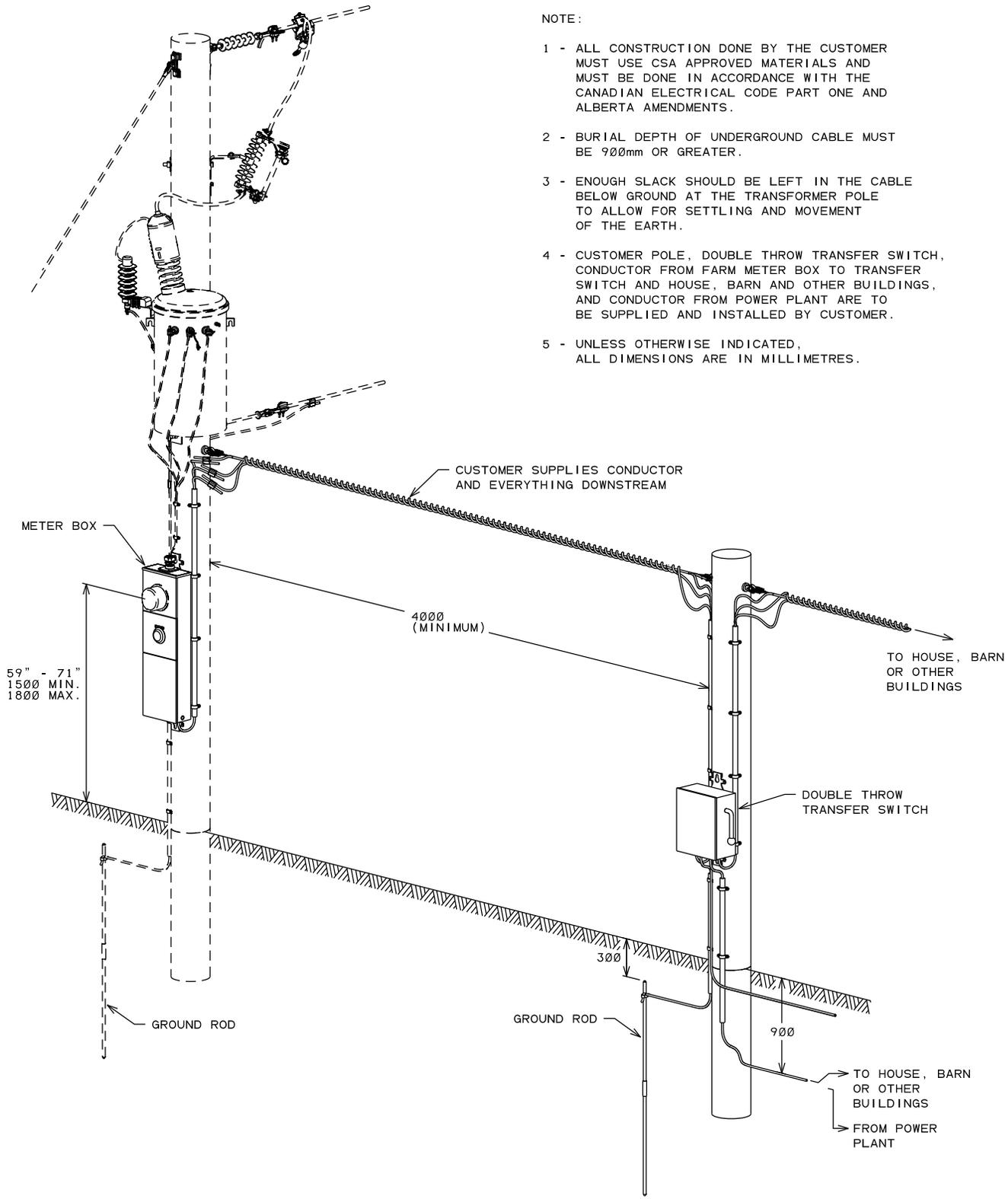
**OUTDOOR INSTRUMENT TYPE ISOMETRIC VIEW**

**NOTE:**

- "NO BUILD" ZONE EXTENDS 1m AROUND SIDES OF THE METER ENCLOSURE
- \* SPECIAL NOTE \*
- IT ALSO EXTENDS UPWARDS (THE WIDTH OF THE METERING BOX) ABOVE THE METER TO THE ROOF LINE. THIS IS TO PREVENT WATER "DRIPPING" ONTO THE METER
- ANY VAPOUR PRODUCING OUTLETS (MOST COMMON TYPES ARE SHOWN IN THE PICTURE ABOVE) HAVE TO BE LOCATED OUTSIDE OF THE "NO BUILD" ZONE. THIS IS TO PREVENT ANY MOISTURE OR CONDENSATION FROM FORMING AND/OR DEVELOPING INSIDE OR ON THE METER ENCLOSURE

<p><b>NO STAMP NEEDED</b></p> <p>APEGGA Permit No. P07387</p>	<p>Engineering Stamp</p> <p>Description</p> <ul style="list-style-type: none"> <li>- UPDATED GROUND</li> <li>- REMOVED EXTRA GROUND CABLE</li> </ul>	<p>Revision Date (YY/MM/DD)</p> <p>20-01-27</p>	<p>Date Created (YY/MM/DD)</p> <p>15-11-12</p>	<p><b>OUTDOOR INSTRUMENT TYPE</b></p> <p><b>1 PHASE, 3 WIRE, 400A</b></p>	
		<p>REVISION Checked <i>NS</i></p>	<p>ORIGINAL Design / Checked <i>NS</i></p>		
		<p>REVISION Approved <i>HN</i></p>	<p>ORIGINAL Approved <i>KN</i></p>		
		<p><b>FORTIS ALBERTA</b></p>		<p>Drawing Number</p> <p>SMG 2.16.4</p>	<p>Sheet</p> <p>2 / 2</p>

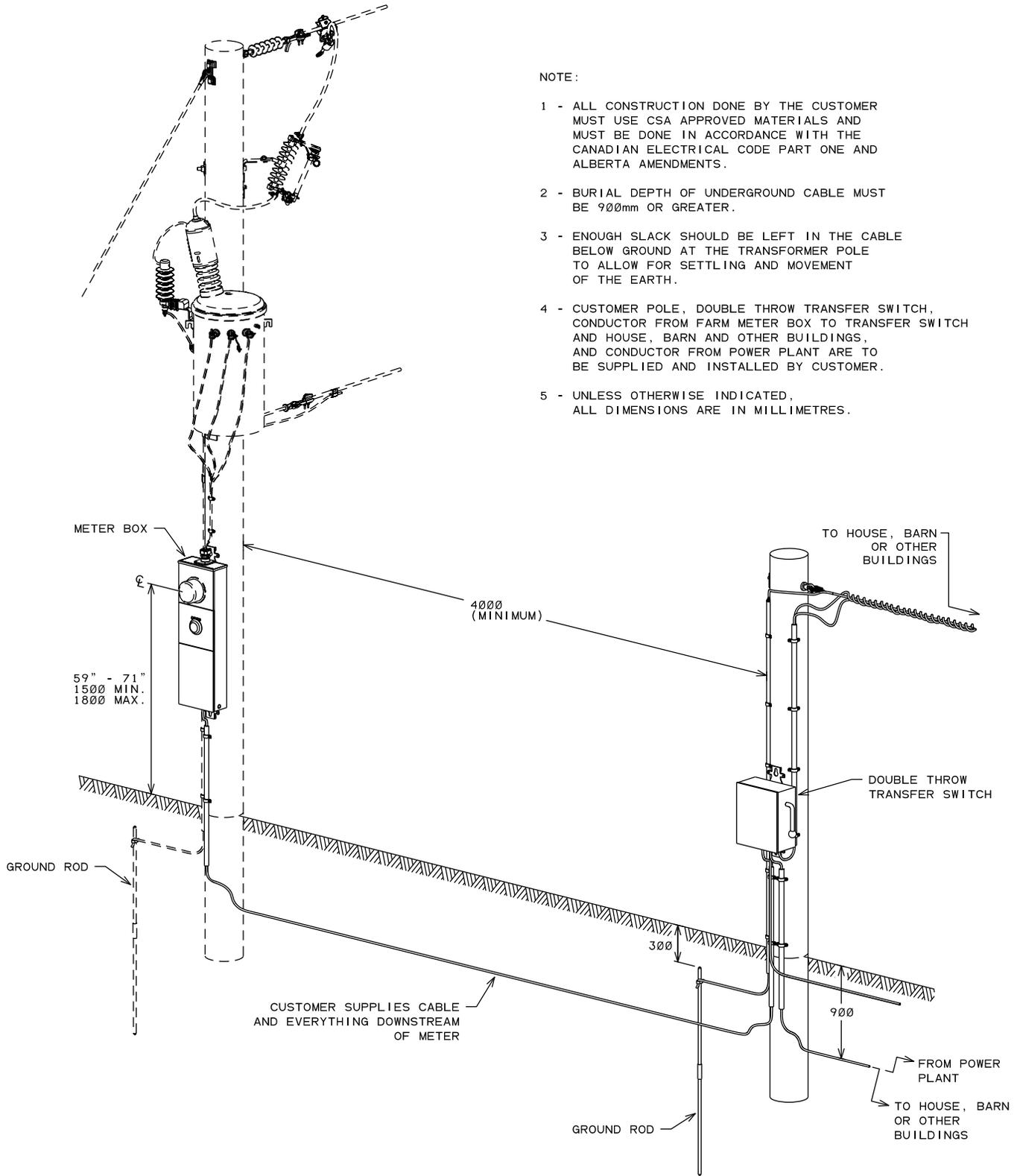
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- NOTE:
- 1 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUST BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART ONE AND ALBERTA AMENDMENTS.
  - 2 - BURIAL DEPTH OF UNDERGROUND CABLE MUST BE 900mm OR GREATER.
  - 3 - ENOUGH SLACK SHOULD BE LEFT IN THE CABLE BELOW GROUND AT THE TRANSFORMER POLE TO ALLOW FOR SETTTLING AND MOVEMENT OF THE EARTH.
  - 4 - CUSTOMER POLE, DOUBLE THROW TRANSFER SWITCH, CONDUCTOR FROM FARM METER BOX TO TRANSFER SWITCH AND HOUSE, BARN AND OTHER BUILDINGS, AND CONDUCTOR FROM POWER PLANT ARE TO BE SUPPLIED AND INSTALLED BY CUSTOMER.
  - 5 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES.

<p><b>NO STAMP NEEDED</b></p> <p>APEGGA Permit No. P07387</p>	<p>Engineering Stamp</p> <p>Description</p> <ul style="list-style-type: none"> <li>- CHANGED MIN SEPARATION BETWEEN XMER POLE AND METER FROM 5 TO 4m</li> <li>- UPDATED GROUND</li> </ul>	<p>Revision Date (YY/MM/DD)</p> <p>20-02-07</p>	<p>Date Created (YY/MM/DD)</p> <p>07-08-02</p>	<p><b>SINGLE PHASE STANDBY OVERHEAD SERVICE</b></p>		
	<p>REVISION Checked <i>AS</i></p>	<p>ORIGINAL Design / Checked <i>AS</i></p>				
	<p>REVISION Approved <i>HN</i></p>	<p>ORIGINAL Approved <i>AS</i></p>	<p><b>FORTIS ALBERTA</b></p>		<p>Drawing Number</p> <p>SMG 6.0.1</p>	<p>Sheet</p> <p>1 / 1</p>

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NOTE:

- 1 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUST BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART ONE AND ALBERTA AMENDMENTS.
- 2 - BURIAL DEPTH OF UNDERGROUND CABLE MUST BE 900mm OR GREATER.
- 3 - ENOUGH SLACK SHOULD BE LEFT IN THE CABLE BELOW GROUND AT THE TRANSFORMER POLE TO ALLOW FOR SETTLING AND MOVEMENT OF THE EARTH.
- 4 - CUSTOMER POLE, DOUBLE THROW TRANSFER SWITCH, CONDUCTOR FROM FARM METER BOX TO TRANSFER SWITCH AND HOUSE, BARN AND OTHER BUILDINGS, AND CONDUCTOR FROM POWER PLANT ARE TO BE SUPPLIED AND INSTALLED BY CUSTOMER.
- 5 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES.

Engineering Stamp

NO  
STAMP  
NEEDED

Description

- CHANGED MIN SEPARATION BETWEEN XMER POLE AND METER FROM 5 TO 4m
- UPDATED GROUND DIMENSION

Revision Date (YY/MM/DD)  
20-02-07

Date Created (YY/MM/DD)  
07-08-02

REVISION Checked *AS*

ORIGINAL Design / Checked *AS*

REVISION Approved *HN*

ORIGINAL Approved *AS*

SINGLE PHASE  
STANDBY UNDERGROUND SERVICE

FORTIS  
ALBERTA

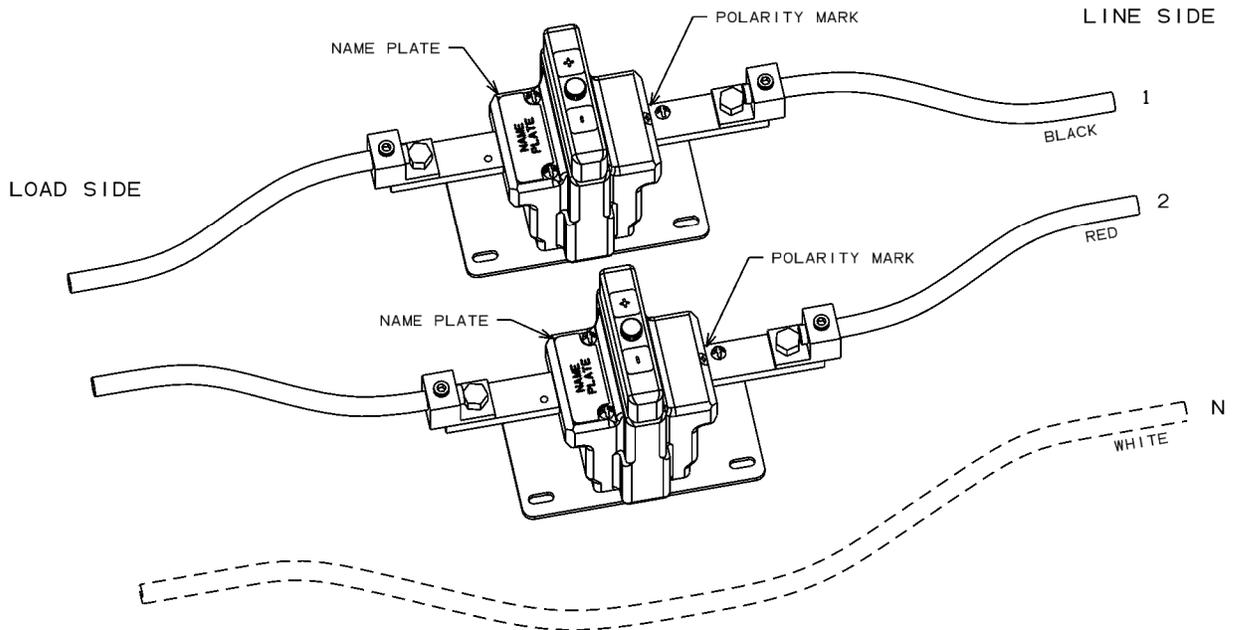
Drawing Number

SMG 6.0.2

Sheet

1 / 1

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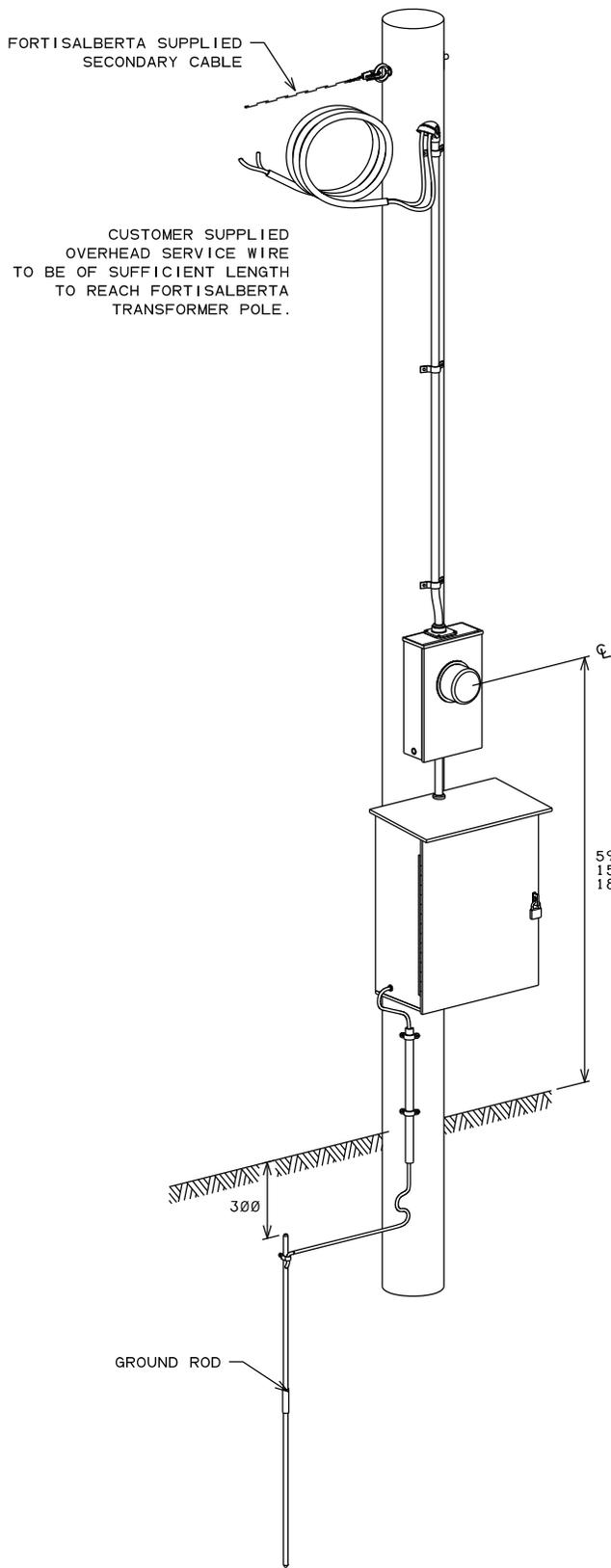


NOTE:

- 1 - IF LOAD AND LINE ARE REVERSED THE CT'S MUST BE REVERSED SO THAT THE POLARITY MARKS ARE ALWAYS ON THE LINE SIDE.
- 2 - NO CONNECTIONS ARE REQUIRED TO THE NEUTRAL CONDUCTOR

<p><b>NO STAMP NEEDED</b></p>	<p>Engineering Stamp Description - REMOVED STAMP</p>	<p>Revision Date (YY/MM/DD) 15-12-09</p>	<p>Date Created (YY/MM/DD) 09-07-09</p>	<p><b>SINGLE PHASE INSTRUMENT TRANSFORMER ENCLOSURE LAYOUT</b></p>	
		<p>REVISION Checked <i>NS</i></p>	<p>ORIGINAL Design / Checked <i>SM</i></p>		
		<p>REVISION Approved <i>HN</i></p>	<p>ORIGINAL Approved <i>D.M.</i></p>		
<p><b>FORTISALBERTA</b></p>		<p>Drawing Number SMG 7.6.1</p>	<p>Sheet 1 / 1</p>		

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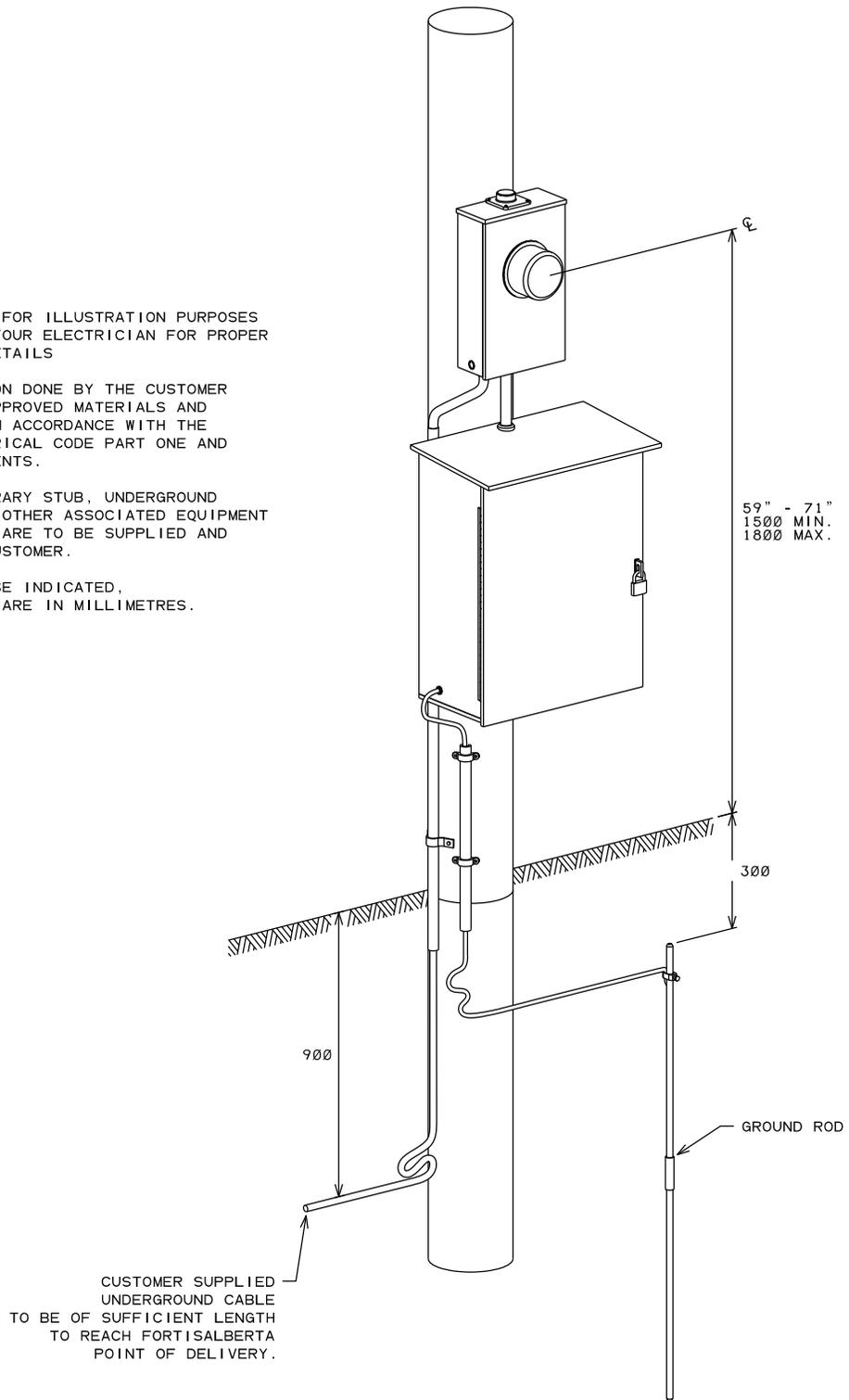
- NOTE:
- 1 - THE DRAWING IS FOR ILLUSTRATION PURPOSES ONLY. CONSULT YOUR ELECTRICIAN FOR PROPER INSTALLATION DETAILS
  - 2 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUST BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART ONE AND ALBERTA AMENDMENTS.
  - 3 - POLE, OVERHEAD SERVICE WIRE, AND ALL OTHER ASSOCIATED EQUIPMENT (EXCEPT METER) ARE TO BE SUPPLIED AND INSTALLED BY CUSTOMER.
  - 4 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES.

<p>Engineering Stamp</p> <p style="font-size: 2em; font-weight: bold;">NO STAMP NEEDED</p> <p>APEGGA Permit No. P07387</p>	<p>Description</p> <p>- UPDATED GROUND</p>	<p>Revision Date (YY/MM/DD)</p> <p>20-01-27</p>	<p>Date Created (YY/MM/DD)</p> <p>07-08-02</p>	<p>CUSTOMER OWNED TEMPORARY/PERMANENT OVERHEAD SERVICE STRUCTURE</p> <p><b>FORTISALBERTA</b></p>			
		<p>REVISION Checked <i>NS</i></p>	<p>ORIGINAL Design / Checked <i>NS</i></p>			<p>Drawing Number</p> <p>SMG 9.2</p>	<p>Sheet</p> <p>1 / 1</p>
		<p>REVISION Approved <i>JL</i></p>	<p>ORIGINAL Approved <i>JS</i></p>				

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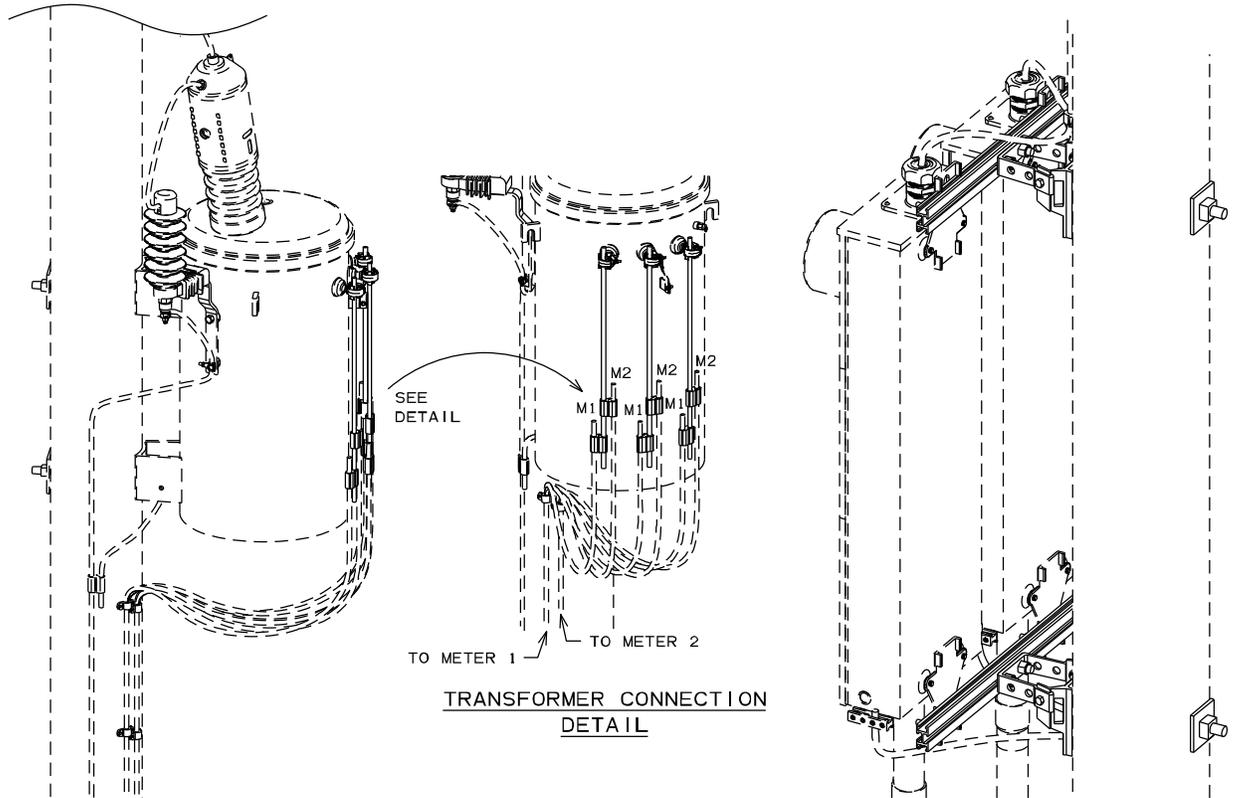
NOTE:

- 1 - THE DRAWING IS FOR ILLUSTRATION PURPOSES ONLY. CONSULT YOUR ELECTRICIAN FOR PROPER INSTALLATION DETAILS
- 2 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUST BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART ONE AND ALBERTA AMENDMENTS.
- 3 - CUSTOMER TEMPORARY STUB, UNDERGROUND CABLE, AND ALL OTHER ASSOCIATED EQUIPMENT (EXCEPT METER) ARE TO BE SUPPLIED AND INSTALLED BY CUSTOMER.
- 4 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES.



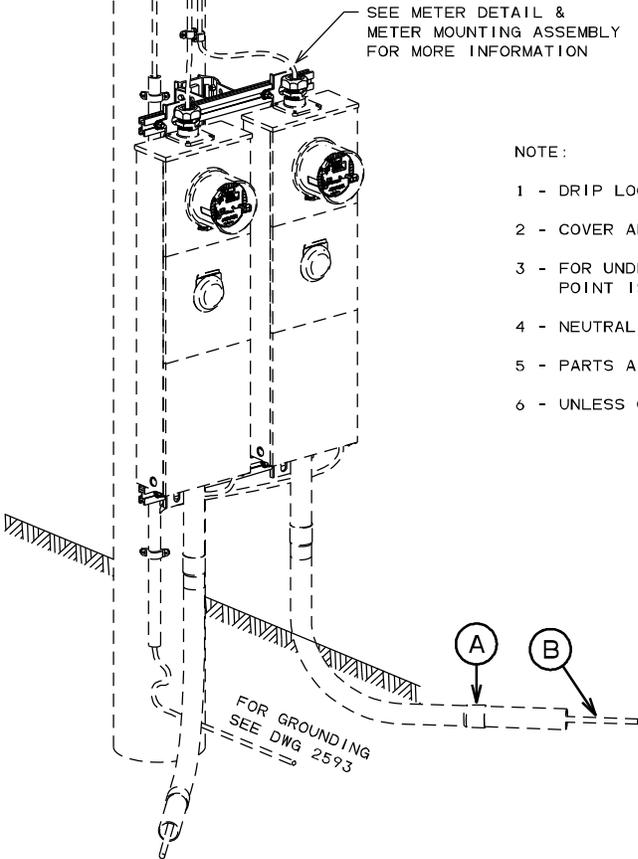
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		<p>REVISION Checked <i>NS</i></p>	<p>ORIGINAL Design / Checked <i>NS</i></p>		
		<p>REVISION Approved <i>JL</i></p>	<p>ORIGINAL Approved <i>JS</i></p>	<p><b>FORTISALBERTA</b></p>	

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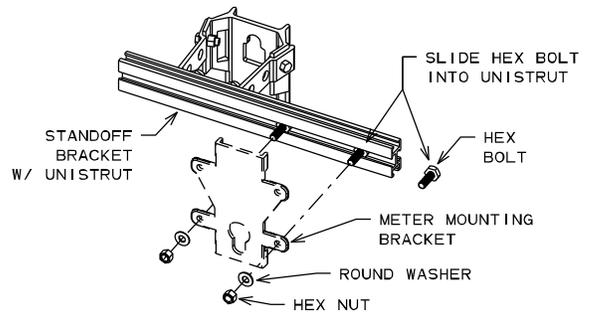
**TRANSFORMER CONNECTION  
DETAIL**

**(REVERSE VIEW)  
METER DETAIL**

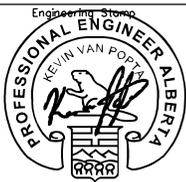


**NOTE:**

- 1 - DRIP LOOP SERVICE ENTRANCE CABLE MUST BE PROVIDED
- 2 - COVER ALL CONNECTORS WITH SELF AMALGAMATING TAPE
- 3 - FOR UNDERGROUND CUSTOMER SERVICES THE ATTACHMENT POINT IS AT THE BREAKER
- 4 - NEUTRAL BAR IN METER BOX MUST BE BONDED TO THE BOX
- 5 - PARTS A AND B ARE SUPPLIED AND INSTALLED BY THE CUSTOMER
- 6 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETRES



**METER MOUNTING ASSEMBLY**



Engineering Status	Description

Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)
	17-12-20
REVISION Checked	ORIGINAL Design / Checked <i>NS</i>
REVISION Approved	ORIGINAL Approved <i>KVP</i>

<b>SINGLE PHASE POLE DUAL METERING FOR TWO SERVICES</b>	
<b>FORTIS ALBERTA</b>	Drawing Number
	1635
	Sheet
	1 / 1

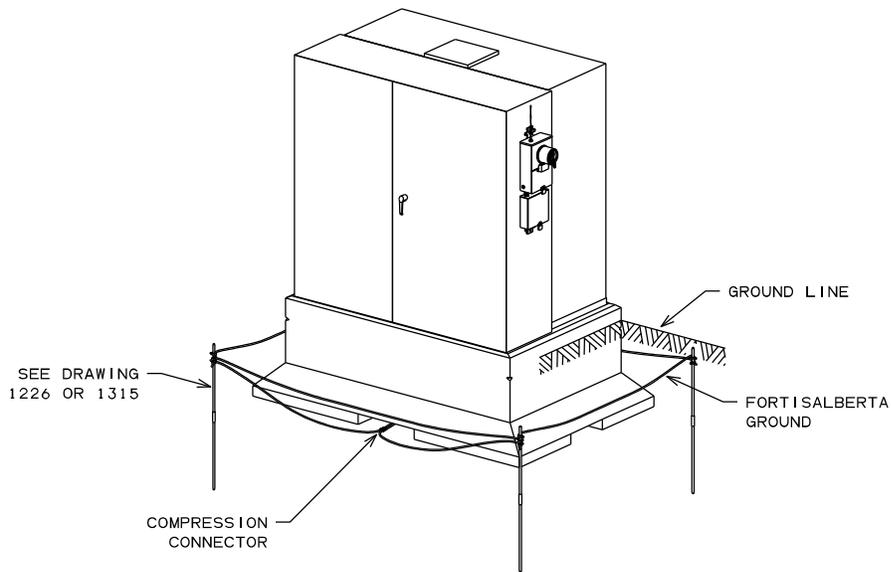
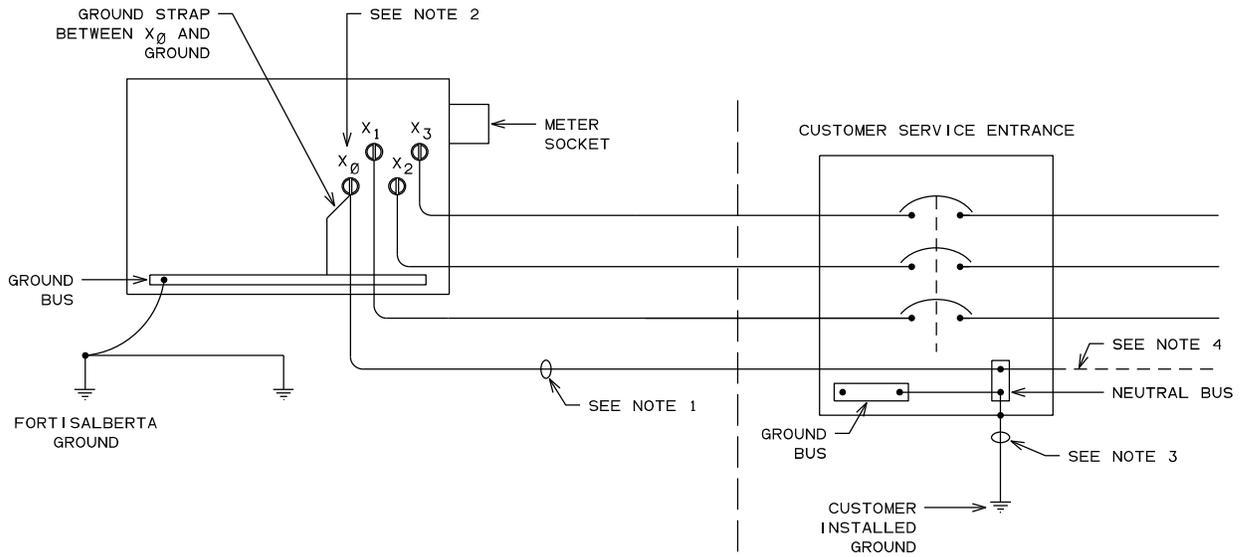
Description: 1 PH DOUBLE POLE METERING, O/H

Item #	Description	UI	-1	-	-	-	-	-	-	-	-	-
5132401	BOLT, HEX, 1/2 X 1-1/2, GALV		8									
5132618	BOLT, MACHINE, 3/4 X 18 INCH		2									
5138401	BOLT, LAG, 1/2" X 4", FETTER, GALV		2									
5142102	WASHER, ROUND, 9/16" HOLE, 1-3/8" RIM		8									
5142207	WASHER, SQ, 3.5 X 3.5 X 1/4, 13/16 HOLE		2									
5142502	WASHER, SINGLE HELIX SPRING LOCK, 1/2"		8									
5142603	WASHER, SPRING LOCK, DOUBLE 3/4		2									
5311206	CONDUCTOR, 4/0 AWG, RWU90, 1000V	M	6									
5530133	CONNECTOR, COMP PG		6									
5530136	CONNECTOR, COMP PG		6									
5890450	BRACKET, ALUMINUM, STANDOFF		2									
5890456	BRACKET, T SLOT, 4 WAY, 24 INCHES LONG		2									

## REMARKS:

1. Meter box and secondary cables are not included in the BOM, order 1637 as required.
2. Where local conditions dictate, supply and install each service in 2" rigid PVC conduit and bell end mounted on standoff brackets.

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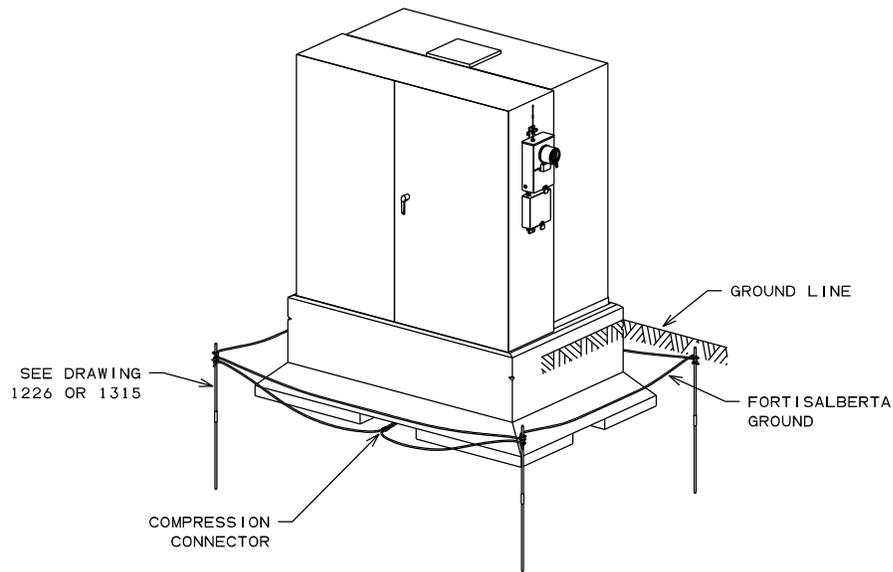
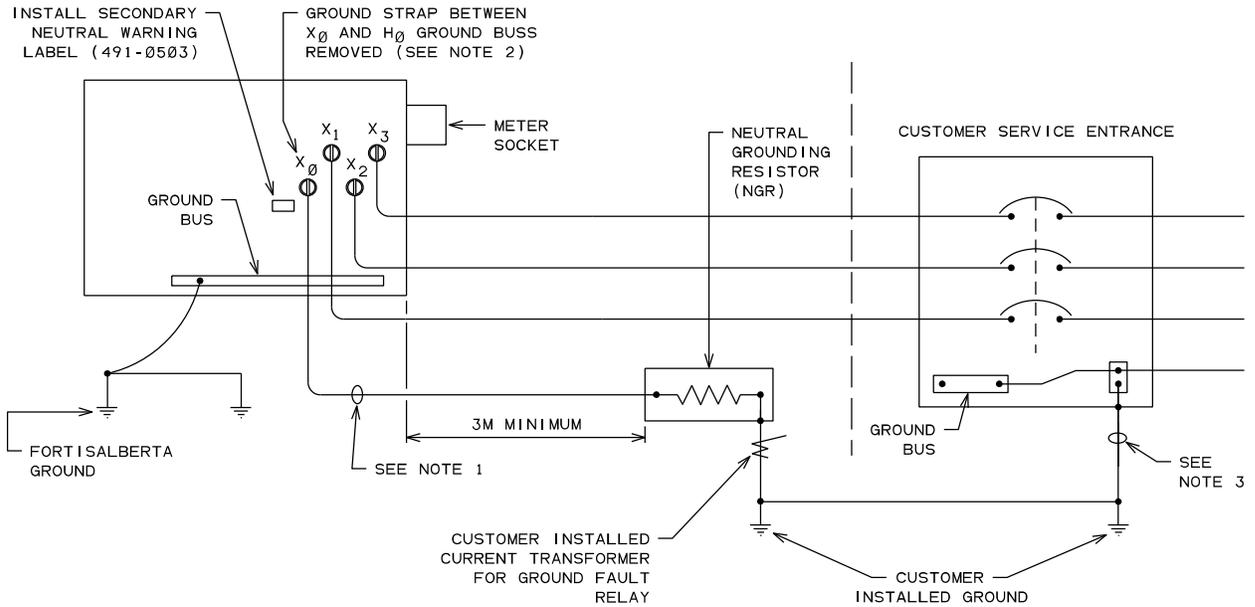
**DETAIL OF FORTISALBERTA  
PADMOUNT TRANSFORMER GROUNDING**

**NOTE:**

- 1 - SOURCE SIDE CONDUCTOR MUST BE FULLY INSULATED TO PHASE VOLTAGE, PER CANADIAN ELECTRICAL CODE CLAUSE 10-308. ROUTED AS DIRECTLY AS PRACTICABLE AND MUST CONNECT TO THE NEUTRAL BUSHING OF THE TRANSFORMER WITH A 1/2" TERMINAL RING CONNECTOR
- 2 - THE STANDARD SERVICE CONNECTION TO FORTISALBERTA SECONDARY CONNECTIONS IS FOR A 4 WIRE GROUNDED WYE. IF THE CUSTOMER ELECTS TO USE THE BARE BONDING CONDUCTOR IN A 3 WIRE TECK CABLE AS THE CUSTOMERS NEUTRAL (WHEN THERE ARE NO NEUTRAL CURRENT PRESENT), THEN THE BARE BONDING WIRE SHALL BE IDENTIFIED WITH WHITE TAPE AT BOTH ENDS OF THE TECK CABLE AND THE CUSTOMER SERVICE NEUTRAL SHALL BE CONNECTED TO THE X<sub>0</sub> BUSHING OF THE TRANSFORMER
- 3 - CONDUCTOR MUST MEET THE REQUIREMENT OF CANADIAN ELECTRICAL CODE CLAUSE 10-116 AND 4.032
- 4 - LOAD WILL DETERMINE IF REQUIRED, OPTIONAL
- 5 - FOR TECH 90 CABLE, IF A BARE COPPER BONDING CONDUCTOR IS PRESENT, BOND AT ONE END ONLY, AT THE CUSTOMERS SERVICE ENTRANCE. ISOLATE THE BONDING CONDUCTOR AT THE SERVICE TRANSFORMER END EITHER BY CUTTING IT BACK OR COVERING WITH A HEAT SHRINK TUBE

<p><b>NO STAMP NEEDED</b></p> <p>APEGA Permit No. P07387</p>	<p><b>Description</b></p> <ul style="list-style-type: none"> <li>- UPDATED NOTES TO FOLLOW C22.1-18</li> <li>- UPDATED GROUND</li> </ul>	<p><b>Revision Date (YY/MM/DD)</b></p> <p>20-04-15</p>	<p><b>Date Created (YY/MM/DD)</b></p> <p>09-08-13</p>	<p><b>3 PHASE SERVICE (PADMOUNT METERING)</b></p>	
		<p><b>REVISION Checked</b></p> <p><i>NS</i></p>	<p><b>ORIGINAL Design / Checked</b></p> <p><i>gmc</i></p>		
		<p><b>REVISION Approved</b></p> <p><i>JS</i></p>	<p><b>ORIGINAL Approved</b></p> <p><i>JS</i></p>		
		<p><b>FORTISALBERTA</b></p>		<p><b>Drawing Number</b></p> <p>SMG 2.13.1</p>	<p><b>Sheet</b></p> <p>1 / 1</p>

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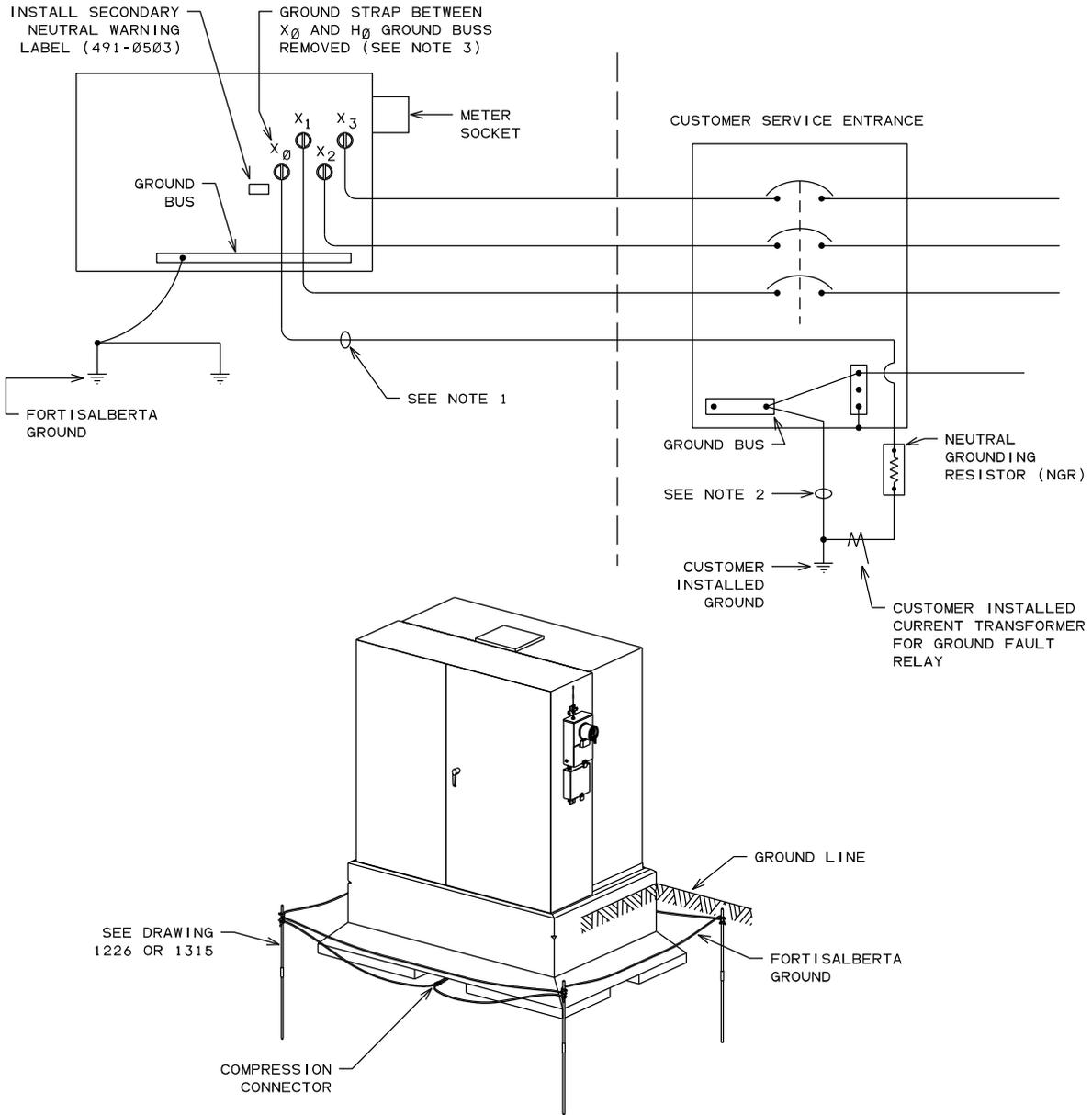
**DETAIL OF FORTISALBERTA  
PADMOUNT TRANSFORMER GROUNDING**

**NOTE:**

- 1 - SOURCE SIDE CONDUCTOR MUST BE FULLY INSULATED TO PHASE VOLTAGE, PER CANADIAN ELECTRICAL CODE CLAUSE 10-308. ROUTED AS DIRECTLY AS PRACTICABLE AND MUST CONNECT TO THE NEUTRAL BUSHING OF THE TRANSFORMER WITH A 1/2" TERMINAL RING CONNECTOR
- 2 - TRANSFORMER GROUND STRAP BETWEEN X<sub>0</sub> BUSHING AND THE GROUND BUSS MUST BE REMOVED. MEASURE NGR CIRCUIT IN OHMS USING A DIGITAL MULTIMETER. THE MEASURED VALUE BETWEEN THE FORTISALBERTA PADMOUNT GROUNDING BUSS AND CUSTOMER NEUTRAL CONDUCTOR SHALL BE WITHIN ±10% OF THE NAMEPLATE RATING OF THE IMPEDANCE GROUNDING DEVICE
- 3 - CONDUCTOR MUST MEET THE REQUIREMENT OF CANADIAN ELECTRICAL CODE CLAUSE 10-116 AND 4.032
- 4 - FOR TECH 90 CABLE, IF A BARE COPPER BONDING CONDUCTOR IS PRESENT, BOND AT ONE END ONLY, AT THE CUSTOMERS SERVICE ENTRANCE. ISOLATE THE BONDING CONDUCTOR AT THE SERVICE TRANSFORMER END EITHER BY CUTTING IT BACK OR COVERING WITH A HEAT SHRINK TUBE

<p><b>NO STAMP NEEDED</b></p> <p>APEGA Permit No. P07387</p>	<p>Engineering Stamp</p> <p>Description</p> <ul style="list-style-type: none"> <li>- UPDATED NOTES</li> <li>- UPDATED GROUND</li> </ul>	<p>Revision Date (YY/MM/DD)</p> <p>20-04-15</p>	<p>Date Created (YY/MM/DD)</p> <p>07-08-02</p>	<p><b>3 PHASE PADMOUNT METERING WITH OUTDOOR NGR</b></p>	
		<p>REVISION Checked <i>JS</i></p>	<p>ORIGINAL Design / Checked <i>JS</i></p>		
		<p>REVISION Approved <i>JS</i></p>	<p>ORIGINAL Approved <i>JS</i></p>		
		<p><b>FORTISALBERTA</b></p>		<p>Drawing Number</p> <p>SMG 2.13.2</p>	<p>Sheet</p> <p>1 / 1</p>

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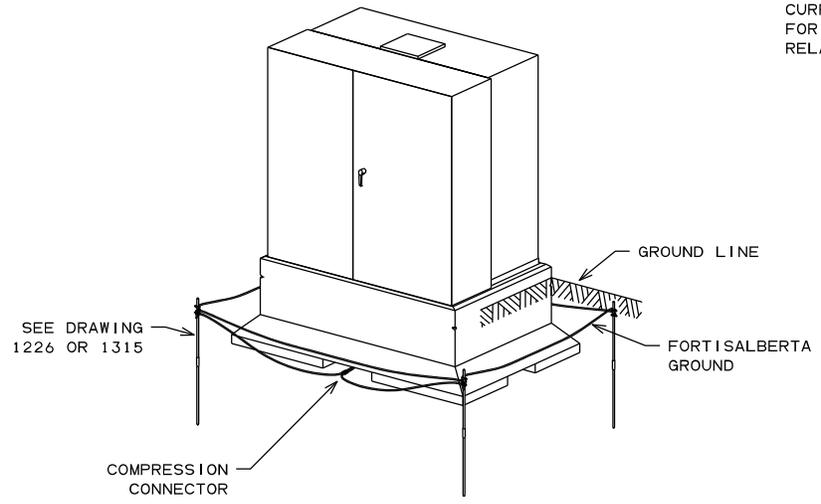
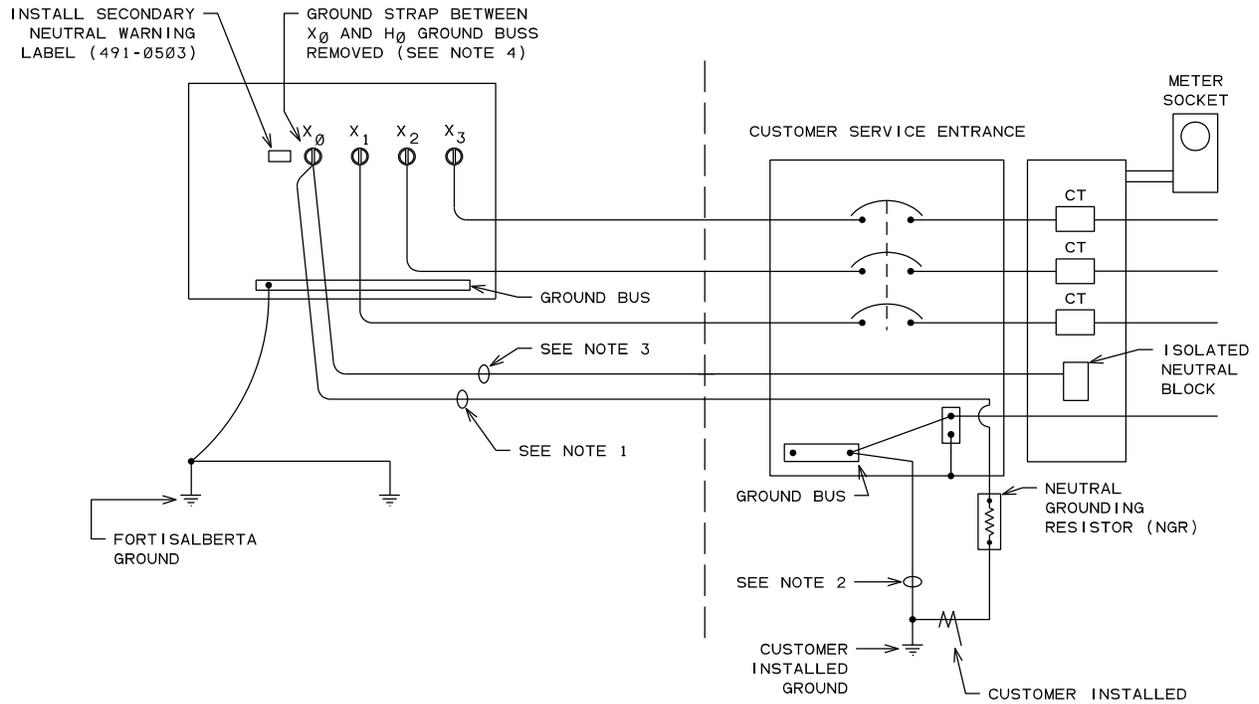
**DETAIL OF FORTISALBERTA  
PADMOUNT TRANSFORMER GROUNDING**

**NOTE:**

- 1 - SOURCE SIDE CONDUCTOR MUST BE FULLY INSULATED TO PHASE VOLTAGE, PER CANADIAN ELECTRICAL CODE CLAUSE 10-308. ROUTED AS DIRECTLY AS PRACTICABLE AND MUST CONNECT TO THE NEUTRAL BUS OF THE TRANSFORMER WITH A 1/2" TERMINAL RING CONNECTOR
- 2 - CONDUCTOR MUST MEET THE REQUIREMENT OF CANADIAN ELECTRICAL CODE CLAUSE 10-116 AND 4-032
- 3 - TRANSFORMER GROUND STRAP BETWEEN X<sub>0</sub> BUSHING AND THE GROUND BUSS MUST BE REMOVED. MEASURE NGR CIRCUIT IN OHMS USING A DIGITAL MULTIMETER. THE MEASURED VALUE BETWEEN THE FORTISALBERTA PADMOUNT GROUNDING BUSS AND CUSTOMER NEUTRAL. CONDUCTOR SHALL BE WITHIN ±10% OF THE NAMEPLATE RATING OF THE IMPEDANCE GROUNDING DEVICE
- 4 - FOR TECH 90 CABLE, IF A BARE COPPER BONDING CONDUCTOR IS PRESENT, BOND AT ONE END ONLY, AT THE CUSTOMERS SERVICE ENTRANCE. ISOLATE THE BONDING CONDUCTOR AT THE SERVICE TRANSFORMER END EITHER BY CUTTING IT BACK OR COVERING WITH A HEAT SHRINK TUBE

<p><b>NO STAMP NEEDED</b></p> <p>APEGA Permit No. P07387</p>	<p>Engineering Stamp</p> <p>Description</p> <p>- UPDATED NOTES</p>	<p>Revision Date (YY/MM/DD)</p> <p>20-04-15</p>	<p>Date Created (YY/MM/DD)</p> <p>07-08-02</p>	<p><b>3 PHASE PADMOUNT METERING WITH INDOOR NGR</b></p> <p><b>FORTISALBERTA</b></p>	<p>Drawing Number</p> <p>SMG 2.13.3</p>	<p>Sheet</p> <p>1 / 1</p>
	<p>REVISION Checked <i>KJS</i></p>	<p>ORIGINAL Design / Checked <i>KJS</i></p>	<p>REVISION Approved <i>JJP</i></p>		<p>ORIGINAL Approved <i>RL</i></p>	

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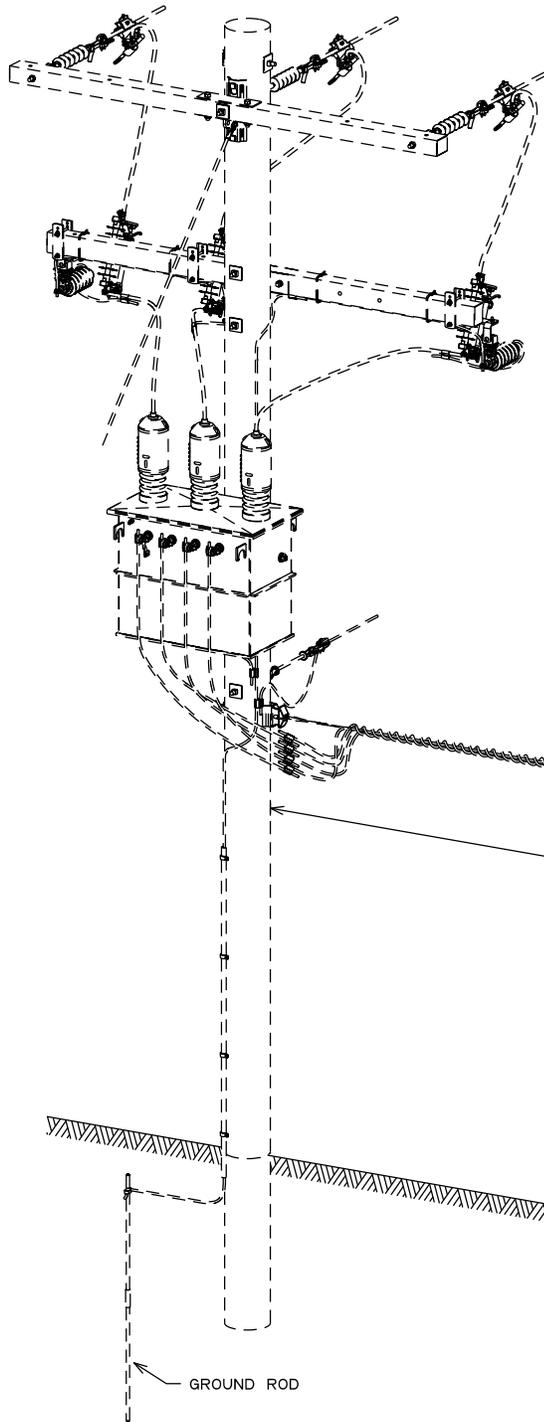
**DETAIL OF FORTISALBERTA  
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**NOTE:**

- 1 - SOURCE SIDE CONDUCTOR MUST BE FULLY INSULATED TO PHASE VOLTAGE, PER CANADIAN ELECTRICAL CODE CLAUSE 10-308. ROUTED AS DIRECTLY AS PRACTICABLE AND MUST CONNECT TO THE NEUTRAL BUS OF THE TRANSFORMER WITH A 1/2" TERMINAL RING CONNECTOR
- 2 - CONDUCTOR MUST MEET THE REQUIREMENT OF CANADIAN ELECTRICAL CODE CLAUSE 10-116 AND 4.032
- 3 - ISOLATED NEUTRAL CONNECTION REQUIRED FOR FORTISALBERTA METERING. CONDUCTOR MUST BE WHITE OR TAPED WHITE AT BOTH ENDS AND SIZED TO CONDUCT THE RATED CURRENT OF THE IMPEDANCE GROUNDING DEVICE, BE ROUTED AS DIRECTLY AS PRACTICABLE AND CONNECT TO THE NEUTRAL BUSHING OF THE TRANSFORMER WITH A 1/2" TERMINAL RING CONNECTOR. IN ACCORDANCE TO CANADIAN ELECTRICAL CODE CLAUSE 6-412 AND 10-308
- 4 - TRANSFORMER GROUND STRAP BETWEEN X<sub>0</sub> BUSHING AND THE GROUND BUSS MUST BE REMOVED. MEASURE NGR CIRCUIT IN OHMS USING A DIGITAL MULTIMETER. THE MEASURED VALUE BETWEEN THE FORTISALBERTA PADMOUNT GROUNDING BUSS AND CUSTOMER NEUTRAL. CONDUCTOR SHALL BE WITHIN ±10% OF THE NAMEPLATE RATING OF THE IMPEDANCE GROUNDING DEVICE
- 5 - FOR TECH 90 CABLE, IF A BARE COPPER BONDING CONDUCTOR IS PRESENT, BOND AT ONE END ONLY, AT THE CUSTOMERS SERVICE ENTRANCE. ISOLATE THE BONDING CONDUCTOR AT THE SERVICE TRANSFORMER END EITHER BY CUTTING IT BACK OR COVERING WITH A HEAT SHRINK TUBE

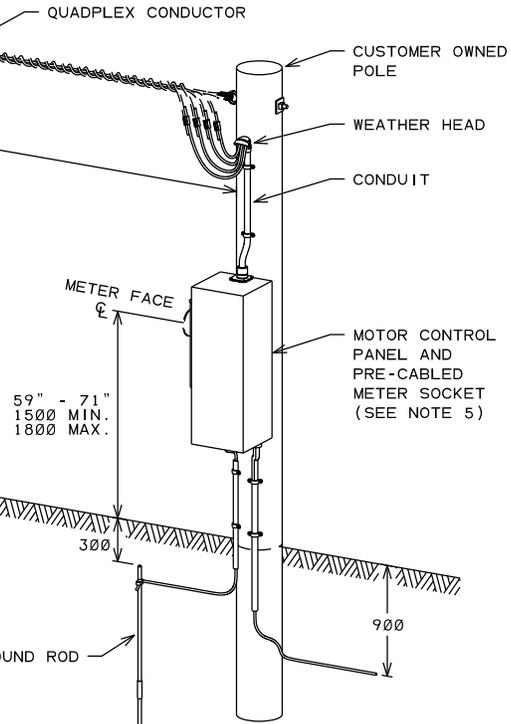
<p><b>NO STAMP NEEDED</b></p> <p>APEGA Permit No. P07387</p>	<p>Engineering Stamp</p> <p>Description</p> <p>- UPDATED NOTES</p>	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	<p><b>3 PHASE SERVICE WITH INDOOR METERING AND NGR</b></p>				
		20-04-15	07-08-02					
		REVISION Checked <i>NS</i>	ORIGINAL Design / Checked <i>NS</i>					
REVISION Approved <i>JS</i>	ORIGINAL Approved <i>JS</i>	<p><b>FORTISALBERTA</b></p>		<table border="1" style="width: 100%;"> <tr> <td>Drawing Number</td> <td>Sheet</td> </tr> <tr> <td>SMG 2.13.4</td> <td>1 / 1</td> </tr> </table>	Drawing Number	Sheet	SMG 2.13.4	1 / 1
Drawing Number	Sheet							
SMG 2.13.4	1 / 1							

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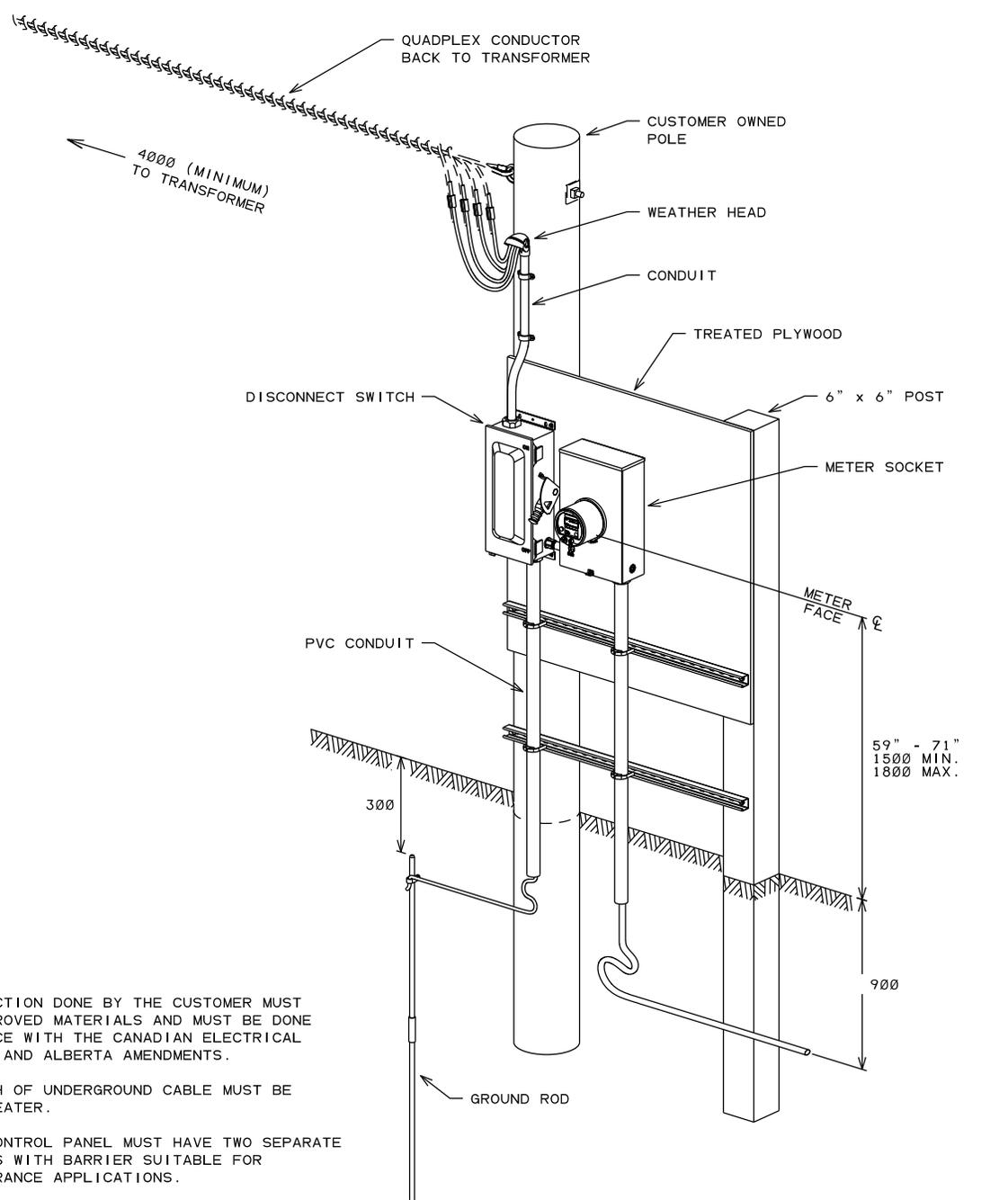
NOTE:

- 1 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUST BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART 1 AND ALBERTA AMENDMENTS.
- 2 - BURIAL DEPTH OF UNDERGROUND CABLE MUST BE 900mm OR GREATER.
- 3 - THE MOTOR CONTROL PANEL MUST HAVE TWO SEPARATE COMPARTMENTS WITH BARRIER SUITABLE FOR SERVICE ENTRANCE APPLICATIONS.
- 4 - THE CONTROL PANEL MUST HAVE INNER DOORS FOR THE TWO COMPARTMENTS AND AN OUTER DOOR FOR PROTECTION AGAINST VANDALISM. PROVISION FOR SEALING THE TOP COMPARTMENT MUST BE PROVIDED ON THE INNER DOOR.
- 5 - FOR SAFETY REASONS, MOTOR CONTROL PANEL SHALL BE EQUIPPED WITH MAIN BREAKER ON LINE SIDE OF METER SOCKET.
- 6 - FOR SECONDARY SERVICES FED FROM THE FORTISALBERTA DISTRIBUTION CONNECTION POINT (SEE NOTE 7). FORTISALBERTA WILL SUPPLY AND INSTALL UP TO 60m OF SUPPLY SERVICE CONDUCTOR WITH ANY ONE SPAN BEING A MAXIMUM OF 35m. AS PER SECTION 9.2 OF THE "FORTISALBERTA INC. CUSTOMER TERMS AND CONDITIONS OF DISTRIBUTION ACCESS SERVICE" THE METER LOCATION MUST BE ACCESSIBLE ON A CUSTOMER-OWNED POLE. THE POLE SHALL BE PROVIDED AND MAINTAINED BY THE CUSTOMER MEETING ALL STANDARDS AND REGULATIONS
- 7 - FORTISALBERTA DISTRIBUTION CONNECTION POINT IS DEFINED AS THE FORTISALBERTA ELECTRICAL LINE, AT SECONDARY OR PRIMARY VOLTAGE (UP TO 25KV) WHICH IS USED TO SERVE MULTIPLE CUSTOMERS.
- 8 - UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN MILLIMETERS.



<p><b>NO STAMP NEEDED</b></p>	<p>Engineering Stamp</p>	<p>Description</p> <ul style="list-style-type: none"> <li>- ADDED BARE BONDING CONDUCTOR DETAIL</li> <li>- CHANGED MIN SEPARATION BETWEEN XMER POLE AND METER FROM 5 TO 4m</li> <li>- CHANGED MIN SPAN LENGTH FROM 30 TO 35m</li> <li>- REVISED NOTE 6</li> <li>- REMOVED REFERENCE TO TECH 90 CABLE AS THIS AN OVERHEAD SERVICE</li> <li>- UPDATED GROUND</li> </ul>	<p>Revision Date (YY/MM/DD)</p> <p>20-02-14</p>	<p>Date Created (YY/MM/DD)</p> <p>07-08-02</p>	<p><b>THREE PHASE OILFIELD AND IRRIGATION OVERHEAD SERVICE</b></p>	
	<p>REVISION Checked</p> <p>AS</p>	<p>ORIGINAL Design / Checked</p> <p>AS</p>				
<p>APEGGA Permit No. P07387</p>	<p>REVISION Approved</p> <p>HN</p>	<p>ORIGINAL Approved</p> <p>AS</p>	<p><b>FORTISALBERTA</b></p>		<p>Drawing Number</p> <p>SMG 2.13.5</p>	<p>Sheet</p> <p>1 / 2</p>

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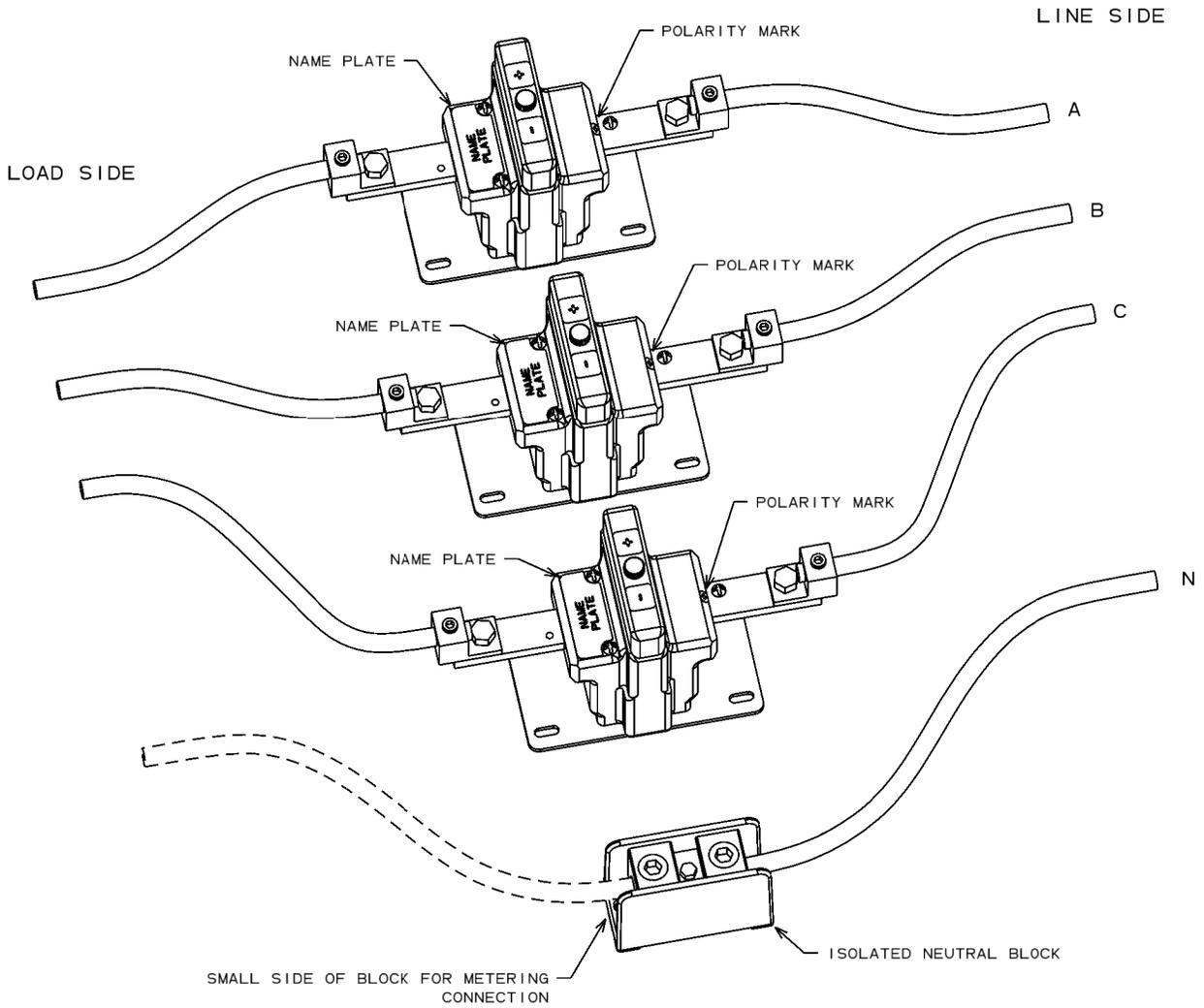


**NOTE:**

- 1 - ALL CONSTRUCTION DONE BY THE CUSTOMER MUST USE CSA APPROVED MATERIALS AND MUST BE DONE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE PART 1 AND ALBERTA AMENDMENTS.
- 2 - BURIAL DEPTH OF UNDERGROUND CABLE MUST BE 900mm OR GREATER.
- 3 - THE MOTOR CONTROL PANEL MUST HAVE TWO SEPARATE COMPARTMENTS WITH BARRIER SUITABLE FOR SERVICE ENTRANCE APPLICATIONS.
- 4 - THE CONTROL PANEL MUST HAVE INNER DOORS FOR THE TWO COMPARTMENTS AND AN OUTER DOOR FOR PROTECTION AGAINST VANDALISM. PROVISION FOR SEALING THE TOP COMPARTMENT MUST BE PROVIDED ON THE INNER DOOR.
- 5 - FOR SECONDARY SERVICES FED FROM THE FORTISALBERTA DISTRIBUTION CONNECTION POINT (SEE NOTE 7). FORTISALBERTA WILL SUPPLY AND INSTALL UP TO 60m OF SUPPLY SERVICE CONDUCTOR WITH ANY ONE SPAN BEING A MAXIMUM OF 35m. AS PER SECTION 9.2 OF THE "FORTISALBERTA INC. CUSTOMER TERMS AND CONDITIONS OF DISTRIBUTION ACCESS SERVICE" THE METER LOCATION MUST BE ACCESSIBLE ON A CUSTOMER-OWNED POLE. THE POLE SHALL BE PROVIDED AND MAINTAINED BY THE CUSTOMER MEETING ALL STANDARDS AND REGULATIONS
- 6 - FORTISALBERTA DISTRIBUTION CONNECTION POINT IS DEFINED AS THE FORTISALBERTA ELECTRICAL LINE, AT SECONDARY OR PRIMARY VOLTAGE (UP TO 25KV) WHICH IS USED TO SERVE MULTIPLE CUSTOMERS.
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<p style="font-size: 2em; font-weight: bold; transform: rotate(-45deg);">NO STAMP NEEDED</p> <p style="font-size: 0.8em;">APEGGA Permit No. P07387</p>	Engineering Stamp	Description	Revision Date (YY/MM/DD)	Date Created (YY/MM/DD)	<p style="font-size: 1.2em; font-weight: bold;">THREE PHASE OILFIELD AND IRRIGATION OVERHEAD SERVICE</p>		
	REVISION Checked	ORIGINAL Design / Checked	20-02-14	(Signature)			
	REVISION Approved	ORIGINAL Approved	HN	<p style="font-size: 1.5em; font-weight: bold;">FORTISALBERTA</p>			Drawing Number
						SMG 2.13.5	2 / 2

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NOTE:

- 1 - PT'S AND FUSES WILL BE SUPPLIED BY FORTISALBERTA AS REQUIRED (SEE TABLE IN SECTION 2.16.5)
- 2 - THE NEUTRAL CONDUCTOR MUST BE RUN INTO THE INSTRUMENT TRANSFORMER ENCLOSURE THE CUSTOMER MUST INSTALL AN ISOLATED NEUTRAL BLOCK TO FACILITATE CONNECTION OF THE POTENTIAL WIRE FOR METERING
- 3 - IF LOAD AND LINE ARE REVERSED THE CT'S MUST BE REVERSED SO THAT THE POLARITY MARKS ARE ALWAYS ON THE LINE SIDE
- 4 - THE ISOLATED NEUTRAL BLOCK MUST BE INSULATED FROM THE ENCLOSURE AND CANNOT BE GROUNDED
- 5 - WHERE PARALLEL CONDUCTORS ARE USED FOR GREATER AMPACITY, ONLY ONE NEUTRAL CONDUCTOR NEED BE CONNECTED TO THE ISOLATED NEUTRAL BLOCK

<p>Engineering Stamp</p> <p style="font-size: 2em; transform: rotate(-45deg);">NO STAMP NEEDED</p>	<p>Description</p> <p>- REMOVED STAMP</p>	<p>Revision Date (YY/MM/DD)</p> <p>15-12-09</p>	<p>Date Created (YY/MM/DD)</p> <p>09-07-09</p>	<p>THREE PHASE INSTRUMENT TRANSFORMER ENCLOSURE LAYOUT</p> <p><b>FORTISALBERTA</b></p>			
		<p>REVISION Checked <i>NS</i></p>	<p>ORIGINAL Design / Checked <i>SM</i></p>			<p>Drawing Number</p> <p>SMG 7.6.2</p>	<p>Sheet</p> <p>1 / 1</p>
		<p>REVISION Approved <i>HN</i></p>	<p>ORIGINAL Approved <i>D.M.</i></p>				