5500-02-EP-001
Service & Metering Guide

December 18, 2024

Revision 0

Nelson Hydro
Suite 101, 310 Ward Street
Nelson, BC V1L 5S4
T 250-352-8240 | **E** hydro@nelson.ca

Contents

Tables

Figures

Revision History

Table 1: Document Revision Table

Revision #	Date	Status	Revision Description	Editor
0	12/19/2024	Final	Initial publication	S. Mountford

The purpose of this document is to provide service and metering guidelines for installations within the Nelson Hydro service area. This document is intended for guidance purposes only and where any information within this document does not meet the minimum requirements of the current Canadian Electrical Code (CEC) (and BC amendments), or is in conflict with the Safety Standards Act (SSA) or the Nelson Hydro Services Bylaw No. 3608, then the CEC, SSA or Nelson Hydro Bylaw shall prevail.

1. General Information

This Service & Metering Guide is intended to provide Service & Metering guidelines to customers and contractors for electrical service installations of within Nelson Hydro electrical service area. The information within supersedes all information previously provided by Nelson Hydro on the subject.

For electrical service installations of greater than 750 volts, please reach out to Nelson Hydro Design Team for service and metering requirements.

All electrical installations must comply with the Canadian Electrical Code (and BC Amendments) and applicable CSA standards. Customer installations cannot be connected before Nelson Hydro takes receipt of the "Supply Authority" copy of an approved Electrical Contractor Authorization & Declaration of Compliance form or an approved Certificate of Electrical Inspection.

The Nelson Hydro technical team, at their sole discretion, may approve variances from these guidelines in exceptional situations.

1.1 Nominal Secondary Supply Voltages

Voltages from pole-mounted transformers may be:

- Single Phase – 120/240 volts, 3 wire, maximum 600 amperes Underground and 400 Amperes Overhead
- Three Phase – 120/208 volts, 4 wire, maximum 300 kVA (3 x 100kVA) transformation capacity
- Three Phase – 347/600 volts, 4 wire, maximum 300kVA (3 x 100kVA) transformation capacity

Voltages from pad-mounted transformers may be:

- Single Phase – 120/240 volts, 3 wire, maximum 600 amperes
- Three Phase – 120/208 volts, 4 wire, maximum 750 kVA transformation capacity
- Three Phase – 347/600 volts, 4 wire, maximum 2,500 kVA transformation capacity

Single phase 120 volt services are prohibited. Delta services are not permitted without prior approval. Nelson Hydro may consider delta services for specific electrical configurations, or for large industrial applications at their sole discretion.

For loads or supply voltages different from those listed in this section (e.g. 277-480 volts), Nelson Hydro may require that a customer supply their own transformation facilities and take service at the available primary voltage; or supply their own secondary voltage conversion transformation.

All Facilities and equipment to be connected to the Nelson Hydro infrastructure must be in a condition that is approved by Nelson Hydro. Installation must be carried out in a manner to ensure that phases and circuits are balanced, and to ensure that Nelson Hydro's equipment is not endangered and that no abnormal voltage fluctuations (equal to or greater than 5%) are caused.

2. Service Guidelines

Unless otherwise authorized by Nelson Hydro, the maximum number of Electrical Services per property is one (1). Where multiple lots are being used for a common purpose, such as a large structure built across

two lots, Nelson Hydro will consider this one property. Nelson Hydro, at its sole discretion, will assess each situation and make recommendations based on voltage, size of the property, number of buildings, etc.

2.1 Overhead Service Guide

Services fed by an aerial means shall be approved by Nelson Hydro and conform to the following:

1. The point of attachment cannot exceed 7m above grade or sidewalk and must allow the secondary conductors to conform to the clearance requirements below:
    a. Across ground normally accessible to pedestrians only: 3.5m
    b. Across residential driveways: 4.5m
    c. Across commercial or industrial driveways: 5.5m
    d. Across streets, lanes, alley and pipeline ROW: 5.5m
2. The point of attachment must face the point of supply.
3. The location of the service entrance cannot create an aerial trespass of the overhead conductors and must:
    a. Provide clearance between the aerial conductor and all vegetation in line with Nelson Hydro Vegetation Management Policy.
    b. Be in a direct line of sight with a Nelson Hydro pole and no further than 1m from the closest corner of the building, or as approved by Nelson Hydro Design Team. Mid-span taps are normally not allowed.

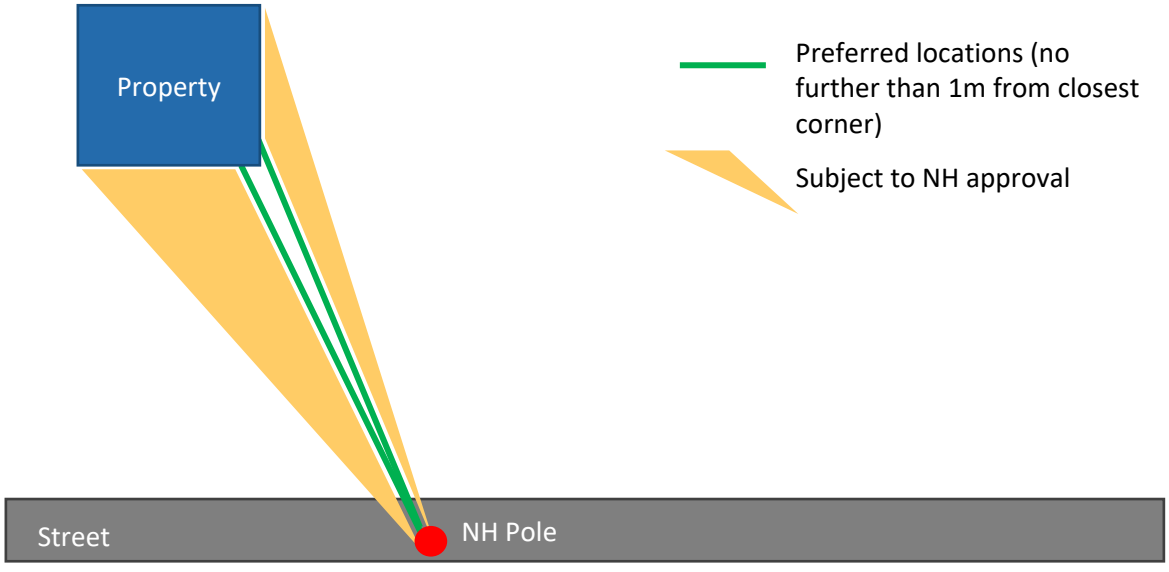


Figure 1: Point of Attachment Location

    c. Have a level ground area at the base of the building for ladder access (with a ladder ratio of 4m high to 1m across) to the service mast, with a maximum height of point of attachment of 6.7m.

4. Construction of structures is not permitted under the overhead conductor, and overhead conductors will not be installed over existing structures.
5. Service mast must be located within 0.5m of the edge of the roof and gutters must be capable of holding the weight of a technician on a ladder.
6. The maximum service length from a Nelson Hydro pole to the customer's point of attachment is 30m. If the service length exceeds 30m intermediate poles or additional engineering may be required, at the customer's expense.
7. Location of the meter base must conform with **3.2 Revenue Meter Location.**

Additional requirements may be required depending on individual circumstances of installation; **it is recommended that customers or their contractor consult with the Nelson Hydro Design Team early in project planning.**

Overhead Service Ownership

The diagram below describes the ownership of the various components of an overhead residential electrical service:

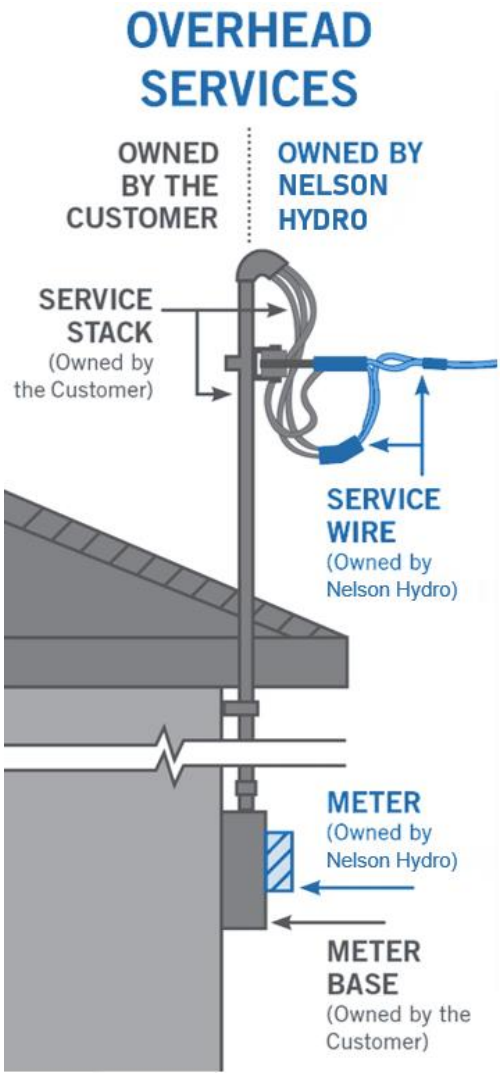


Figure 2: Overhead Service Ownership

2.2 Underground Service Guide

Services fed underground shall be approved by Nelson Hydro and conform to the following:

1. The customer is responsible to install the service conduit according to the design provided by Nelson Hydro. Conduit installation guidelines for underground services:
    a. All materials, unless indicated in design, will be supplied and installed by the customer.
    b. Service conduits shall be a minimum of 900mm below grade.

c. Service conduits shall be rigid PVC (above grade) or DB2 (underground), minimum of 76mm in diameter, gray, electrically rated and CSA approved for use. Transitions between RPVC and DB2 should be a minimum of 150mm below grade.

d. If the service conduit run exceeds 270 degrees of bends, Nelson Hydro may require a pull box in an approved location.

e. Service conduits with 90 degree bends shall have a minimum bend radius of 900 mm, and all bends shall be manufactured. Bends terminating above ground shall be rigid PVC.

f. All conduit rising up poles shall be on stand-off brackets. Contact Nelson Hydro Design Team for specifications. The lowest standoff shall be a minimum of 3m above the base of the pole.

g. All terminated conduit shall be capped (but not sealed) and shall be marked with lot number and/or duct designation.

h. All conduits shall have Polyester Measure/Pulling Tape 3/4" (19.1 mm) installed and tied or fastened securely at both ends unless it is unsafe to do so. The pulling tape shall have a minimum tensile strength of 11,000 N. It is permitted to reuse Pulling Tape but it must be one continuous piece.

2. The service conduit run shall not exceed 30m, unless approved by Nelson Hydro.
3. Only authorized Nelson Hydro personnel may access Nelson Hydro owned pad-mount transformers or underground secondary vaults or boxes.
4. Location of the meter base must conform with **3.2 Revenue Meter Location.**

Additional requirements may be required depending on individual circumstances of installation; **it is recommended that customers or their contractor consult with the Nelson Hydro Design Team early in project planning.**

Underground Service Ownership

The electrical components, excluding conduit, of an Underground Service or overhead service up to and including 200 Amperes shall be owned, operated and maintained by Nelson Hydro to the Point of Connection. The electrical components of Electrical Services greater than 200 Amperes shall be owned, operated and maintained by the Customer. Maintenance work by Customer must be completed in co-ordination with Nelson Hydro.

The diagram below describes the ownership of the various components of an underground residential electrical service:

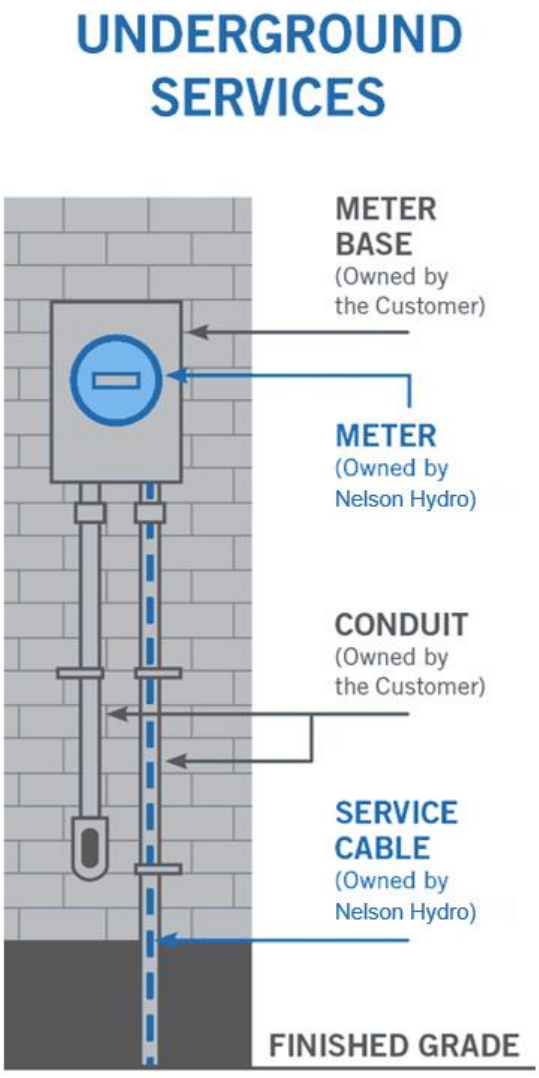


Figure 3: Underground Service Ownership (up to and including 200A)

2.3 Pole-Mounted Services

Pole mounted services may be permitted for Rural Customers.

Services up to 400A are permitted to be located on a private service pole. This pole shall be supplied, installed and maintained by the customer and approved by Technical Safety BC.

The location of the pole-mounted service must be on the customers property, easily accessible, and within 30m of a Nelson Hydro pole.

If the pole is deemed unsafe to climb by Nelson Hydro personnel, Nelson Hydro holds the right to disconnect the service until the customer has repaired or replaced the pole.

Location of the meter base must conform with **3.2 Revenue Meter Location.**

2.4 Pedestal-Mounted Services

Customers wishing to install pedestal-mounted services shall submit their proposed pedestal specifications to Nelson Hydro for approval.

Pedestals shall be of non-combustible material.

The meter pedestal shall be supplied, installed, owned and maintained by the customer and approved by Technical Safety BC.

Location of the meter base must conform with **3.2 Revenue Meter Location.**

2.5 Temporary Services

Single phase temporary or construction services are permitted upon request to Nelson Hydro, where approved by Technical Safety BC.

Overhead temporary services are required to conform to **2.1 Overhead Service Guide**.

Underground temporary services shall be fed by customer supplied Teck or ACWU cable to the predetermined pad-mounted transformer or secondary vault. Sufficient spare cable shall be provided in an open excavated location, in close proximity to the pad-mounted transformer or secondary vault to allow Nelson Hydro to make connections. **NOTE:** Only authorized Nelson Hydro personnel may access pad-mount transformers or underground secondary vaults or boxes.

Location of the meter base must conform with **3.2 Revenue Meter Location.**

2.6 Unmetered Services

Unmetered services may be permitted by Nelson Hydro providing it is for street/outdoor lighting or telecom owned equipment with known loads. Rates for street or outdoor lighting can be found in the City of Nelson Hydro Services Bylaw 3608. Contact Nelson Hydro Design Team to apply.

2.7 Services on Pad-Mounted Transformers

Customers may apply to Nelson Hydro for metering to be installed at the service transformer where the following conditions apply:

- The service is Three-Phase WYE configuration (120/208V or 347/600V);
- The service exceeds 400A; and
- The transformer serves only one customer.

2.8 Supply of Service Materials

Up to and Including 200 Amperes

Nelson Hydro will supply conductor for services up to and including 200 Amperes up to a distance of 30 metres. Any conductor in excess of 30 metres will be at the expense of the Customer.

Greater than 200 Amperes

For services greater than 200 Amperes, conductor is to be supplied by the Customer. For multi-gang meter bases, service size is the rating of the bus.

3. Meter Guidelines

3.1 Types of Metering

The type of metering will depend on the class of service, service size and type of load.

1. Self-Contained Meters are required for Single-Phase service up to 320A and Three-Phase services up to 200A.
2. Instrument Metering are required for Single-Phase services greater than 320A and Three-Phase services greater than 200A.
3. Group Metering is permitted for Single-Phase and Three-Phase services.

3.2 Revenue Meter Location

The Customer is responsible for supplying and installing a meter base that is compliant with Nelson Hydro bylaws and Sections 3.3 and 3.4 below. The meter base must be in a location approved by the Nelson Hydro. Meter location guidelines shall be as follows:

1. Except in the case of metering over 300 volts, the meter socket shall be surface mounted, located on an outside wall and in an approved location as per **Figure 1** or as agreed with NH Design.
2. All meter sockets shall be installed between 1.5 m and 2 m above final ground level to the centre of the meter.
3. Meters shall not be installed in carports, breezeways or on decks or other similar areas that could potentially be enclosed, limit or restrict accessibility.
4. Meters shall be installed in locations that permit safe and unfettered access by employees or agents of Nelson Hydro.
5. Nelson Hydro, at its sole discretion, may make exceptions to the general specifications for meter installations, where a standard location will cause design and installation difficulties, subject to the meter remaining accessible to Nelson Hydro at all times.
6. Nelson Hydro may require, at the customer's expense, that the customer relocate any meter that is located in an area that cannot be conveniently accessible at all times, or is considered by Nelson Hydro to be unsafe.
7. For individually metered services in excess of 200A that require instrument metering, the customer shall supply and install an enclosure for current and potential transformers and the design of the enclosure shall first be approved by Nelson Hydro.
8. Nelson Hydro requires a minimum of 1m of working space directly in front of the meter and any associated electrical enclosures at all times.
9. Nelson Hydro may refuse connection of any Electrical Service built in a location not approved by Nelson Hydro, or not built to Nelson Hydro standards.

10. Nelson Hydro, at its sole discretion, may install additional equipment for metering communication purposes.

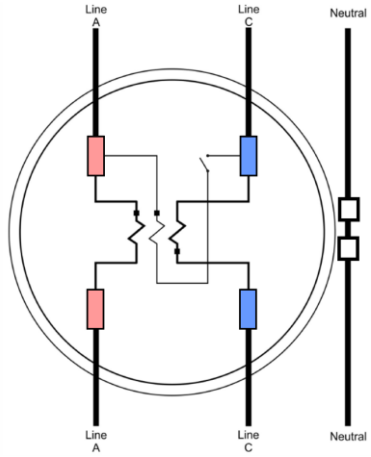
Nelson Hydro will perform pre-construction design reviews and site inspections on customer request.

All revenue meters shall be supplied and installed by Nelson Hydro. The Meters shall remain the property of Nelson Hydro and shall be maintained in accordance with the requirements of Measurement Canada and Technical Safety BC.

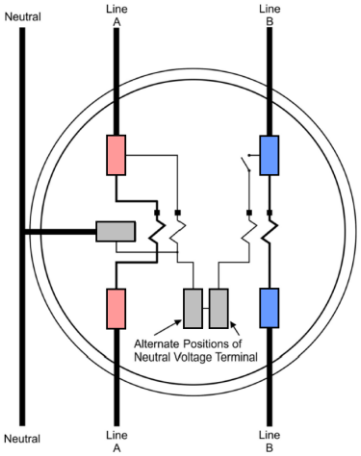
3.3 Self-Contained Metering

Nelson Hydro requires the customer to provide the following meter socket jaw configuration for new services:

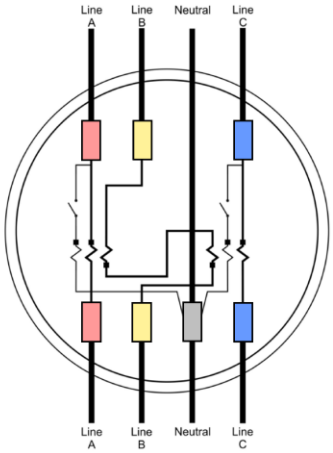
- Single Phase 3 Wire 120/240V service meter socket shall be Form 2S - 4 Jaw



- Three Phase 3 Wire 120/208V service meter socket shall be Form 12S - 5 Jaw



- Three Phase 4 Wire 120-600V Three-Phase service meter socket shall be Form 16S - 7 Jaw



Approved 120/240V 320A Self-Contained Meter Sockets

- 4 Jaw
    - Microelectric BP320-V (O/H)
    - Microelectric BP320-TV (U/G)

3.4 Instrument Metering

A meter measuring a service greater than 200A will require instrument metering.

Nelson Hydro will supply the meter, metering conductors, current transformer (CT), test block, potential transformer (PT) and fuse block. Nelson Hydro will make all connections to the meters, current transformer secondary terminals, test block, potential transformers and fuse blocks.

The customer is responsible for supplying and installing the instrument meter socket and CT enclosure. The customer will obtain CTs from Nelson Hydro, install the CTs in the enclosure, and complete primary side terminations. Primary conductors should be routed and supported so that no stress is applied to the CTs.

Approved Instrument Meter Sockets

<u>120/240V 400A Single Phase Three-Wire All-In-One CT Cabinet and Meter Socket:</u>

- 5 Jaw
    - Hydel CT4-BC-INK
    - Microelectric JS4B-STW

<u>120/240V 400A Single Phase Three-Wire All-In-One CT Cabinet, Meter Socket and Breaker:</u>

- 5 Jaw
    - Hydel CT4-WSOH-BC (O/H)
    - Hydel CT4-WS-BC (U/G)

120/240V Single Phase Three-Wire Meter Socket:

- 5 Jaw
  - Microelectric CT105-L
  - Hydel CTS405-PW-BC

120/208V, 347/600V Three-Phase Four-Wire WYE Meter Socket:

- 13 Jaw
  - Microelectric CT113-L
  - Hydel CTS130PW-BC

Metering Cabinet Enclosures

A separate metering cabinet must be installed for each service utilizing current transformers unless an approved all-in-one cabinet with meter socket is used.

Table 2: CT Metering Cabinet Enclosure Specifications

Service Voltage	Service Phase/Wire	Service Size	Enclosure Height	Enclosure Width	Enclosure Depth	Current Transformer Requirements
120/240	Single-Phase 3-Wire	201-400A	760mm 30”	760mm 30”	254mm 10”	One 3-Wire Current Transformer
120/240	Single-Phase 3-Wire	401-600A	760mm 30”	760mm 30”	254mm 10”	One 3-Wire Current Transformer
120/208	Three-Phase 4-Wire	201-600A	760mm 30”	760mm 30”	254mm 10”	Three 2-Wire Current Transformers
120/208	Three-Phase 4-Wire	601-1200A	915mm 36”	915mm 36”	305mm 12”	Three 2-Wire Current Transformers
347/600	Three-Phase 4-Wire	601-1200A	915mm 36”	915mm 36”	305mm 12”	Three 2-Wire Current Transformers

Enclosures are to be provided by the customer in accordance with the following requirements:

- Securely mounted;
- Approved instrument metering socket securely mounted at a height of 1.4 to 1.7 meters (4.5 to 5.5 feet) above floor height, measured from the meter socket’s centre point;
- Capacity for current transformer to be securely mounted utilizing all mounting holes, in a manner that allows it to be accessible and removable by personnel;
- Capacity for current transformer to be positioned with the primary polarity mark toward the source of supply and in an arrangement that will not obstruct access to the secondary terminals;

- Conduit securely installed and bonded between instrument transformer enclosure and meter socket enclosure;
- Nameplates to be clearly visible when enclosure is open;
- Equipped with a vertically hinged door, non-removable in the closed position, and with provisions for securing the door with a 9mm-shackle padlock or utility seal.

3.5 Net Metering

Net Metering is permitted on systems up to 25 kW providing the installation meets the standards in the Nelson Hydro Net Metering Interconnection Requirements. Visit the Nelson Hydro website or contact Nelson Hydro Design Team for additional net metering program details or to apply.

3.6 Group Metering

Nelson Hydro's standard is for one service per property. Additional service(s) may be approved where one of the following criteria is met to be installed in a location as approved by NH Design:

- Duplex, triplex, fourplex requiring individual metering.
- Commercial customers where multiple businesses share a building.
- Addition or connection of a defined living space such as a suite or carriage house.
- Meters are at different tariff rates, such as one residential and one commercial.

Where more than one meter is required on the property, each meter socket enclosure shall be labelled in a permanent and legible manner. This label must correspond with the Canada Post mailing address of the service or an identifier approved by Nelson Hydro.

For underground services, multiple meters must be installed in a duplex, triplex, or fourplex meter base. The meter base shall have a maximum of 200 amps per position. The meter sockets must be connected via a wiring compartment at the service entrance that is separate from all customer compartments with a sealable and removable cover.

Twin masts may be approved by Technical Safety BC and Nelson Hydro where required. Both masts must meet CEC requirements and the service conductors entering each mast shall be identified. A duplex meter base supplied in a single mast is also acceptable.

All meter sockets on the property must be electrically interconnected with a single service connection point unless otherwise approved by Nelson Hydro.

All multi-socket meter bases must have a blank cell for supply entry.

Figure 4: Multi-Socket Meter Base with Blank Cell

A maximum of 4-meter sockets are permitted to be installed on the exterior of a building.

Meter centers shall be “Cold Style” with the meter socket located on the load side of the associated circuit breaker. “Cold style metering” where a load break disconnect is installed between source and the meters is required on sub services with Three-Phase secondary voltages and Single-Phase services greater than 400A.

Customers shall be responsible for supplying spare meter socket covers and seal rings.

Distribution Gutter Boxes on the line side of group meters must have a means to seal or lock.

NELSON HYDRO

Prepared by:

Sophia Mountford

Nelson Hydro Project Coordinator

Reviewed by:

Casey Smit, P.Eng

Nelson Hydro Project and Customer Service Manager

SM /CS

Proprietary and Confidentiality Notice