The intent of this manual is to provide direction and guidance for customers, consultants and electrical contractors either requiring or installing an electrical service that will be energized by the Utility Company.

This manual provides specifications for metering configurations for most services under 5,000 Volts. Special arrangements can be made for installing service connections not specified in this manual, with approval prior to installation.

The metering and service specifications outlined in this publication must comply with all applicable requirements of Part 1 of the current Canadian Electrical Code, Alberta Safety Codes Act and the company's "Terms & Conditions". All metering and service installations must meet these requirements. *Where the design, application, location or construction of the installation does not conform to these requirements or violates any other related act or code regulations, the company will not install metering or energize a service.*

This Customer Metering & Services Manual is being used with the permission of ATCO Electric by:

ATCO Electric Yukon
Northland Utilities (Yellowknife) Limited
Northland Utilities Limited

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APPENDIX

List of Drawings Page

Glossary

Electrical terms used in this manual are based on accepted electrical industry practice and the company's "Terms & Conditions".

AMR - Automatic Metering Reading.

CEC - Canadian Electrical Code, Part 1 and Amendments.

CSA - Canadian Standards Association.

AECUC - Alberta Electrical and Communications Utility Code.

Demand - The average value of power over a specified interval of time. The most common quantities are kilowatt (kW) and kilovolt amperes (kVA) demand.

Energy - The integral of active power with respect to time. E.g. kilowatt-hours (kWh)

Harmonics - are distortions to the voltage and current waveforms from their normal sinusoidal shape.

Instrument Transformer Metering - using a transformer in a metering circuit to step down the current and/or the voltage to a level that can be accommodated safely by the meter.

Multiple Service - a service to a building such as an apartment building or shopping centre that has two or more units and a common service entrance in which each unit is served and metered separately.

Network - the two phase wires and neutral of a three-wire service obtained from a three-phase, four wire wye system.

Self-contained Meter - meter designed to accommodate the full line current and voltage of the circuit.

SCA - Alberta Safety Codes Act

The Utility Company - Yukon Electrical Company Limited, Northland Utilities Limited and ATCO Electric (Yukon)

GENERAL INFORMATION

Types of Metering

The type of metering specified by the company shall depend on the class of service, size of load to be served and the applicable rate, for e.g.: energy, kW or kVA demand. The company shall install, maintain and own all meters.

All meters must be sealed, maintained and tested according to federal government standards.

Self-contained Metering

Used for metering loads up to 600 volts where the main breaker does not exceed 200 amperes.

Instrument Meters

Used for metering loads where the main breaker is greater than 200 amperes and/or over 600 volts. On loads over 1000 kW pulse generating meters may be required.

Optional Customer Pulse - Upon request a pulse output meter or devices such as transducers and pulse duplicating relays may be installed in the customers metering circuit. The customer will discuss data acquisition needs with the company early in the project planning stages. Before the company installs optional pulse devices, the customer will complete a data acquisition agreement and will be billed for costs above the company's standard installations.

Primary Metering

Primary metering is available for multi-voltages or services normally over 1000 kVA.

Un-Metered Services

The company serves a number of small loads which normally do not require metering. These loads either do not exceed the minimum billing charge or have a steady low consumption. The following are loads which may not require metering:

- traffic lights
- railway signal crossing
- telephone toll booth
- streetlight, floodlight or sentinel light
- telephone digital carriers
- railway hot box detectors

To verify your service does not require metering, please contact the local company office prior to construction.

Standard Supply Voltages

The following tables show the company's standard overhead and underground voltage, phase and load configurations. Not all standard voltages are available at all locations:

Table 1
Standard Overhead Distribution System

Service Voltage	Phase/Wire	Transformer Load Range	Full Load Range Line Amperes	
120/240	Single Phase, 3 Wire	10 to 167 kVA (may be larger for special loads)	@ 120V 83 to 1391 Amps	@ 240V 41 to 696 Amps
120/208Y	Three Phase, 4 Wire	30 to 300 kVA	83 to 833 Amps	
277/480Y	Three Phase, 4 Wire	15 to 3000 kVA	18 to 3610 Amps	
347/600Y	Three Phase, 4 Wire	150 to 3000 kVA	144 to 2887 Amps	

Table 2
Standard Underground Distribution System

Service Voltage	Phase/Wire	Transformer Load Range	Full Load Range Line Amperes	
120/240	Single Phase, 3 Wire	10 to 100 kVA	@ 120V 83 to 833 Amps	@ 240V 41 to 416 Amps
120/208Y	Three Phase, 4 Wire	75 to 500 kVA	208 to 1388 Amps	
277/480Y	Three Phase, 4 Wire	150 to 4000 kVA	180 to 4813 Amps	
347/600Y	Three Phase, 4 Wire	Minimum 150 kVA	144 Amps and Up	

Other Voltages

Service may be provided at any required voltage, under mutually, satisfactory agreed terms. Requests for non-standard voltage supply must be approved by the company.

Voltage Operating Conditions

All services are alternating current 60 hertz. The normal system voltage and voltage limits at the service entrance are as specified in the Canadian Electrical Association Reference Standard for Canadian Practice "Preferred Voltage Levels for AC Systems 0-50,000 Volts" and CSA Standard CAN 3-C235-83, Table 3.

Table 3

For circuits up to 1,000 volts the recommended voltage variation limits at the service entrance is:

Nominal Voltage	Extreme Operating Conditions	Normal Operating Conditions		
Single Phase				
120/240	106/212	110/220	125/250	127/254
240	212	220	250	254
480	424	440	500	508
600	530	550	625	635
Three Phase 4 Conductor				
120/208Y	110/190	112/194	125/216	127/220
240/416Y	220/380	224/388	250/432	254/440
277/480Y	245/424	254/440	288/500	293/508
347/600Y	306/530	318/550	360/625	367/635
Three Phase 3 Conductor				
240	212	220	250	254
480	424	440	500	508
600	530	550	625	635

For supply circuits of 1,000 - 50,000 volts the recommended voltage variation to the customer is:

1. The voltage rise does not exceed six percent above normal (7.2 volts on 120 volt base).
2. The voltage drop sub transmission does not exceed six percent below normal (7.2 volts on 120 volt base) or on distribution does not exceed eight percent below normal (9.6 volts on 120 volt base).
3. The voltage variation from maximum to minimum on load cycle periods does not exceed nine percent (10.8 volts on 120 volt base).

Ownership of Facilities

The company retains full title on all equipment, lines and apparatus which it provides in extending service and metering the electricity supply. Instrument transformers provided by the company and installed by a customer remain the property of the company.

"Terms & Conditions" and Rate Schedules

Information on the company's "Terms & Conditions" and Rate Schedules are available at any company office.

APPLICATION FOR SERVICE & GENERAL REQUIREMENTS

The customer should apply for service early in the planning stage of a project in order for the company to meet the customer's needs, determine the best service arrangement and to provide the time to obtain necessary equipment.

The customer shall provide the company with all the necessary information regarding the type of service, connected loads, timing, service voltage and a site plan. A service agreement may be required with the company's "Terms & Conditions" and the rate schedule applicable to the service. A customer contribution may be required.

Service Voltage and Location

The service voltage is the voltage and phase(s) requested by the customer. Each service will be at one of the standard voltages listed in this manual and will be metered appropriately. Requests for non-standard voltage supply must be approved by the company. The service location on the customer's premises is subject to approval of the company.

Service Entrance Drawings

To ensure the customer does not experience any delays on a service entrance over 200 amperes, one set of drawings of the service entrance, service location, and service and metering layout shall be submitted to a company customer service or marketing representative. The drawings shall be stamped final and initialed by the issuing consultant or electrical contractor. All installations shall comply with the applicable requirements of the Canadian Electrical Code and Alberta Safety Codes Act regulations.

Access

The company has the right, and will endeavor to make reasonable arrangements, to enter the customer's property or premises to install, inspect, read, change, maintain and remove its facilities.

For company facilities located within locked customer premises the customer shall provide a means of access.

In subdivisions, the developer shall provide easement at no cost to the company where required for access, and for providing service extensions to each parcel of property.

Meter Locations

All metering and service locations shall be approved by the company prior to installation. Meters shall be located either on the line side where the voltage is less than 300 volts line to line or load side of the customer's main breaker (disconnect) where the voltage is greater than 300 volts line to line as detailed in Section 6-408 of the Canadian Electrical Code. The company personnel must have reasonable access to the meter to perform meter changes, testing and meter reads.

The company will not install meters in alleyways or areas where the meter is unprotected from moving equipment in the path of water from eaves or rain spouts or where the meter may be subject to steam or corrosive hazardous vapors. The company will not install meters in areas that are difficult to access; such areas include open pits, near moving machinery, hatchways, closets or stairways or where there are noticeable vibrations.

Splitter Box Location

A splitter box must not be installed ahead of the meter or service disconnect.

Wiring Permit

A copy of a signed electrical wiring permit shall be presented to the company before the electrical service is connected on a new, altered or relocated service.

Relocations

Where a building extension encloses or interferes with existing metering, the company will relocate the service at the customer's expense. There is no charge if the overhead service conductors and the meter only are relocated.

The company will, at the request of a customer, relocate the facilities installed to service the customer, provided the customer pays all costs of such relocation. There will be no charge to relocate only the meter and overhead service conductors.

Modifications

Customers shall obtain written approval from the company before modifying an existing service which may affect the metering. The customer may be charged for costs associated with any change required to the company's facilities due to the service modification.

LB’s

These are not permitted prior to the meter. Special permission from the Power Company is required prior to installation. Conditions for allowance (if any) will be given to those asking for permission. .

Load Changes

A customer shall advise the company in writing of any changes to their load requirements so that the company may determine if service changes are required to accommodate the increased load. The customer shall provide sufficient time for the company to obtain equipment and make the necessary changes. If a customer has not obtained permission from the company the customer can be held responsible for any damage to the company's property or equipment resulting from a major change in a load.

Harmonic Loading Additions

The customer shall notify the company when harmonic loads such as VFD (variable frequency drive) motors are added to an existing utility transformer. If the calculated harmonic current is in excess of 5% of the utility transformer rated current as stated in IEEE C57.12.00 - 1987, the transformer may have to be changed. The customer shall be responsible for any incremental costs associated with the transformer change.

Harmonic Distortion

All customers with loads producing harmonic distortion shall comply with the "ATCO Electric Transmission and Distribution System Guide to Non-Linear Load Additions". This document follows The Institute of Electrical and Electronics Engineers 519-1992 "IEEE Recommended Practices and Requirements for Harmonic Control in Electric Power Systems" with some ATCO Electric modifications which take precedence over IEEE 519-1992. This guide outlines the procedures, information and technical requirements to be observed from the initial design stages to the energization of the harmonic producing load installation. Contact your local company representative for a copy of this document.

Three Phase Loads

The customer is responsible for single phase protection on three phase loads.

Electronic Loads

The customer is responsible for protecting all sensitive electronic loads against transients caused by such events as lightning or utility switching.

Non-standard Services

Service and metering requirements not covered in this manual are to be discussed with the local Utility Company representative. The customer shall submit one set of drawings of the service entrance, service location and service and metering layout to a company customer service or marketing representative. The drawings shall be stamped final and initialed by the issuing consultant or electrical contractor. All installations shall comply with the applicable requirements of the CEC and SCA regulations. The company will make every effort to meet the customer's needs.

Electric Heat

Electric heat is not allowed in areas where the primary source of electricity is diesel generation, unless approved by the company.

Single-phase Motor Size

In areas where the primary source of electricity is diesel generation, single phase motors larger than 5 horsepower (3.73KW) are not allowed unless equipped with soft start. The exception to this is the area served from Watson Lake.

Winter Construction Limitations

The winter season is from Oct. 16th to May 14th. We will not install cables at temperatures colder than -20 degrees centigrade. The customer is responsible for snow removal, trench settling & returning trench to final grade and for the costs over and above normal summer construction. The company reserves the right to terminate underground service construction at its discretion, to ensure the installation quality and reliability is not compromised.

The ground near poles or anchors installed during the winter conditions may settle or the pole may lean due the frozen fill. The customer is responsible for any costs related to repair the settled ground or straightening any pole due the installations done during winter conditions.

Should existing weather conditions warrant, the termination date may be accelerated on future seasons.

RESIDENTIAL SERVICES

Residential services are generally self-contained metering services to an urban or rural house or dwelling.

General Requirements

- Metering shall be located on the line side of the customer's main breaker.
- Metering shall be located on the outside wall of the house except for rural residential services which may utilize pole metering.
- Where recessed metering is installed in a wall, a clear space of not less than 0.2 meters on either side of the centre line of the meter base and 1.0 meter in front of the meter is required, to provide the company access to the meters.
- The centre line of the meter socket shall be 1.5 to 1.8 meters above the finished grade or permanent platform.
- Winter construction (October 16th - May 14th) if required by the customer will involve the trench and backfill being provided at the customer's expense and must be approved by the company in writing. All alternative locations or arrangements will have to be approved in writing by the company in advance

Single Phase Residential Services - Self-contained Metering

Single phase self-contained metering is used for residential services where the main breaker rating does not exceed 200 amperes. Metering shall be located on the line side of the customer's main breaker.

Overhead Urban Residential Service

The customer shall:

- supply and install a CSA approved low voltage, socket type meter base with a 100 or 200 ampere rating. The base shall not have a shorting device.
- supply and install conduit, weatherhead, rack and conductor in the mast on the line side of the main breaker.
- supply and install all wiring, equipment and facilities on the load side of the meter.

The company shall:

- supply and install all facilities required for electrical service up to the weatherhead including:
- conductors and connectors from pole to mast.
- the meter.

Underground Urban Residential Service

The customer shall:

- supply and install a CSA approved low voltage, socket type meter base with a 200 ampere rating. The base shall not have a shorting device.
- supply and install all wiring, equipment and facilities on the load side of the meter.
- ensure the meter cabinet location shall be:

  a) within 3 meters of the closest corner of the residence including attached garage closest to the stub-off;

  b) so as to provide a straight run of service cable from the stub-off to the meter, without crossing any other utilities (i.e. sewer lines, waterlines).

- contact the company prior to building construction to:

  a) confirm location of the existing service cable stuff-off on your lot,

  b) discuss recommended service entrance location with respect to minimizing the costs for installation of the underground service;

- arrange for the electrical cable locate prior to excavating for water/sewer hookups, and prior to lot landscaping and /or fencing.

The Utility Company must approve in writing any other service entrance locations. It is not permitted for the company's underground service cable to be routed underneath buildings, houses, garages, deck, porches, sheds, trailers/mobile home. Clearances from fuel tanks and lines shall adhere to the Canadian Electrical Code regulations.

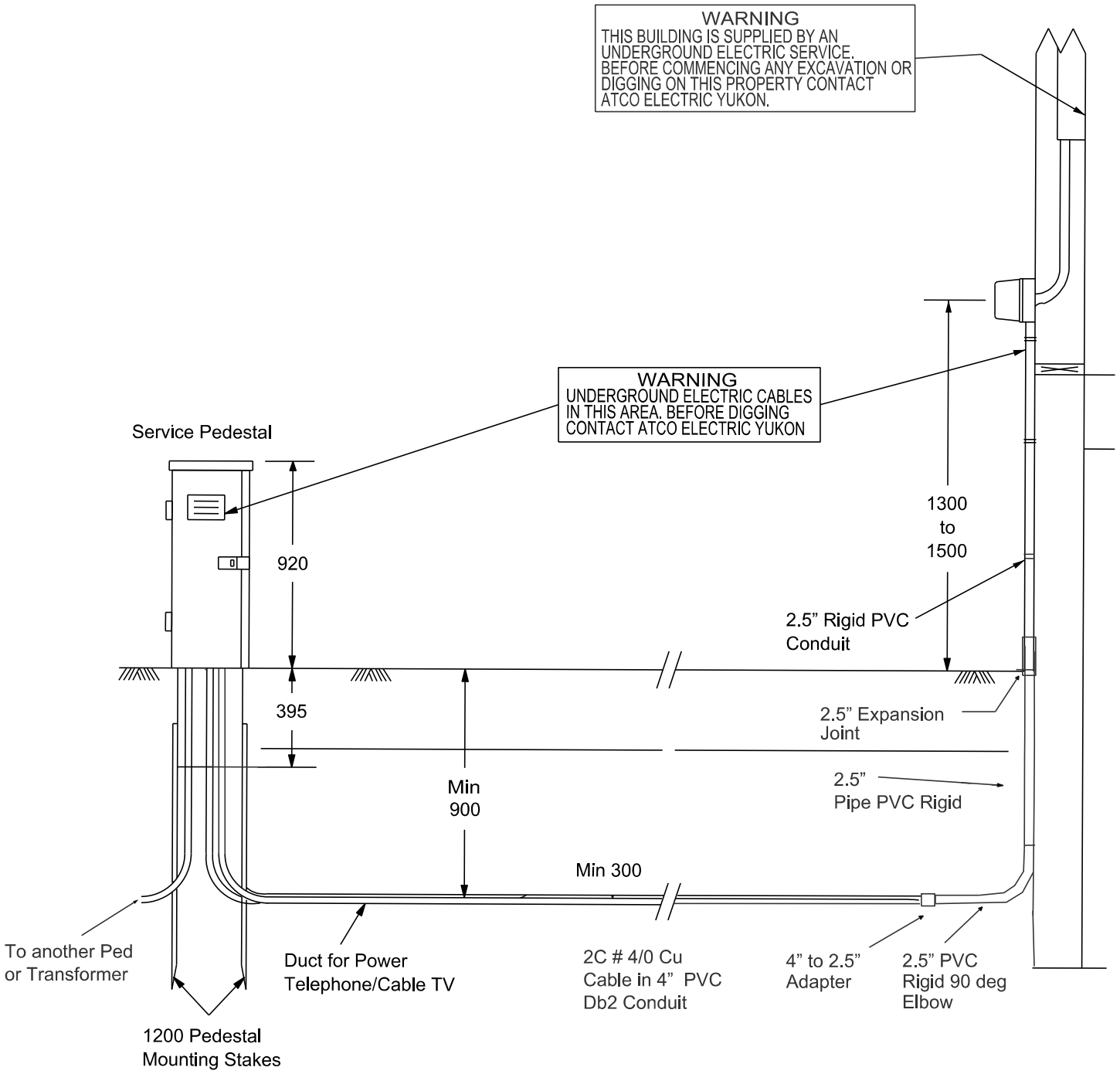
The company shall:

- provide the cable and associated splices, trenching, sanding or conduit, backfilling and compaction as required from the cable stub-off to the meter cabinet (closest corner of the building plus three (3) meters. Arrange for other shallow utility installations in "joint-use" trench wherever possible.
- supply and install the conduit for the company's conductors to the meter socket on the line side.
- supply and install conductors and connectors from service pedestal or transformer to the nearest corner of the house.
- supply and install the meter.

The company reserves the right to terminate underground service construction at its discretion, to ensure installation quality and reliability is not compromised. Based on historical experience this termination date will effectively be October 16th. Should existing weather conditions warrant this termination date may be accelerated on future construction seasons.

Refer to drawing on page 18 (*Underground Residential Pedestal, Service and Cable Stubbing Arrangement)*

Underground Residential Pedestal, Service And Cable Stubbing Arrangement



Dimensions are in mm

Underground services using a farm service is not available in urban areas. Country Residential lots that are not eligible for subdivision in municipal boundaries are allowed to use farm services with prior approval in writing. See page 22 and 23 for details.

1-Phase Underground Residential Service in Urban Areas:

The underground residential service from overhead systems in urban areas is not available.

Overhead Rural Residential Service

The customer shall:

- supply and install a CSA approved low voltage, socket type meter base with a 100 or 200 ampere rating for metering on a building. The base shall not have a shorting device.
- supply and install conduit, weatherhead, rack and conductor in the mast on the line side of the main breaker for a service on a building.
- supply and install all wiring, equipment and facilities on the load side of the meter.

The company shall:

- supply and install all facilities required for electrical service up to the weatherhead.
- supply and install the meter.

Underground Rural Residential Service

General Requirements:

If the customer wishes to install an underground service from a service pole in his property or on the dead end pole in the primary line, the installation of the farm service is required. Please refer to Page 23 for details *(Underground Tap from a Farm Service Pole)*

For Farm Service:

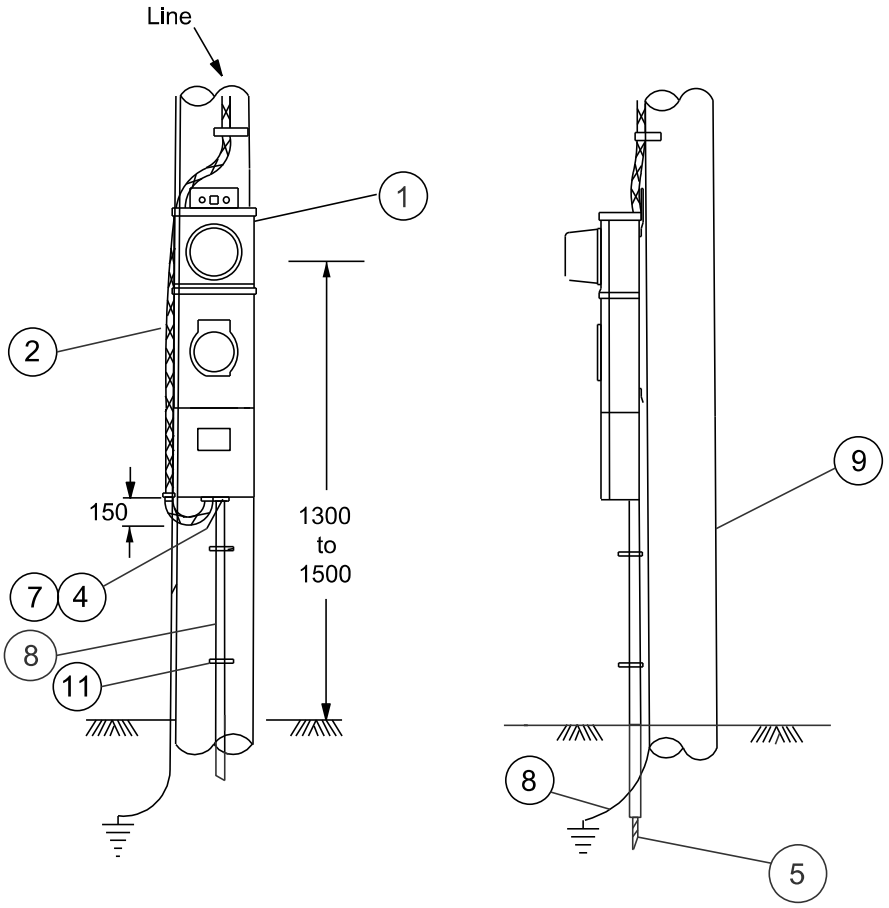
The customer shall:

- trench and install the electrical service from the farm service breaker to the house panel.
- supply and install all the materials as per page 23.
- supply and install all wiring, equipment and facilities on the load side of the meter.

The company shall:

- supply and install SE cable up to the farm service breaker, cabinet, 80 ampere or 200 ampere circuit breaker and all facilities required for electrical service up to the top of the pole.
- supply and install the meter.

Underground Tap From A Farm Service Pole



Dimensions in mm

Item	Qty	Customer Owned and Installed - List of Materials
5	1	Cable S.E. underground service
4	1	Connector bottom for SE cable
7	1	Connector bottom for pipe plastic (PVC)
8	1.7	Pipe plastic rigid PVC 41mm (2”)
11	2	Conduit straps (staple fence)
		Company Owned and Installed - List of Materials
1	1	Cabinet # 10 136005 (Utility Supplied)
2	12	Cable SE (or Tech) see X70 (Utility Supplies)
8	1	E12 ground
9	1	Pole

Note:

1. Customer is responsible to supply and install the electrical service from the meter base to the breaker panel inside the house.
2. The installation shall be to the Canadian Electrical Code requirements.
3. The Company may install an anchor for the new farm services on poles.

Urban Multiple Residential Dwelling
Urban multi residential dwellings include apartment buildings, duplexes or four-plexes. Refer to page 25 for more details (*Multiple Services in a Multiple Dwelling*)

General Requirements

- Lots that have/will have strata or condo association ties to the lot, or have a strata or condo association building on the lots will be served by a single service entrance. Refer to page 78 for details.
- All services requiring services for more than a duplex will require a main disconnect a splitter box and meter bases.
- One-Four meters can be installed on the outside wall. The meters must be installed at a height between 1.5 to 1.8 meters. The meters for one building must be grouped together.
- There shall not be any cover built on the main breaker, splitter and meters. This entire installation shall be weatherproof and must conform to Canadian Electrical Code.
- If desired by the customer, or if 5 or more meters serve a building, the main breaker, splitter box and electrical meters will be installed in an electrical room inside the building.
- The minimum inside width of the room will be 2 meters by 2.44 meters high and must be equipped with at least one light. The customer must provide access for this room to the utility.
- Services with expected demand over 75KVA shall be 3 phase. Services over 150kVA must be underground. Services over 225KVA will be serviced with a padmount transformer and a service pedestal.

Single Phase Urban Residential Multiple Dwelling Services from an Overhead Transformer

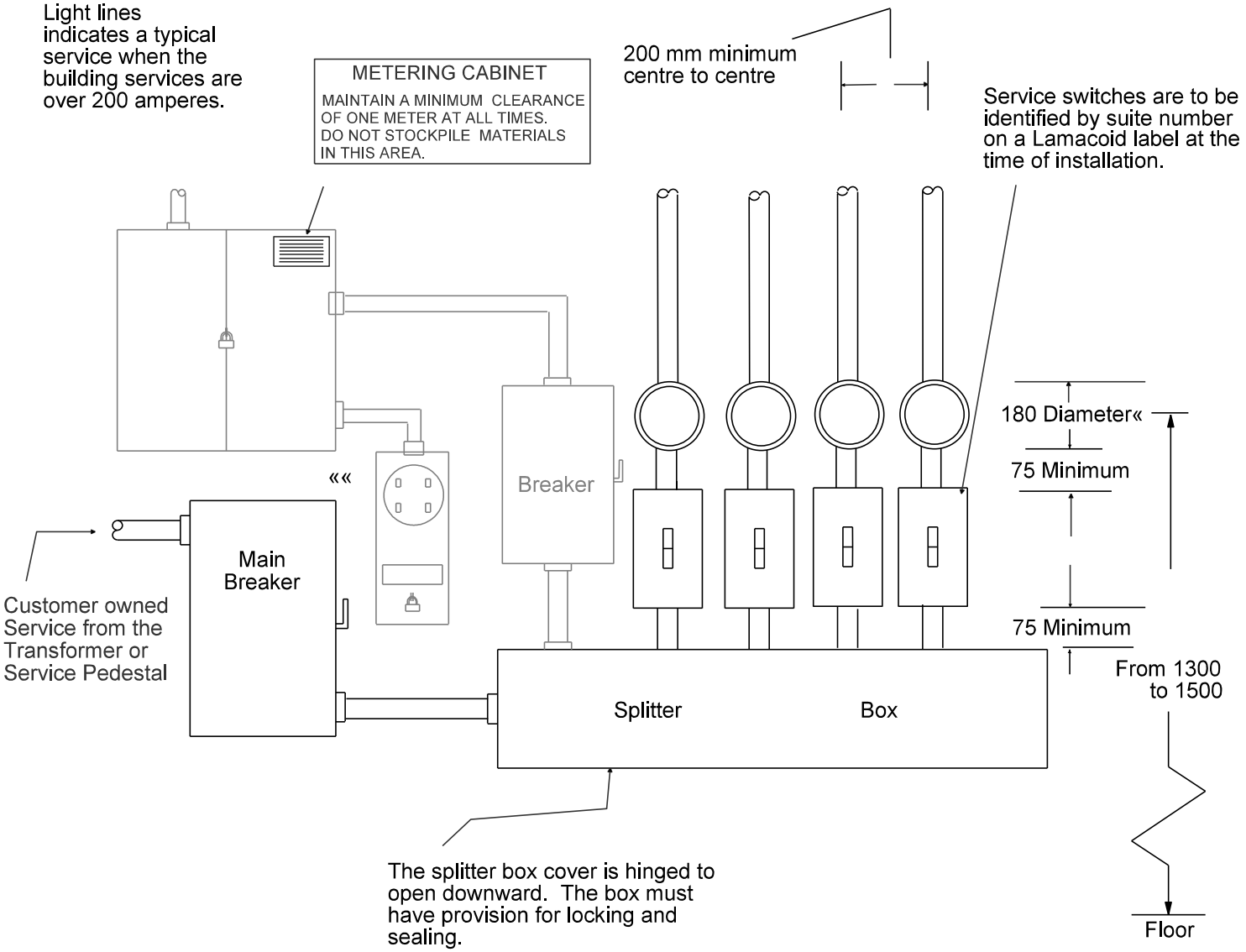
The customer shall:

- supply & install a CSA approved low voltage, socket type meter base with a 200 ampere rating with a minimum size of 254mm x 432mm. For contained apartments or duplexes, provide an approved 200 amp, 2 gang meter base minimum 406 mm x 610 mm wide. The base shall not have a shorting device.
- supply the connectors*(see page 26 for details) for any services **greater *than*** 150 kVA if served from a 3 ph transformer bank with a secondary riser.
- supply and install conduit, weatherhead, rack and conductor in the mast.
- supply and install the main breaker, conductors, splitter box, all wiring, equipment and facilities on the load side of the meter.

The company shall:

- supply and install all facilities required for electrical service up to the weatherhead including the conductors, connectors**(see page 26 for details) from pole to mast for the services ***up to*** 150 KVA if served from a 3 phase transformer bank.
- supply and install the meter/meters.

Multiple Services In A Multiple Dwelling



Notes:

1. Where there are three or more meters, a main breaker and a splitter box on the line side of the meters is required.
2. A maximum of four meters can be installed on the outside wall of the building provided the maximum height and minimum height remains between 1.8 to 1.5 meters. This installation shall be weatherproof and must conform to the Canadian Electrical Code.
3. The meters can also be installed in an electrical room. For the minimum dimensions of the electrical room see page 24.
4. The customer must provide access to the building and electrical room.
5. The breakers are ahead of the meters the customer will provide the means to lock/seal the breakers.

Dimensions are in mm

Urban Residential Multiple Dwelling - Underground Service

The customer shall:

- supply and install a CSA approved low voltage, socket type meter base with a 200 ampere rating with a minimum size of 254mm x 432mm. For contained apartments or duplexes, provide an approved 200 ampere, 2 gang meter base minimum 406mm x 610 mm. The base shall not have a shorting device.
- supply and install the main breaker, conductor and splitter box.
- trench, supply and install the conduit and conductors from the service pedestal or pole with an overhead to underground riser to the main breaker for a 3 Plex or more units. Refer to drawing page 25 *(Multiple Services in a Multiple Dwelling),* page 29 for *(1-Phase Underground Commercial Service from a Company Pole)* and page 47 for *(3- Ph Underground Service from a Company Pole).*
- install the CTs and complete the primary connections of the CTs, if the service is over 200 ampere.
- supply and install all wiring, equipment and facilities on the load side of the meter.
- supply the connectors for any services **greater *than*** 150 kVA if served from a 3 phase transformer bank with a secondary riser.
- *supply the connectors which are approved by the Utility Company. The customer is required to contact the Utility Company before purchasing the connectors to ensure the connectors supplied by the customer are of adequate quality.
- make the secondary cable connections in the service pedestal during the supervision of utility employee.

The company shall:

- supply and install all facilities required for electrical service up to the transformer or service pedestal or riser.
- supply and install connectors for services ***up to*** 150 KVA if served from a 3 phase transformer bank with a secondary riser.
- **make the secondary cable connections to the transformer bank jumpers if the service is over 150KVA.
- trench and install the service wires up to the line side of the electrical meter for services for a duplex.
- supply CTs for the house meter (for services over 200 ampere)
- connect all wiring between the current transformers (CTs) and the meter base.
- provide the supervision for the customer to connect to utility service pedestal.

*see page 24 for reference
**see page 24 for reference

Commercial Services

Commercial services are generally businesses that provide sales, transportation, packaging, distribution, storage and accounting of goods and services.

Single Phase Commercial Services - Self-contained Metering

Underground Commercial Service in an Overhead area:

Single phase self-contained metering is used for commercial services where the main breaker rating does not exceed 200 amperes. For services less than 300 volts line to line, metering shall be located on the line side of the customer's main breaker. For services over 300 volts line to line, metering shall be located on the load side of the customer's main breaker.
Please refer to page 33 for more details *(Multiple services for Commercial Services-Self Contained Metering).*

General Requirements:

- If the number of services is more than two, a main breaker, splitter box and meter bases are required as per page 25.
- The main disconnect, splitter box and meters can be installed on the outside wall of a building in a weatherproof cabinet.
- Where recessed metering is installed in a wall, a clear space of not less than 0.2 meters on either side of the centre line of the meter base and 1.0 meter in front of the meter is required, to provide the company access to the meters.
- The centre line of the meter socket shall be 1.5 to 1.8 meters above the finished grade or permanent platform and in a properly lighted area.
- Services with expected demand over 75KVA shall be 3 phase. Services over 150kVA must be underground. Services over 225KVA will be serviced with a pad mount transformer and a service pedestal.
- When there is no building available and there will never be a building on site, the underground conductor to the electrical meter for those 1ph U/G services are installed in such a way so that the minimum and maximum heights of the electrical meter is from 1.5 meters to 1.8 meters respectively. The customer to ensure they have approval from the YTG's inspections branch.
- Refer to page 14 for winter construction limitation.

The customer shall:

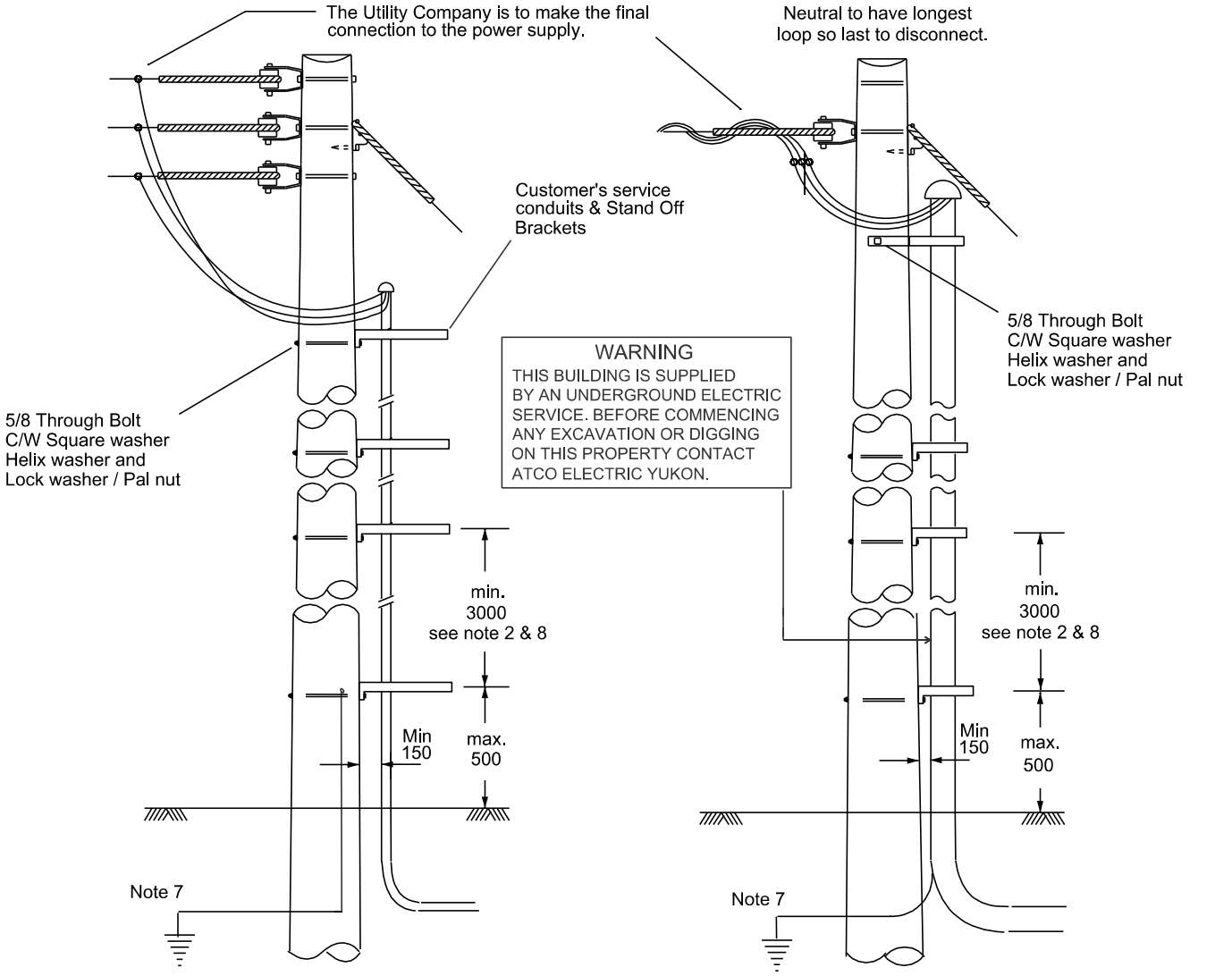
- supply and install a CSA approved low voltage, socket type meter base with a 200 ampere rating. The base shall not have a shorting device.
- trench, supply and install all conduits, unistrut brackets, clamps, weatherhead and service conductors. Please refer to page 29 (1-*Phase Underground Commercial Service from a Company Pole*) for more details.
- install the first section of the conduit and arrange to assist the Utility Company to install remaining conduits of the riser.
- if no ground exists at the riser pole location, the customer is to supply a ground rod and 15 meters of # 4 WP copper wire to the non-climbing side of the pole to a height of 2.5 meters above ground level.

- maintain all facilities installed by the customer.
- obtain an Electrical Permit/Connect Authorization from the Electrical Inspection branch.

The company shall:

- install customer supplied ground wire on pole and connect to the neutral.
- install all conduits and unistrut brackets higher than 2.5 meters above ground with the customer's assistance.
- supply and install connectors for services ***up to*** 150 KVA if served from a 3 phase transformer bank with a secondary riser.
- make the secondary cable connections to the transformer bank jumpers if the service is over 150KVA.
- supply and install the meter/meters.

1-Phase Underground Commercial Service From A Company Pole



Dimensions in mm

Notes:

1. Customer to supply service conductors, all conduits, unistrut brackets, clamps and weatherhead.
2. Conduits of size 2.5"(or Larger) rigid PVC will be acceptable with spacing between supports as per CEC rule # 12-1114 and with minimum spacing of 3.0 meters at one point only.
3. Prior to starting work on the riser installation and connection to the Utility System, the electrical contractors are to arrange onsite meeting with Utility Company's service department to discuss the work plan.
4. Customer's electrical contractor to install maximum amount of conduits, while ensuring equipment and people maintains 1 meter clearance from the power facilities.
5. Conduits to be installed on the non climbing side of the pole as determined by the Utility Company. The non climbing side will be seen as (in order of priority): (a) Not the side nearest the road or lane (b) Under a guy wire as shown above (c) Under the transformers (if applicable)
6. Customer to contact the Utility Company's service department prior to digging in the vicinity of the pole to determine if it is necessary to support the pole.
7. The bottom stand-off bracket needs to be grounded by the customer's electrical contractor.
8. Ensure that the conduit & other installation do not obstruct the view of pole details, showing height and class.

Overhead Commercial Service in overhead areas

The customer shall:

- supply and install a CSA approved low voltage, socket type meter base with a 100 or 200 ampere rating for metering on a building. The base shall not have a shorting device.
- supply and install conduit, weatherhead, rack and conductor in the mast for metering located on a building.
- supply the connectors for any services **greater *than*** 150 kVA if served from a 3 phase transformer bank with a secondary riser.
- supply the connectors which are approved by the Utility Company. The customer is required to contact the Utility Company before purchasing the connectors to ensure the connectors supplied by the customer are of adequate quality.
- supply and install all wiring, equipment and facilities on the load side of the meter.

The company shall:

- supply and install all facilities required for electrical service on the line side of the weatherhead.
- supply and install connectors for services ***up to*** 150 KVA if served from a 3 phase transformer bank with a secondary riser.
- make the secondary cable connections to the transformer bank jumpers if the service is over 150KVA.
- supply and install the meter.

Underground Commercial Service in underground areas

The customer shall:

- supply and install a CSA approved low voltage, socket type meter base with a 200 ampere rating. The base shall not have a shorting device.
- supply and install the conduit for the conductors to the meter socket on the line side.
- trench, supply and install the conductors from service pedestal to the building.
- supply and install all wiring, equipment and facilities on the load side of the meter.
- make the secondary cable connections to the pedestal during the supervision of the utility employee.

The company shall:

- supply and install all facilities required for electrical service on the line side of service pedestal.
- provide the supervision for the customer to connect to utility service pedestal.
- supply and install electrical meter/meters.

Single Phase Commercial Services - Instrument Transformer Metering

Instrument transformer metering is used for commercial services where the main breaker rating exceeds 200 amperes and/or 600 volts. Metering shall be on the load side of the customer's breaker. Refer to page 51(*Meter requiring Instrument Transformers*) for additional information.

General Requirements

- Metered and un-metered cable shall not be installed in the same auxiliary gutter or splitter box.
- There shall be no elbows with covers (LB's) or pull boxes between the instrument transformer cabinet and the meter socket.
- Meters shall be located on the inside of a building in the same room as the instrument transformer enclosure, separated by a maximum of 6.5 meters. If the meter cannot be accommodated inside the building, it may be located outside in a weatherproof cabinet.
- For 120/240 volt between 250 to 400 amperes service, two 2 wire CTs will be used. Please refer to page 55 for connections and polarity details and page 54 for typical outline of a 2-wire current transformer 600 volts class, bar type, 50 to 1200 amperes.
- For single phase 120/208 volt over 200 amperes service, a 13 jaw socket type meter base and test switch is required. The customer to install 3 CTs and extend 3rd phase to the CT cabinet.
- Services with expected demand over 75KVA shall be 3 phase. Services over 150kVA must be underground. Services over 225KVA will be serviced with a padmount transformer and a service pedestal.
- Refer to page 14 for winter construction limitations.

Overhead Commercial Service

The customer shall:

- supply and install a CSA approved low voltage, 6 jaw socket type meter base complete with pre-wired test switch and enclosure (for 120/240 volt, 1ph service greater than 200 amperes)
- supply and install the conduit, weatherhead, rack and conductors in the mast.
- supply the connectors for any services **greater than** 150KVA if served from a 3 phase transformer bank with a secondary riser,
- supply the connectors which are approved by the Utility Company. The customer is required to contact the Utility Company before purchasing the connectors to ensure the connectors supplied by the customer are of adequate quality
- supply and install all wiring, equipment and facilities on the load side of the meter.
- supply and install a company approved instrument transformer enclosure. See page 50 *(Instrument Transformers)* and page 62 *(Manufactured Switchgear for Services)* for details.

- be responsible for the installation and primary connection to the current transformer.
- be responsible for purchase and installation of the main breaker

The company shall:

- supply and install all facilities required for electrical service up to the load side of the weatherhead.
- supply and install connectors for services ***up to*** 150 KVA if served from a 3 phase transformer bank with a secondary riser.
- make the secondary cable connections to the transformer bank jumpers if the service is over 150KVA.
- supply the current transformer and make the secondary connections of the CT with the test switch and the meter
- supply and install the meter.

Underground Commercial Service

The customer shall:

- supply and install a CSA approved low voltage, 6 jaw socket type meter base complete with pre-wired test switch and a CSA approved enclosure for 120/240 volt 1-phase services greater than 200 amperes.
- supply and install a 13 jaw socket type meter base and test switch for the services operating on 120/208 volt single phase. The customer will extend 3rd phase up to CT cabinet.
- supply and install a company approved instrument transformer enclosure. See page 50 and 62 for details.
- be responsible for the installation and primary connection to the current transformer.
- trench, supply and install service conductors on the load side of the service pedestal
- supply and install all wiring, equipment and facilities on the load side of the meter.
- make the secondary cable connections to the pedestal during the supervision of the utility employee.

The company shall:

- supply the current transformer and make the secondary connections of the CT with the test switch and the meter.
- supply and install all facilities required for electrical service on the line side of the service pedestal.
- provide the supervision for the customer to connect to utility service pedestal.
- supply and install the meter/meters.

Multiple service for Commercial Services – Self Contained Metering

Refer to page 25, (*Multiple Services in a Multiple Dwelling*)

Three Phase Commercial Services - Self-contained Metering

Three phase self-contained metering is used for commercial services where the main breaker rating does not exceed 200 amperes and 600 volts. For services less than 300 volts line to line, metering shall be located on the line side of the customer's main breaker. For services over 300 volts line to line, metering shall be located on the load side of the customer's main breaker. Services over 150kVA must be underground. Services over 225KVA will be serviced with a padmount transformer and a service pedestal.

Overhead and Underground Commercial Service

The customer shall:

- supply and install a CSA approved low voltage, 7 jaw socket type meter base for the services less than 300 volts. The base shall not have a sorting device.
- supply and install a CSA approved low voltage, 7 jaw socket type meter base with isolated neutral option for the services over 300 volts line to line.
- supply and install all wiring, equipment and facilities on the load side of the meter.
- supply and install conductors (in duct) from meter to the service pedestal for underground services.
- supply the connectors for any services greater ***than*** 150 kVA if served from a 3 phase transformer bank with a secondary riser.
- supply the connectors, which are approved by the Utility Company. The customer is required to contact the Utility Company before purchasing the connectors to ensure the connectors supplied by the customer are of adequate quality.
- make the secondary cable connections to the pedestal during the supervision of the utility employee.

For underground services in an overhead areas refer to page 47*(3-Phase Underground Services from a Company Pole).*

The company shall:

- supply and install conductors up to weatherhead for services ***up to*** 150 KVA for overhead services.
- make the secondary cable connections to the transformer bank jumpers if the service is over 150KVA
- supply and install all facilities required for electrical service up to the service pedestal for underground services.
- provide the supervision for the customer to connect to utility service pedestal.
- supply and install the meter/meters.

Three Phase Commercial Services - Instrument Transformer Metering

Three phase instrument transformer metering is used for commercial services where the main breaker rating exceeds 200 amperes and/or 600 volts. Metering shall be on the load side of the customer's breaker.

General Requirements

- Metered and un-metered cable shall not be installed in the same auxiliary gutter or splitter box.
- There shall be no elbows with covers (LB's) or pull boxes between the instrument transformer cabinet and the meter socket.
- Meters shall be located on the inside of a building or in an outdoor weatherproof cabinet. The instrument transformer enclosure and the meter shall be in the same room, separated by a maximum of 6.5 meters. Refer to drawing on page 51 *(Meter requiring Instrument Transformers).*
- Services over 150kVA must be underground. Services over 225KVA will be serviced with a padmount transformer and a service pedestal.
- One meter of clearance is required in front of the metering cabinets for access to the electrical meters.

The customer shall:

- supply and install an appropriate CSA approved 13 jaw meter socket and test switch enclosure.
- be responsible for the installation and primary connection to the current transformers and the installation of the voltage transformers.
- supply and install a company approved instrument transformer enclosure. Refer to page 50 & page 62 for details.
- be responsible for ensuring that the neutral wire is extended into the instrument transformer enclosure. Refer to page 56 & page 57 for details.
- supply the connectors for any services **greater *than*** 150 kVA if served from a 3 phase transformer bank with a secondary riser.
- supply the connectors, which are approved by the Utility Company. The customer is required to contact the Utility Company before purchasing the connectors to ensure the connectors supplied by the customer are of adequate quality.
- supply and install conductors up to the load side of the service pedestal or overhead to underground riser for the underground services.
- supply and install all wiring, equipment and facilities on the load side of the meter.
- make the secondary cable connections to the pedestal during the supervision of the utility employee.

The company shall:

- supply current and/or voltage instrument transformers and upon request, ship the equipment to the electrical contractor or manufacturer.

- supply and install conductors and connectors up to the weatherhead for overhead services ***up to*** 150kVA.
- make the secondary cable connections to the transformer bank jumpers if the service is over 150KVA.
- supply and install all facilities required for electrical service up to the service pedestal.
- provide the supervision for the customer to connect to utility service pedestal.
- supply and install the meter/meters.

INDUSTRIAL SERVICES

Industrial services are generally large facilities where the primary function is in oilfield operations, mining operations, manufacturing and/or producing of a product.

General Requirements

- Where recessed metering is installed in a wall, a clear space of not less than 0.2 meters on either side of the centre line of the meter base and 1.0 meters in front of the meter is required, to provide the company access to the meters.
- Metering shall not be located on the pump jack. Metering shall be located on a remote or separate service pole. (i.e. a service pole or transformer pole) away from the pump jack.
- The centre line of the meter socket shall be 1.5 to 1.8 meters above the finished grade or permanent platform and in a properly lighted area.
- Refer to page 14 for winter construction limitations.

Single Phase Industrial Services - Self-contained Metering

Single phase self-contained metering is used for industrial services where the main breaker rating does not exceed 200 amperes. For services less than 300 volts line to line, metering shall be located on the line side of the customer's main breaker. For services over 300 volts line to line, metering shall be located on the load side of the customer's main breaker.

General Requirements

Meters shall be located on the outside of a building.

Overhead Industrial Service

The customer shall:

- supply and install a standard 100 or 200 ampere rating 4 jaw socket type meter base for 120/240 volt single phase service, The base shall not have a shorting device.
- supply and install a standard 5 jaw socket type meter base with a 100A or 200 ampere rating for metering on the building for 120/208 volt single phase service.
- supply and install conduit, weatherhead, rack and conductor in the mast for metering located on a building.
- supply and install all wiring, equipment and facilities on the load side of the meter.

The company shall:

- supply and install all the secondary conductors required for electrical service up the load side of the weatherhead.
- supply and install the meter/meters.

Underground Industrial Service

The customer shall:

- supply and install a standard 4 jaw socket type meter base with a 100 or 200 ampere rating for metering on a building for 120/240 volt single phase services, The base shall not have a shorting device.
- supply and install a standard 5 jaw socket type meter base with a 100 or 200 ampere rating for metering on the building for 120/208V single phase service.
- trench, supply and install the secondary service conductors from service pedestal to the line side of the meter.
- supply and install all wiring, equipment and facilities on the load side of the meter.
- make the secondary cable connections to the pedestal during the supervision of the utility employee.

The company shall:

- supply and install all facilities required for electrical service up to the service pedestal.
- provide the supervision for the customer to connect to utility service pedestal.
- supply and install the meter/meters.

Single Phase Industrial Services - Instrument Transformer Metering

Single phase instrument transformer metering is used for industrial services where the main breaker rating exceeds 200 amperes. Metering shall be on the load side of the customer's breaker.

General Requirements

- Metered and un-metered cable shall not be installed in the same auxiliary gutter or splitter box. There shall be no elbows with covers (LB's) or pull boxes between the instrument transformer cabinet and the meter socket.
- Meters shall be located on the inside of a building or in an outdoor weatherproof cabinet with the instrument transformers. The instrument transformer enclosure and the meter shall be in the same room, separated by a maximum of 6.5 meters. Refer to drawing on page 51 for more details.
- Services with expected demand over 75KVA shall be 3 phase. Services over 150kVA must be underground. Services over 225KVA will be serviced with a padmount transformer and a service pedestal.

Overhead Industrial Service

The customer shall:

- install two 2 wire CTs and 6 jaw meter base complete with a pre-wired test switch for 120/240 volt between 250 to 400 ampere service. Please refer to page 55 (*connections and polarity details*) *and* page 54 *(typical outline of a 2-wire current transformer 600 volts class, bar type, 50 to 1200 amperes).*
- install a 13 jaw socket type meter base and test switch for single phase 120/208 volt over 200 ampere service The customer to install three CTs and extend 3rd phase to the CT cabinet.
- supply and install the conduit, weatherhead, rack and conductors in the mast.
- supply the connectors for any services **greater than** 150KVA if served from a 3 phase transformer bank with a secondary riser,
- supply the connectors which are approved by the Utility Company. The customer is required to contact the Utility Company before purchasing the connectors to ensure the connectors supplied by the customer are of adequate quality
- supply and install a company approved instrument transformer enclosure. Please refer to page 50 and 62 for details.
- be responsible for the installation and primary connection to the current transformers.
- supply and install all wiring, equipment and facilities on the load side of the meter.

The company shall:

- supply and install all facilities required for electrical service to the line side of weatherhead.
- supply and install connectors for services ***up to*** 150 KVA if served from a 3 phase transformer bank with a secondary riser.

- make the secondary cable connections to the transformer bank jumpers if the service is over 150KVA.
- supply the current transformers.
- supply and install the meter/meters.

Underground Industrial Service

The customer shall:

- install two 2 wire CTs and 6 jaw meter base complete with a pre-wired test switch for 120/240 volt between 250 to 400 ampere service. Please refer to page 55 *(connections and polarity details)* and page 54 *(typical outline of a 2-wire current transformer 600 volts class, bar type, 50 to 1200 amperes).*
- install a 13 jaw meter base and test switch for single phase 120/208 volt over 200 ampere service. The customer to install 2 CTs and extend 3rd phase to the CT cabinet.
- supply and install a company approved instrument transformer enclosure. Please refer to page 50 and 62 for details.
- be responsible for the installation and primary connection to the current transformer.
- supply and install all wiring, equipment and facilities on the load side of the meter.
- trench, supply and install the conductors from service pedestal to the building.
- make the secondary cable connections in the pedestal during the supervision of the utility employee.

The company shall:

- supply the current transformer.
- supply and install all facilities required for electrical service up to and including the service pedestal.
- provide the supervision for the customer to connect to utility service pedestal.
- supply and install the meter/meters.

Three Phase Industrial Services - Self-contained Metering

Three phase self-contained metering is used for industrial services where the main breaker rating does not exceed 225 amperes and 600 volts. For services less than 300 volts line to line, metering shall be located on the line side of the customer's main breaker. For services over 300 volts line to line, metering shall be located on the load side of the customer's main breaker.

Services over 150kVA must be underground. Services over 225KVA will be serviced with a padmount transformer and a service pedestal.

General Requirements

For all three phase oilfield services, 7-jaw meters shall be used. See page 65 *(Diagram of Socket Connections - continued).*

Overhead and Underground Industrial Service

The customer shall:

- supply and install the standard 7 jaw socket type meter base for a service less than 300 volts. The base shall not have a shorting device.
- supply and install the standard 7 jaw socket type meter base with the isolated neutral block as per Canadian Electrical Code for a service greater than 300 volts line to line.
- supply and install all wiring, equipment and facilities on the load side of the meter.
- trench, supply and install conductors from the meter to the service pedestal for underground services.
- supply the connectors for any services greater ***than*** 150 kVA if served from a 3 phase transformer bank with a secondary riser.
- supply the connectors, which are approved by the Utility Company. The customer is required to contact the Utility Company before purchasing the connectors to ensure the connectors supplied by the customer are of adequate quality.
- make the secondary cable connections to the service pedestal during the supervision of the utility employee for underground services.

The company shall:

- supply and install conductors up to weatherhead for services ***up to*** 150 KVA for overhead services.
- make the secondary cable connections to the transformer bank jumpers if the service is over 150KVA
- supply and install all facilities required for electrical service up to and including the service pedestal for underground services.
- provide the supervision for the customer to connect to utility service pedestal for underground services.
- supply and install the meter/meters.

Three Phase Industrial Services - Instrument Transformer Metering

- Three phase instrument transformer metering is used for industrial services where the main breaker rating exceeds 225 amperes and/or 600 volts. Metering shall be on the load side of the customer's breaker.
- Services over 150kVA must be underground. Services over 225KVA will be serviced with a padmount transformer and a service pedestal.

General Requirements

- Metered and un-metered cables shall not be installed in the same auxiliary gutter or splitter box. There shall be no elbows with covers (LB's) or pull boxes between the instrument transformer cabinet and the meter socket.
- Meters shall be located on the inside of a building in the same room as the instrument transformer enclosure, separated by a maximum of 6.5 meters. If the meter cannot be accommodated inside the building, it may be located outside in a weatherproof cabinet. Refer to page 51*, (Meter Requiring Instrument Transformers)* for additional information.
- Refer to page 50, *(Instrument Transformers) and page 47* (*3-Phase Underground Service from a Company Pole)* for additional information.

Overhead and Underground Industrial Services

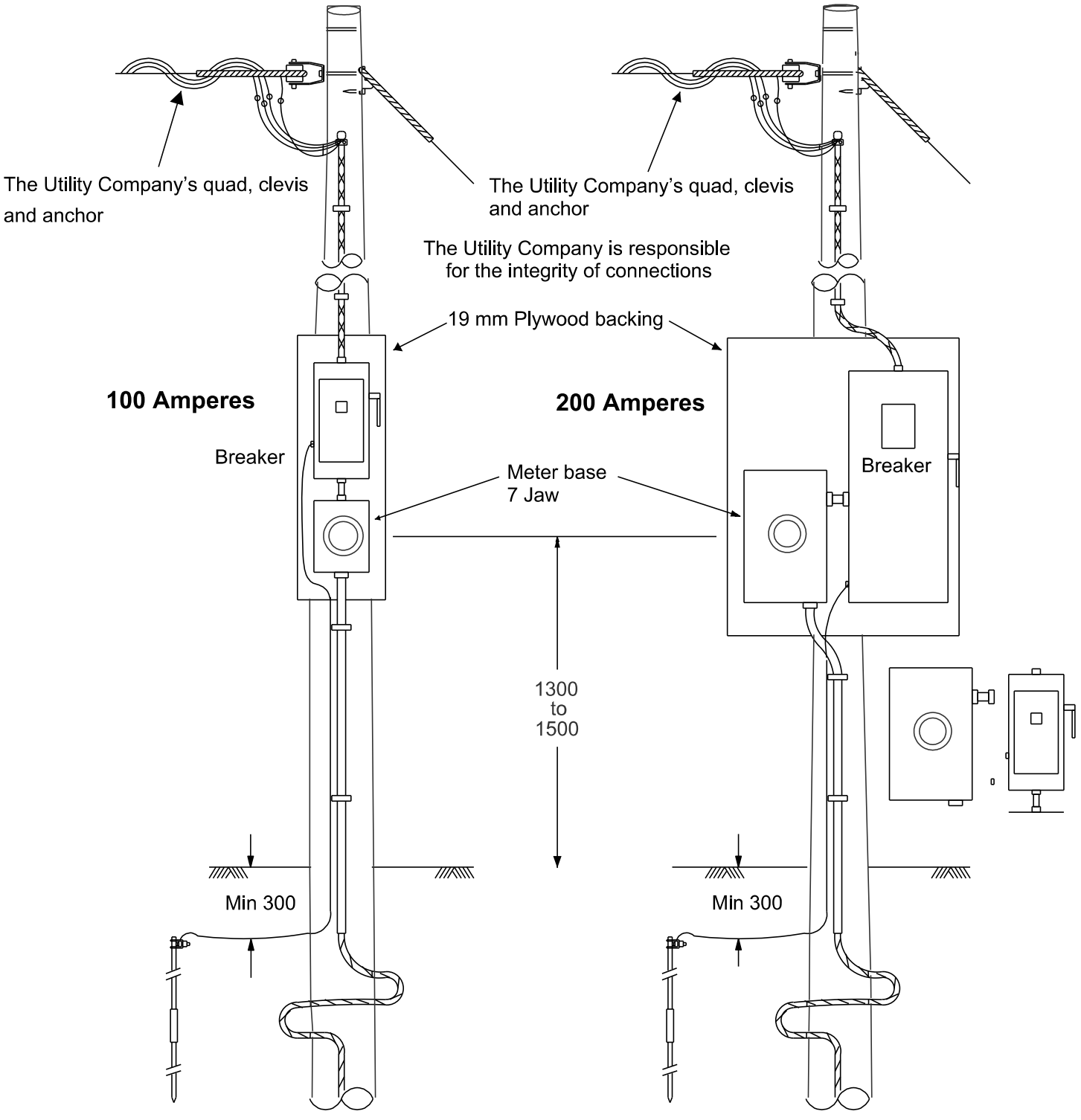
The customer shall:

- supply and install an appropriate CSA approved 13 jaw meter socket and pre-wired test switch enclosure.
- be responsible for the installation of and primary connection to, the current transformers and the installation of the voltage transformers.
- supply and install a company approved instrument transformer enclosure. See page 62, *(Manufactured Switchgears for Services & Metering)* for details.
- be responsible for ensuring that the neutral wire is extended into the instrument transformer enclosure. Refer to page 56 *(3-Phase, 4W 120/208V Y Instrument Metering)* and page 57 *(3-Phase 277/480V Y or 347/600V Y Instrument Metering)* for details.
- supply the connectors for any services **greater *than*** 150 kVA if served from a 3 phase transformer bank with a secondary riser.
- supply the connectors, which are approved by the Utility Company. The customer is required to contact the Utility Company before purchasing the connectors to ensure the connectors supplied by the customer are of adequate quality.
- supply and install the secondary service conductors from the meter to the service pedestal for underground services.
- supply and install all wiring, equipment and facilities on the load side of the meter.
- supply and install conductors up to the load side of the service pedestal or overhead to underground riser for the underground services.
- make the secondary cable connections to the service pedestal during the supervision of the utility employee for underground services.

The company shall:

- supply current and/or voltage instrument transformers and upon request, ship the equipment to the electrical contractor or manufacturer.
- supply and install conductors and connectors up to the weatherhead for overhead services ***up to*** 150kVA.
- make the secondary cable connections to the transformer bank jumpers if the service is over 150KVA.
- supply and install all facilities required for electrical service up to the line side of the service pedestal.
- provide the supervision for the customer to connect to utility service pedestal.
- supply and install the meter/meters.

Self-contained Metering For 3-Phase Oilfield Loads 2-200 Amperes Over 300V

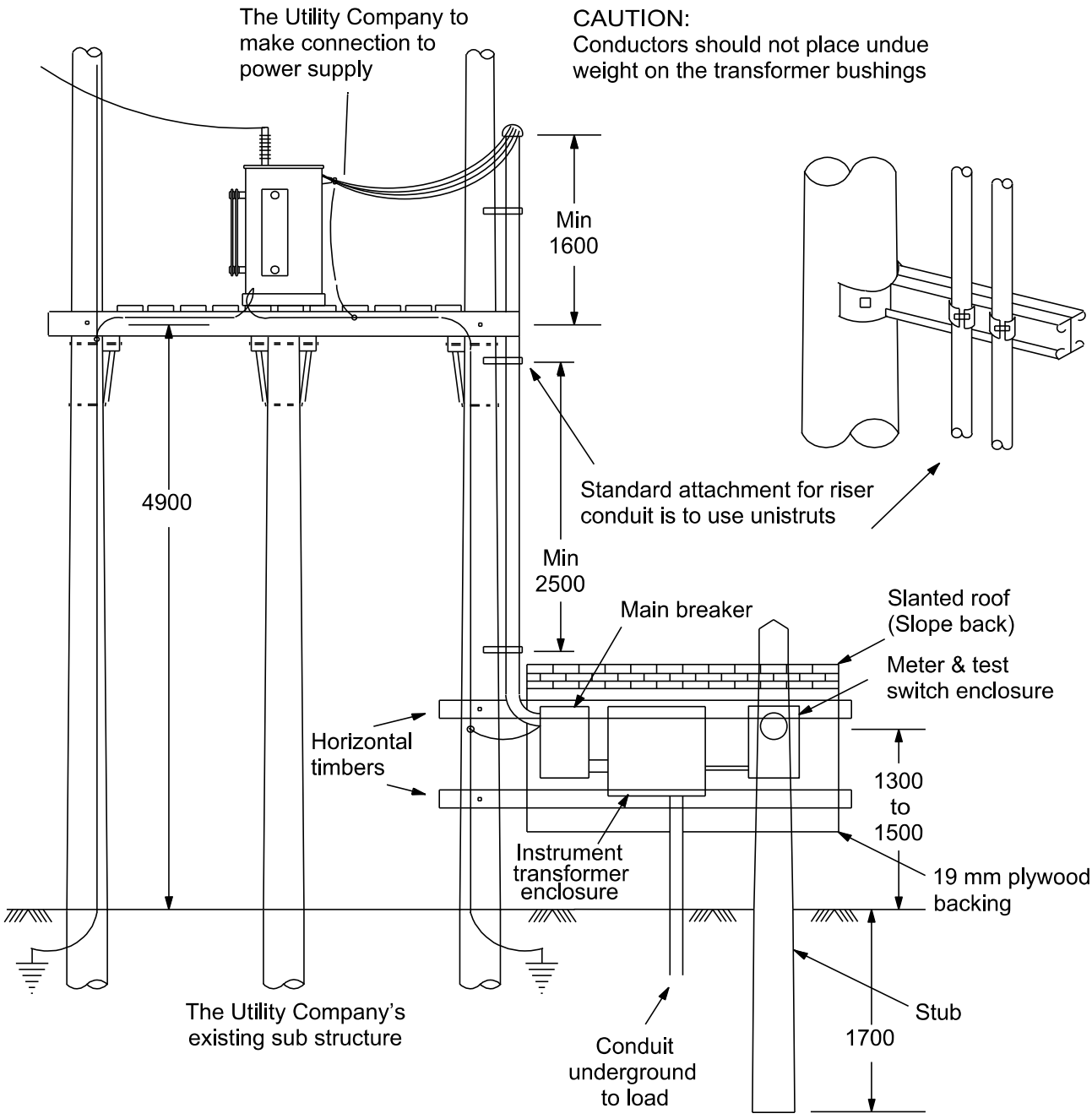


Dimensions in mm

Notes:

1. **For variations, contact the Utility Company's engineering department.**
2. **The Utility Company supplies one conductor per phase or neutral.**
3. **The Utility Company installs customer owned service pole and meter as shown in dashed lines while the customer installs parts shown in solid lines (S.E. Cable, 7-jaw meter socket, U/G service, and ground)**

Pole Metering For Oilfield Loads Over 200 Amperes

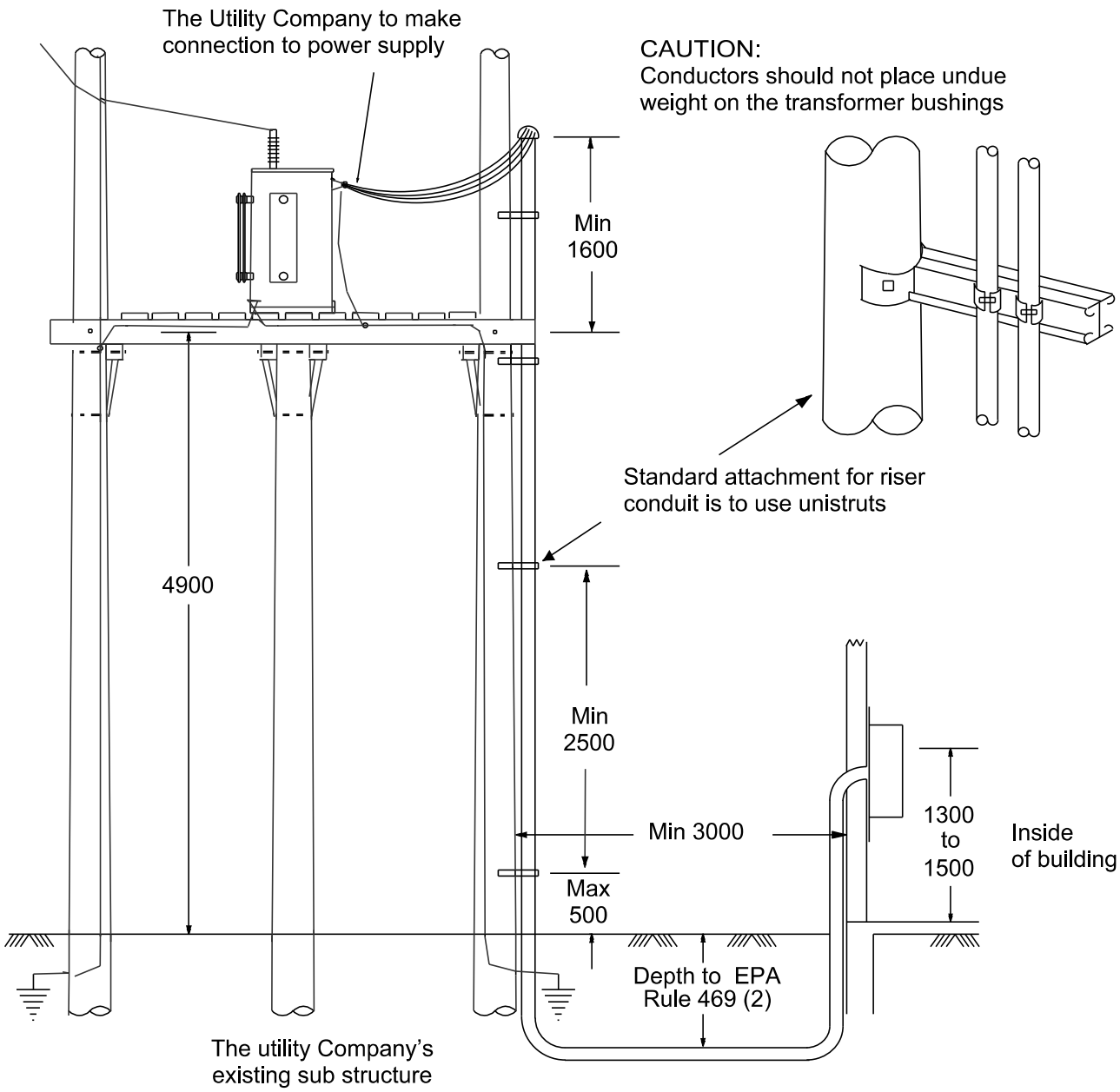


Notes:

1. Provisions required for the Utility Company to lock and seal CT and VT enclosure and meter enclosure.
2. Unistrut brackets are to be installed where cables require conduit of a diameter larger than 40mm or when more than one conduit is required.
3. There shall be no Lb's (90 degree elbows with covers) between the instrument transformer enclosure cabinet and the meter cabinet.
4. The CT cabinet is to be weatherproof.

Dimensions in mm

Metering In A Building For Oilfield Loads Over 200 Amperes

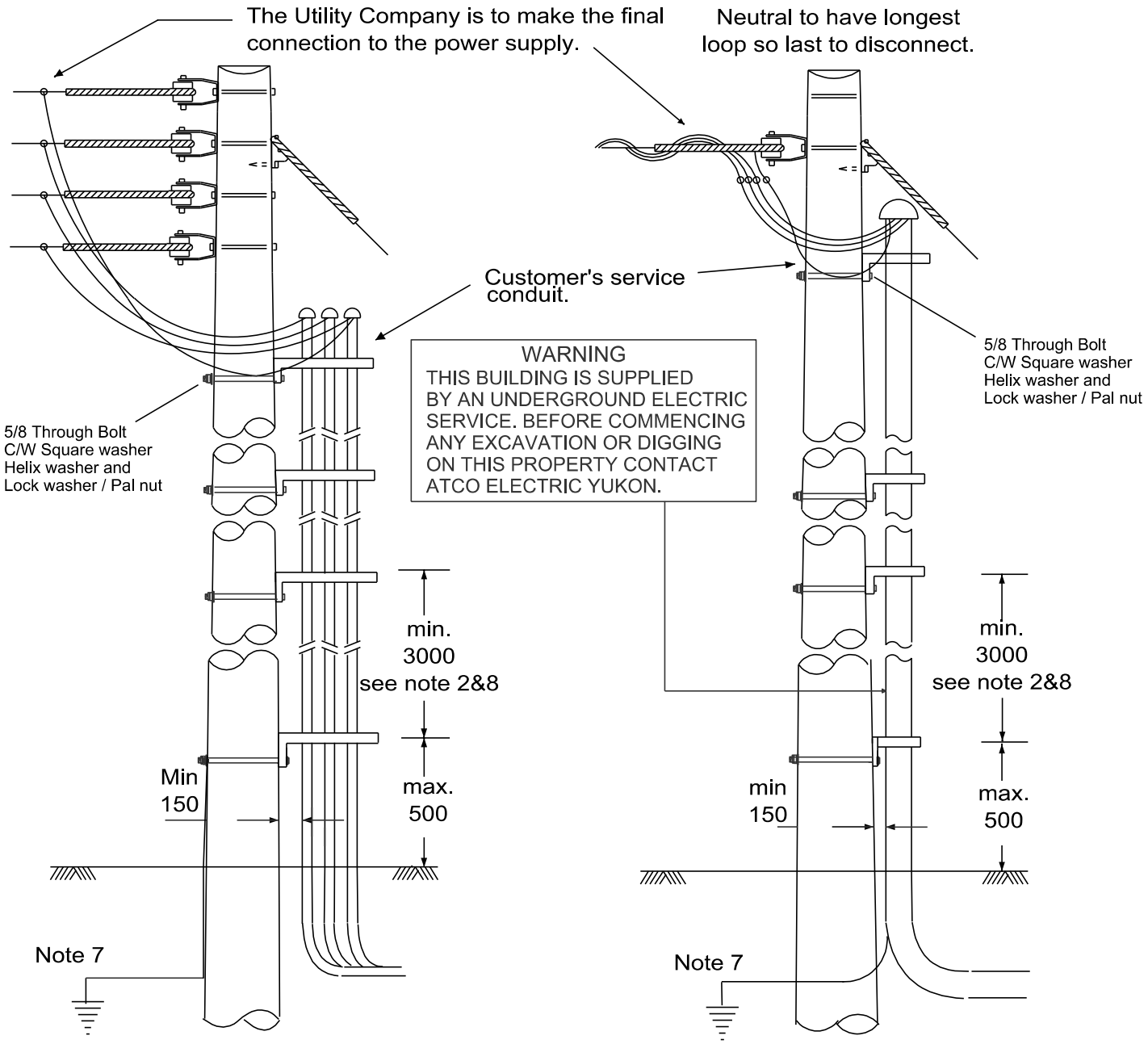


Notes:

1. Provisions required for ATCO to lock and seal CT and VT enclosure and meter enclosure.
2. The customer will supply and install the equipment shown in solid lines on this drawing.
3. The customer shall provide access to the metering for periodic institu testing of CT's and VT's and for reading meter.
4. Unistrut brackets are to be installed where cables require conduit of a diameter larger than 40 mm or when more than one conduit is required.
5. Unistruts come in two sizes with a 216 or 381mm stand-off arm.

Dimensions in mm

3-Phase Underground Service From A Company Pole



Dimensions in mm

Notes:

1. Customer to supply service conductors, all conduits, unistrut brackets, clamps and weatherhead.
2. Conduits of size 2.5"(or Larger) rigid PVC will be acceptable. The spacing between supports as per CEC rule # 12-1114 and with minimum spacing of 2.5 meters at one point only.
3. Prior to starting work on the riser installation and connection to the Utility System, the electrical contractors are to arrange onsite meeting with Utility Company's service department to discuss the work plan.
4. Customer's electrical contractor to install maximum amount of conduits, while ensuring equipment and people maintains 1 meter clearance from the power facilities.
5. Conduits to be installed on the non climbing side of the pole as determined by the Utility Company.
6. Customer to contact the Utility Company's service department prior to digging in the vicinity of the pole to determine if it is necessary to support the pole.
7. The bottom stand-off bracket needs to be grounded by the customer's electrical contractor.
8. Ensure that the conduit & other installation do not obstruct the view of pole details, showing height and class.

TEMPORARY SERVICES & STANDBY SERVICES

Temporary Services

Temporary service normally means a service that will be required for two years or less. In some cases, a longer period may be appropriate if both the company and the customer know that the customer has no intention of remaining on-site permanently. For example, road construction camps sometimes require service for three years while they are constructing a project such as a stretch of highway. To determine whether a service is temporary contact your local company office.

A) Temporary underground service

1) Winter Temporary Services:

Refer to page 14 for winter construction limitation.

The customer shall:

- supply and install an approved “temporary service pole” complete with meter socket base and related hardware within 15m of utility pole and where drop wire cannot be driven under.
- install the temporary service pole next to the conduit stub-off.
- supply and install an approved cable from the meter socket base to the stub-off. The cable is to be a minimum # 6AWG in size and be suitable for connection to 2C #4/0 AL C/N stub-off cable and the cable to have a minimum of 1.5 meters of additional cable slack to ensure sufficient cable to splice into stub-off.
- provide an “Electric Connect Permit/ Connect Authorization” from The Electrical Inspector: and signing of service orders at the Utility Company’s billing office***.***

The company shall:

- supply and install cable from source to conduit stub-off.
- provide the splice connection and bury the splice and associated conductor.
- supply the meter and energize the service.

2) Summer Temporary Services:

Summer construction season is between May 15th and Oct 15th.

The customer shall:

- supply and install an approved “temporary service pole” complete with meter socket base and related hardware placed 3m - 15m of utility pole and where drop wire cannot be driven under.
- install the temporary service pole next to the permanent meter location.
- supply and install an approved cable from the meter socket base to the stub-off. The cable is to be a minimum # 6AWG in size and be suitable for connection to 2C # 4/0 AL C/N stub-off cable and the cable to have a minimum of 1.5 meters of additional cable slack to ensure sufficient cable to splice into stub-off.

- provide an “Electric Connect Permit/ Connect Authorization” from the Electrical Inspector: and signing of service orders at the Utility Company’s billing office***.***

The company shall:

- supply and install cable from source to conduit stub-off.
- provide the splice connection and bury the splice and associated conductor.
- supply the meter and energize the service.

B) Temporary overhead services:

The maximum length of the service drop for an overhead temporary service is 20 meters. The height of the temporary service pole should be selected to ensure the minimum conductor to ground clearance is met. For minimum requirements of the conductor to ground clearance contact the local company

The customer shall:

- supply and install an approved “temporary service pole” complete with meter socket base and related hardware.
- provide an “Electric Connect Permit/ Connect Authorization” from the Electrical Inspector: and signing of service orders at the Utility Company’s YECL billing office***.***

The company shall:

- supply and install low voltage wire (triplex) from nearest power source to the temporary service pole.
- supply the meter and energize the service.

Once all the requirements are complete the company can make arrangements to energize the temporary service.

Note: For the details of the Temporary Service Pole and grounding requirements please check with your local Electrical Inspection Branch.

Standby Services

Standby service normally means a service that has been temporarily disconnected for a period of six to twelve months. The meter will normally have a disconnect sleeve connected or the metering and associated facilities such as the transformer may be temporarily removed. During the standby service period, the customer will be billed on the greater of the contract minimum as agreed upon in their Electric Service Agreement or the rate minimum.

For service reconnection contact your local company office.

The local company office or marketing representative can provide further details on standby services.

INSTRUMENT TRANSFORMERS

Through its local service office, the company shall supply current and voltage instrument transformers. Upon request, the company will ship the equipment to the electrical contractor or manufacturer. The customer is responsible for the installation and primary connection of the current transformers and for the installation of the voltage transformers.

Instrument Transformer Enclosures

The customer must provide a company approved instrument transformer enclosure. On three phase installations the customer is responsible for ensuring that the neutral wire and all phase wires are connected inside the instrument transformer enclosure. Refer to page 56, *(3 Phase, 4 W 120/208 Volt Instrument metering)* & page 57, *(3 Phase, 4 W 277/480Y or 347/600Y Volt Instrument Metering*) for details.

Instrument transformer metering requires a combination socket base and test switch enclosure. Only socket type meters are approved by Yukon Electrical.

Refer to:

page 53, *(Meter and Test Switch Enclosures)*

page 56, *(3 Phase, 4 W 120/208 Volt Instrument metering)* &

page 57*, (3 Phase, 4 W 277/480Y or 347/600Y Volt Instrument Metering)*.

The customer shall supply and install either a 4-jaw meter socket and test switch enclosure, in the case of single-phase services, or a 13-jaw meter socket and test switch enclosure, in the case of three-phase services.

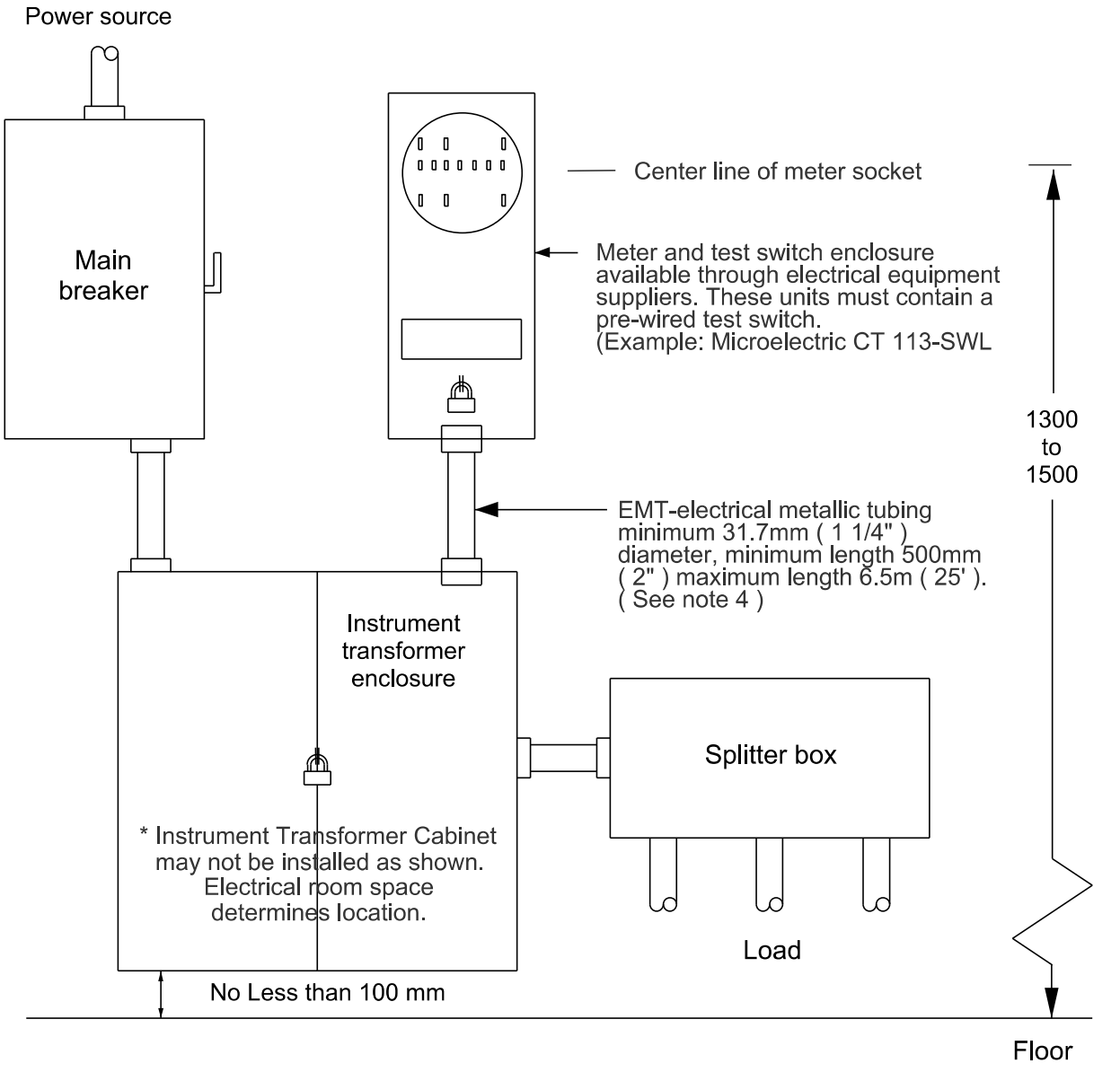
A clear space of one meter is required in front of the enclosure. The company will place a decal label on the outside of the instrument transformer enclosure door. A minimum clearance of 600 mm shall be maintained to pass by the edge of the door of the enclosure which in the open position would block an exit route.

The CT cabinet of the switchgear shall be at least 100 mm above the floor and the switchgear enclosures height shall be no more than 2400 mm above the floor. The enclosure door(s) shall swing open a minimum of 110 degrees. Double, vertically-hinged doors which swing open at least 110 degrees are preferred; however a single-hinged door is acceptable. Enclosures for instrument transformers, meters and test switches shall have provisions for locking and sealing.

For the instrument transformer enclosure dimensions see page 62 *(Manufactured Switchgear for Services and Metering)*. The diagram on page 60 shows Window Type Current Transformer, 600 volt class for larger loads.

Meter Required Instrument Transformers

Typical arrangement for meter requiring instrument transformers.

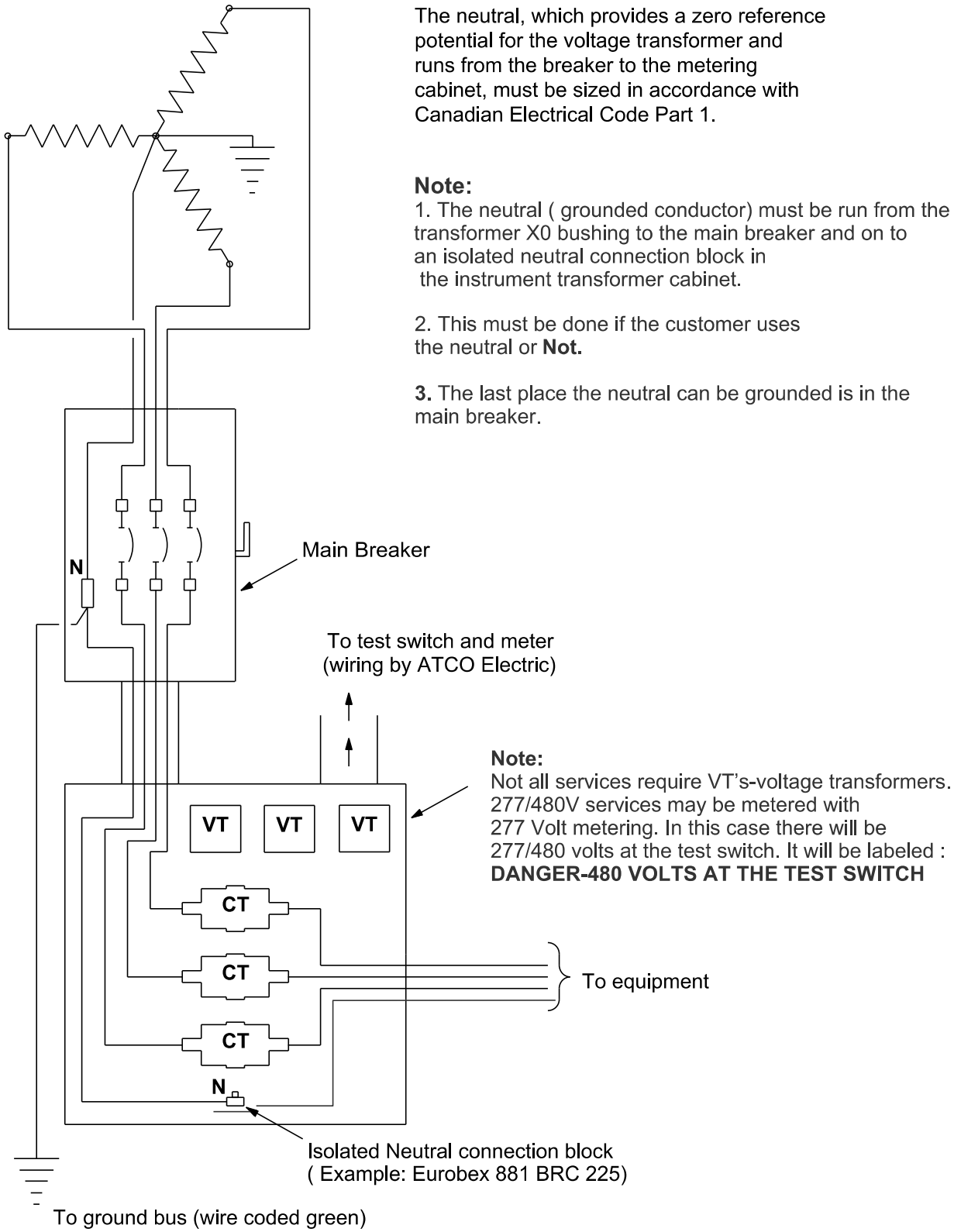


Dimensions in mm

Notes:

1. The instrument transformer, meter and test switch enclosures must be in the same room.
2. The customer must supply meter base with pre-wired test switch.
3. The company prefers that an instrument transformer enclosure with double doors is used, but an enclosure with a single-hinged door is acceptable.
4. Meter shall be located inside a building or on an outside wall in a weatherproof cabinet.
5. There will be no LB's (90 degrees elbows with covers) between the meter enclosure and the instrument transformer enclosure.

Typical Connections For 3-Phase Services



The neutral, which provides a zero reference potential for the voltage transformer and runs from the breaker to the metering cabinet, must be sized in accordance with Canadian Electrical Code Part 1.

Note:

1. The neutral (grounded conductor) must be run from the transformer X0 bushing to the main breaker and on to an isolated neutral connection block in the instrument transformer cabinet.

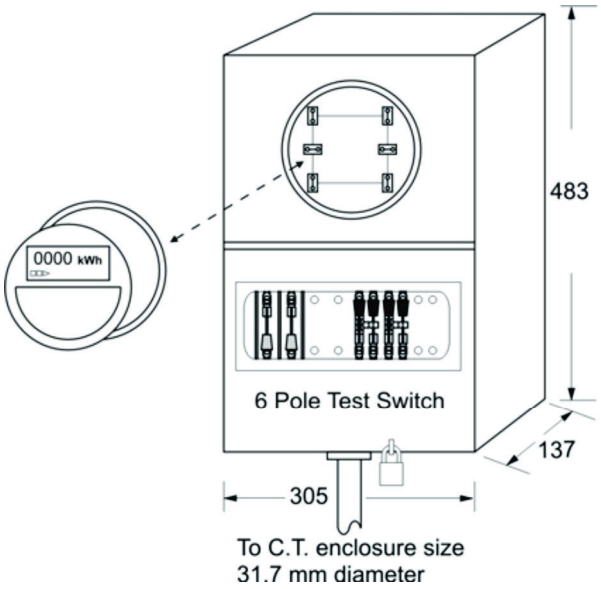
2. This must be done if the customer uses the neutral or **Not.**

3. The last place the neutral can be grounded is in the main breaker.

Note:
Not all services require VT's-voltage transformers. 277/480V services may be metered with 277 Volt metering. In this case there will be 277/480 volts at the test switch. It will be labeled : **DANGER-480 VOLTS AT THE TEST SWITCH**

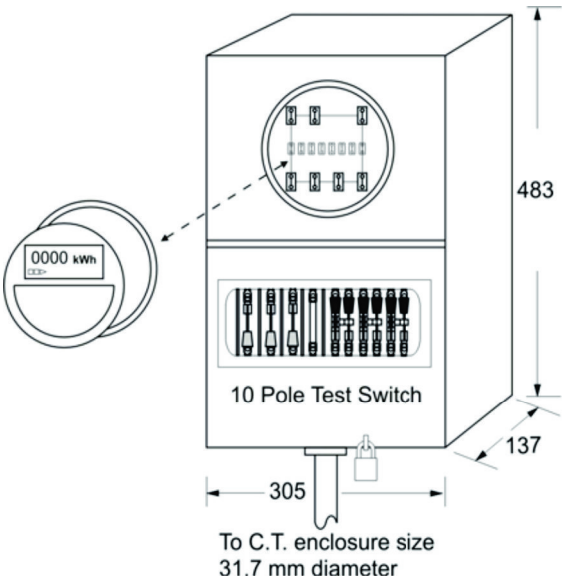
NOTE: An isolated neutral conductor must be provided for all installations.

Meter And Test Switch Enclosures



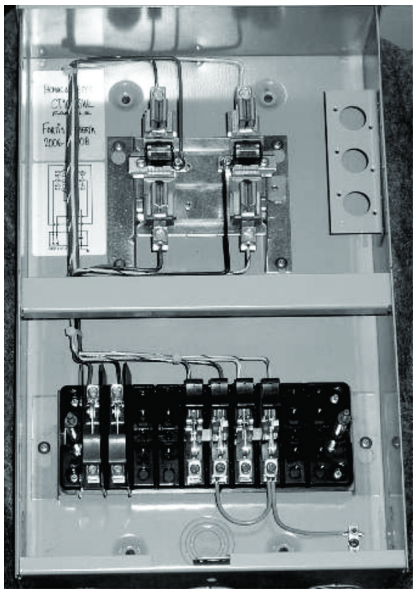
Single Phase (1)

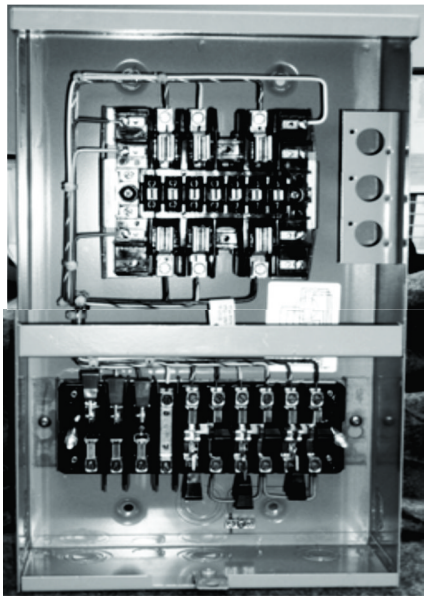
Combined Six terminal meter socket base and 6 pole test switch enclosure with provision of locking



Three Phase (2)

Combined thirteen terminal meter socket base and pole test switch enclosure with provision of locking





Notes:

1. For outdoor application use a single door weatherproof instrument transformer cabinet.
2. The electrical contractor shall not place LB (elbow with cover) between the meter/test switch enclosure and the transformer cabinet.
3. If the meter socket anf the test switch enclosure is on top of the instrument transformer cabinet, the minimum separation is 50mm.
4. For single phase 3 wire services greater than 200 ampere, the Microelectric FA4B-6T may be used. It is a combination of 6 jaw meter socket and test switch enclosure that also houses two 2 wire current transformers. It may be used outside and inside applications.

2-Wire Current Transformer 600V Class

Typical outline of a 2-wire current transformer 600 volt class, bar-type, 50 - 1200 amperes

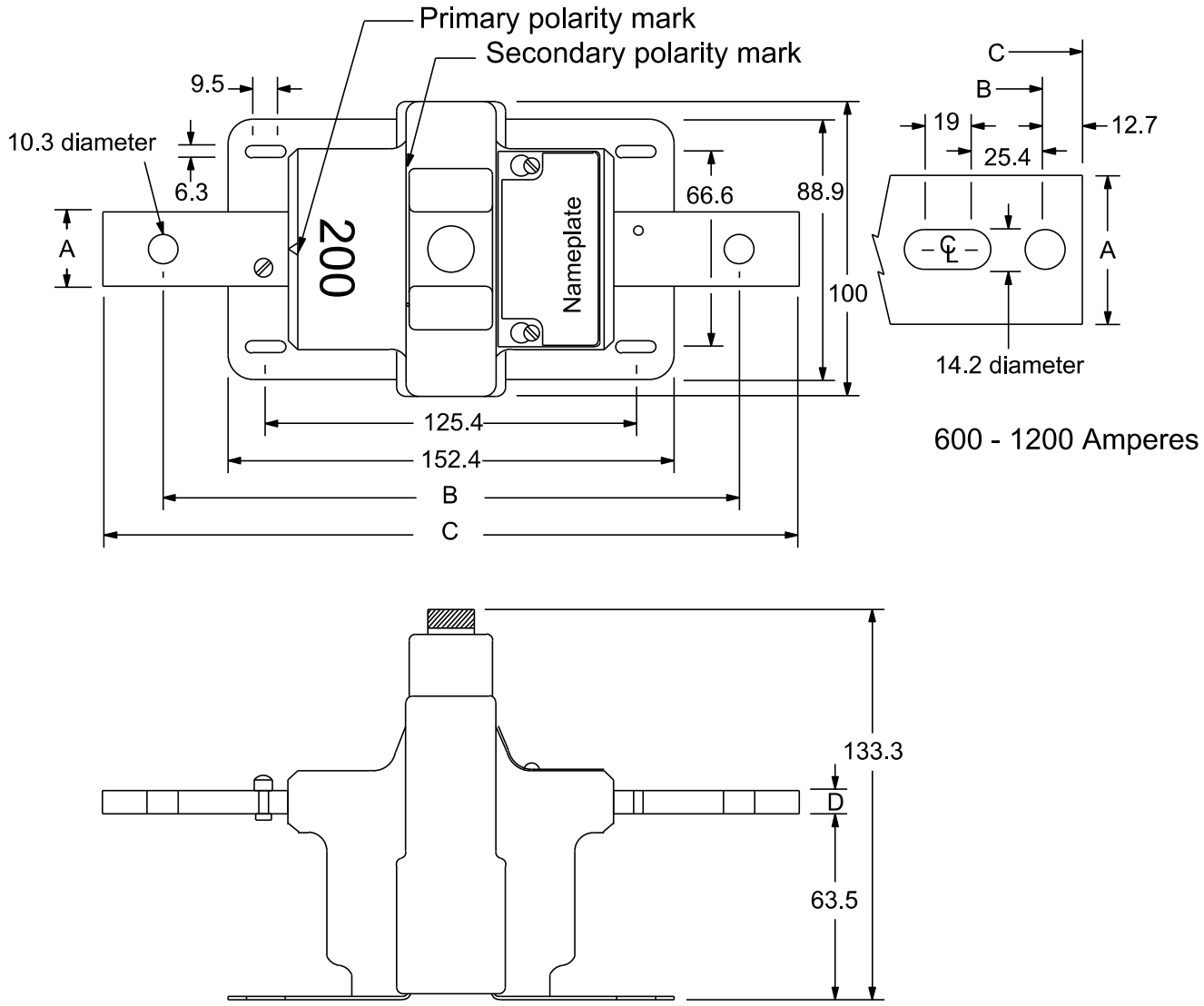
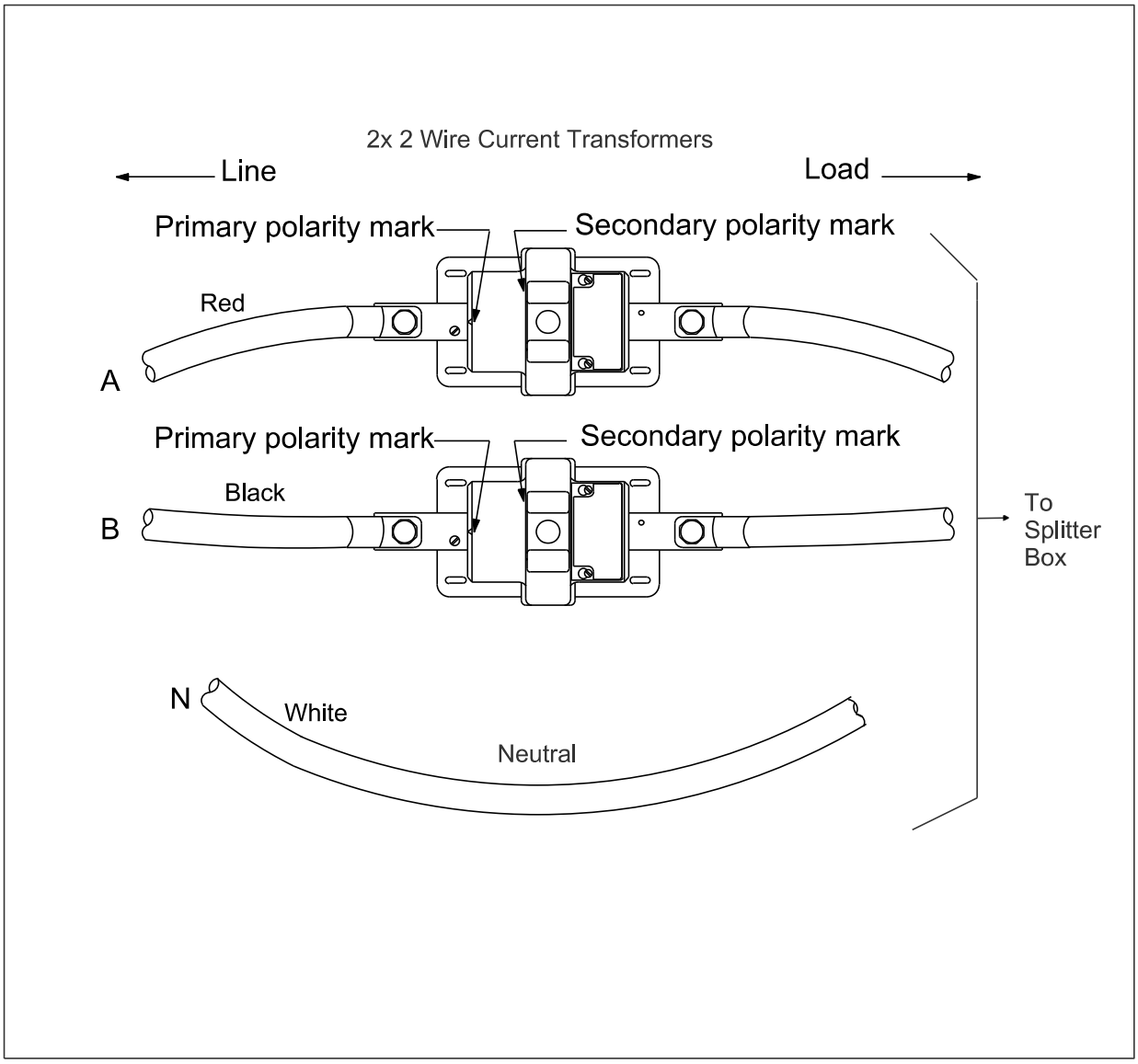


Diagram of a Sangamo Current Transformer

Primary Bar Dimensions				
Capacity (Amperes)	A	B	C	D
50-400	25.4	196.8	238.1	7.9
500-1200	50.8	266.7	292.1	9.5

Dimensions in mm

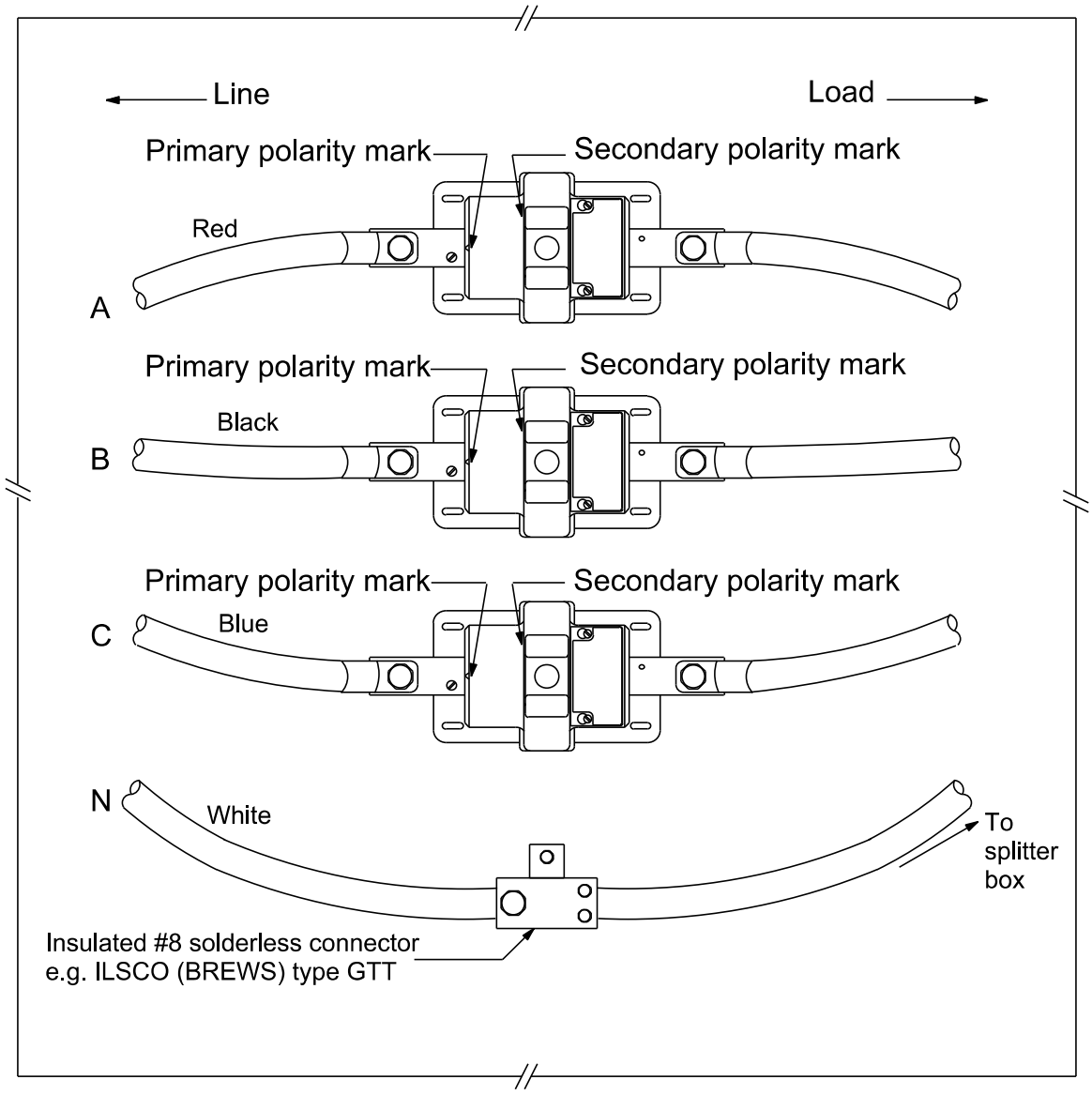
Single Phase, 3 Wire 120/240 Volt Instrument Metering
Typical arrangement of a single phase, 3 wire 120/240 volt instrument metering.



Notes:
1. The Current Transformer secondary polarity marks must always be on the line side
2. The instrument transformer enclosure must be at least 760X760X250mm (H X W X D).
3. A combination of 6 terminal meter socket and test switch enclosure is required as shown on page 53,*Meter and Test Switch Enclosures.*
4. The electrical contractor shall not place LB (elbow with cover) between the meter / test switch enclosure and the instrument meter cabinet.
5. The electrical contractor shall ensure that the connection to the current transformer is made with the correct bolt and is tight.

3 Phase, 4W 120/208Y Volt Instrument Metering

Typical arrangement of a 3 phase, 4 wire 120/208Y volt instrument metering within an instrument transformer enclosure for a 200 to 1200 ampere service.

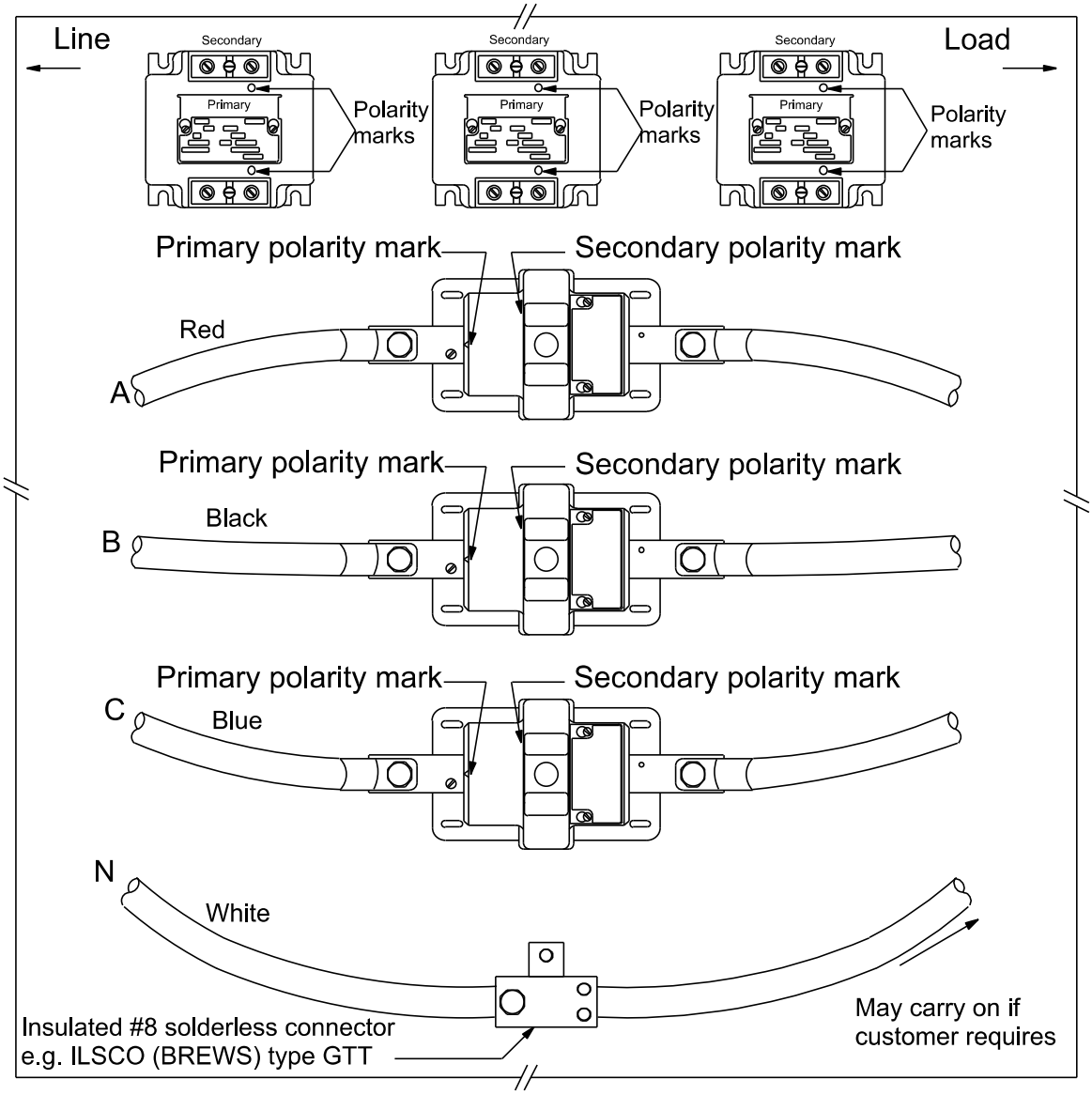


Notes:

1. The secondary polarity marks must always be on the line side.
2. For Instrument transformer enclosure see page 52.
3. A combination of 13 terminal meter socket base within an enclosure is required as shown on page 53, *Meter and Test Switch Enclosures.*
4. The neutral may be connected as shown on page 42, *Typical connections for three phase services.*
5. There must be no LB 's between the instrument transformer cabinet and the meter enclosure.

3 Phase, 4W 277/480Y or 347/600Y V Instrument Metering

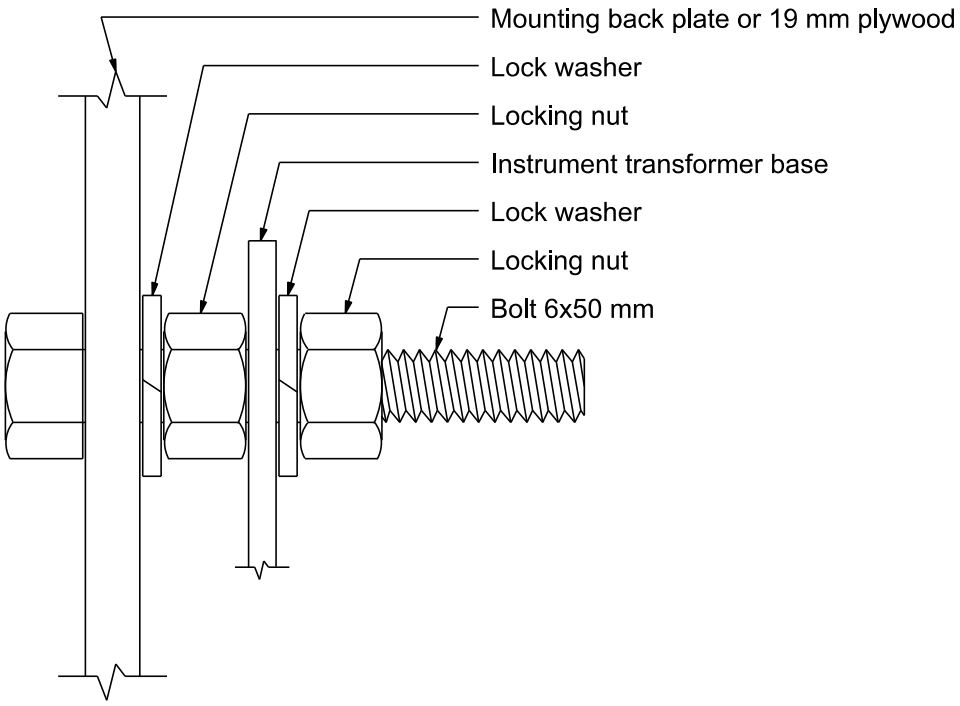
Typical arrangement of a 3 phase, 4 wire 277/480Y or 347/600Y volt instrument metering within an instrument transformer enclosure for a 200 to 1,200 ampere service.



Notes:

1. The secondary polarity marks must always be on the line side.
2. For the instrument transformer enclosure see page 51 and 62.
3. A combination of 13 terminal meter socket base within an enclosure is required as shown on page 53, *Meter and test Switch Enclosures*
4. Typical connections for a three phase service is shown on page 52.
5. There must be no LB 's (elbow with cover) between the instrument transformer cabinet and the meter enclosure.

Method Of Bolting An Instrument Transformer



Notes:

1. The Instrument transformer must be mounted using all the mounting holes supplied by the manufacturer.
2. The company must be able to remove the Instrument transformers without removing the back plate.

MOBILE HOME PARKS AND SERVICES TO MULTIPLE SINGLE FAMILY DETACHED HOUSES ON ONE TITLED PROPERTY

General

Underground services

The customer shall:

- supply and install the metering centre or meter pedestals with breakers on the line side of the metering.
- have provisions to seal the unmetered sections of the metering centre.
- supply and install the wiring and trenching from utility delivery point (Service Pedestal) to the meter centres.
- operate and maintain this service.
- make the secondary cable connections in the service pedestal during the supervision of utility employee.

The company shall:

- supply and install electrical meter/meters.
- provide the supervision for the customer to connect to utility service pedestal.

Mobile Home Parks

In a mobile home park the primary wires including transformers will be owned and operated by the utility. Any wires after the delivery point will be owned, operated and maintained by the customer**.**

The meters shall be located in either metering centres or service pedestals.
No meters on an individual unit will be permitted.

Mobile Home Subdivisions

At mobile home subdivisions, where there are individual titled properties the electrical meters will be installed on the individual residences. Refer to pages 15 to 18 for details.

Overhead servicing

The company **may** allow overhead service to a trailer in its own titled property.

Window Type Current Transformer, 600 Volt Class

Single Phase, 3W 120/240V Instrument Metering

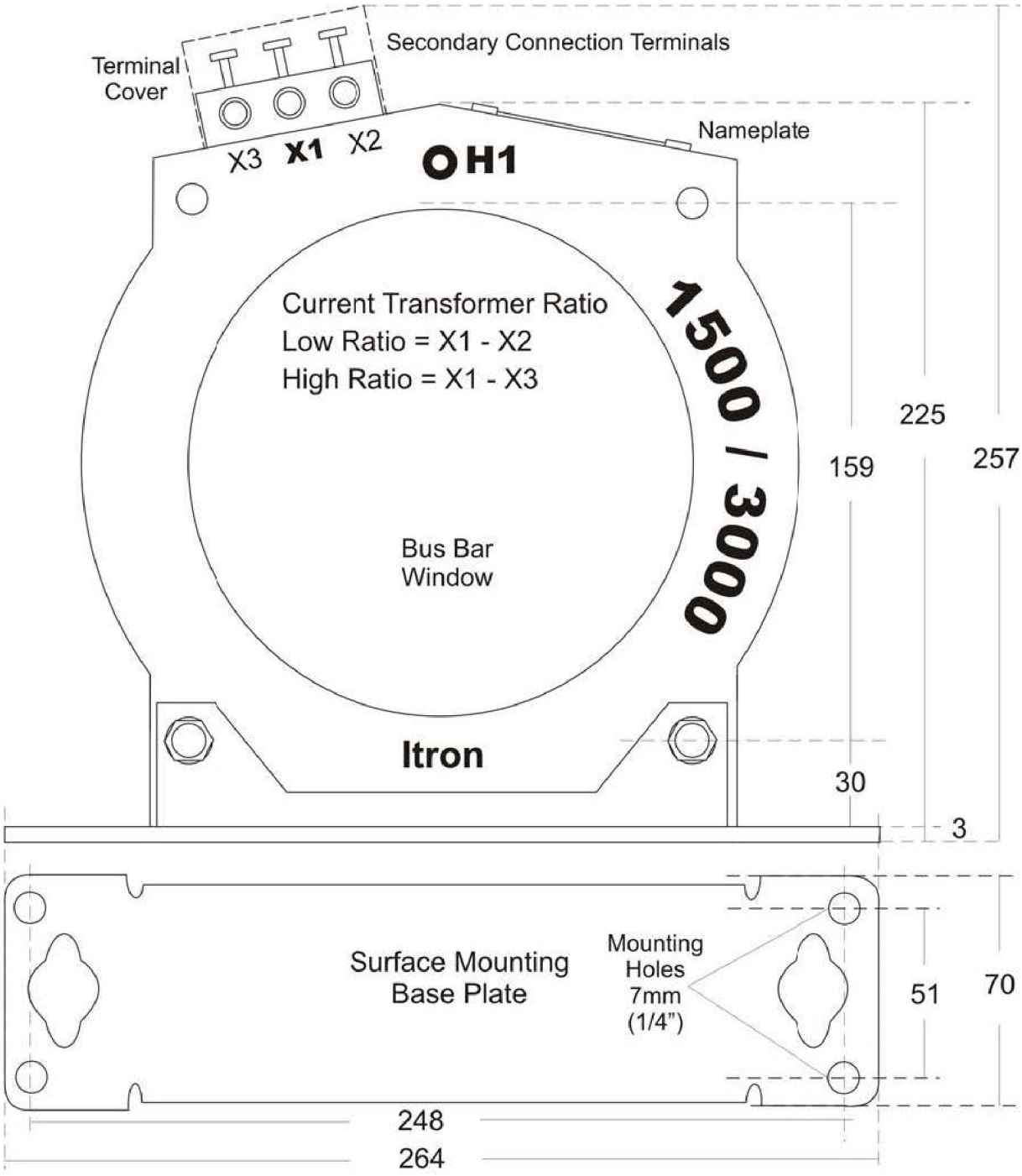


Diagram of Itron, R6L 1500/3000/5 Dual Ratio Window Type CT

Notes:
Window type current transformer require an instrument transformer enclosure of at least 1200X900X300 (H X W X D)

Voltage Transformer 600V Class
Typical outline of a voltage transformer 600 volt class

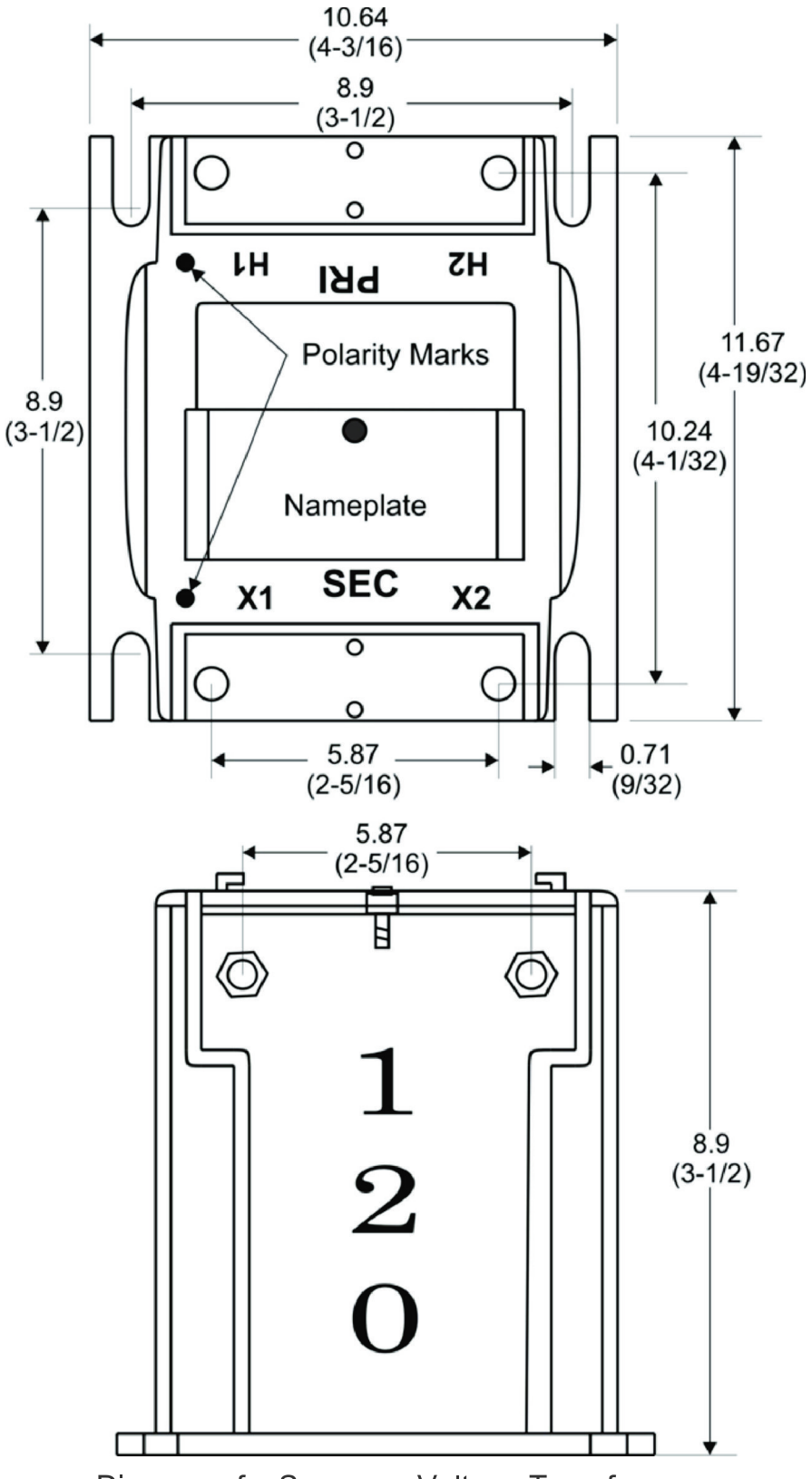


Diagram of a Sangamo Voltage Transformer

Dimensions in cm/in

MANUFACTURED SWITCHGEAR FOR SERVICES & METERING

For 600 volt switchgear, the instrument transformer compartment shall be a minimum height x width x depth of:

760 x 760 x 250 mm for 200-1200 amp service entrance size,
1200 x 900 x 300 mm for 1201-2000 amp service entrance size, and
1200 x 900 x 450 mm for 2001-4000 amp service entrance size.

On CSA approved metal-clad (not cubicle) switchgear some deviation from the above sizes is permitted with prior approval from the company.

For 5000 volt switchgear, the instrument transformer compartment shall be a minimum height x width x depth of 1250 x 900 x 450 mm. The minimum size of conductor leads for the VT primary leads is to be No. 8 AWG shield 5kV cable.

Indoor/Outdoor Switchgear

For service greater than 200 amperes and up to 750 volts with customer owned switchgear, indoor metering is preferred. For 5 - 25kV services, the company prefers outdoor pole mounted metering.

Transducer/Sensing Connections in Switchgear

On indoor customer owned switchgear the only customer load connections permitted ahead of the company metering are load characteristic sensing transducers (i.e.: current or voltage and/or phase sequence or ground fault sensing devices) and transfer switch sensing devices required for main breaker control tripping and safety. All other transducers (i.e.: panel display lighting, panel meters, motor trip/close actuators and auxiliary sensing and power supply services) are to be connected on the load side of the company's metering.

Manufacturer/Consultant's Drawings for Switchgear

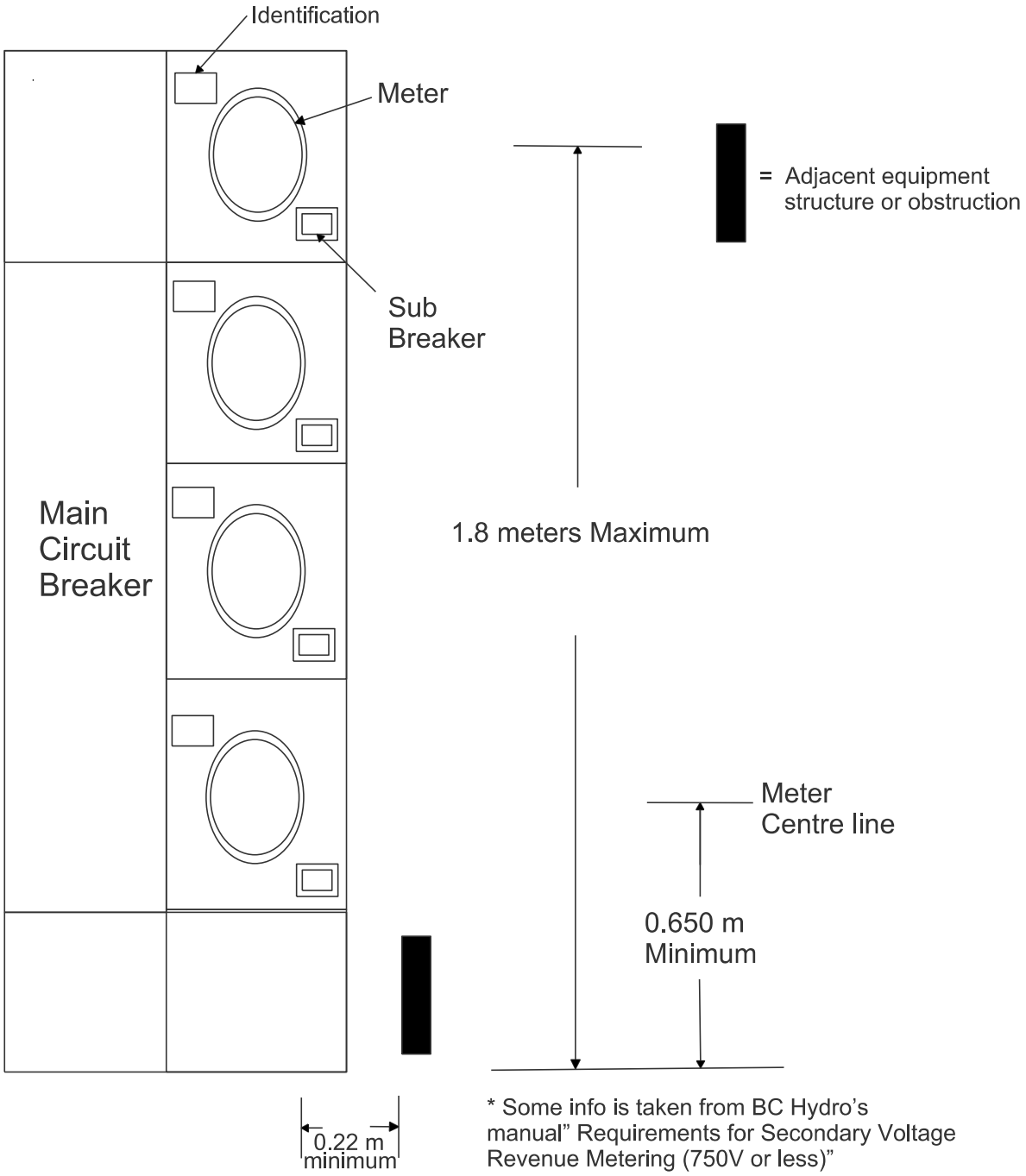
Prior to the manufacturing of the switchgear, the customer shall submit one copy of the manufacturers or consultants drawings including dimensions of the main breaker cubicle, the control and sensing compartment and the metering compartment. Drawings shall include single line diagrams of all customer control and sensing devices connected on the line side the company's metering.

Warning Signs for Manufactured Switchgear

The customer shall place a sign warning of live (fused) components, even if the breaker is open in a conspicuous location near the main breaker.

Metering Centre *

When serving a number of units in a building a meter center can be installed as shown below:



Note:

1. The meter centre shall be certified as per CSA Standards C22.2 No. 22.
2. The meter centre shall be installed on the load side of the assciated sub-breaker.
3. The main circuit breaker and the sub circuit breakers will have the provisions to lock and seal.
4. Each customer suite number shall be permanently marked with a lamacoid sign on each meter base.
5. These meter cabinets must be mounted in such a way that the maximum height of the top meter does not exceed 1.8m and the minimum height of the bottom meter is not less than 0.65m.
6. Grouped, field constructed sub service meter assemblies shall be as per page 25 (Multiple Service in a Multiple Dwelling).
7. The meter centres must be installed indoor in an electrical room. Refer to page 24 for the dimensions of the electrical room.

Appendix

Diagram Of Socket Connections

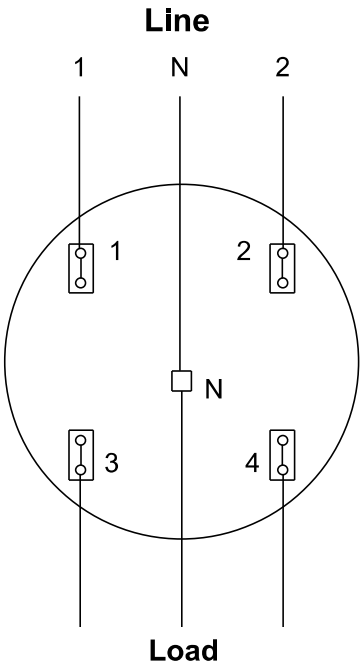


Figure 1

Single phase, three wire circuit, 120/240 volt utilizing
100 ampere meter socket or 200 ampere heavy duty meter socket.

	Voltage at Socket					
Terminal Number	1-2	2-3	1-N	1-4	2-N	3-N
Normal	240	-	120	-	120	-

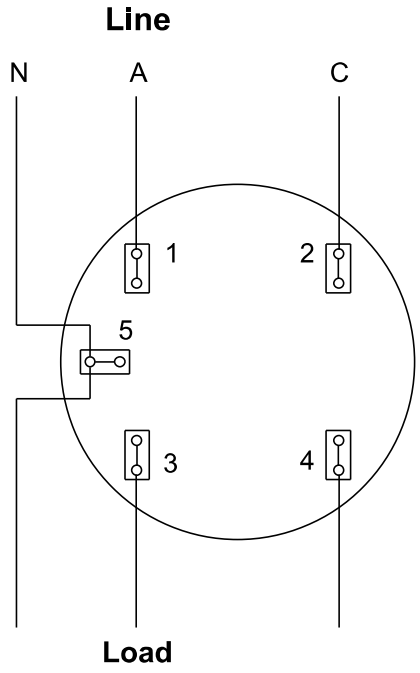


Figure 2

Network, three wire circuit, 120/208 volt utilizing 100 ampere
meter socket or 200 ampere heavy duty meter socket.

	Voltage at Socket					
Terminal Number	1-2	2-3	1-N	1-4	2-N	3-N
Normal	208	-	-	-	120	120

Diagram Of Socket Connections - Continued

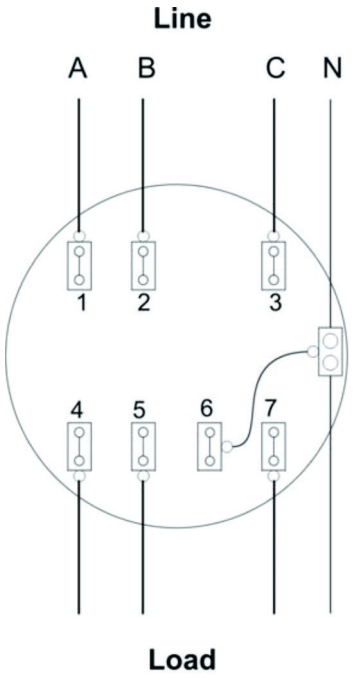


Figure 3

Three phase, four wire circuit, 120/208Y volt utilizing 100 amp meter socket or 200 amp heavy duty meter socket.

Voltage at Socket						
Terminal No.	1-2	2-3	1-3	1-6	2-6	3-6
120/208 V	208	208	208	120	120	120

Notes:

On 120/208 Volt services the metering:

1. typically installed on the line side of the main breaker.
2. ***must*** have a neutral connection lug in the meter socket base.
3. the 6th jaw, terminal number 6 is the neutral connection for the meter.

The ***last*** place the Neutral (Grounded conductor) can be grounded is in the main breaker.

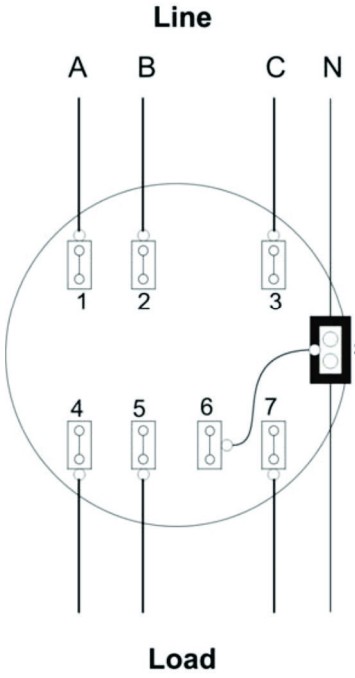


Figure 4

Three phase, four wire circuit, 277/480Y, or 347/600Y volt utilizing 100 amp meter socket or 200 amp heavy duty meter socket.

Voltage at Socket						
Terminal No.	1-2	2-3	1-3	1-6	2-6	3-6
277/480 V	480	480	480	277	277	277
347/600 V	600	600	600	347	347	347

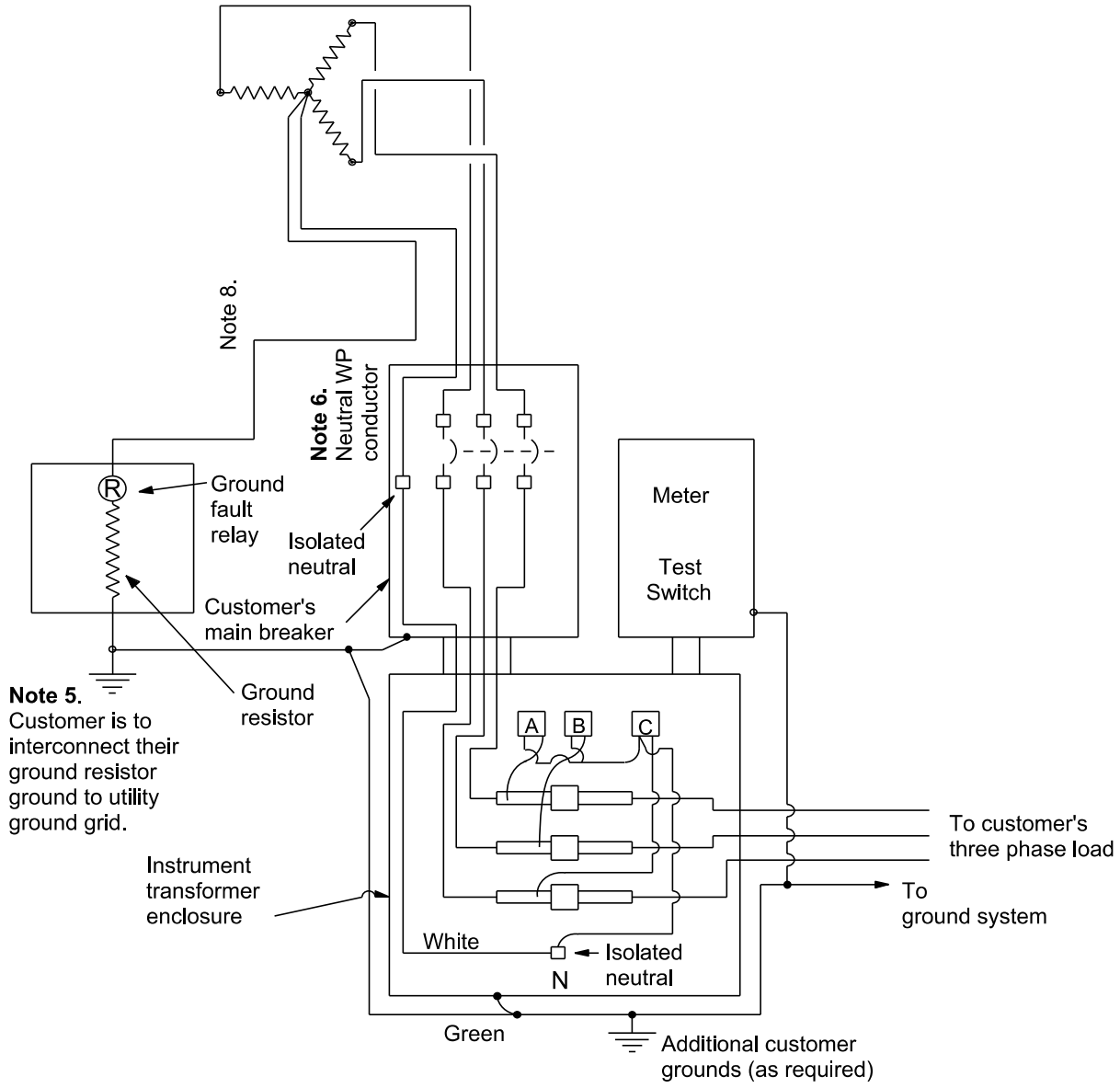
Notes:

On services <u>over 300 volts Line to Line</u> the metering:

1. ***must*** be installed on the load side of the main breaker.
2. ***must*** have an ***isolated*** neutral connection lug in the meter socket base.
   - use the “IN” option when purchasing the meter socket base.
3. the 6th jaw, terminal number 6 is the neutral connection for the meter.

The ***last*** place the Neutral (Grounded conductor) can be grounded is in the main breaker.

Wiring Diagram For Grounding Resistors

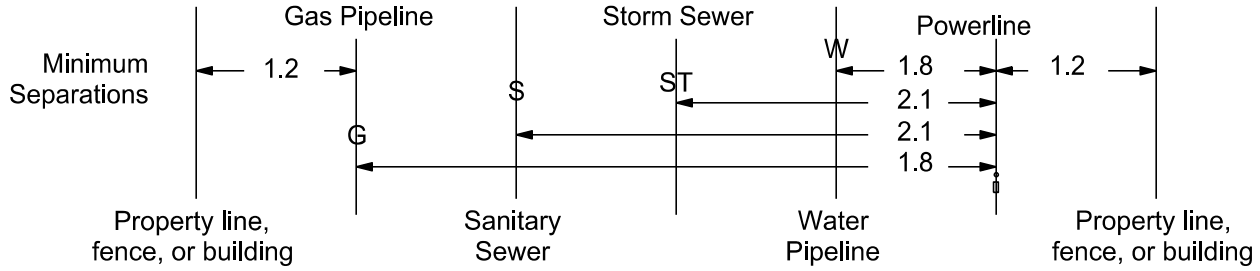


Notes:

1. Transformer primary - ground the primary star point, transformer case and interconnect with ground from lightning arrestors, if installed. The secondary neutral is grounded through the ground resistor.
2. At the transformer, customer's main breaker and instrument transformer enclosure install a sign reading "Caution grounding resistor intalled. Do not tie secondary neutral to case ground." Obtain the sign from division metering.
3. The design of the ground resistor should be coordinated with ATCO Electric division engineering.
4. On star-star transformers the interally connected primary and secondary grounds must be separated.
5. Where the ground resistor is installed inside a substation, the resistor case ground and the transformer case shound be interconnected to the ground.
6. The customer is to install an insulated bushing for the neutral WP conductor which is allowed to pass through the main breaker. The neutral is only for the star point for the metering.
7. An installation of 5kV or 25kV metering on a secondary service is similar to the above and should include a means for disconnecting the service on the supply side of the metering set.
8. The conductor from the X_0 Transformer bushing to the ground resistor is to be encased in PVC conduit and the lead from the ground resistor to the customer's building should be mechanically protected from damage with conduit, unless protected by elevation above ground.
9. Refer to CEC Section 10-1100 through to 10-1108 regarding conductor sizing and installation.

Design Clearances For Underground Supply

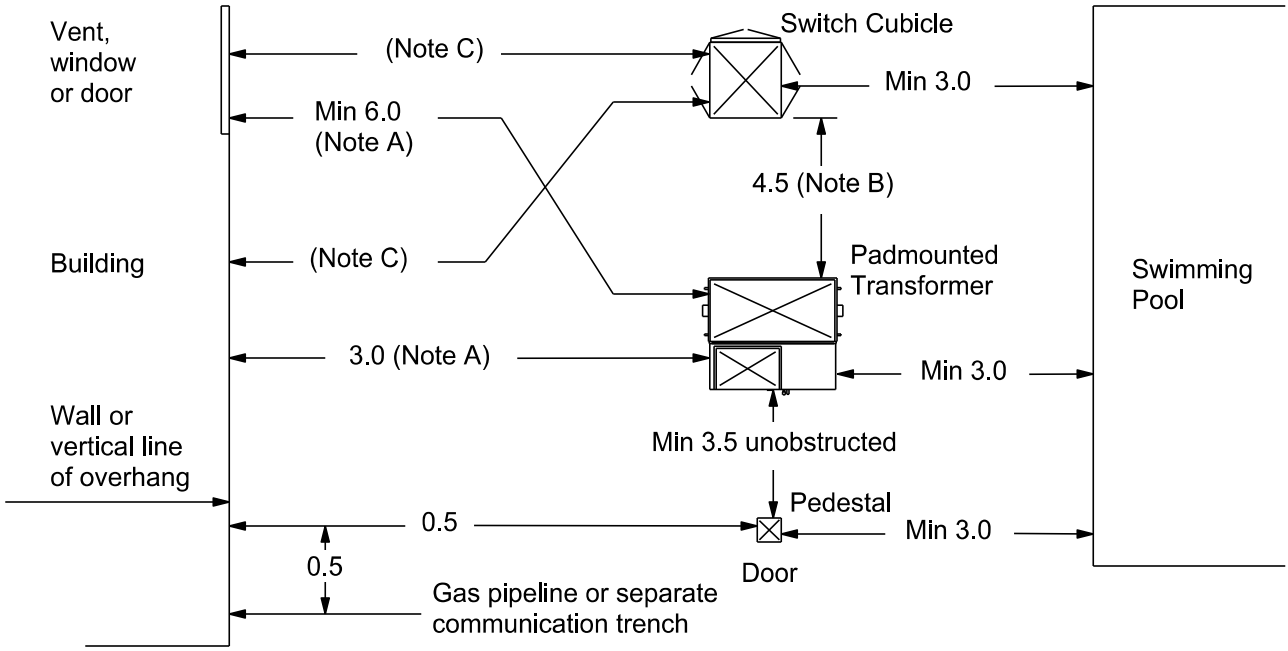
Typical Arrangement of Utility Trenches on a Common Right-Of-Way



Notes:

1. The above minimum design clearance from power-line trenches should be increase in areas of loose soil or deep excavation by another utility to allow the main power-line trench to fall on undisturbed earth.
2. Refer to drawing SC65 Section 1 for crossing over pipeline trenches and burial depth.
3. Refer to drawing SC62, SC63 and SC64 Section 1 for alignment of power-line and underground facilities on utility lanes, easements, roadside boulevards, or lanes open to vehicle traffic.

Other Typical Clearances



Notes:

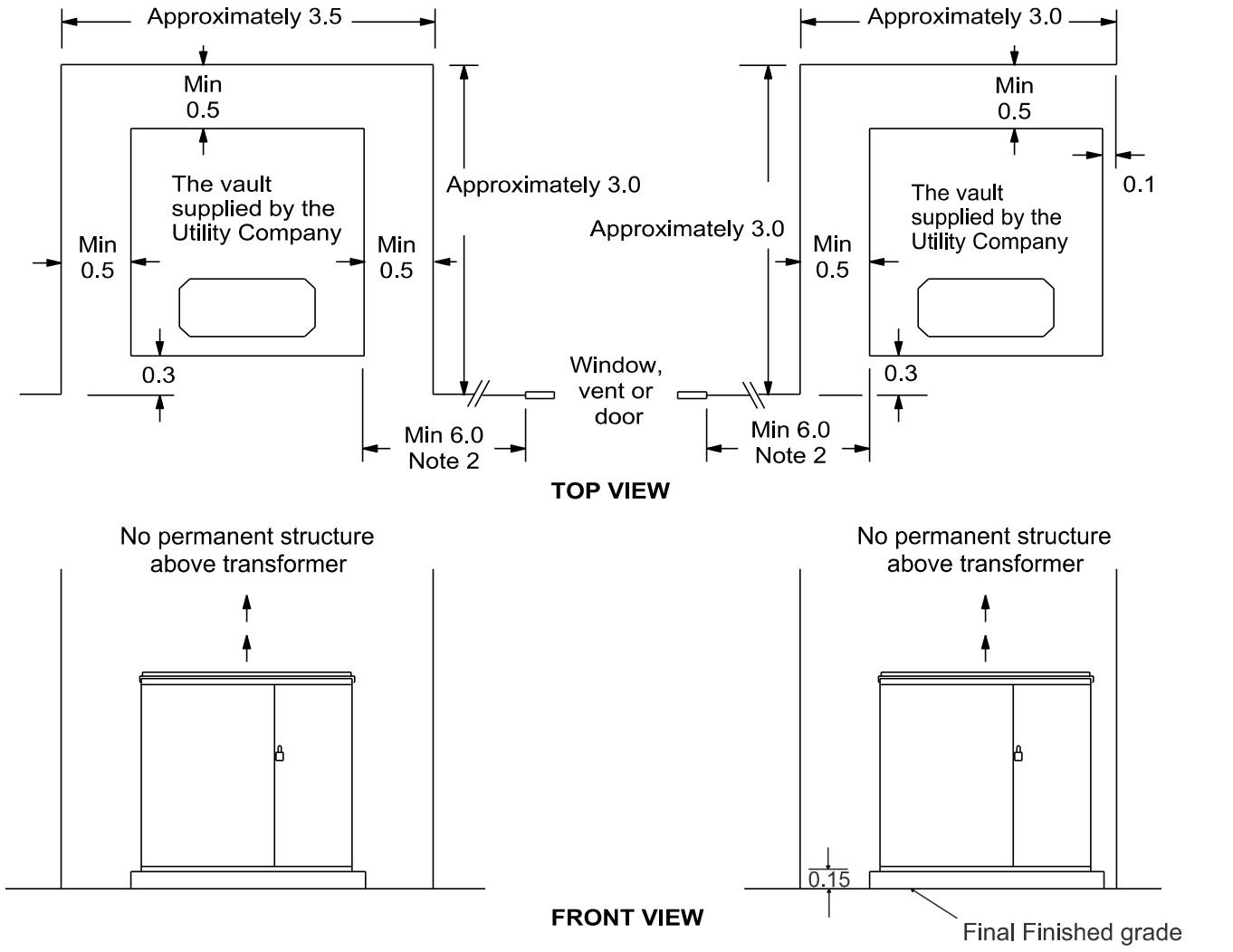
A) The Canadian Electrical Code Rule 26-242 applies.

B) If an transformer is placed closer than 3 meters to a steel building, the owner is required to burry a No. 4 copper conductor as a gradient control wire and 0.5 to 1.0 meters away from the building, buried 200 to 300 mm below ground level with interconnection to building and to Utility Company's gradient control wire.

C) The door on the switch cubicle and padmounted transformer must not face each other without adequate work space of at least 4.5 meters.

D) If the doors on the switch cubicle are not located on the side of the cubicle adjacent to the building, the distance between the building and the cubicle may be reduced to 1.0m. In all installations there must be work space of at least 4.5 meters in front of the doors.

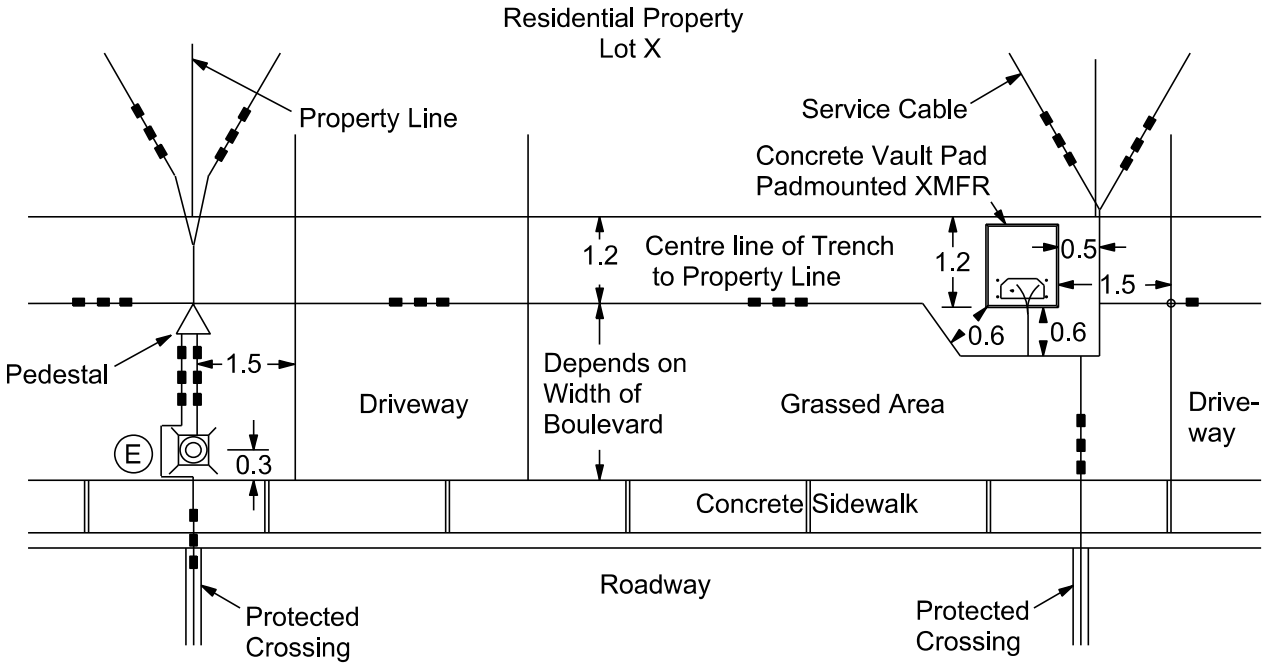
Sizing Of Building Alcove



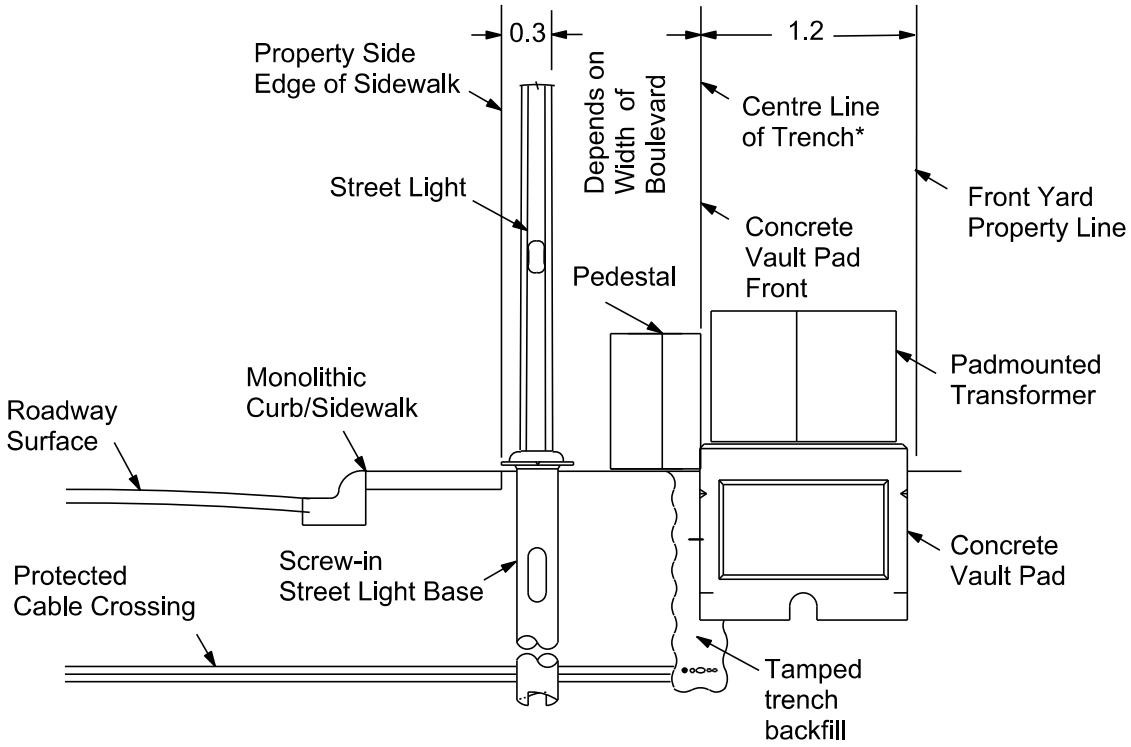
Dimensions in meters

Note:
1. Minimum clearance from pad to building in alcove does not apply to footings for vault pads which may extend right up to the building foundation.
2. If the suitable fire resistance wall or barrier is constructed, this distance may be reduced to line of sight distance.
3. The accessible work area in front of the padmounted transformer must be of adequate strength.
4. To access, install, raise and remove a transformer a minimum of 10 meters un-obstructed distance is required in front of the alcove.
5. Before building an alcove in a building, the customer must contact the Utility Company's engineering department for the details of the alcove, grounding etc.

Typical Alignment For Front Street Monolithic Curb/Sidewalk



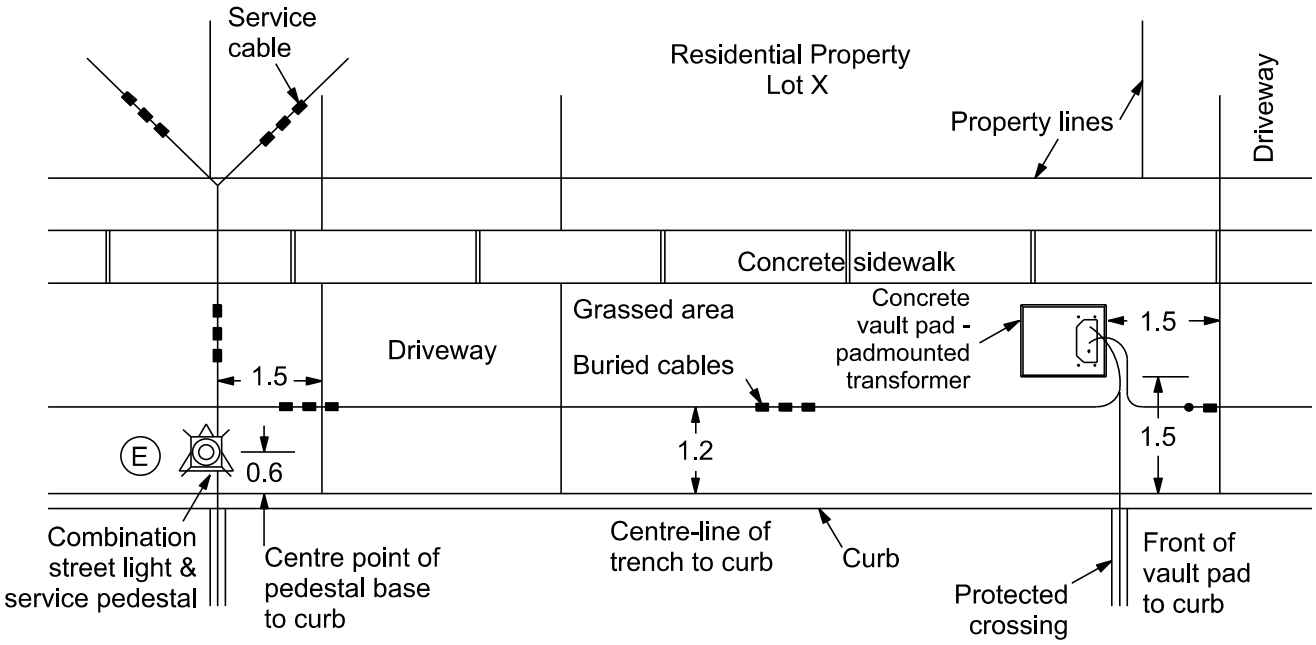
Plan View



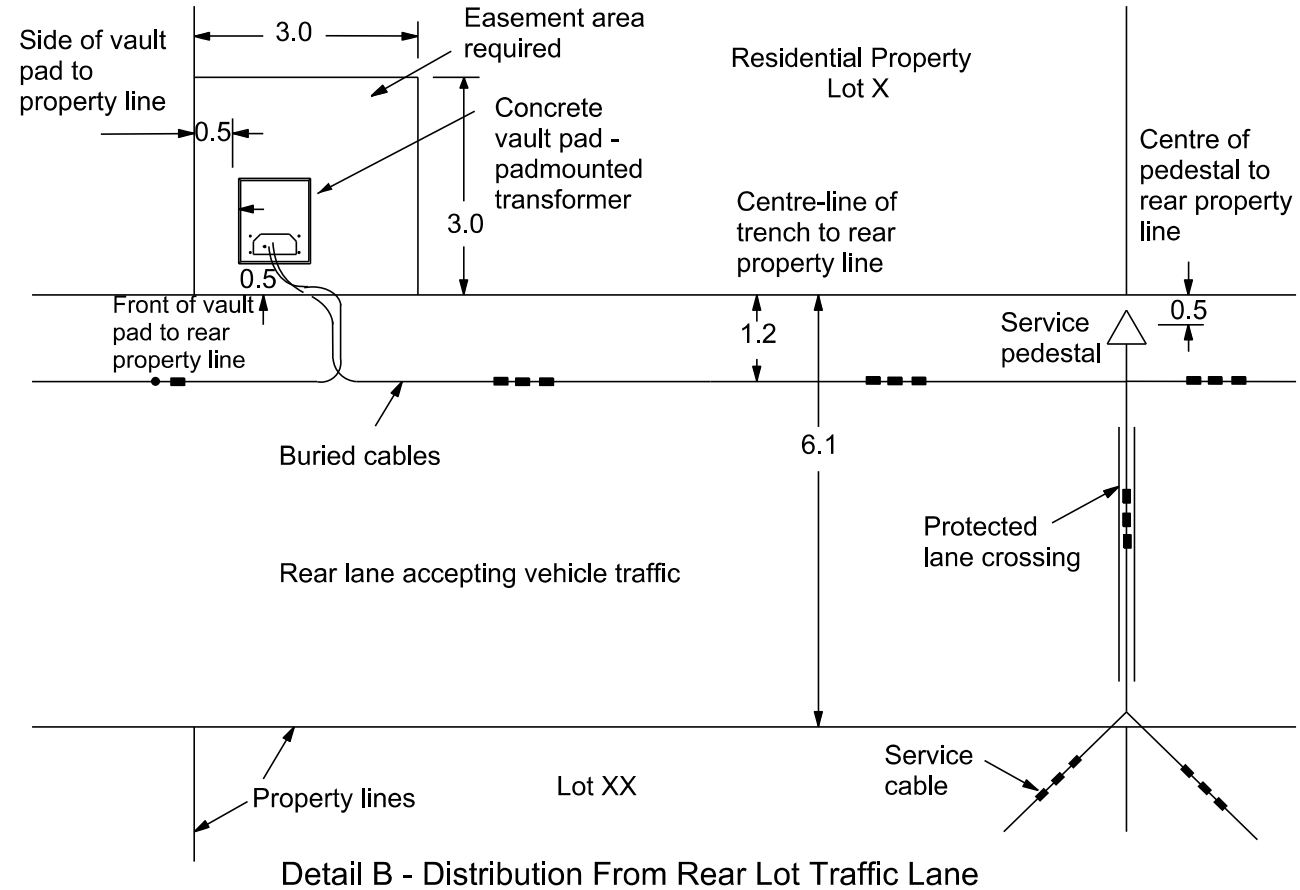
Side View

Dimensions in m

Typical Alignment For Front Street Boulevard / Rear Traffic Lane



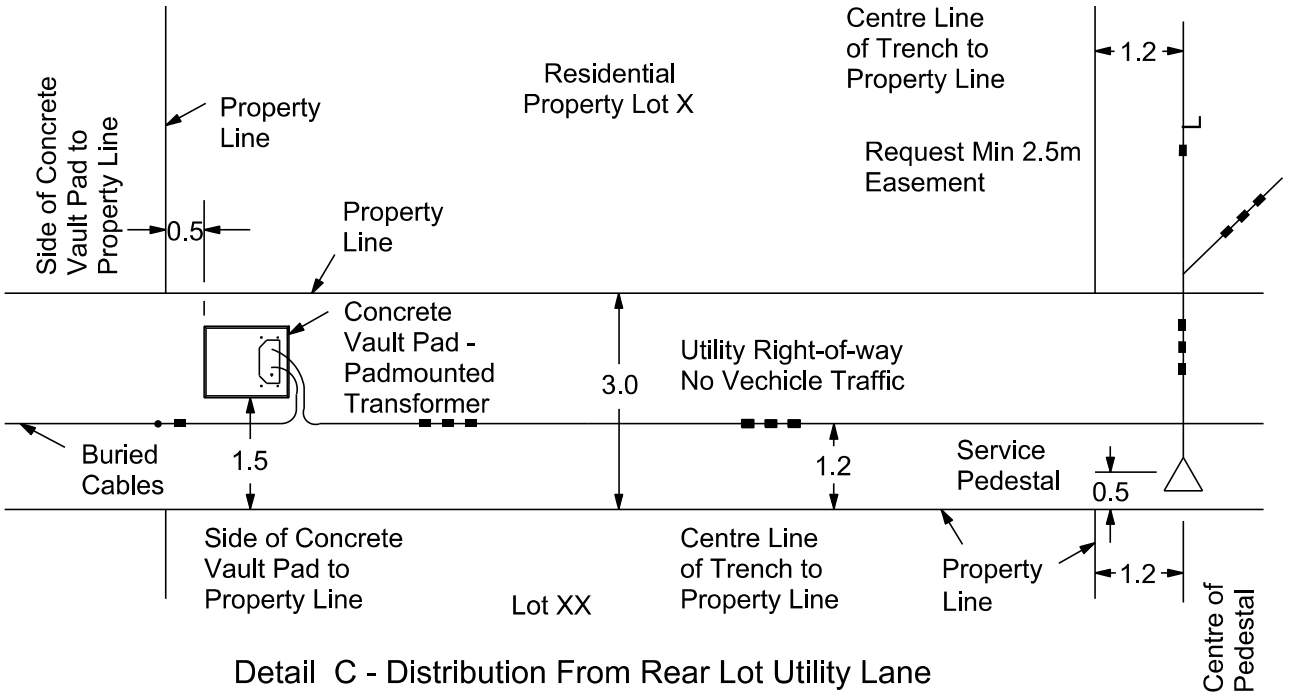
Detail A - Distribution From Front Lot Street Boulevard



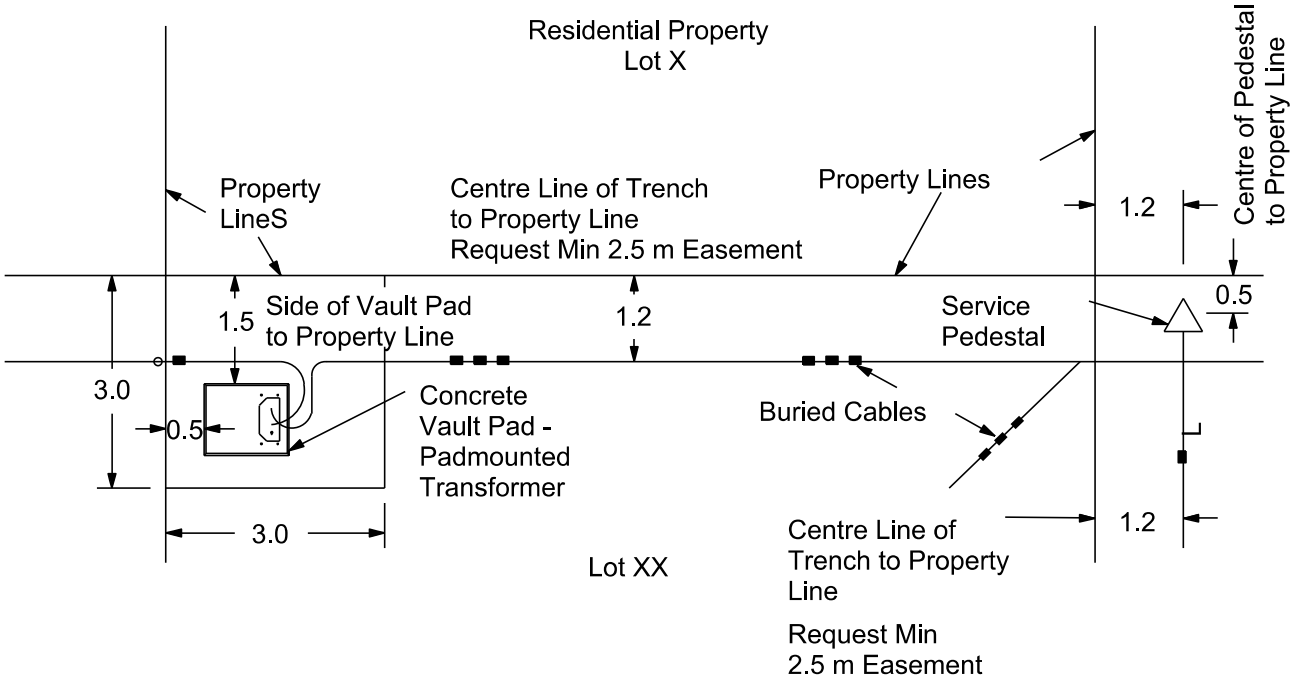
Detail B - Distribution From Rear Lot Traffic Lane

Dimensions in m

Typical Alignment For Rear Utility Lane / Rear Easement Access



Detail C - Distribution From Rear Lot Utility Lane



Distribution from Rear Lot Easement

Access Easement to be Obtained if not Provided (min 2.5 m)

Dimensions in m

Landscaping Adjacent to Company Equipment

The following is a guideline for landscaping with bushes, shrubs, and trees adjacent to equipment installed to provide underground electrical service:

1. Shrubs planted around the equipment should be of a type that can easily be trimmed and have a shallow root system.
2. Suggested shrubs are: cedar, juniper, lilac, golden elder, and mugo pine.
3. Keep trees, shrubs, and grass trimmed in order to reduce fire hazard during dry spells.
4. In addition to the clearance between equipment and shrubs, there should also be a path to the equipment. The landscaping should include lawn or low growing plants in front of the equipment door. Clearances are shown on page74, (*Landscaping Adjacent to Padmounted Transformer and Pedestal)* and page75, (*Landscaping Adjacent to Padmounted Switch Cubicle and Street Light)*.
5. To minimize obstruction of roadway lighting, trees planted in boulevards should be kept pruned in the manner illustrated on page 76, (*Landscaping Adjacent to Padmounted Switch Cubicle and Street Light)*, where:

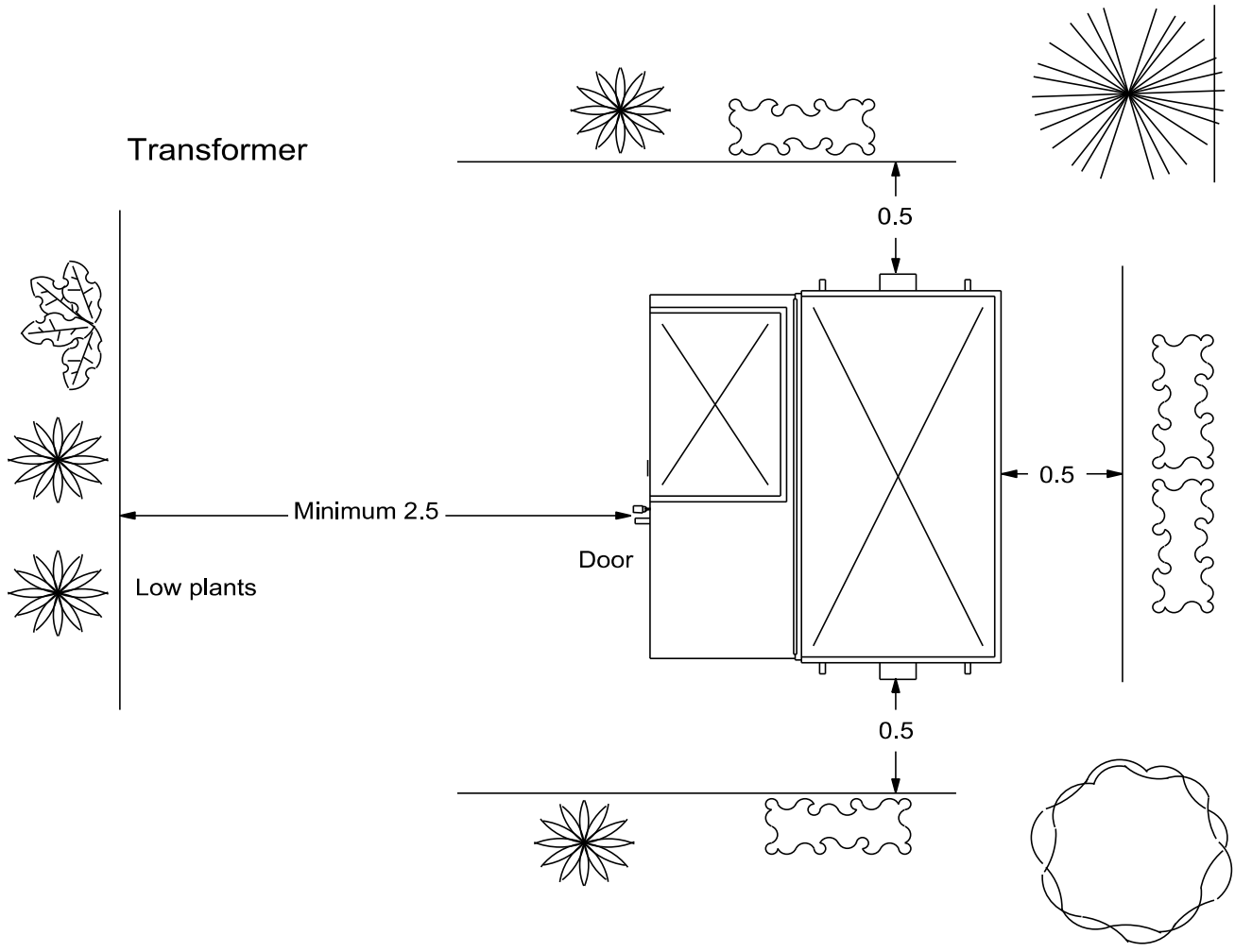
"h" is the tree pruning height,

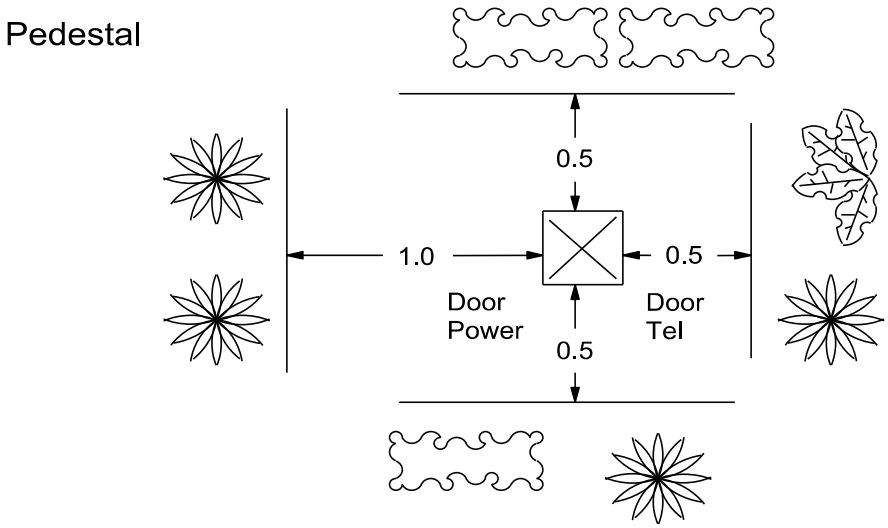
"MH" is the light mounting height,

"D" is the distance between the tree and the light, and

"A" is the light distribution angle for maximum candle power (lux) on the road. On type II lights this angle is between 73° to 80° and on type III lights is between 70° to 77°.

Landscaping Adjacent To Padmounted Transformer Or Pedestal

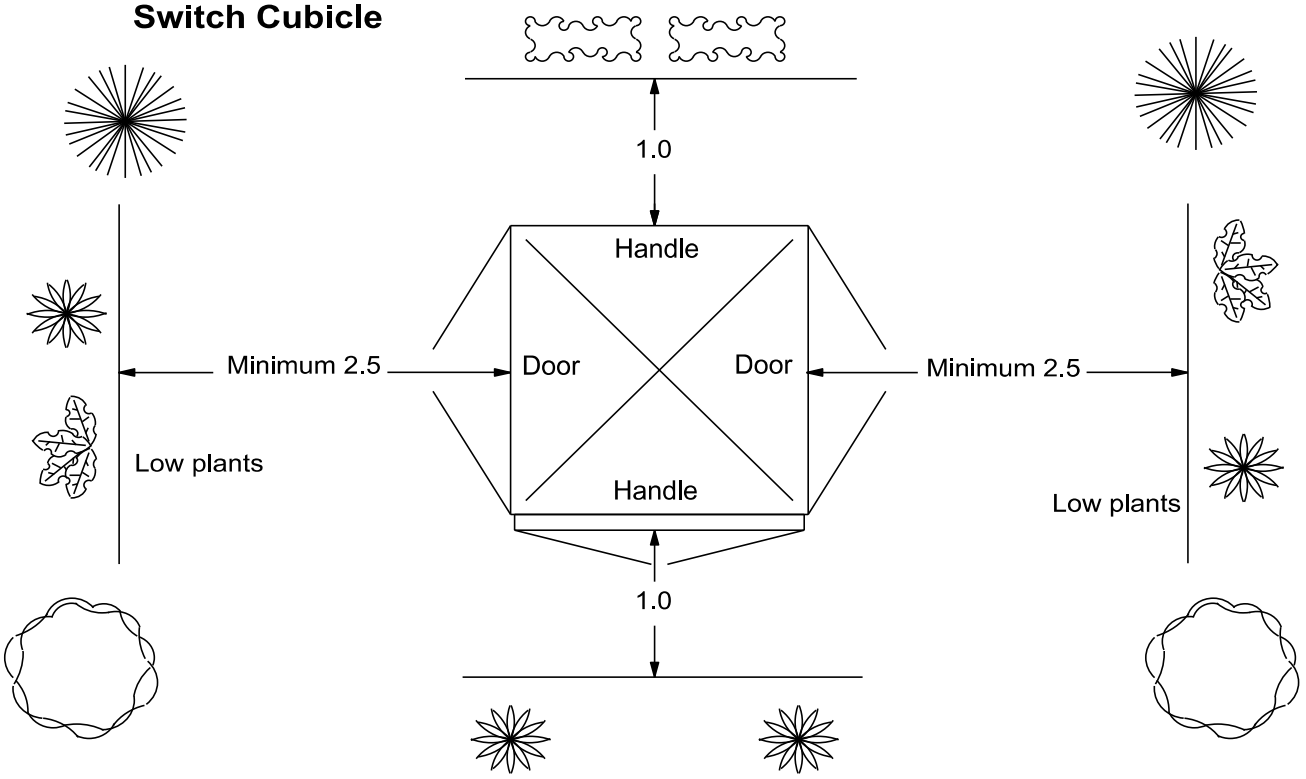




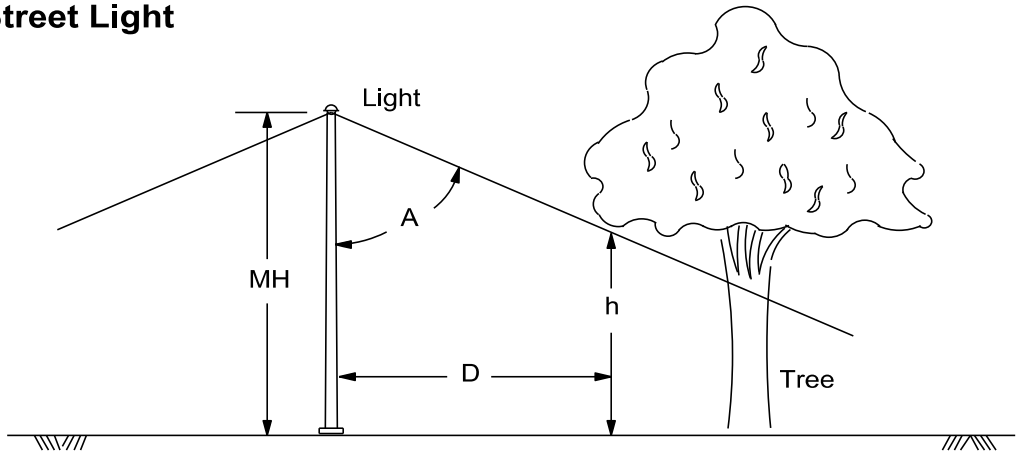
Dimensions in m

Landscaping Adjacent To Padmounted Switch Cubicle Or Street Light

Switch Cubicle



Street Light



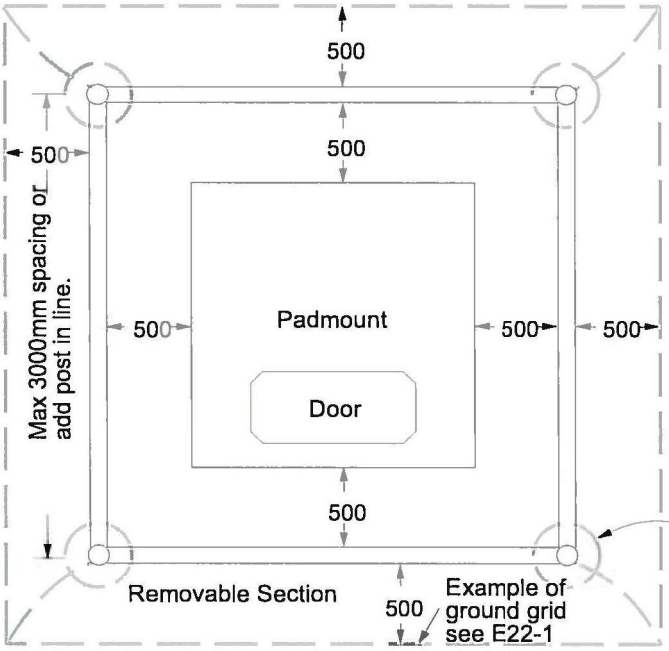
" A "	" h "
70°	MH - .36D
75°	MH - .26D
80°	MH - .17D

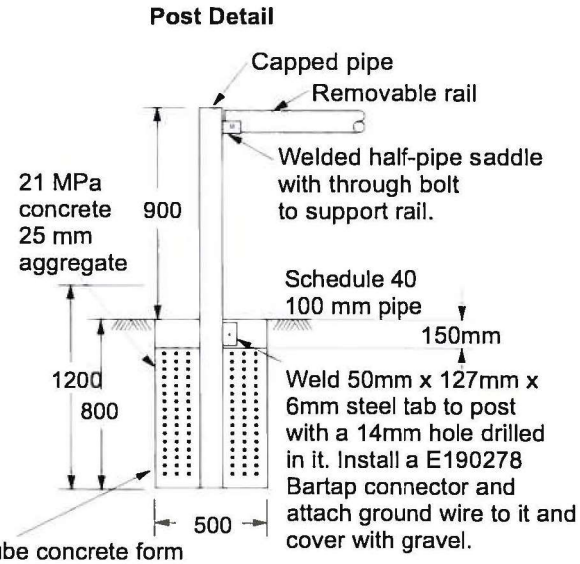
For definition of symbols see page 88.

Dimensions in m

Protective Guard For Padmounted Transformers In Open Areas

1. For Padmounts In Open Areas Subject To Frequent Vechicle Traffic: (Post & Rail)



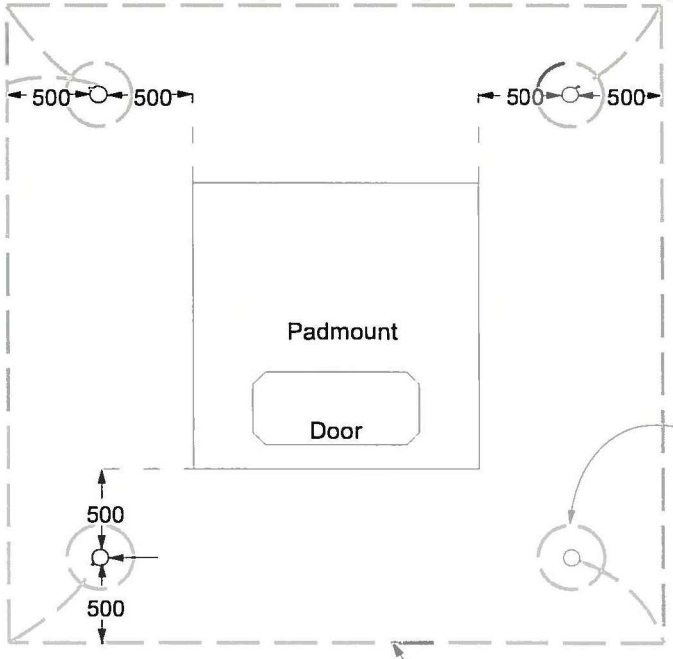


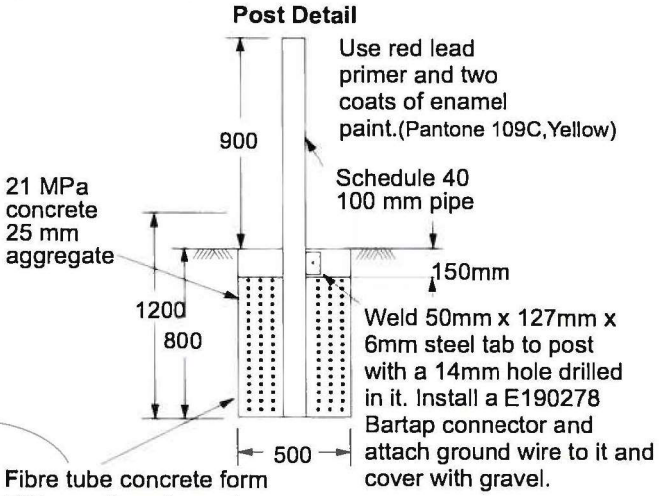
Fibre tube concrete form 500 mm diameter and 1200 mm long (to allow for sub-grade variance) installed by ATCO Electric

Note: If post in front of door is required, it must be removable. Use red lead primer and two coats of enamel paint (Pantone 109C,Yellow)

Note: Guard posts and rails are to be bonded with ground grid

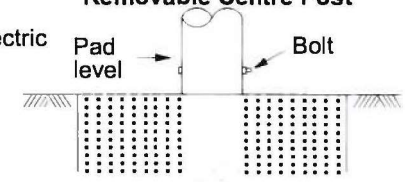
2. For Padmounts In Open Areas Subject To Occasional Equipment Traffic: (Bollards)





Fibre tube concrete form 500 mm diameter and 1200mm long (to allow for sub-grade variance) installed by ATCO Electric

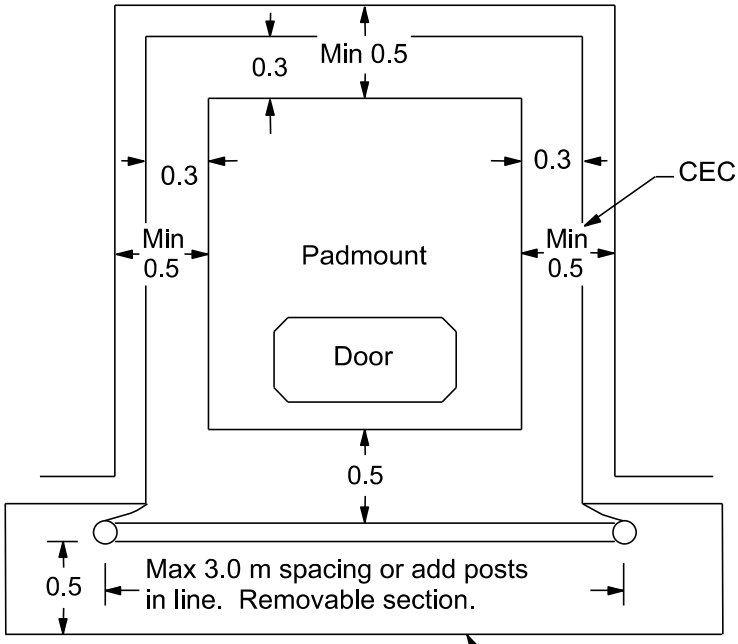
Detail of Removable Centre Post



Dimensions in mm

Note: Guard posts and rails are to be bonded with ground grid

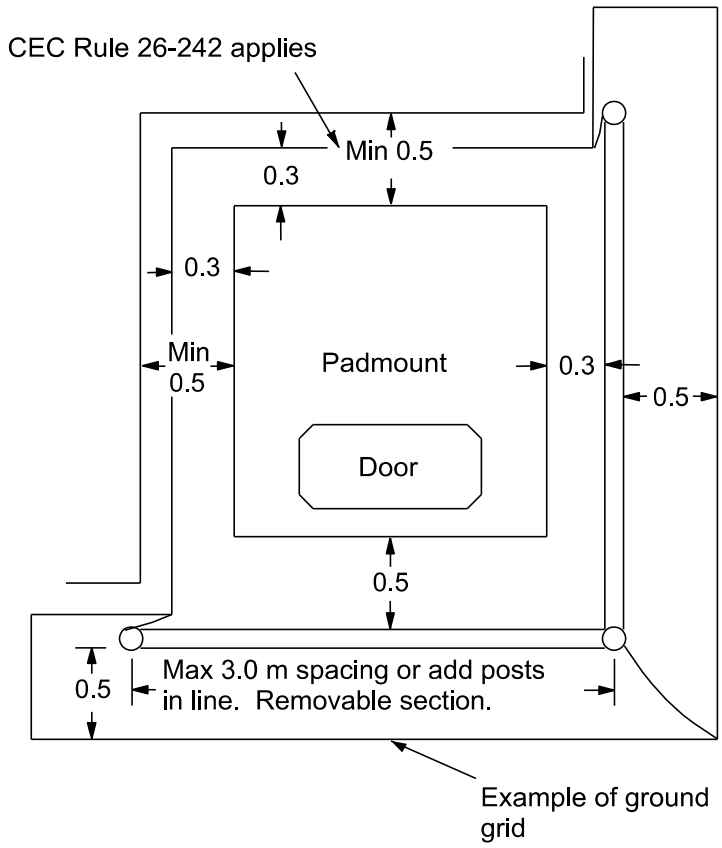
Protective Guard For Padmounted Transformers In Alcove
For Padmount Transformers in Alcoves subject to Vehicular Traffic

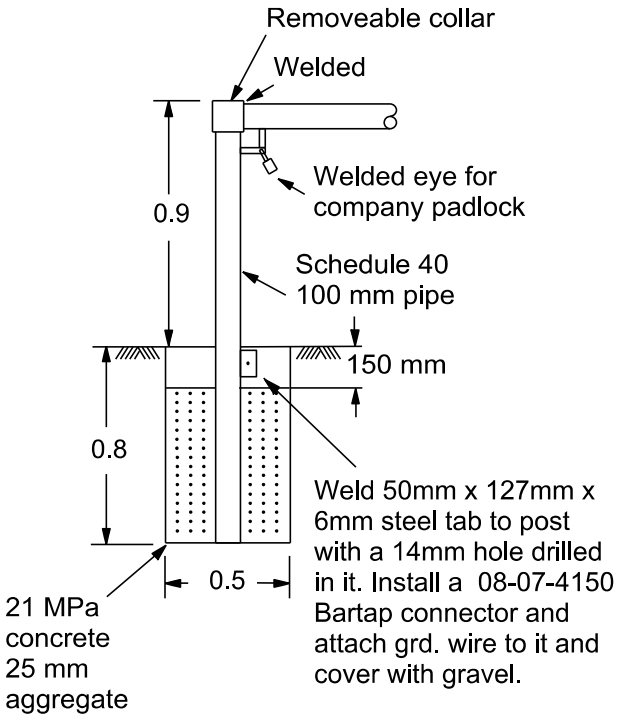


Ground posts and guard rail.

Post Detail

Non-removable section welded to post below collar



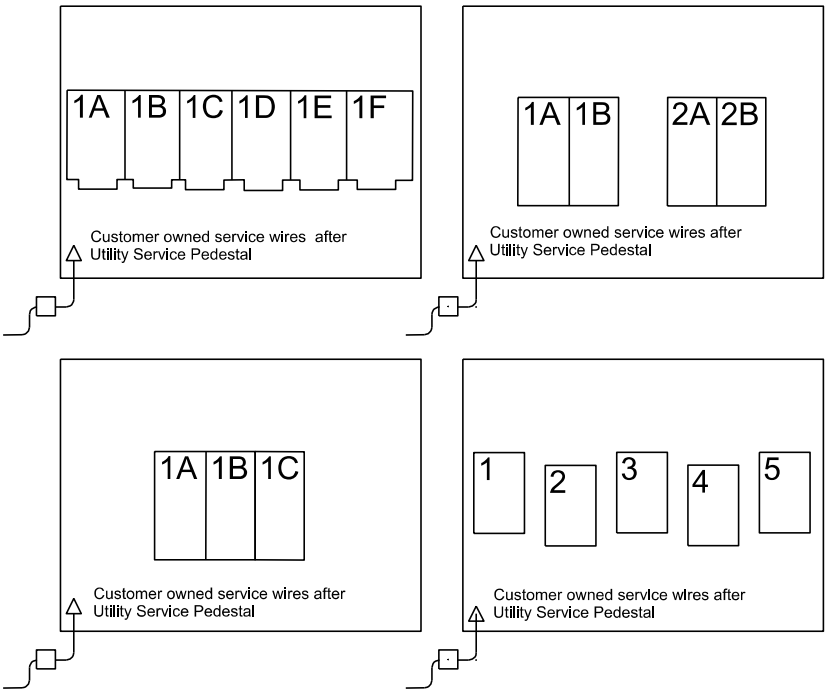


Note:
If post in front of door is required, it must be removable. Use red lead primer and two coats of enamel paint.

Service Options For Multi Dwelling/Single Family Services

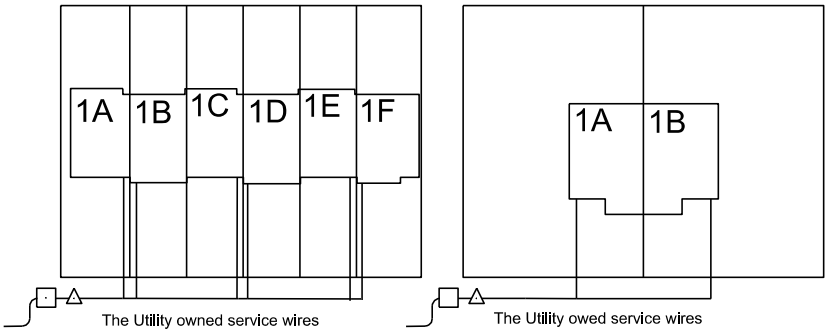
One Lot, Multiple Units

One Service Entrance - Customer Owned Metering from Utility Service Pedestal



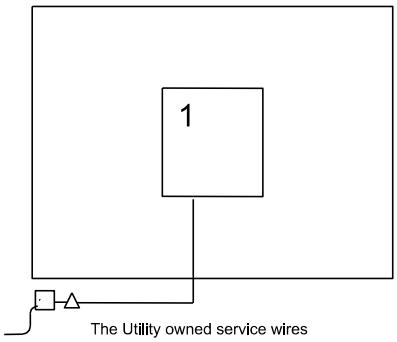
Multiple Lots, One Unit

Multiple Service Entrances- the Utility Company supplies service to each unit in its own titled lot



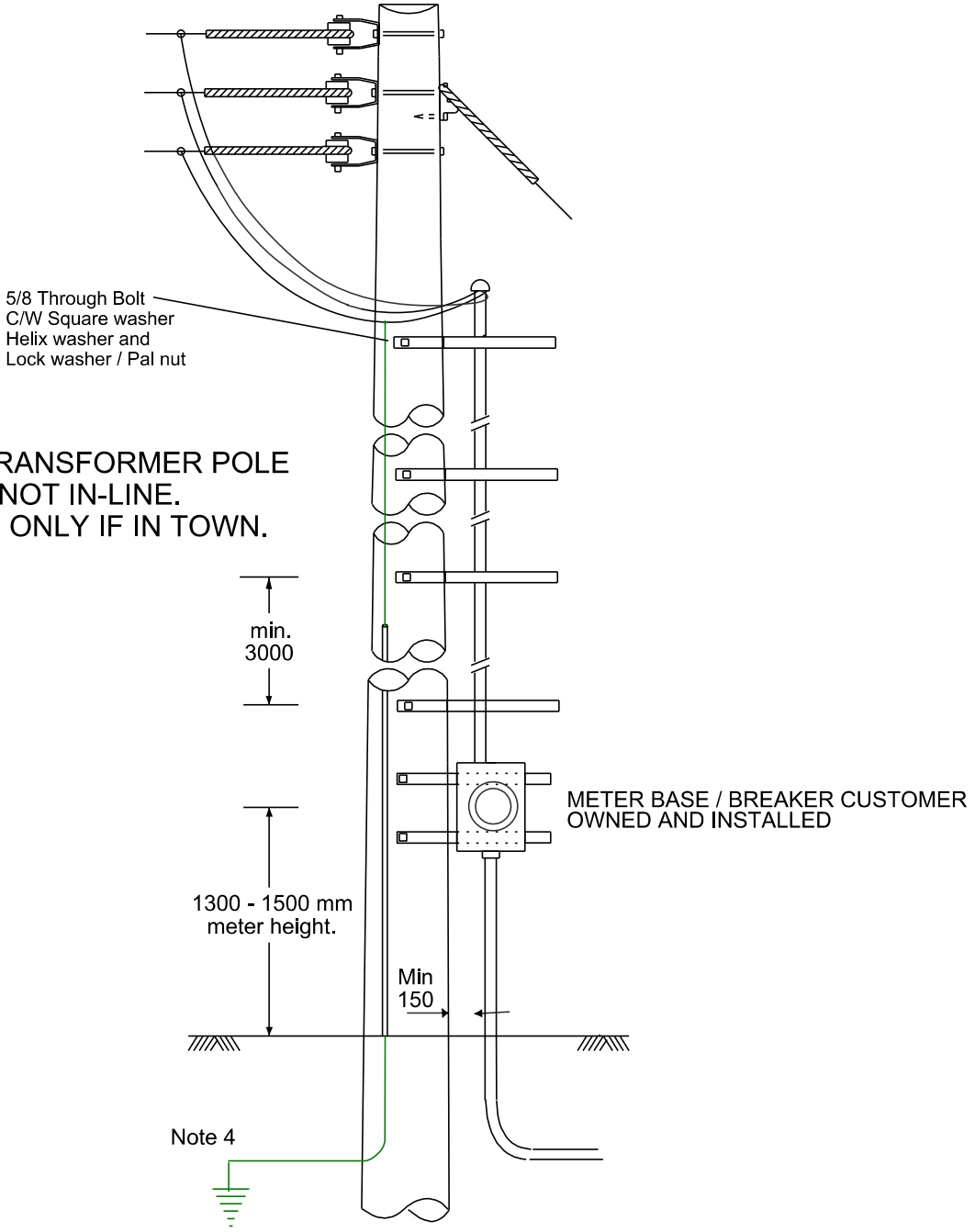
Legend:

- □ Utility Transformer
- △ Utility Service Pedestal
- ——— Utility owned service wires



Customer Service On Company Pole

Non Critical Services In Overhead Areas: Heat Tape / Parking Plugs / Highway Signs / Weight Scales / Traffic Counters

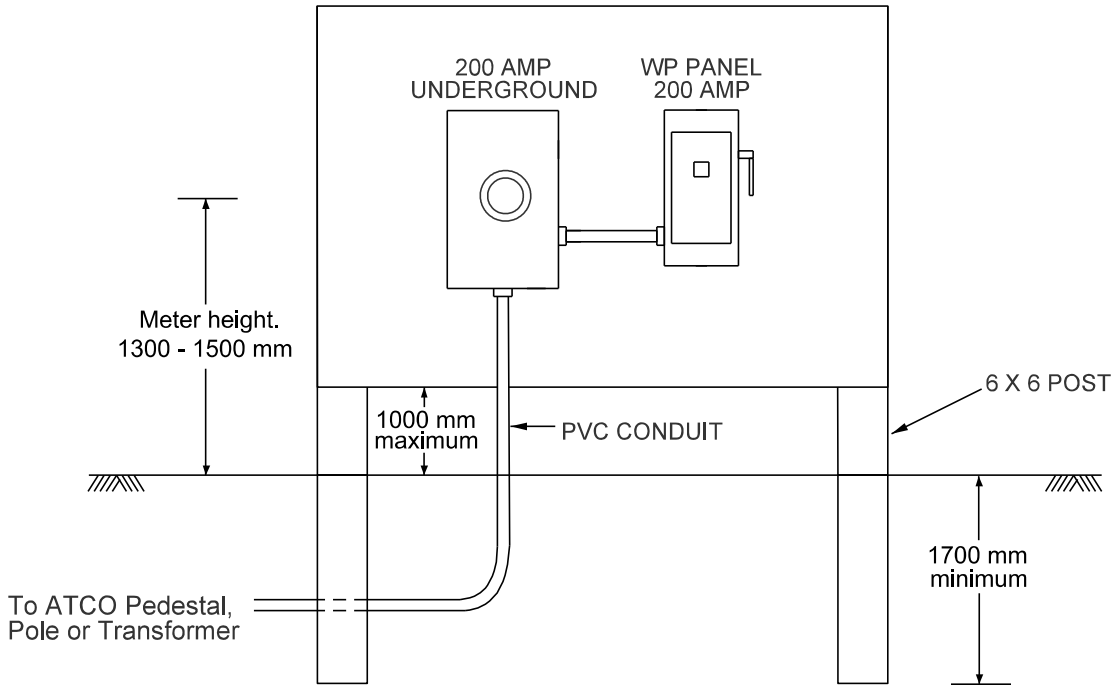


Notes:

1. Customer to supply all conduit, unistrut brackets, clamps and weather head. Spacing as per C.E.C., except where noted.
2. Conduit to be minimum 2.5 inch thickwall PVC. Customer to install bottom section of conduit.
3. Customer to arrange to assist ATCO in installing remaining conduit.
4. Conduit to be installed on non climbing side of pole as determined by ATCO.
5. Customer to contact ATCO prior to digging in the vicinity of the pole to determine if it is necessary to support pole.

Customer Service On Stand-off Structure

Non Critical Services In Underground Areas



Notes:

1. 6 X 6 pressure treated posts.
2. 4 ft. X 4 ft. 3/4" pressure treated plywood with 2 X 4 pressure treated supports for additional strenghth.

MICRO–GENE RATION

In Yukon Micro-Generation is administered through Energy Solutions centre. Here are the links to the important info:

http://www.energy.gov.yk.ca/microgeneration.html

http://www.energy.gov.yk.ca/pdf/microgen_policy_summary.pdf

Micro-Generation Policy - Summary

Yukon Energy Corporation and Yukon Electrical Company Ltd. Micro-generation Interconnection and Operating Agreement