

This Legal Acknowledgement Form shall be governed by the laws of the Province of British Columbia and the applicable federal laws of Canada. In the event of conflicts or inconsistencies, if any, between or among this Legal Acknowledgement Form and the terms and conditions of the Standard, the provisions set out in this Legal Acknowledgement Form take precedence.

Disclaimer

The Standard, and all information and referenced standards therein, is provided as a public service by the British Columbia Hydro and Power Authority ("BC Hydro"). Material contained within it carries no guarantee of any kind, express or implied.

Neither BC Hydro nor the Standard designer, recommender, or acceptor, are accountable for the manner in which the Standard is used, or in the way its content is applied. Persons using the Standard, including retained engineers and contractors, are responsible and assume full responsibility and liability for its application, including but not limited to ensuring that the application of its content is appropriate, and that its application does not compromise operability, safety, reliability or maintainability.

The Standards have been prepared for or by BC Hydro to meet specific purposes of BC Hydro. No person shall use or rely upon the Standard, in whole or in part, in any manner, except:

- a) for the purpose of providing services to BC Hydro;
- b) for the purpose of connecting equipment to BC Hydro equipment;
- c) with the prior written consent of BC Hydro, or
- d) as required by law.

Limitation of Liability

BC Hydro, its servants or agents, shall not be liable to any person for injury, loss or damage arising out of the use of or reliance upon this Standard, in whole or in part, except for those situations where the person uses the Standards to provide services to BC Hydro to the extent damages are not due to the fault of the person using the Standard, including but not limited to that person's misapplication of the Standard, negligence, or misconduct.

Any person using these Standards hereby agrees to release and indemnify BC Hydro, its servants or agents, from any injury, loss, damage or claim arising or alleged to be arising from use of or reliance upon the Standards, in whole or in part, except for those situations where the person directly uses the Standards to provide services to BC Hydro to the extent damages are not due to the fault of the person using the Standard, including but not limited to that person's misapplication of the Standard, negligence, or misconduct.

Copyright

BC Hydro holds all title and rights, including the copyright, in or to the Standard. Copying all or any part of this Standard is permitted provided copies are used in accordance with this Legal Acknowledgement Form, credit is given to BC Hydro, and copies of the Standard or parts thereof are not sold for profit. The Standard may be stored in any type of electronic retrieval system provided BC Hydro is clearly indicated as the source and provided no profit accrues from such storage.

BC Hydro notes that the Standard may be revised from time to time and recommends that any person using the Standard in accordance with this Legal Acknowledgement Form confirm it is using the most recent version.

BC Hydro is not liable for reliance on past versions of the Standard that may be stored electronically.

REVISIONS: UPDATED LEGAL ACKNOWLEDGEMENT FORM. FD MAR '16

DESIGNED J. AGNOLIN	RECOMMENDED  F. DENNERT	ACCEPTED  G. REIMER	ENGINEER OF RECORD 	NOTICE FROM THE EXECUTIVE VICE PRESIDENT TRANSMISSION AND DISTRIBUTION AND CUSTOMER SERVICE	
DISTRIBUTION STANDARDS 		ISSUED: MAR 2016 REPLACES: MAY 2004 ORIGINALLY ISSUED: NOV 1980		PAGE 1 OF 2	ES43/53/54/55/65 A1-01.01 ^R 4

Scope

This manual is one of a series containing standards for construction of the BC Hydro electrical distribution plant within the service area of BC Hydro. A new distribution plant shall be designed, constructed, owned, operated, maintained and repaired to these standards.

Purpose of Standards

BC Hydro objectives require standardization to:

- a) Ensure uniform safety requirements comply with BC statutes and regulations.
- b) Provide uniform system reliability.
- c) Provide uniform operating practices.
- d) Permit economic bulk purchasing of materials.
- e) Achieve optimum life cycle cost of plant construction.
- f) Effect efficient quality assurance.

Responsibility

The Distribution Standards Department prepares these standards and verifies that specified plant and procedures will perform adequately under all normally expected conditions encountered throughout the province of British Columbia. These standards are approved by Professional Engineers. It is the responsibility of BC Hydro Managers to ensure that the standards are followed unless abnormal conditions are encountered that require variations. These variations should be kept to a minimum and their performance shall be the responsibility of the Professional of Record in charge of the project, who will record and seal the variation based on satisfactory qualifications and experience to do so. As per the latest revision of the BC Hydro Distribution Owner's Engineer Guide, these variations must be accepted by BC Hydro's Owner's Engineer.

Use of Stock Materials

The electrical distribution plant covered by these standards is built using stock materials approved by a Professional Engineer as required by law. The use of non-stock materials for special and unusual situations must be approved by Distribution Standards or the BC Hydro Engineer responsible for the project.

Revisions to Manual

These standards are revised from time to time to improve the safety, performance, workability, cost effectiveness or appearance of the plant. The existing plant built to previous standards need not be updated unless so specifically advised by BC Hydro. When maintenance or other work, such as voltage conversion or conductor change is being done, updating plant to current standards is encouraged.

Mailing Addresses

The manual has been issued to a corporation or firm rather than to an individual. The corporation or firm is responsible for the safekeeping of the manual, and for keeping it current. Changes of address or in number of copies required must be reported promptly.

Suggestions for changes in the manual, or required changes of address may be made on the pre-addressed comment sheet included in the Manual and with each issue of revision.

REVISIONS: UPDATED LEGAL ACKNOWLEDGEMENT FORM. FD MAR '16

DESIGNED J. AGNOLIN	RECOMMENDED  F. DENNERT	ACCEPTED  S. REIMER	ENGINEER OF RECORD 	NOTICE FROM THE EXECUTIVE VICE PRESIDENT TRANSMISSION AND DISTRIBUTION AND CUSTOMER SERVICE		
DISTRIBUTION STANDARDS BC Hydro		ISSUED: MAR 2016 REPLACES: MAY 2004 ORIGINALLY ISSUED: NOV 1980		PAGE 2 OF 2	ES43/53/54/55/65 A1-01.02	R 4



Information Bulletin:

Release of ES54 S0-04 and S1 Standards for 120/240 V Single-Phase Secondary Services up to 600 A

Revision Note

This revised advisory 2022-023 R1 describes the latest revisions to ES54 S0-04 (R1), S1-03 (R1), and S1-04 (R1):

- Changed content is marked in the revised standards by green vertical revision lines in the left margin.
- This advisory is referenced by number in the Revision Notes sections of the affected standards.
- ES54 S0-04 R1, S1-03 R1, and S1-04 R1 have been released and posted online. The previous revisions of the standards (ES54 S0-04 R0, S1-03 R0, and S1-04 R0) are appended to this advisory for reference to help make it easier to understand the changes.

1.0 Items Covered

ES54 S0-04 R1	Services General Notes Secondary Services
ES54 S1-01 R10	Secondary Single-Phase Services 200 A Single and 400 A Multiple Self-Contained Meter Installation
(ES54 S1-02	Secondary Single-Phase Services 320 A Self-Contained Meter Installation) – Hold for Future
ES54 S1-03 R1	Secondary Single-Phase Services 400 A and 600 A CT-Based Meter Installation
ES54 S1-04 R1	Secondary Single-Phase Services 200 A to 600 A Pad-Mounted Kiosk and Pedestal, Self-Contained and CT-Based Meter Installation

2.0 Overview

This revised bulletin is a continuation-in-part to the original EA2022-023 R0 advisory issued November 25, 2022, describing subsequent changes made over the past six months to the ES54 section S standards for single-phase 120/240 V services up to 600 A.

Since November 2022, BC Hydro made several presentations to external and internal stakeholders and received valuable comments and suggestions for improving the standards. All constructive comments have been reviewed by BC Hydro and included in the latest standards revisions.

2.1 ES54 S1-01 R10 Secondary Single-Phase Services 200 A Single and 400 A Multiple Self-Contained Meter Installation

No changes.

2.2 Hold for Future – ES54 S1-02 Secondary Single-Phase Services 320 A Self-Contained Meter Installation

BC Hydro has successfully completed and energized several trial installations over the past six months for the future 320 A 120/240 V customer services, which we anticipate being available as a standard customer service connection in January 2024.

2.3 ES54 S1-03 R1 Secondary Single-Phase Services 400 A and 600 A CT-Based Meter Installation

Page	Section	Changes
3	Note 3 Service Entrance	- Table 3 deleted - See ES53 S1-01 for a list of BC Hydro-supplied cable clamps
10-12	Note 6 600 A 120/240 V Prefabricated Service Assemblies	- Note 6.a added ¾" (18 mm) diameter duct - Table 3 wireway minimum height reduced from 1400 mm to 1200 mm

2.4 ES54 S1-04 R1 Secondary Single-Phase Services 200 A to 600 A Pad-Mounted Kiosk and Pedestal, Self-Contained and CT-Based Meter Installation

Page	Section	Changes
16-17	Note 6 Hybrid Installations	- Figure 18 revised showing underground and above ground duct run - Installation notes revised describing concrete encasement as a protective barrier against power diversion

2.5 ES54 S0-04 R1 Services General Notes Secondary Services

This standard is for secondary customer-owned single-phase and three-phase services.

Page	Section	Changes
3	Note 2 Customer Service Main	2.1.d fuses are not acceptable ahead of revenue metering devices 2.2 temporary construction power new section in compliance with TSBC Information Bulletin IB-EL 2016-03 and accepted by local inspection authority
5	Note 3 Customer-Owned Transformation	3.1.c corrected 1600 A to 600 A at three-phase four-wire 347/600 V
5	Note 4 Wireways and Pullboxes	4.1.c Added new paragraph as guide for designer to determine service cable size
7	Note 6 Cable Clamps	- Deleted Table 1 - See ES53 S1-01 for BC Hydro-supplied cable clamps
7-8	Note 8 Grounding	- Moved customer bonding and service grounding installation from ES53 S1-01 to Figure 3 - Grounding stud is no longer required inside the utility wireway when working on low-voltage equipment (120/240 V, 120/208 V, and 347/600 V customer-owned services)

3.0 Action

ES54 S0-04 R1, S1-03 R1, and S1-04 R1 are effective July 31, 2023. Applications for work approved by the local BC Hydro design office on or after July 31, 2023 shall meet the requirements of these new revisions. Work approved prior to July 31, 2023 may comply with the previous revisions (ES54 S0-04 R0, S1-03 R0, and S1-04 R0) or may choose to comply with the new revisions.

Designers and Engineers

Designers and engineers should familiarize themselves with the revisions to ES54 S0-04, S1-03, and S1-04.

Civil Inspectors

Civil inspectors should familiarize themselves with the revisions to ES54 S0-04, S1-03, and S1-04.

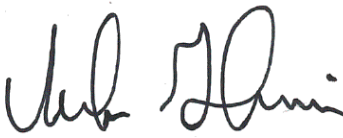
Customers and Customer Representatives

Customers and customer representatives, including electricians, project managers, consultants, and contractors, should familiarize themselves with the revisions to ES54 S0-04, S1-03, and S1-04. Please direct any questions or concerns to your local BC Hydro representative.

4.0 Distribution Standards Contact

Name: Mark Kelvin	Email: mark.kelvin@bchydro.com
Phone: 604-529-5679	Mobile: 604-220-3905

5.0 Approval

Recommended		Reviewed		Approved	
					
M. Kelvin		M. Stevens		H. Giesbrecht	
Date:	2023-06-30	Date:	2023-06-30	Date:	2023-06-30

Application

This standard provides general notes for ES54 S1 and S2 secondary underground service connections.

Revision Notes

R0 – New standard. November 2022, MK

Reference Standards

ES54 S0-02	Services General Notes
ES54 S0-05	Services General Notes, Service Ducts and Trenches
ES54 S1-01	Secondary Single-Phase Services 200 A Single and 400 A Multiple Self-Contained Meter Installation
ES54 S1-03	Secondary Single-Phase Services 400 A and 600 A CT-Based Meter Installation
ES54 S1-04	Secondary Single-Phase Services 200 A to 600 A Pad-Mounted Kiosk and Pedestal, Self-Contained and CT-Based Meter Installation
ES54 S2-01	Secondary Three-Phase Services 120/208 V and 347/600 V up to 1600 A Private Property Installation

Reference Documents

Primary Guide	Requirements for Customer-Owned Primary Services Supplied at 4 kV to 35 kV
Secondary Metering	Requirements for Secondary Voltage Revenue Metering (750 V and less)
DI S10-4	Electric Service Connections – Voltages
EA2021-003	Interim Guide for Acceptance of Secondary Service Equipment per Standards ES54 S1-01 and ES54 S2-01
BCEC	Canadian Electrical Code, Part 1 (CSA C22.1) adopted for BC and endorsed by Technical Safety BC (TSBC)

Notes

1. Typical Service Configurations

Following is a summary of typical BC Hydro secondary voltage customer services.

1.1 Single 200 A 120/240 V Single-Phase

This is the most common type of secondary underground service for residential dwellings. The meter socket in this configuration is mounted on the outside wall and separated from the service main panel. See ES54 S1-01.

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SERVICES GENERAL NOTES SECONDARY SERVICES	
DISTRIBUTION STANDARDS 	ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022	PAGE 1 OF 7		ES54 S0-04.01	R 0

1.2 Multiple Main up to 400 A 120/240 V Single-Phase

This combination panel may facilitate up to four 200 A 120/240 V meter sockets for supplying small duplex, triplex and fourplex residential buildings. See ES54 S1-01.

1.3 Single 400 A or 600 A 120/240 V Single-Phase

This secondary service is a combination panel comprising a service main breaker and CT-based revenue meter. These combination panels are suitable for small commercial buildings and large single-family dwellings or acreage homes. These combination panels may be rated up to 600 A 120/240 V and are available as surface-mounted panels. See ES54 S1-01.

1.4 Single 200 A to 600 A 120/240 V Single-Phase Pad-Mounted

This secondary service is an outdoor-type free-standing pad-mounted service pedestal or kiosk. Service pedestals are suitable for residential dwelling where the owner wants to restrict utility personnel access. Service kiosks are suitable for large residential dwellings, golf courses, small commercial buildings, service upgrades for additional electric vehicle chargers or laneway houses, and other multiple service connections. See ES54 S1-04.

1.5 Multiple Main 600 A Splitter 120/240 V Single-Phase

This is a common field-assembled service for smaller commercial and industrial installations with relatively small 120/240 V single-phase loads. This customer service is fed from a large CSA-certified splitter box up to 600 A 120/240 V. See ES54 S1-03.

1.6 Single up to 1200 A 120/240 V Single-Phase

This is a service with customer-owned transformation. The BC Hydro designer shall review and accept these services, subject to Revenue Metering's acceptance, for the installation of a bar-type CT up to 1200 A. BC Hydro requirements regarding customer-owned transformation can be found in *Requirements for Secondary Voltage Revenue Metering (750 V and less)*.

1.7 Single 200 A 120/208 V Three-Phase

This is a relatively common type of hot-style secondary underground service for residential and small commercial services and temporary construction power. The available fault current shall be less than 10 kA. Meter sockets do not require separate pull boxes, subject to the enclosure minimum dimensions in ES54 S2-01. BC Hydro terminates the utility supply conductors into the meter socket, which is ahead of the customer service main panel. BC Hydro also offers 200 A three-phase / 3W revenue meters for 240 V and 480 V special customer services with customer-owned transformation. Supply service ducts to customer-owned three-phase meter bases shall be 4" diameter minimum. See *Requirements for Secondary Voltage Revenue Metering (750 V and less)*.

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SERVICES GENERAL NOTES SECONDARY SERVICES	
DISTRIBUTION STANDARDS 			ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022	PAGE 2 OF 7	ES54 S0-04.02
					R 0

1.8 Multiple Main Splitter up to 1600 A 120/208 V and 347/600 V Three-Phase / 4W

These are common field-assembled large services for commercial and industrial installations. These customer services are fed from a large CSA-certified splitter box up to 1600 A and may supply multiple metered services for separate buildings and diverse customer loads, such as fire pumps and essential services panels. See ES54 S2-01 and equipment advisory EA20221-003.

1.9 Multiple Main Switchgear up to 1600 A 120/208 V and 347/600 V Three-Phase / 4W

These are the most common large factory-assembled and CSA-certified residential, commercial, and industrial secondary services up to 1600 A. This type of switchgear assembly has an integral utility cable cubicle with bus extensions and cable clamps for the safe connection of BC Hydro service supply cables. Integral to the assembly is the customer service main, as well as a sealed revenue metering CT compartment located immediately after the service main. See ES54 S2-01. Further information on BC Hydro rules and requirements for customer service connections can be found in DI S10-4.

2. Customer Service Main

The main service protective device for the services listed above shall be capable of interrupting the available fault current as follows:

- Single-phase 120/240 V up to 600A, available fault-current up to 22 kA;
- Three-phase 120/208 V, wye-connected, grounded neutral, up to 1600 A, available fault current up to 45 kA; or
- Three-phase 347/600 V, wye-connected, grounded neutral, up to 1600 A, available fault current up to 45 kA.

3. Customer-Owned Transformation

The maximum available secondary customer service connection size depends on the BC Hydro primary distribution system (12.5 kV, 25 kV, or 34.5 kV) available at the customer's location. If the customer requires larger service than the maximum available secondary service for the location, the customer shall provide customer-owned transformation and become a primary service customer. For further information see the BC Hydro Primary Guide or contact a BC Hydro designer for the area.

3.1 12.5 kV Primary Service

In areas where the primary service voltage is 12.5 kV (may include areas designated for 25 kV), the maximum customer service sizes rated for 80% continuous operation are:

- 600 A at single-phase three-wire 120/240 V;
- 1600 A at three-phase four-wire 120/208 V; and
- 1600 A at three-phase four-wire 347/600 V.

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SERVICES GENERAL NOTES SECONDARY SERVICES	
DISTRIBUTION STANDARDS 	ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022	PAGE 3 OF 7		ES54 S0-04.03	R 0

3.2 25 kV Primary Service

In areas where the primary service voltage is 25 kV, the maximum customer service sizes rated for 80% continuous operation are:

- 600 A at single-phase three-wire 120/240 V;
- 1600 A at three-phase four-wire 120/208 V; and
- 1600 A at three-phase four-wire 347/600 V.

3.3 Up to 34.5 kV Primary Service

In some rural applications where the primary service voltage is 19,920 V / 34,500 V grounded wye, the maximum consumer service sizes rated for 80% continuous operation to be supplied by BC Hydro at the secondary distribution voltage are:

- 600 A at single-phase three-wire 120/240 V;
- 1600 A at three-phase three-wire 120/208 V; and
- 1600 A at three-phase four-wire 347/600 V.

4. Wireways and Pull Boxes

4.1 Utility Wireway

- BC Hydro no longer terminates utility supply cables directly onto a customer-owned service main switch or breaker lugs due to liability and restricted access.
- Customer-owned three-phase services, except for the 200 A 120/208 V meter socket, require a separate utility compartment for securing and terminating BC Hydro supply cables. Supply lugs within the BC Hydro utility wireway shall be tunnel-type, clearly visible, and vertically oriented to permit direct conductor access for termination 1.5 m minimum clearance shall be provided in front of wireways and pull boxes.

4.2 Pull Boxes General

- A pull box is the compartment necessary for cable installation crews to safely and effectively pull in the required cable. Pull boxes are required at service entrance equipment locations except for meter bases and switchgear rated 200 A and less.
- Mid-run pull boxes located outside a building shall be a BC Hydro equivalent 632 or 332 box, as determined by the BC Hydro designer and approved by the local field manager.
- Mid-run pull boxes, wall-mounted inside a building, shall be minimum 900 mm W x 1800 mm H x 800 mm D.
- Pull boxes shall be located in consultation with a BC Hydro designer and accepted by the local field manager. A minimum 1.5 m clearance shall be provided for working space in front of the box to accommodate pulling equipment and BC Hydro crews.

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SERVICES GENERAL NOTES SECONDARY SERVICES	
DISTRIBUTION STANDARDS 			ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022	PAGE 4 OF 7	ES54 S0-04.04
					R 0

- e. Concrete pull boxes on private property and ducts entering customer-owned pull boxes and wireways shall be terminated into bell ends to eliminate the possibility of service cable damage.

4.2 Pull Boxes Located at the Service Entrance of Wireways

- a. Wireways can be either top, bottom, back, or side entry, and have either a wireway or integral pull box. The requirements outlined herein apply to service entry assemblies except where noted.
- b. Suitable cable supports shall be provided in wireways and pull boxes per note 6 *Cable Clamps*.
- c. Bus bars shall be extended into the wireway and be staggered and separated horizontally or vertically as shown in the ES54 S1 and S2 standards.
- d. Service entry ducts shall be placed within the wireway, pull box, or cable entrance compartment.
- e. Wireway and pull box dimensions shall be in accordance with applicable tables in the ES54 S1 and S2 standards.

5. Cable Pulling

- a. Customer-owned service switchgear, wireways, and pull boxes are not rated for direct attachment of BC Hydro cable pulling gear. The BC Hydro designer shall advise the customer about installing necessary pulling irons, which are supplied by BC Hydro and installed by the customer. The BC Hydro designer in consultation with a local field manager shall review rear and side cable entry services and customer-owned pull boxes and provide the necessary acceptance.
- b. Service cables may be installed by hand if the BC Hydro structure or customer pull box is close to the utility point of connection and the expected maximum pulling tension is less than 450 N, excluding reel back tension. Hand feed installation assumes one installer pushing and one installer pulling the cables. There is no reel back tension in the pulling calculation. Pulling irons are not required for hand feed installation. The BC Hydro designer shall obtain acceptance for hand feed installation from the local field manager.
- c. Portable pulling equipment may be used to pull cable into a utility cable compartment located in the customer's building. Pulling irons are typically required if hand feed is not possible but may be omitted through consultation and agreement with a field operations manager or delegate.
- d. Threaded inserts for attaching BC Hydro pulling irons, if required, shall be engineered by the customer's consultant and connected to the building structure. The customer is responsible for determining the pulling iron holding strength based on the BC Hydro-provided maximum pulling line tension, location of the pulling iron, and pulling equipment and rigging.

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SERVICES GENERAL NOTES SECONDARY SERVICES	
DISTRIBUTION STANDARDS  BC Hydro	ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022			PAGE 5 OF 7	ES54 S0-04.05
					R 0

- e. The customer shall provide engineered threaded inserts or attachments to the building structure for BC Hydro removable pulling irons as determined by BC Hydro designer. The customer shall supply and install bolts and hardware deemed necessary by the customer's engineer and shall be left threaded in place for use by BC Hydro crews during cable pulling.
- f. Cable positioning sheaves for side entry utility pull boxes and wireways may be large (400 mm to 675 mm) for large service cable bending radii. The wireway or pull box for such installations shall be large enough to rig a suitable cable guide sheave for each of the cable runs without requiring removal of or other conflict with a previously installed existing service supply cable.

6. Cable Clamps

- a. Cable clamps shall be installed in a 1½" x 1½" C-channel mounted on a slotted adjustable angle bracket, suitable for facing either outward or upward. Slotted angles shall provide back and forth adjustment of the C-channel within 100 mm of the enclosure front or the back.
- b. BC Hydro will supply threaded hardware and cable clamps required for the support of BC Hydro service cables.

Table 1 – Size of secondary cable clamps

Cable Description	Clamp Size	Cable OD Range (mm)	Material Number
1/0 AWG, Copper	½"	10-13	97008225
4/0 AWG, Copper	¾"	17-19	97008227
350 kcmil, Copper	7/8"	19-22	97008228
500 kcmil, Copper	1"	23-25	97008229
#1 AWG, Aluminum	½"	10-13	97008225
4/0 AWG, Aluminum	5/8"	14-16	97008226
350 kcmil, Aluminum	7/8"	19-22	97008228
500 kcmil, Aluminum	1"	23-25	97008229

BC Hydro requires relatively large pull boxes and wireways for pulling and training large service supply cables. The minimum dimensions of these boxes, depending on the size of the service, are listed in ES54 S1 and S2 standards.

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SERVICES GENERAL NOTES SECONDARY SERVICES	
DISTRIBUTION STANDARDS 		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 6 OF 7	ES54 S0-04.06
				R	0

7. Concrete Encasement of Supply Service Ducts

BC Hydro does not provide adequate overcurrent protection for supply service cables. Service ducts shall be installed on the outside of the building unless they are encased in concrete (see BCEC Rule 6-208). The portion of the service ducts running inside the building shall be embedded in and enveloped by a concrete cover a minimum 75 mm thick for three-phase services and 50 mm thick for single-phase services.

8. Grounding

- BC Hydro accepts customer-owned service ground wiring installations per applicable BCEC rules, based on a contractor's declaration or evidence of a final inspection certificate. BC Hydro does not inspect customer-owned grounding and bonding for compliance with BCEC rules. Customer grounding and bonding connections shall be completed and inspected by the local authority having jurisdiction's electrical inspector before calling for energization by BC Hydro.
- The customer building or service grounding conductor connection to the neutral bus shall be done outside the utility compartment. Switchgear manufacturers typically designate the customer ground connection inside the service main switchgear and provide ¾" duct as a feed-through barrier inside the BC Hydro revenue metering compartment.

9. Standby Power and Transfer Switches

- Customer-owned standby generation is classified as either open-transition ("break-before-make") or closed-transition ("make-before-break").
- A customer may operate an open-transition standby generator at secondary voltage as an emergency power supply, independent and disconnected from BC Hydro service. The generator must never operate in parallel with BC Hydro service.
- Compliance and installation verifications and inspections of customer-owned open-transition transfer switches for secondary voltage customers with an open-transition standby generator are performed by TSBC and the local electrical authority having jurisdiction. BC Hydro only accepts CSA-certified utility transfer switches built specifically for this function, per applicable CSA C22.2 standards. BC Hydro does not accept custom-built mechanical or electrical interlock schemes replicating the function of a CSA-certified utility supply transfer switch.
- BC Hydro does not accept sleeve-type transfers switch-mounted on 120/240 V 200 A CSA certified meter sockets. See ES54 S1-01.

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SERVICES GENERAL NOTES SECONDARY SERVICES	
DISTRIBUTION STANDARDS 			ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022	PAGE 7 OF 7	ES54 S0-04.07
					R 0

Application

This standard describes BC Hydro requirements for customer-owned surface-mounted single-phase 120/240 V single 400 A and 600 A secondary voltage underground services for small residential, commercial, and industrial customers. These services have CT-based revenue meter and integral service main breaker and may be installed indoors inside a shed or closet, or outside on a house wall or acceptable permanent support structure.

Revision Notes

R0 – New standard derived from ES54 S1-01 R9. November 2022, MK

Reference Standards

ES54 S0-02	Services General Notes
ES54 S0-04	Services General Notes, Secondary Services
ES54 S0-05	Services General Notes, Service Ducts and Trenches
ES54 S1-01	Secondary Single-Phase Services 200 A Single and 400 A Multiple Self-Contained Meter Installation

Reference Documents

Secondary Metering	Requirements for Secondary Voltage Revenue Metering (750 V and less)
DI S10-1	Electric Service Connections – General
DI S10-4	Electric Service Connections – Voltages
BCEC	Canadian Electrical Code, Part I (CSA C22.1) adopted for BC and enforced by Technical Safety BC (TSBC)
TSBC D-EI 2017-01	Directive: Exemptions to public utilities
TSBC IB-EL 2017-04	Information Bulletin: Electrical Safety Regulation application to public utilities

Notes

1. General

- Residential single 400 A and 600 A and multiple 400 A 120/240 V services may be installed inside a detached power shed, an outdoor pad-mounted power kiosk, an external closet attached to a dwelling, or on an external building wall. BC Hydro personnel shall have unrestricted access directly from the outside.
- Commercial and industrial 400 A and 600 A 120/240 V service equipment located inside a customer building is acceptable as shown in Figure 1.

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SECONDARY SINGLE-PHASE SERVICES 400 A AND 600 A CT-BASED METER INSTALLATION	
DISTRIBUTION STANDARDS 	ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022	PAGE 1 OF 13		ES54 S1-03.01	R 0



Figure 1 – Acceptable commercial meter closet inside building

- c. Customer service, bonding, and grounding conductors shall be installed and terminated on the load side before BC Hydro installs utility supply cables and seals the meter socket for BC Hydro access only.
- d. Civil work and grounding installations are the responsibility of the customer. See ES54 S0-05 for service duct and trench requirements.
- e. BC Hydro accepts both grounding options of meter socket and customer service ground in compliance with BCEC Rule 10-210.
- f. 400 A and 600 A 120/240 V services require BC Hydro to install larger pad-mounted transformers with higher available fault levels (above 10 kA). All new construction and upgraded 400 A and 600 A customer-owned service breaker panels shall have a minimum 22 kA interrupting capacity.

2. Service in Duct

- a. Underground service duct should be installed outside the foundation walls and run on the surface of the exterior building walls. Service duct may be installed within the foundation and building wall if encased in concrete.
- b. Service ducts inside building walls shall be encased in concrete as a fire barrier. BC Hydro does not provide overcurrent protection for supply service cables. This requirement is consistent with BCEC Rule 6-208 for customer-owned service conductors.

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SECONDARY SINGLE-PHASE SERVICES 400 A AND 600 A CT-BASED METER INSTALLATION		
DISTRIBUTION STANDARDS 	ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022			PAGE 2 OF 13	ES54 S1-03.02	R 0

3. Service Entrance

- Table 1 shows acceptable enclosure and service assembly options for 400 A and 600 A services.
- Minimum dimensions shown in figures are required for adequate working space for BC Hydro personnel. The customer may use larger enclosures if necessary.
- Table 2 shows minimum knockout and tunnel-type cable lug sizes for 400 A and 600 A services.
- Table 3 shows BC Hydro supplied and installed cable clamps required for service cables. The cable clamps shall be installed in 1½" x 1½" C-channels mounted on a slotted adjustable angle bracket, suitable for facing either outward or upward. Slotted angles, as shown in Figures 11 and 13, shall provide back-and-forth adjustment of the C-channel within 100 mm of the front or back of the enclosure. BC Hydro shall supply all threaded hardware and cable clamps required for supporting BC Hydro service cables.

Table 1 – Minimum enclosure options for 400 A and 600 A 120/240 V services

Option	Figure	Service Size (A)	Breaker	CT Provision	Ducts or Full Wireway	Prefabricated or Field Assembled
1	7	400	Yes	Integral	Ducts	Prefabricated, Hydrel
2	8	400	Yes	Meter socket	L-box, full wireway	Field assembled
3	9	400	Yes	Meter socket	Ducts, compact wireway	Field assembled
4	10	400	Yes	Compartment	Ducts, compact wireway	Field assembled
5	11	Up to 600	Yes	Separate enclosure	Full wireway	Prefabricated
6	12	Up to 600	Yes	Field installed	L-box, full wireway	Field assembled

Table 2 – Minimum KO size and line side lugs for 400 A and 600 A 120/240 V services

Service Size	Minimum KO and Duct Size	Minimum Line Side Cable Lug Range
Up to 400 A	3"	#4/0 500 kcmil Cu/Al
Up to 600 A	2 x 3"	#4/0 500 kcmil Cu/Al, two lugs per phase

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SECONDARY SINGLE-PHASE SERVICES 400 A AND 600 A CT-BASED METER INSTALLATION	
DISTRIBUTION STANDARDS 		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 3 OF 13	ES54 S1-03.03
					R 0

Table 3 – Secondary cable clamp size (supplied and installed by BC Hydro)

Cable Description	Clamp Size	Cable OD Range (mm)	Material Number
4/0 AWG, copper	¾"	17-19	97008227
350 kcmil, copper	7/8"	19-22	97008228
500 kcmil, copper	1"	23-25	97008229
4/0 AWG, aluminum	5/8"	14-16	97008226
350 kcmil, aluminum	7/8"	19-22	97008228
500 kcmil, aluminum	1"	23-25	97008229

4. Construction Details for 400 A and 600 A Services

- a. A circuit breaker only as customer service main is acceptable to BC Hydro. A fused loadbreak switch is not permitted since the customer access requirement for fuse replacement precludes effective sealing of unmetered conductors and buses. See Figures 2 and 3.



Figure 2 – Unacceptable loadbreak switch



Figure 3 – Acceptable service main breaker

- b. BC Hydro no longer terminates utility supply cables directly onto a customer-owned service main due to liability and restricted access. The customer shall provide a separate utility service cable compartment and certified splitter for terminating utility supply cables and customer-owned cables. An example of a certified splitter is shown in Figures 4 and 6.
- c. Customer service splitter busbars shall extend into the utility cable compartment and be fitted with line-side tunnel-type lugs for terminating BC Hydro supply cables. BC Hydro will accept staggering of phase cables over neutral, as shown in Figures 4 and 5.
- d. See Figure 6 for minimum dimensions and details on cable lug and busbar clearances, busbar staggering, and splitter portion insulator spacers. The dimensions shown in Figure 6 are BC Hydro requirements for working space. Clearances from conductive components to the metal enclosure shall comply with CSA 22.2 standards.

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SECONDARY SINGLE-PHASE SERVICES 400 A AND 600 A CT-BASED METER INSTALLATION	
DISTRIBUTION STANDARDS 	ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022	PAGE 4 OF 13		ES54 S1-03.04	R 0

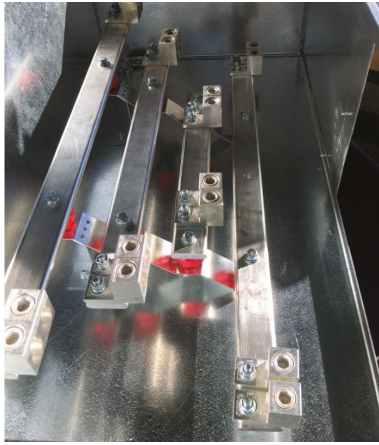


Figure 4 – Splitter bus layout and spacing

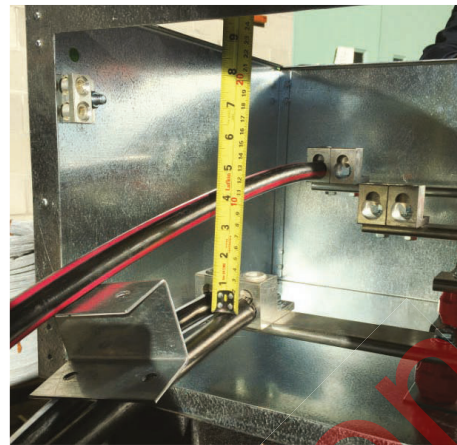


Figure 5 – Phase cable staggered over neutral

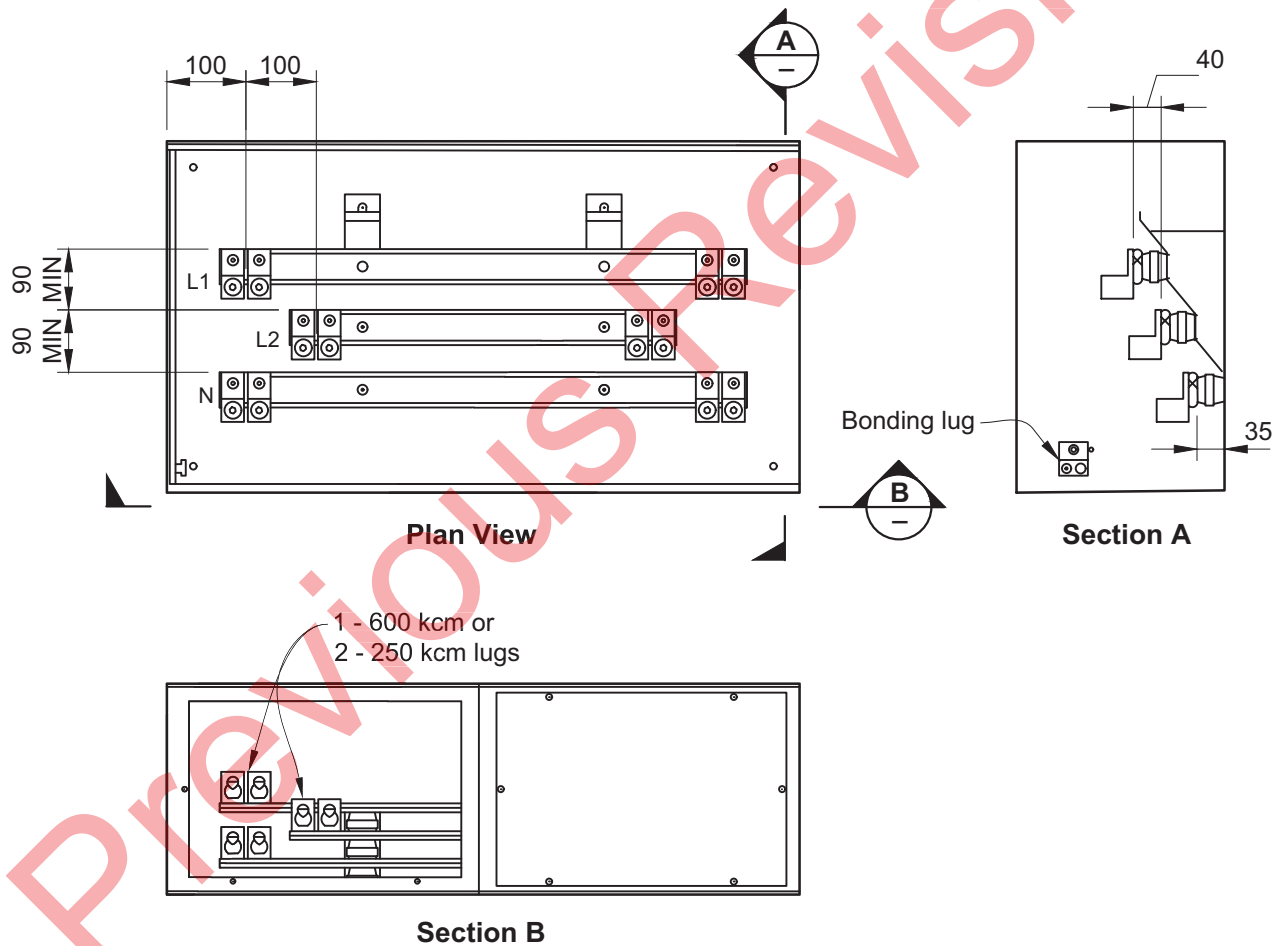


Figure 6 – Certified splitter up to 600 A service

DESIGNED	RECOMMENDED	ACCEPTED	ENGINEER OF RECORD	SECONDARY SINGLE-PHASE SERVICES 400 A AND 600 A CT-BASED METER INSTALLATION		
 M. KELVIN	 M. STEVENS	 H. GIESBRECHT				
DISTRIBUTION STANDARDS 	ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022			PAGE 5 OF 13	ES54 S1-03.05	R 0

5. 400 A 120/240 V Service Assemblies

- a. Hydel offers a fully integrated 400 A 120/240 V customer service assembly with an integral utility cable compartment, splitter, 400 A service main, 400:5 A CT block, and 5 A revenue meter as shown in Figure 7. The entire Hydel enclosure is sealed for BC Hydro access only. The customer can access the service main breaker handle through a lockable hinged breaker cover as shown in Figure 7.

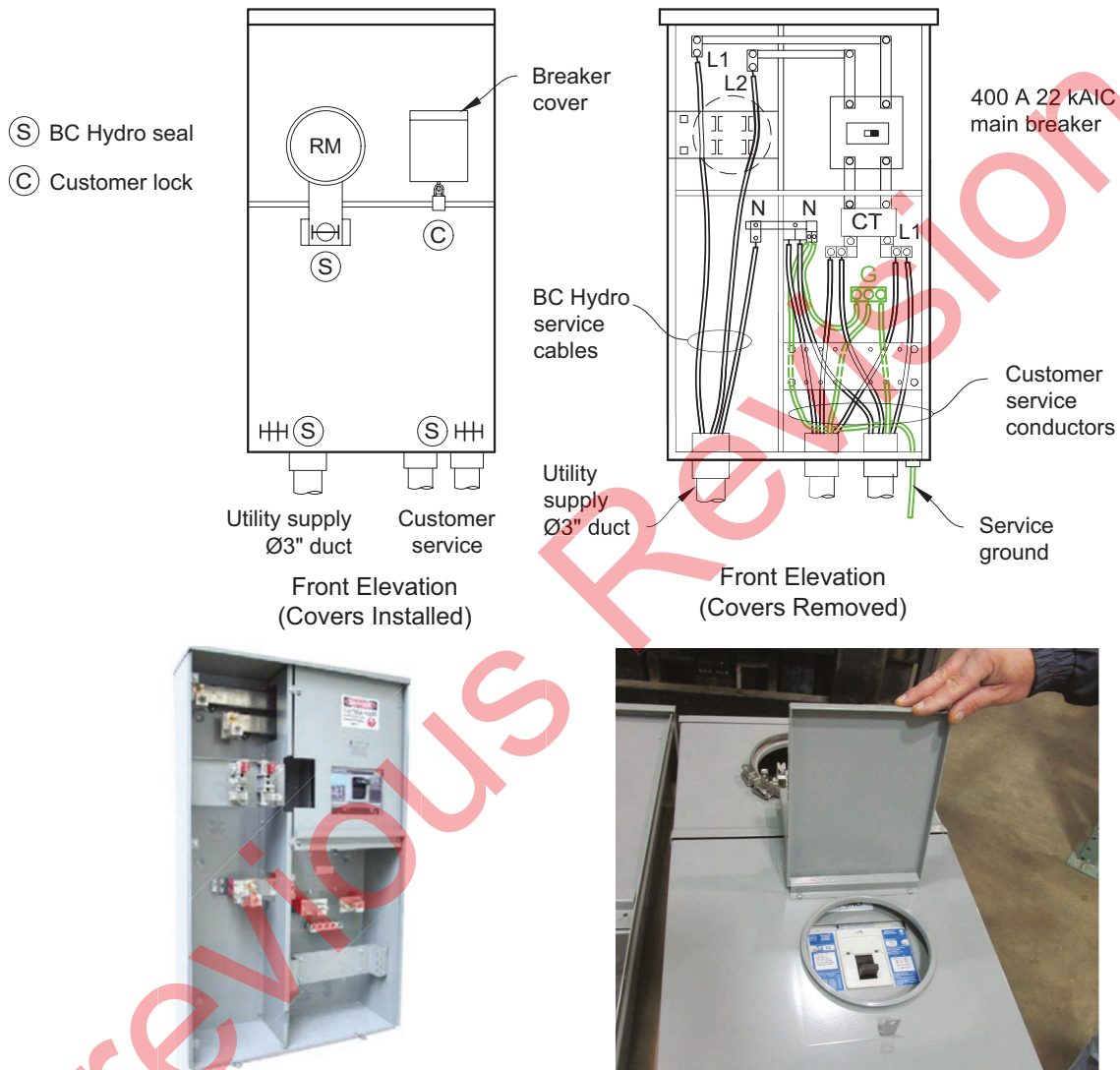


Figure 7 – Hydel 400 A integral with breaker and CT

- b. Microelectric and Hydel self-contained 400 A meter sockets with 400:5 A integral CT and test blocks require the installation of a 400 A service breaker ahead of the meter socket for safety isolation. See Figures 8, 9, and 10.

DESIGNED M. KELVIN	RECOMMENDED M. STEVENS	ACCEPTED H. GIESBRECHT	ENGINEER OF RECORD M. KELVIN	SECONDARY SINGLE-PHASE SERVICES 400 A AND 600 A CT-BASED METER INSTALLATION	
DISTRIBUTION STANDARDS 		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 6 OF 13	ES54 S1-03.06 R 0

- c. Figure 8 shows a field-assembled installation and construction details for a full-size indoor-type service assembly with a prefabricated L-box having an integral utility cable compartment and a splitter. The L-box, including utility cable compartment and a splitter, is sealed with sealing studs for BC Hydro access only. The customer service breaker is installed inside a separate enclosure and is sealed for BC Hydro access only. The customer can access the service main breaker handle without breaking any seals.

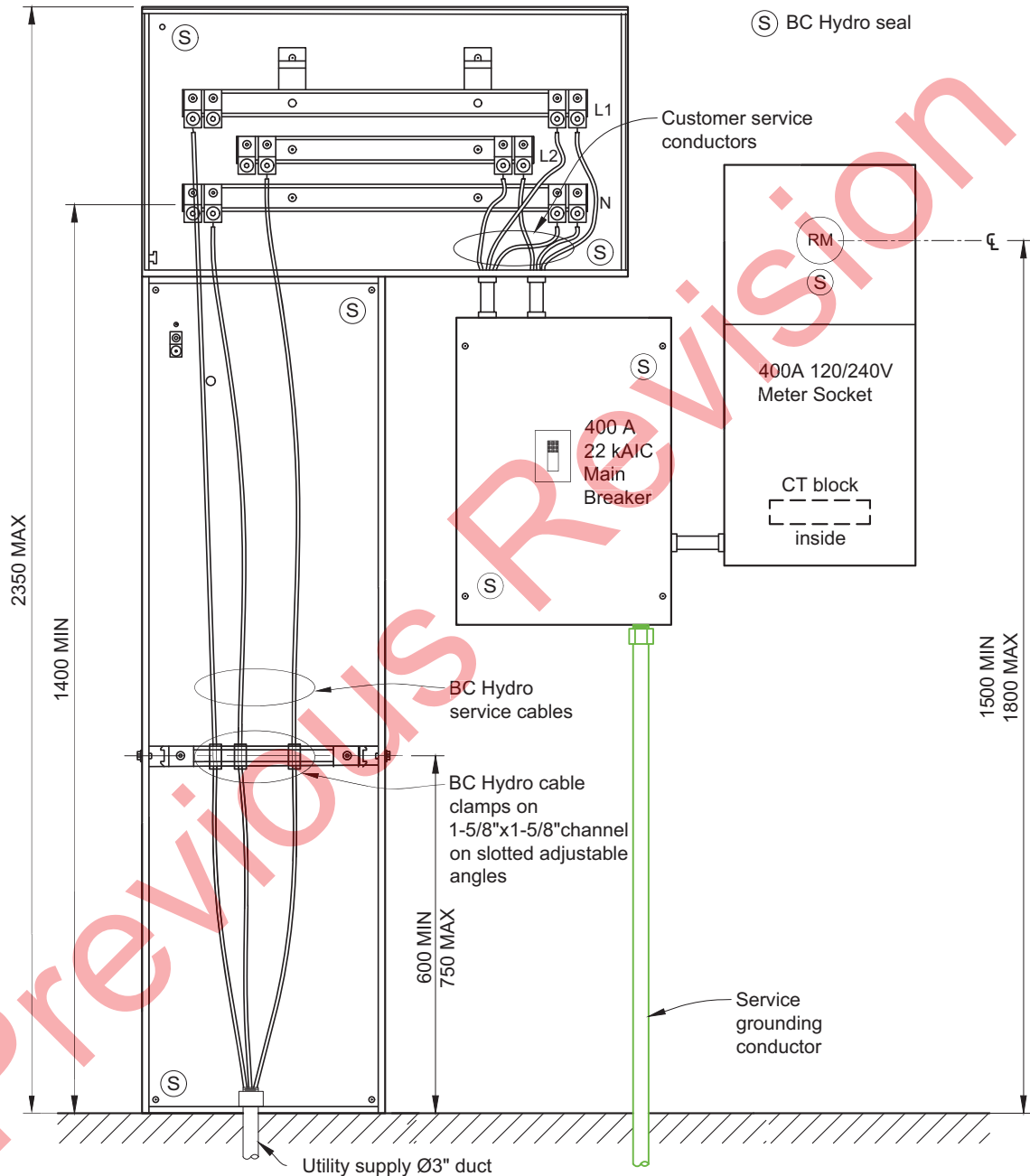


Figure 8 – 400 A service assembly using L-box

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SECONDARY SINGLE-PHASE SERVICES 400 A AND 600 A CT-BASED METER INSTALLATION		
DISTRIBUTION STANDARDS 		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 7 OF 13	ES54 S1-03.07	R 0

- d. Figure 9 shows construction details for a compact enclosure service assembly with an integral service breaker suitable for outdoor-type surface mounting. An example of such an installation is shown in Figure 3. The service enclosure is locked for BC Hydro access only. The customer can access the service main breaker handle through a lockable hinged access hatch as shown in Figure 9.

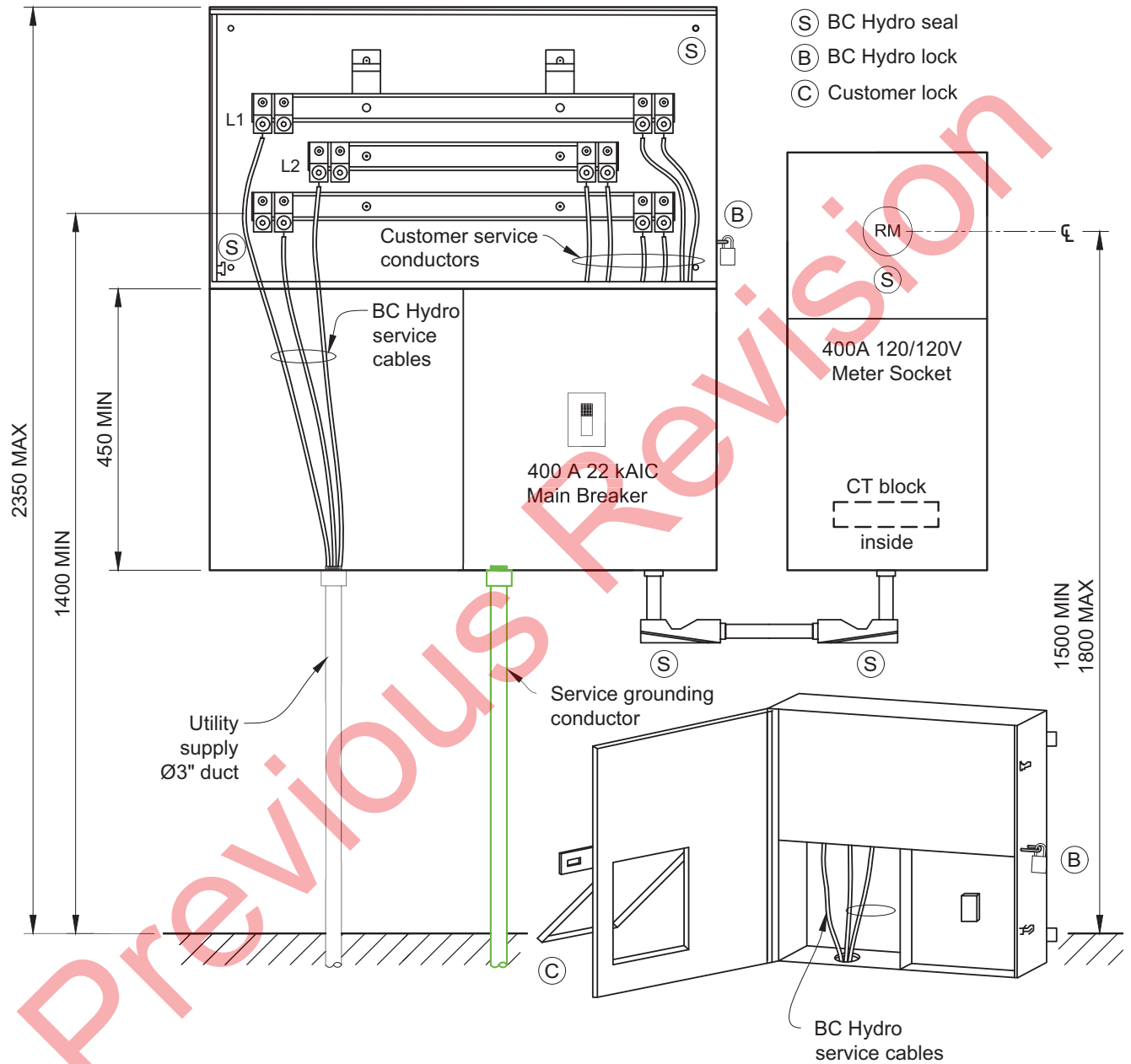


Figure 9 – 400 A service assembly using 3R outdoor-type enclosure

DESIGNED	RECOMMENDED	ACCEPTED	ENGINEER OF RECORD	SECONDARY SINGLE-PHASE SERVICES 400 A AND 600 A CT-BASED METER INSTALLATION		
 M. KELVIN	 M. STEVENS	 H. GIESBRECHT				
DISTRIBUTION STANDARDS 	ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022			PAGE 8 OF 13	ES54 S1-03.08	R 0

- e. BC Hydro will accept a certified splitter mounted vertically (see Figure 10). Vertical splitter busbars shall be spaced 100 mm apart to the centerline of the busbar or cable lugs. BC Hydro requires a utility wireway a minimum 450 mm below the splitter to train and terminate service cables.

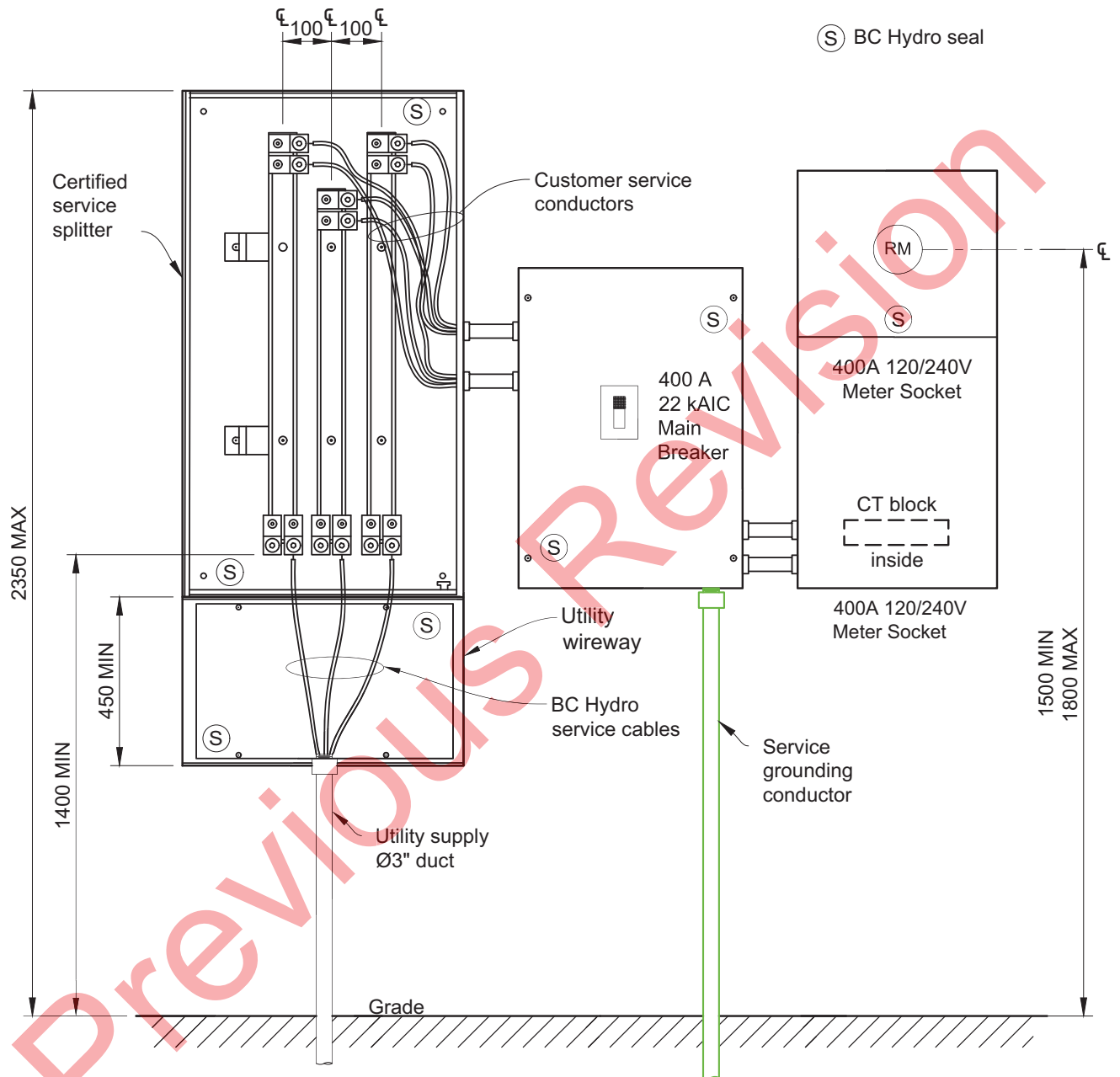


Figure 10 – Typical indoor-type vertically mounted service splitter

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SECONDARY SINGLE-PHASE SERVICES 400 A AND 600 A CT-BASED METER INSTALLATION		
DISTRIBUTION STANDARDS BC Hydro	ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 9 OF 13		ES54 S1-03.09	R 0

6. 600 A 120/240 V Prefabricated Service Assemblies

- a. The majority of 600 A 120/240 V customer service assemblies are installed as prefabricated enclosures comprising an integral utility cable compartment, splitter, service main, and a BC Hydro revenue metering compartment below the service main.

For some installations, the customer could install a field-assembled service assembly comprising a separate utility cable compartment, splitter, service main enclosure, and revenue metering cabinet. Such installations require the customer to install another load-side splitter for connecting several customer feeder cables.

Both configurations (prefabricated and field-assembled) require the customer to install a separate 100 A 120/240 V meter socket for a BC Hydro 5 A secondary revenue meter fed from the revenue metering compartment or a box.

- b. Figure 11 shows typical construction of an indoor-type prefabricated 600 A 120/240 V service, which may also be used for a 400 A customer service assembly. See Table 4 for minimum dimensions.

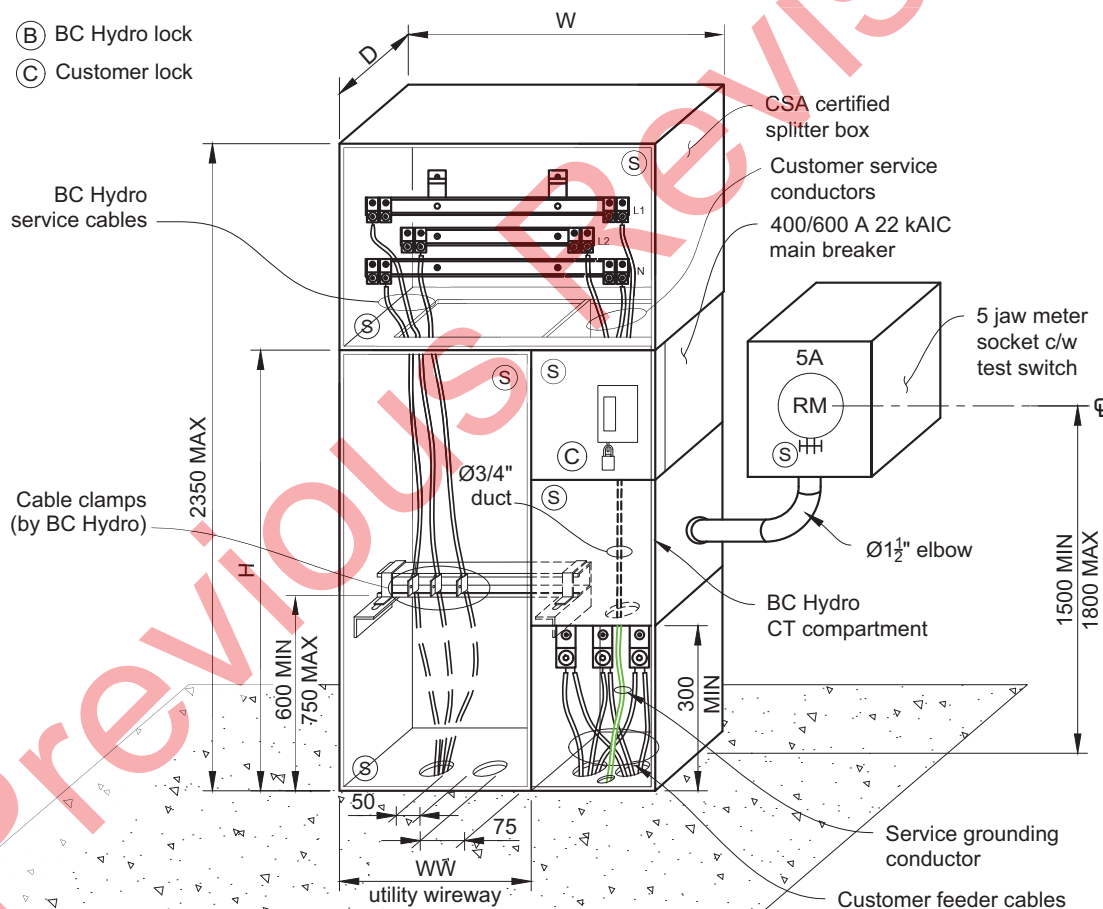


Figure 11 – Prefabricated integral assembly up to 600 A, bottom entry

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD  M. KELVIN	SECONDARY SINGLE-PHASE SERVICES 400 A AND 600 A CT-BASED METER INSTALLATION		
DISTRIBUTION STANDARDS 		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 10 OF 13	ES54 S1-03.10	R 0

- c. Figure 12 shows typical construction of a field-assembled 600 A 120/240 V service indoor-type customer-owned service assembly. The customer shall install a separate revenue metering enclosure and separate 5 A revenue meter socket for such installations. See the Secondary Metering guide for further requirements. BC Hydro will not accept an outdoor-type field-assembled 600 A service as shown in Figure 12. See ES54 S1-04 for outdoor-type installations (kiosks).

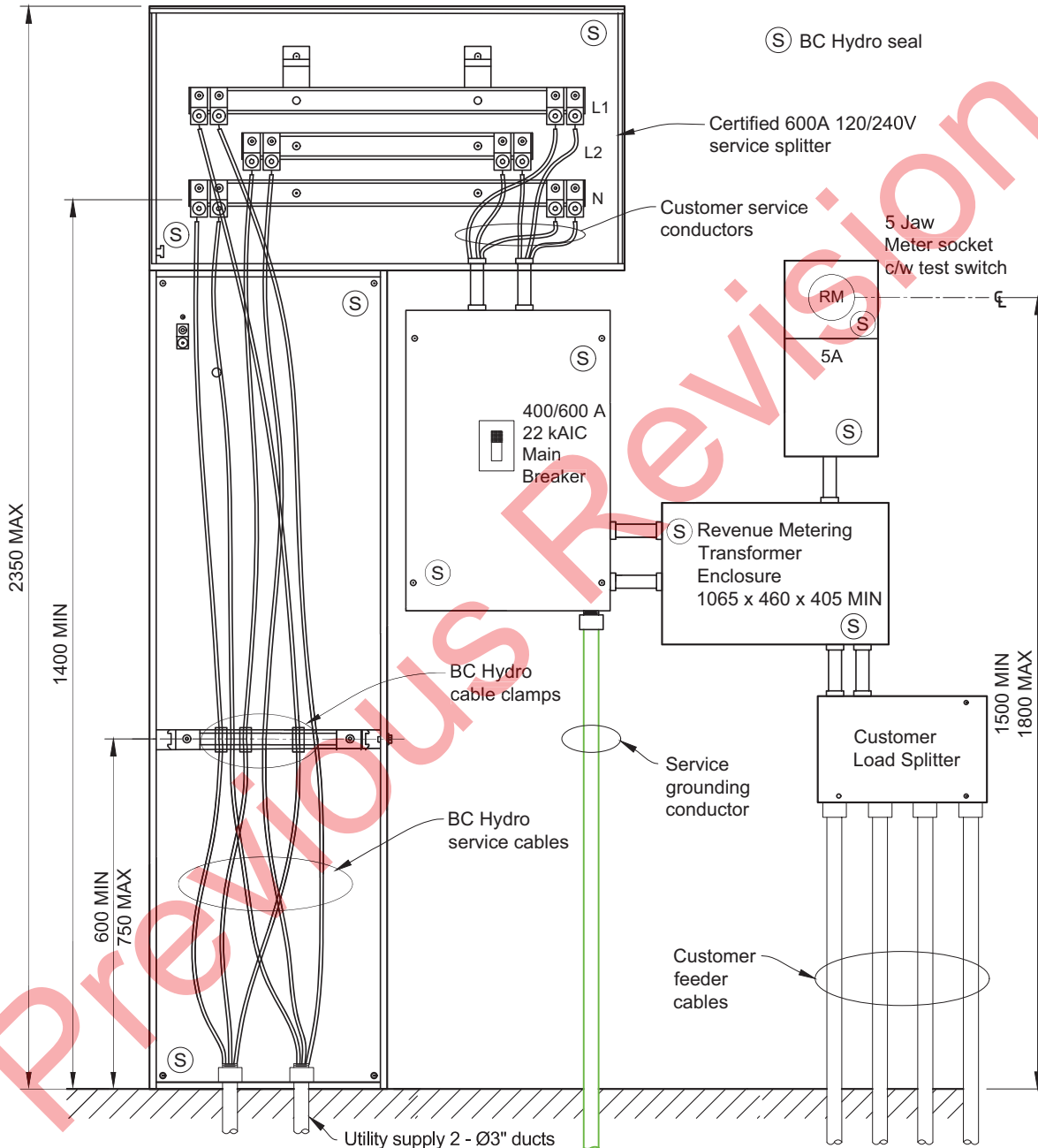


Figure 12 – 600 A field assembled indoor-type service

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SECONDARY SINGLE-PHASE SERVICES 400 A AND 600 A CT-BASED METER INSTALLATION	
DISTRIBUTION STANDARDS 	ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022	PAGE 11 OF 13		ES54 S1-03.11	R 0

- ☐ (S) BC Hydro seal
☐ (C) Customer lock



Use only for doing work with or for BC Hydro. Complete Legal Acknowledgement is at www.bchydro.com/distributionstandards.

Table 4 – Minimum size of pull boxes and wireways for service equipment up to 600 A 120/240 V or mid-cable run

Main Switch/ Breaker Size	Duct Size and Quantity (note 2)	Minimum Pull Box Size (mm)				Minimum Wireway Bottom Entry Size (mm)		Minimum Height (H)
		Side and Top Entry		Rear Entry		Width (WW)	Depth (D)	
		Width (W)	Depth (D)	Width (W)	Depth (D)			
Up to 200A	1 x 3"	800	500	500	800	300 (note 1)	200	1400
Up to 400 A	1 x 3"	800	500	500	800	300 (note 1)	300	1400
Up to 600 A	2 x 3"	800	500	500	800	450	300	1400

Table notes:

- 300 mm minimum wireway width acceptable for vertically staggered bus extensions.
450 mm minimum wireway width required for horizontally staggered bus extensions.
- 900 mm W x 1800 mm H x 800 mm D minimum size for any customer-owned mid-run pull boxes wall mounted inside.

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SECONDARY SINGLE-PHASE SERVICES 400 A AND 600 A CT-BASED METER INSTALLATION	
DISTRIBUTION STANDARDS 		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 13 OF 13	ES54 S1-03.13
					R 0

Application

This standard describes BC Hydro requirements for customer-owned pad-mounted pedestals and kiosks for single-phase 120/240 V secondary voltage services. These service kiosks and pedestals are best suited for regular and large single-family dwellings, service upgrades for additional electric vehicle charging stations, separate laneway houses, and other multiple service connections.

Revision Notes

R0 – New standard derived from ES54 S1-01 R9. November 2022, MK

Reference Standards

ES54 S0-02	Services General Notes
ES54 S0-04	Services General Notes, Secondary Services
ES54 S0-05	Services General Notes, Service Ducts and Trenches
ES54 S1-01	Secondary Single-Phase Services 200 A Single and 400 A Multiple Self-Contained Meter Installation
ES54 S1-03	Secondary Single-Phase Services 400 A and 600 A CT-Based Meter Installation

Reference Documents

Secondary Metering	Requirements for Secondary Voltage Revenue Metering (750 V and less)
DI S10-1	Electric Service Connections – General
DI S10-4	Electric Service Connections – Voltages
BCEC	Canadian Electrical Code, Part I (CSA C22.1) adopted for BC and enforced by Technical Safety BC (TSBC)
TSBC D-EI 2017-01	Directive: Exemptions to public utilities
TSBC IB-EL 2017-04	Information Bulletin: Electrical Safety Regulation application to public utilities

Notes

1. Installation Types

- 200 A service pedestal with a self-contained plug-in loadbreak-type 200 A revenue meter.
- 200 A service kiosk, standard height enclosure for non-municipal installations based on self-contained 200 A revenue meters.
- 200 A service kiosk, reduced height municipal-owned metered and unmetered, based on self-contained revenue meters or no revenue meter.
- 400 A and 600 A service kiosk, CT-based with integral main breaker and separate 5 A revenue meter.

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD  M. KELVIN	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION	
DISTRIBUTION STANDARDS 	ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022	PAGE 1 OF 18		ES54 S1-04.01	R 0

- e. Complex 120/240 V up to 600 A meter stack free-standing service kiosk with integral main breaker and a stack of several self-contained revenue meters.

2. General

- a. Pedestal-type and outdoor kiosk services rated up to 600 A 120/240 V shall provide 1.0 m minimum unrestricted and clear front access for BC Hydro personnel directly from the outside.
- b. Customer-owned service, bonding, and grounding conductors shall be installed and terminated on the load side before BC Hydro installs utility supply cables and seals the meter socket for BC Hydro access only.
- c. Civil work and grounding installations are the responsibility of the customer.
- d. BC Hydro accepts both grounding options of meter socket and customer service ground connections in compliance with BCEC Rule 10-210.
- e. Pedestals and kiosks shall have an adequate concrete pad and stability to withstand tipping resistance and seasonal weather changes. See note 3 for more information.
- f. BC Hydro may install larger pad-mounted transformers with higher available fault levels (above 10 kA) due to increased load demand for 120/240 V services. New construction and upgraded 120/240 V customer-owned service breaker panels shall have a minimum 22 kA interrupting capacity.
- g. Due to liability and restricted access, BC Hydro no longer terminates utility supply conductors directly onto a customer-owned service main. A circuit breaker only as service main is acceptable. A fused loadbreak switch is not permitted as the customer access requirement for fuse replacement precludes effective sealing of unmetered conductors and buses.
- h. Dimensions shown in this standard are the minimum for service entrance enclosures and BC Hydro requirements. Larger size enclosures may be used as required by the customer.

3. Concrete Pads and Service Ducts

- a. Figure 1 shows a vector diagram and construction details for concrete pads and service ducts for a typical free-standing 200 A 120/240 V pedestal. Figure 2 shows a vector diagram and construction details for a typical free-standing kiosk up to 600 A.
- b. The customer shall ensure the following BC Hydro requirements are met:
 - i. The kiosk or pedestal shall have an engineered base frame anchored to a concrete pad suitable for a 1200 N-m overturning moment to prevent damage caused by vandalism.
 - ii. BC Hydro service cables shall not be exposed to extraordinary stress caused by soil expansion and contraction due to seasonal weather changes.
- c. In general, BC Hydro will accept a certified engineering construction drawing for pedestals and kiosks that meet the above requirements.

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD  M. KELVIN	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION	
DISTRIBUTION STANDARDS 		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 2 OF 18	ES54 S1-04.02 R 0

3.1 200 A Pedestal

- a. If a service pedestal installation is performed by a contractor or owner without certified construction drawings, BC Hydro will accept pedestal base and duct installation in compliance with the requirements shown in Figure 1:
 - i. Concrete pads shall extend 50 mm past the pedestal base frame and shall be a minimum 600 mm deep to withstand overturning force.
 - ii. Concrete pads shall be placed on top of gravel fill extending 150 mm below the frost line to eliminate differential settlement stresses caused by freeze/thaw cycles.
 - iii. Concrete pads shall protrude 50 mm min above finished grade.

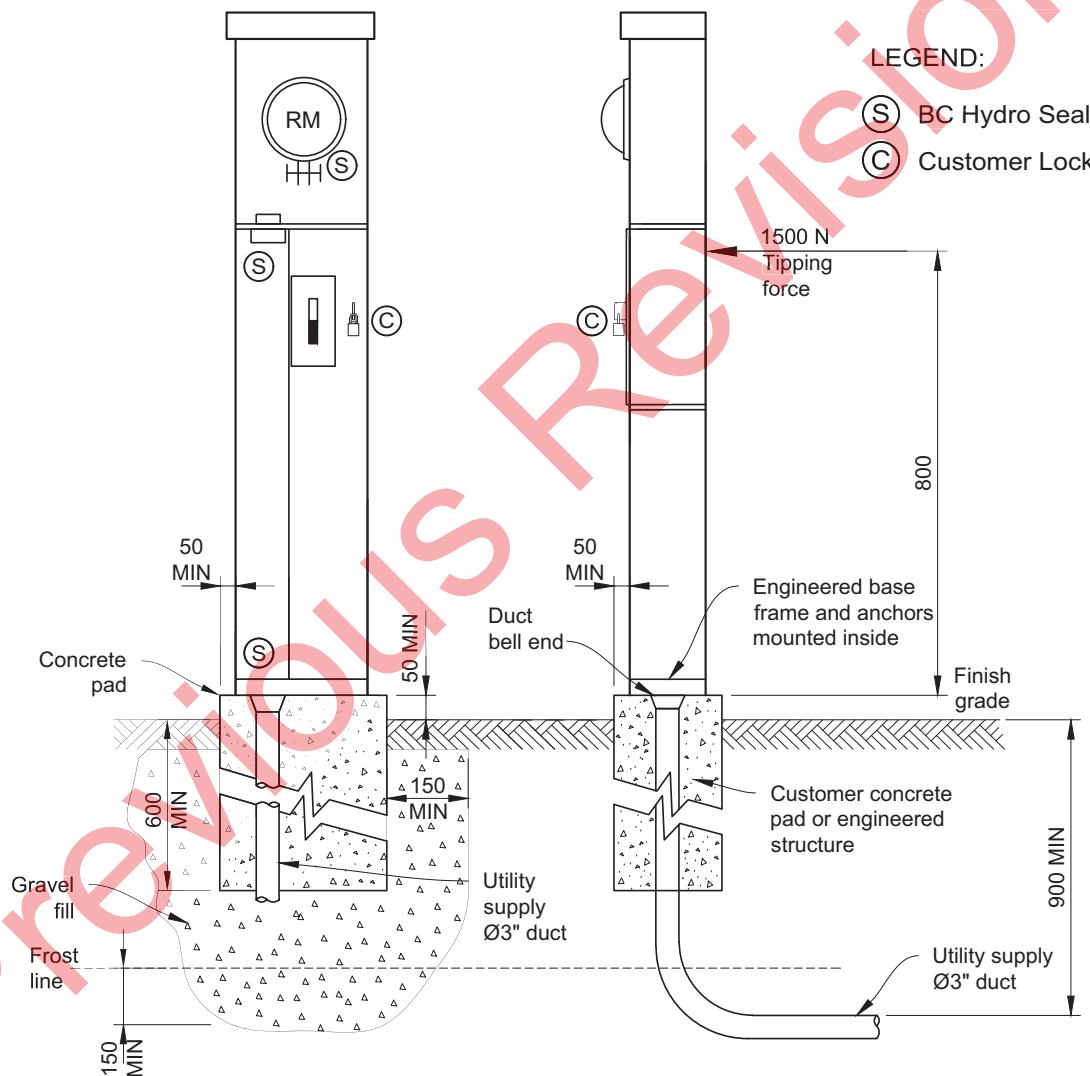


Figure 1 – 200 A pedestal, concrete pad and duct installation

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD  M. KELVIN	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION	
DISTRIBUTION STANDARDS 	ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022			PAGE 3 OF 18	ES54 S1-04.03 R 0

3.2 200 A to 600 A Kiosk

- a. If a service kiosk installation is performed by a contractor or owner without certified construction drawings, BC Hydro will accept kiosk concrete pad and duct installation in compliance with the requirements shown in Figure 2:
 - i. Concrete pads shall extend 50 mm past the kiosk mounting base frame and shall have a minimum 200 mm thickness.
 - ii. Concrete pads shall be reinforced with 12 mm (½") rebar rods equally spaced 200 mm on center and installed axially and radially.
 - iii. Concrete pads shall be installed on top of gravel fill or integrally connected with helical anchors or sono tubes with rebar, as a means of structural support to the hard pan or the ground, extending 150 mm below the frost line.
- b. These requirements shall be discussed with and accepted by a BC Hydro designer before the start of construction.

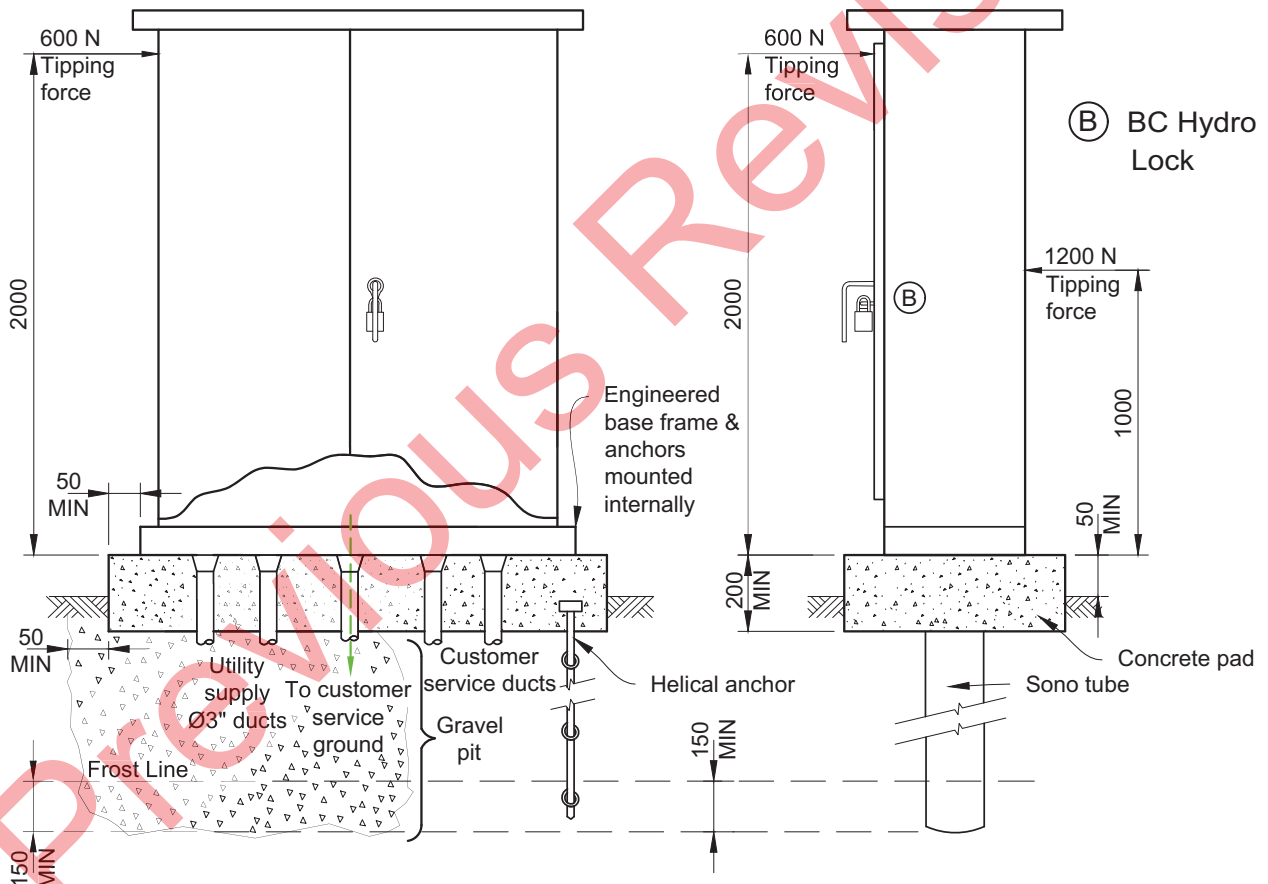


Figure 2 – 200 A to 600 A kiosk, concrete pad and duct installation

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD  M. KELVIN	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION		
DISTRIBUTION STANDARDS BC Hydro	ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 4 OF 18		ES54 S1-04.04	R 0

4. Pedestal and Kiosk Enclosure and Base Frame

- a. Pedestals and kiosks shall be rated for outdoor installation and carry applicable CSA 22.2 standards certification as acceptable to TSBC and the local authority having jurisdiction.
 - i. Kiosks having one external hinged access door shall be equipped with a dual access hasp (or equivalent) as shown in Figure 3.

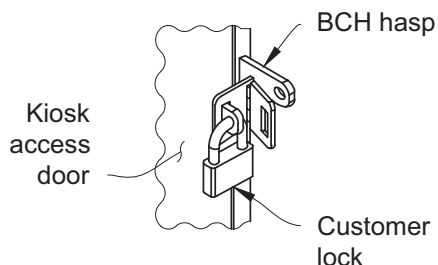


Figure 3 – Dual access hasp for single-door outdoor kiosk

- ii. Kiosks having two external hinged access doors requires dual access and shall be equipped with two separate three-point latches and separate hasps for each door as shown in Figure 5.
- iii. Large revenue meter centre kiosks having two external hinged access doors require dual access as shown in Figure 16. The customer shall provide a dual lock hasp bracket as shown in Figure 17.

4.1 200 A Pedestal

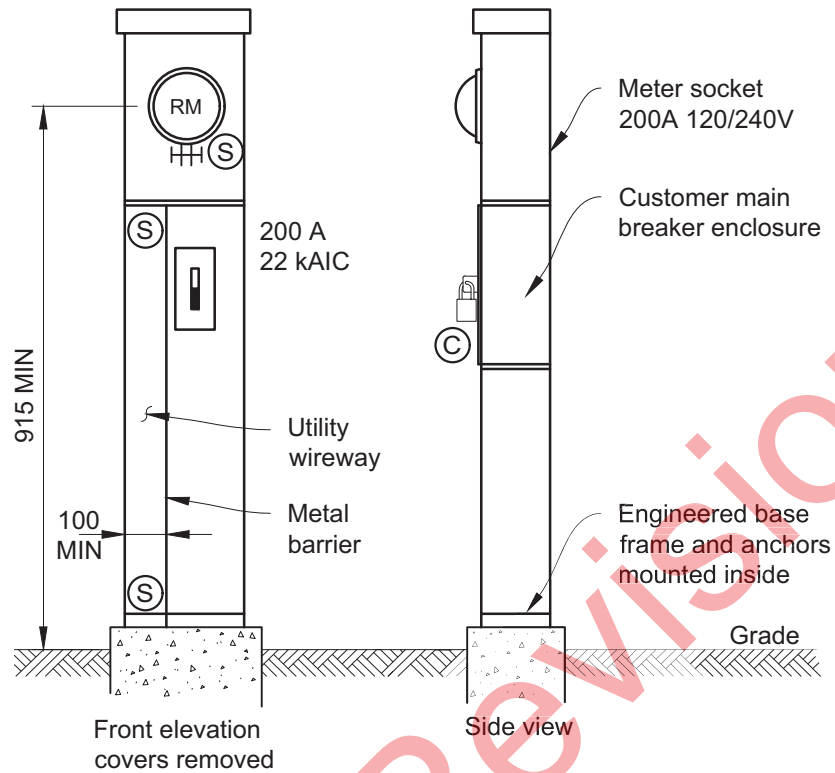
- a. Figure 4 shows a typical customer-owned 200 A pedestal with the following BC Hydro requirements:
 - i. Pedestal height shall be minimum 1200 mm in response to customer requests for improved appearance.
 - ii. Revenue meter centerline elevation measured from the finished grade shall be minimum 915 mm.
 - iii. Pedestal shall contain a separate utility cable wireway barriered off from customer equipment and sealable by BC Hydro for restricted access to BC Hydro personnel.
 - iv. Utility supply cables and customer cables shall not cross.
 - v. Pedestal shall be equipped with a 200 A 22 kAIC breaker to protect customer-owned underground service conductors.

Note: BC Hydro has received numerous service calls to restore electrical services to customers supplied from the same low-profile transformer when one customer damages customer-owned underground service cables.

- vi. BC Hydro recommends that owners install a customer-owned lock for breaker compartment access to prevent unauthorized operation of the service main breaker.

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION		
DISTRIBUTION STANDARDS 	ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022			PAGE 5 OF 18	ES54 S1-04.05	R 0

- © Customer Lock
 (S) BC Hydro Seal



Pedestal with cover installed

Figure 4 – 200 A pedestal design details

DESIGNED M. KELVIN	RECOMMENDED M. STEVENS	ACCEPTED H. GIESBRECHT	ENGINEER OF RECORD M. KELVIN	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION	
DISTRIBUTION STANDARDS BC Hydro		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 6 OF 18	ES54 S1-04.06 R 0

4.2 200 A Non-Municipal Kiosk

- a. Figure 5 shows free-standing 200 A kiosks having a self-contained revenue meter socket mounted inside the kiosk. The customer shall ensure the following BC Hydro requirements are met:
 - i. Kiosks shall have adequate concrete pad and service ducts installed in compliance with note 3.2.
 - ii. Kiosks shall have adequate height to facilitate the installation of a revenue meter with a centreline elevation between 1500 mm and 1800 mm measured from the finished grade.
 - iii. Kiosks shall have a separate utility compartment and access door and a hasp for a BC Hydro padlock. The access door shall have a centered viewing window a minimum 150 mm in diameter. See *Requirements for Secondary Voltage Revenue Metering (750 V and less)* for further BC Hydro requirements.
- b. Figure 6 shows construction and installation details for free-standing 200 A kiosks having a self-contained revenue meter socket mounted outside of the kiosk bolted onto the kiosk enclosure. The customer shall ensure the following BC Hydro requirements are met:
 - i. Kiosks shall have adequate concrete pad and service ducts installed in compliance with note 3.2.
 - ii. Kiosk shall have adequate height to facilitate the installation of a revenue meter with a centreline elevation between 1500 mm and 1800 mm measured from the finished grade.
 - iii. Utility access into the customer-owned service breaker compartment is not required.
 - iv. An externally mounted meter socket shall be permanently attached to the kiosk enclosure by means of 1½" channels bolted with tamperproof bolts to prevent vandalism.
- c. The customer may apply to BC Hydro for acceptance of a reduced height service kiosk if the kiosk poses a safety risk from visual obstruction or if improved appearance is justified.

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD  M. KELVIN	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION	
DISTRIBUTION STANDARDS 		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 7 OF 18	ES54 S1-04.07
					R 0

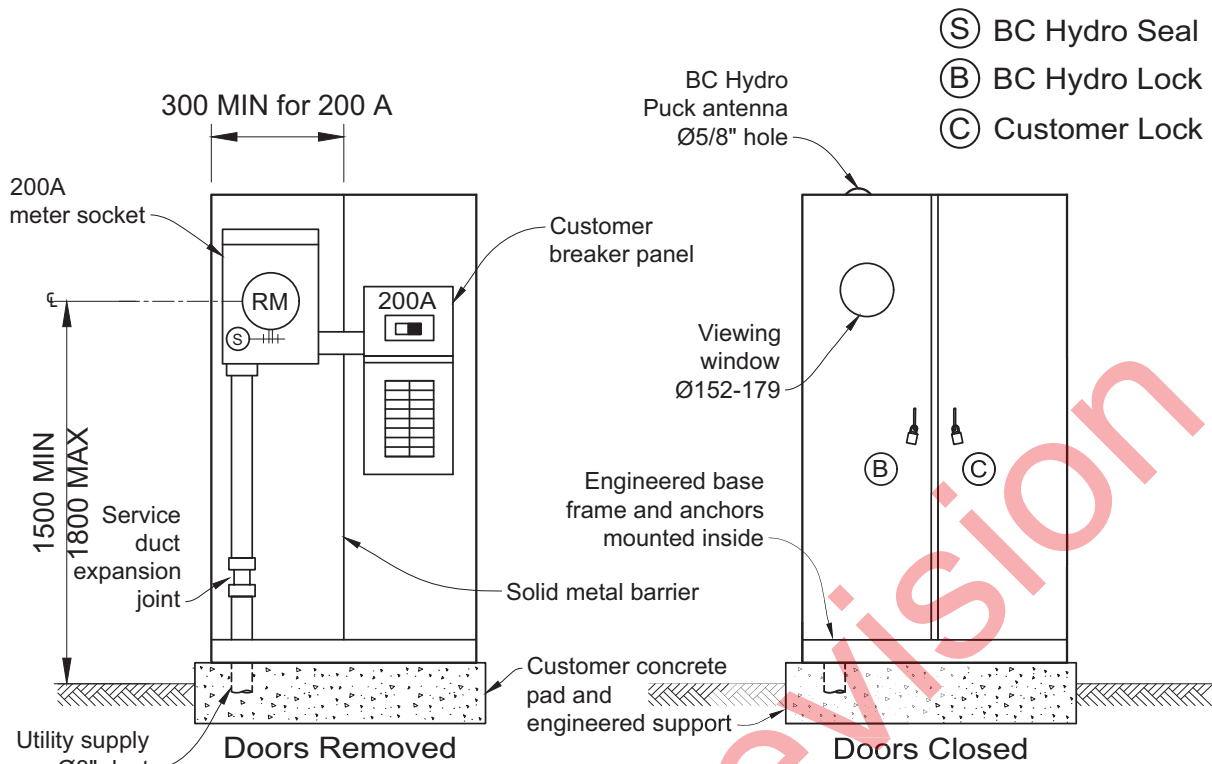


Figure 5 – Kiosk with revenue meter socket mounted inside enclosure

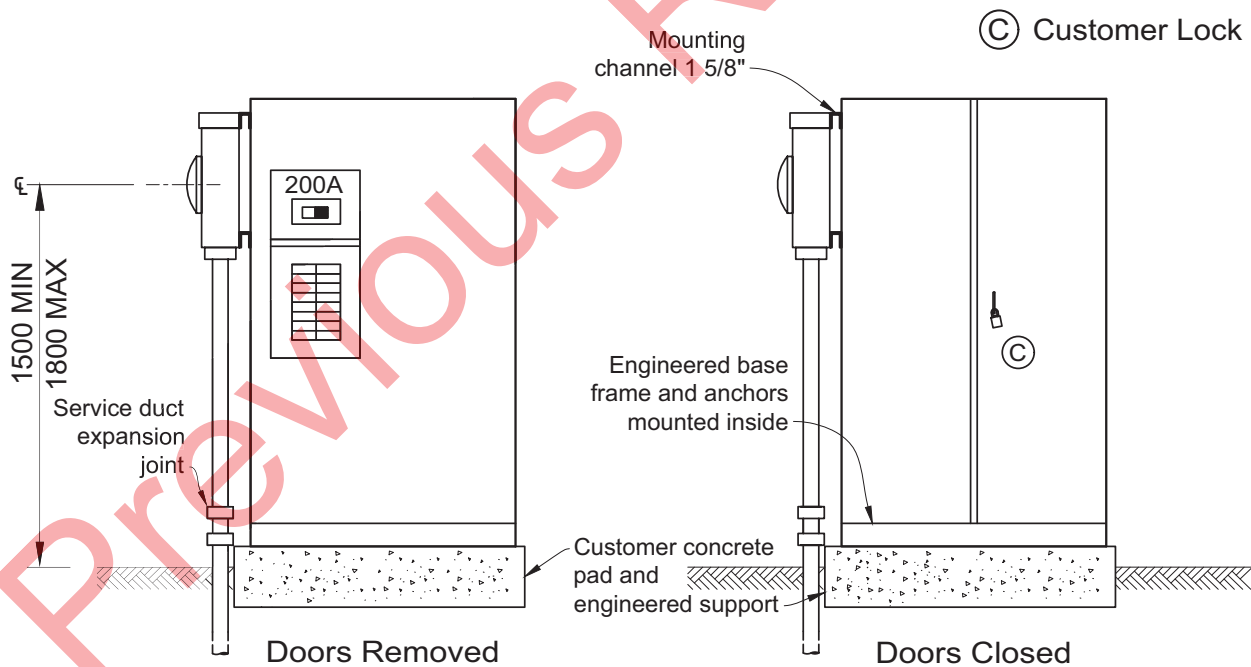


Figure 6 – Kiosk with revenue meter socket mounted outside enclosure

DESIGNED	RECOMMENDED	ACCEPTED	ENGINEER OF RECORD	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION		
 M. KELVIN	 M. STEVENS	 H. GIESBRECHT				
DISTRIBUTION STANDARDS 	ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022			PAGE 8 OF 18	ES54 S1-04.08	R 0

4.3 200 A Low-Profile Municipal Kiosk

- Requirements for metered municipal kiosks are the same as for non-municipal kiosks (see note 4.2 200 A Non-Municipal Kiosk) except municipal kiosks shall have a maximum enclosure height of 1200 mm for reduced visual obstruction when installed near street intersections.
- Figure 7 shows a typical free-standing 200 A unmetered municipal kiosk. 200 A terminal blocks are acceptable for terminating utility supply cables. Utility access is required if BC Hydro crews terminate the supply service cables.

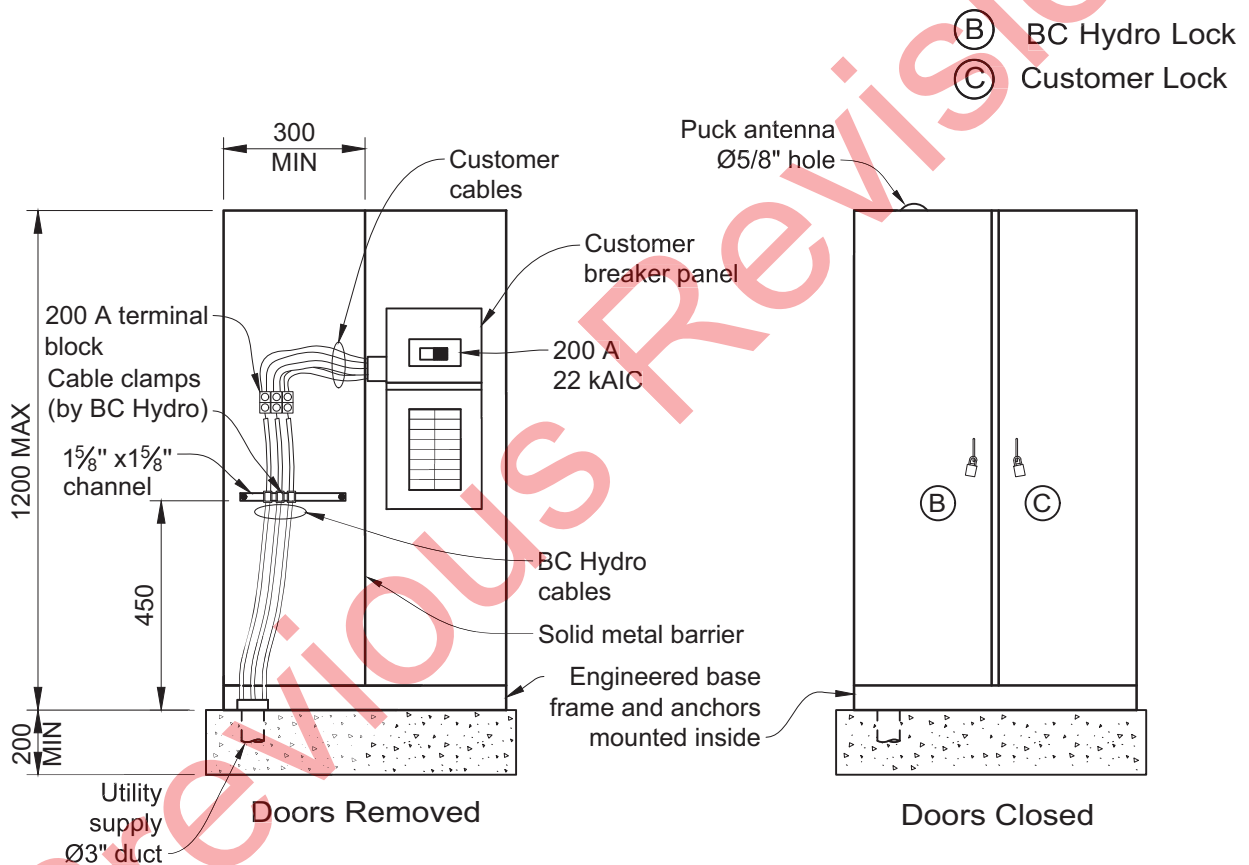


Figure 7 – Municipal kiosk unmetered up to 200 A

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION		
DISTRIBUTION STANDARDS 		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 9 OF 18	ES54 S1-04.09	R 0

4.4 400 A and 600 A CT-Based Kiosk

- a. Figure 8 shows typical free-standing 400 A and 600 A kiosks having a CT-based revenue meter socket mounted on the side of the kiosk. The customer shall ensure the following BC Hydro requirements are met:
 - i. Kiosks shall have adequate concrete pad and service ducts installed in compliance with note 3.2.
 - ii. Kiosks shall have adequate height to facilitate the installation of a revenue meter with a centreline elevation between 1500 mm and 1800 mm measured from the finished grade.
 - iii. Kiosks shall be restricted to BC Hydro access only, including a three-point latch handle and a hasp for a BC Hydro padlock. The customer shall have access to the service main breaker handle via a lockable weatherproof cover (see Figure 9).
 - iv. The kiosk manufacturer may provide separate customer access to the customer service cable connection termination blocks by means of a lockable hinged door or a gasketed and bolted cover plate.
 - v. An externally mounted meter socket shall be permanently attached to the kiosk enclosure by means of 1½" channels bolted with tamperproof bolts to prevent vandalism.
 - vi. The customer may request BC Hydro to install a revenue meter inside the kiosk. See *Requirements for Secondary Voltage Revenue Metering (750 V and less)* for further BC Hydro requirements.
 - vii. The CT compartment shall be located 300 mm above the enclosure base frame and connected to the revenue meter enclosure with ¾" duct.
 - viii. The CT compartment shall be equipped with ¾" diameter PVC duct for service ground and bonding conductor connection to the service neutral inside the service main compartment.
 - ix. Customer service splitter busbars shall extend into the utility cable compartment and be fitted with line-side tunnel-type lugs for terminating BC Hydro supply cables. BC Hydro will accept staggering of phase cables over neutral, as shown in Figures 10 and 11.
 - x. See Figure 12 for minimum dimensions and details on cable lug and busbar clearances, busbar staggering, and splitter portion insulator spacers. The dimensions shown in Figure 12 are BC Hydro requirements for working space. Clearances from conductive components to the metal enclosure shall comply with CSA 22.2 standards.
 - xi. A cable bus shall terminate on bus bar cable lugs with 100 mm spacing as shown in Figure 13. A cable bus from the service main breaker terminating into the terminal block inside the BC Hydro wireway is unacceptable.

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION	
DISTRIBUTION STANDARDS 		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 10 OF 18	ES54 S1-04.10 R 0

- (B) BC Hydro Lock
(C) Customer Lock

(*) Customer could apply for special permission to mount revenue meter inside the kiosk enclosure - refer to Revenue Metering guide.

(**) 1 5/8" x 1 5/8" channel mounted on slotted sliding angle as shown on ES54 S1-03 Figure 11.

(***) Refer to Figure 12 for bus spacing and lug clearances.

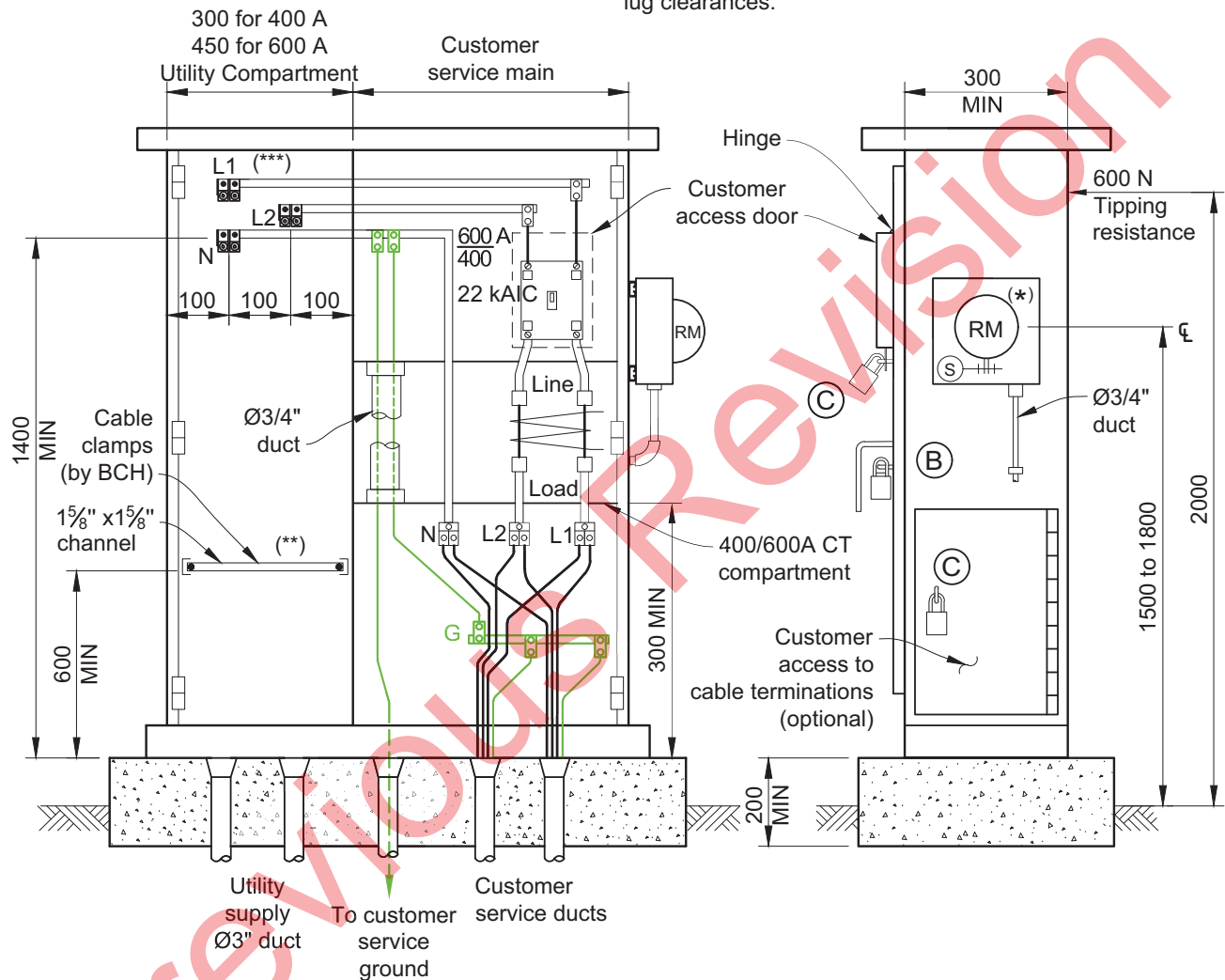


Figure 8 – 400/600 A service kiosk

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD  M. KELVIN	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION		
DISTRIBUTION STANDARDS 		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 11 OF 18	ES54 S1-04.11	R 0



Figure 9 – Customer breaker with lockable cover



Figure 10 – Splitter bus layout and spacing



Figure 11 – Phase cables staggered over neutral

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION		
DISTRIBUTION STANDARDS 		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 12 OF 18	ES54 S1-04.12	R 0

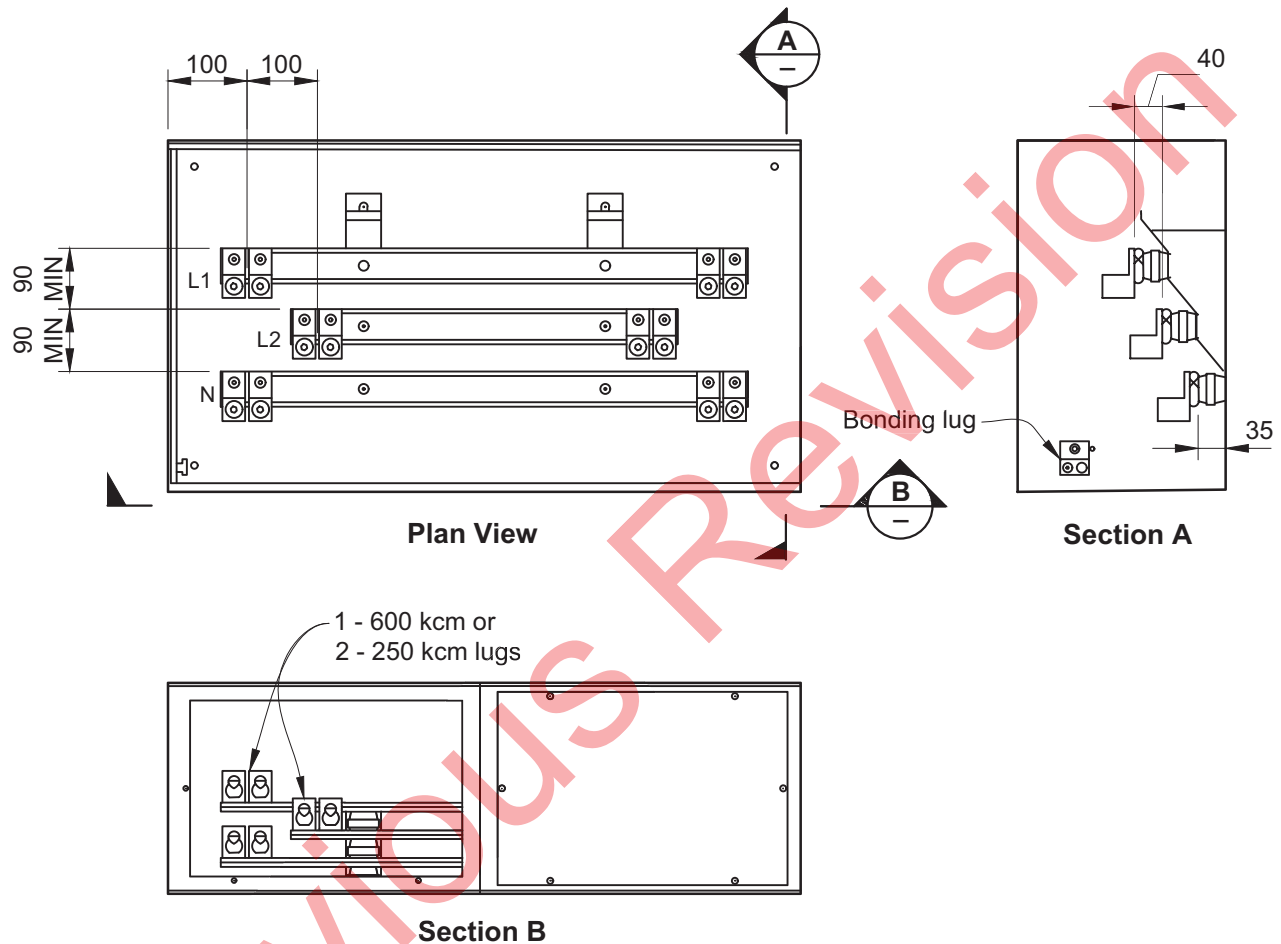


Figure 12 – Minimum requirement for service splitter

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD  M. KELVIN	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION	
DISTRIBUTION STANDARDS 		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 13 OF 18	ES54 S1-04.13 R 0

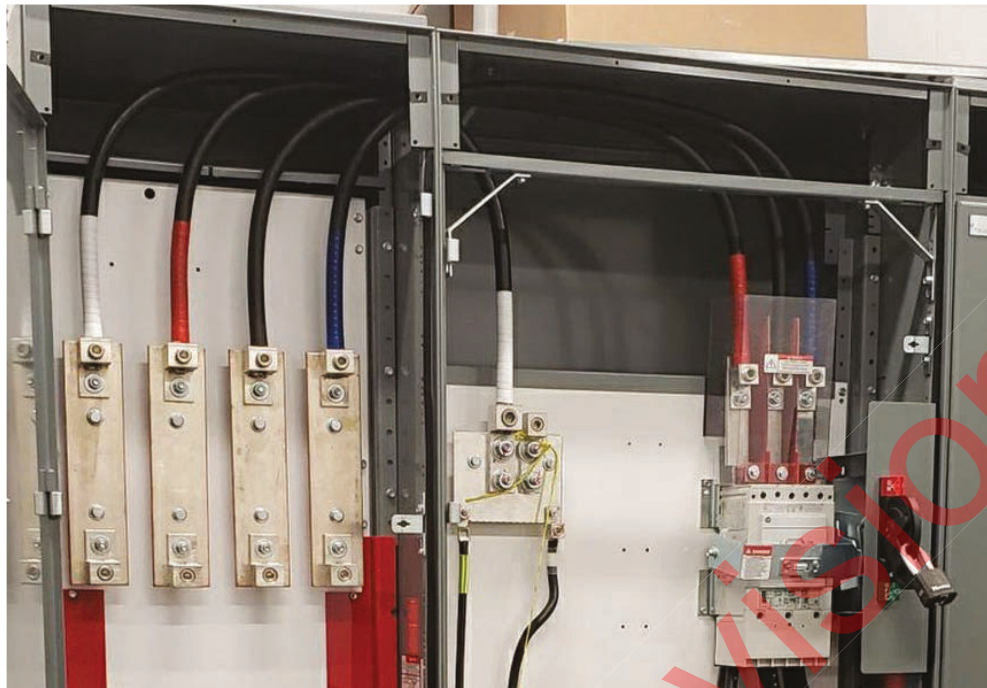


Figure 13 – Acceptable cable bus option for a splitter, 100 mm (4”) on centre for bus spacing



Figure 14 – Unacceptable revenue meter centre kiosk with fused loadbreak switch

DESIGNED	RECOMMENDED	ACCEPTED	ENGINEER OF RECORD	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION		
 M. KELVIN	 M. STEVENS	 H. GIESBRECHT				
DISTRIBUTION STANDARDS 	ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022			PAGE 14 OF 18	ES54 S1-04.14	R 0

5. Revenue Meter Centre Kiosk

- a. Figure 15 shows a typical two-door large meter centre service installation with a 600 A breaker as service main. Each revenue meter socket is equipped with individual sub-service main breakers, which requires customer access. Such kiosks shall be equipped with dual access provision. A meter centre kiosk shall meet the following BC Hydro requirements:
- Kiosks shall have adequate concrete pad and service ducts installed in compliance with note 3.2. See *Requirements for Secondary Voltage Revenue Metering (750 V and less)* for further BC Hydro requirements.
 - Kiosks shall be equipped with dual access provision for the installation of separate BC Hydro and customer locks. Dual access for a single cover door shall comply with Figure 3. Dual access for a two-door kiosk shall comply with Figures 16 and 17.
 - A fused loadbreak switch as service main as shown in Figure 14 is unacceptable

Ⓢ BC Hydro Seal

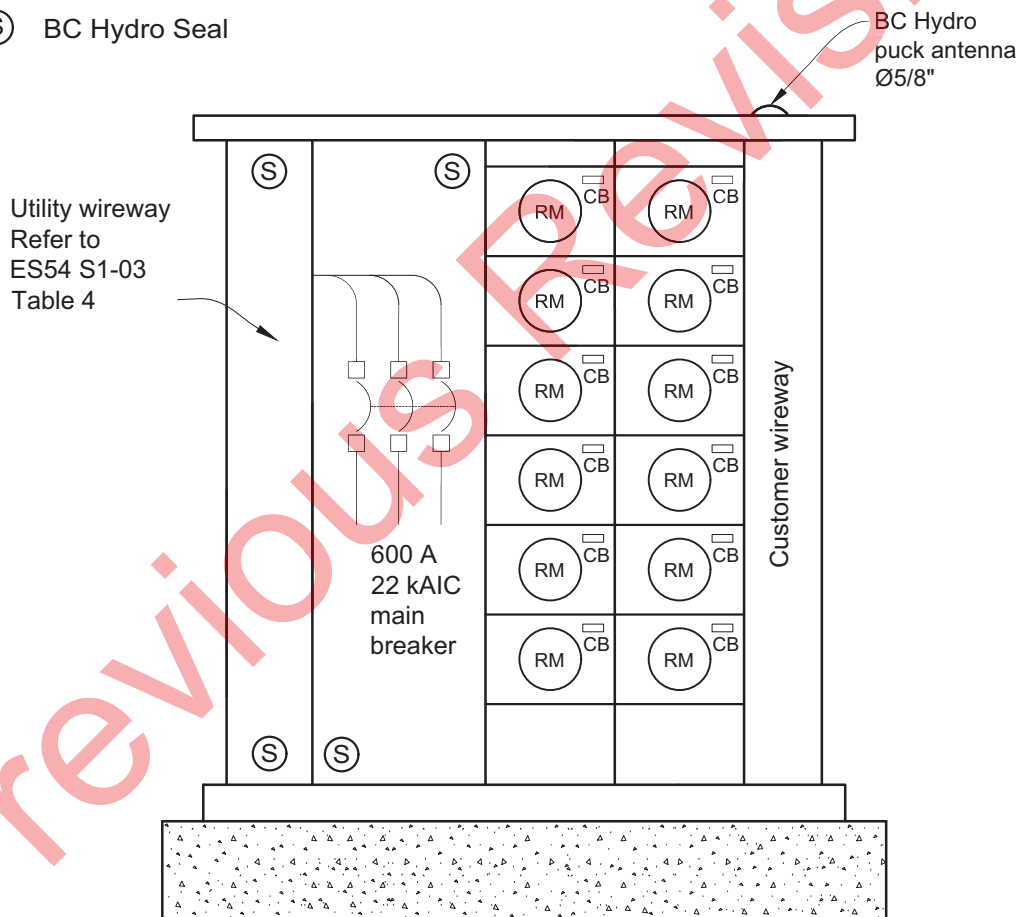


Figure 15 – Revenue meter centre kiosk doors removed

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION		
DISTRIBUTION STANDARDS BC Hydro		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 15 OF 18	ES54 S1-04.15	R 0

- Ⓑ BC Hydro Lock
- Ⓒ Customer Lock

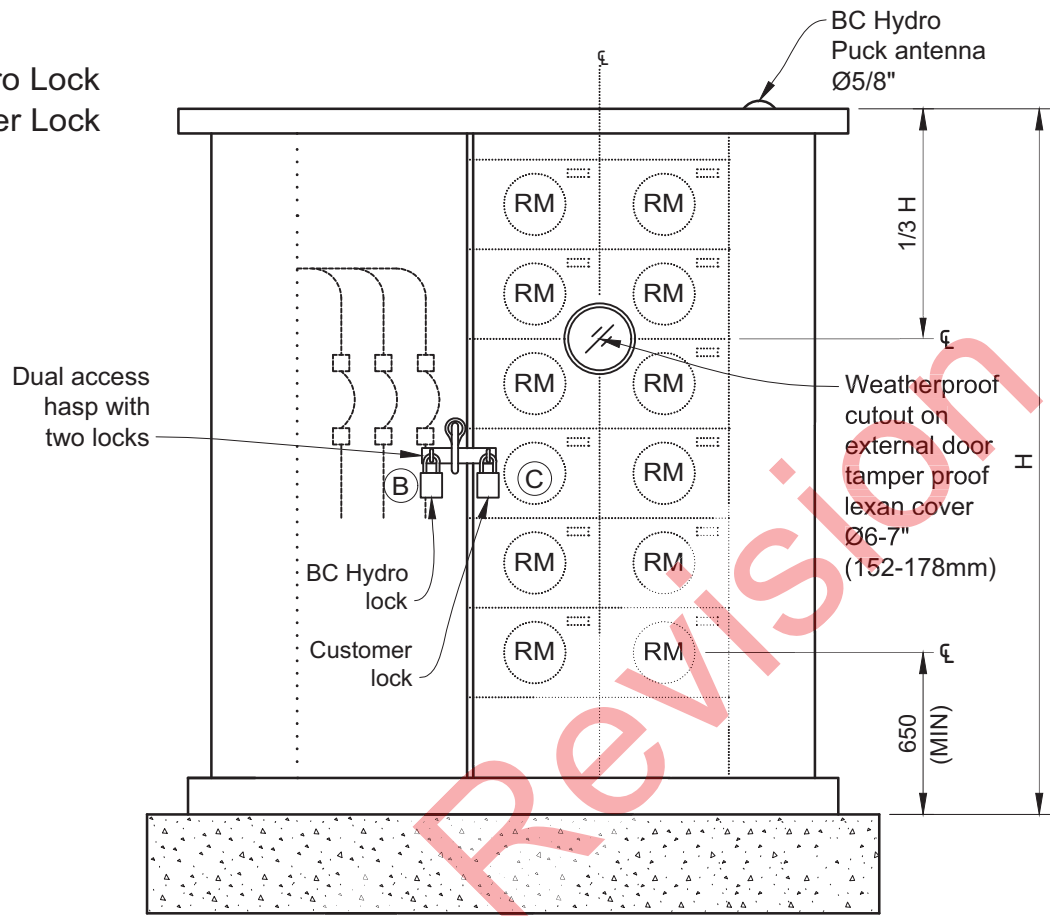


Figure 16 – Revenue meter centre kiosk communication cutout

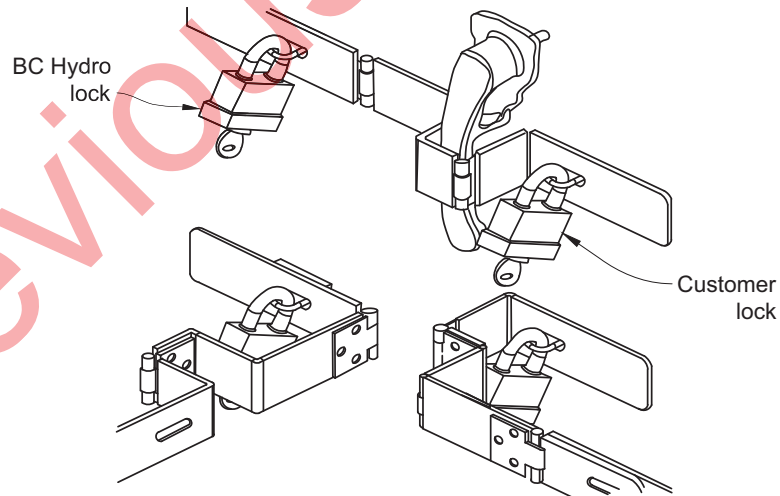


Figure 17 – Dual access hasp for two-door outdoor kiosk

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION	
DISTRIBUTION STANDARDS 		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 16 OF 18	ES54 S1-04.16 R 0

6. Hybrid Installations

- Figure 18 shows an example of an overhead service supply terminating on a customer-owned pole on private property. Customer-owned ducting continues down the pole into the ground for bottom entry into the customer-owned kiosk. BC Hydro will not accept duct entry into the kiosk enclosure above ground.
- Free standing customer kiosks shall comply with BC Hydro requirements per note 4.3 and shall have access restricted to BC Hydro for the unmetered portion, including the service main. Customer access to the service main breaker handle shall comply with Figure 9.
- BC Hydro overhead service spans shall be attached to a class 4 pole for 50-year service connection life expectancy. A 4" x 4" treated wood post is not an acceptable attachment structure.

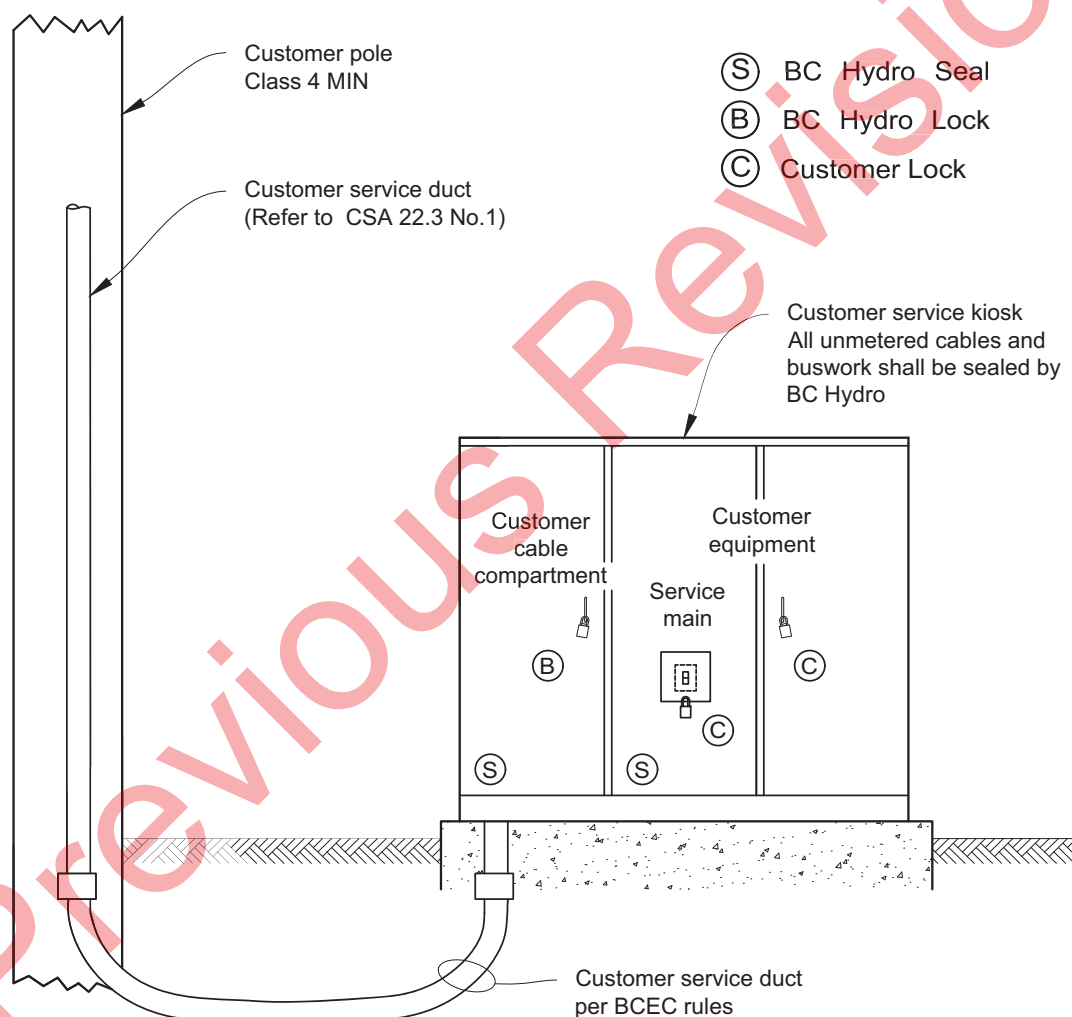


Figure 18 – Example of overhead supply to pad-mounted kiosk

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION		
DISTRIBUTION STANDARDS 		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 17 OF 18	ES54 S1-04.17	R 0

- d. Figure 19 shows an example of an underground service connection on difficult sloped terrain. BC Hydro will accept a customer-owned pedestal or kiosk or service combo-type panel installed at the property line at the base of a slope subject to the terrain being stabilized by a retaining wall. The customer-owned service cables on the load side may be installed at a reduced depth in compliance with applicable BCEC rules. See ES54 S1-01 for more information.

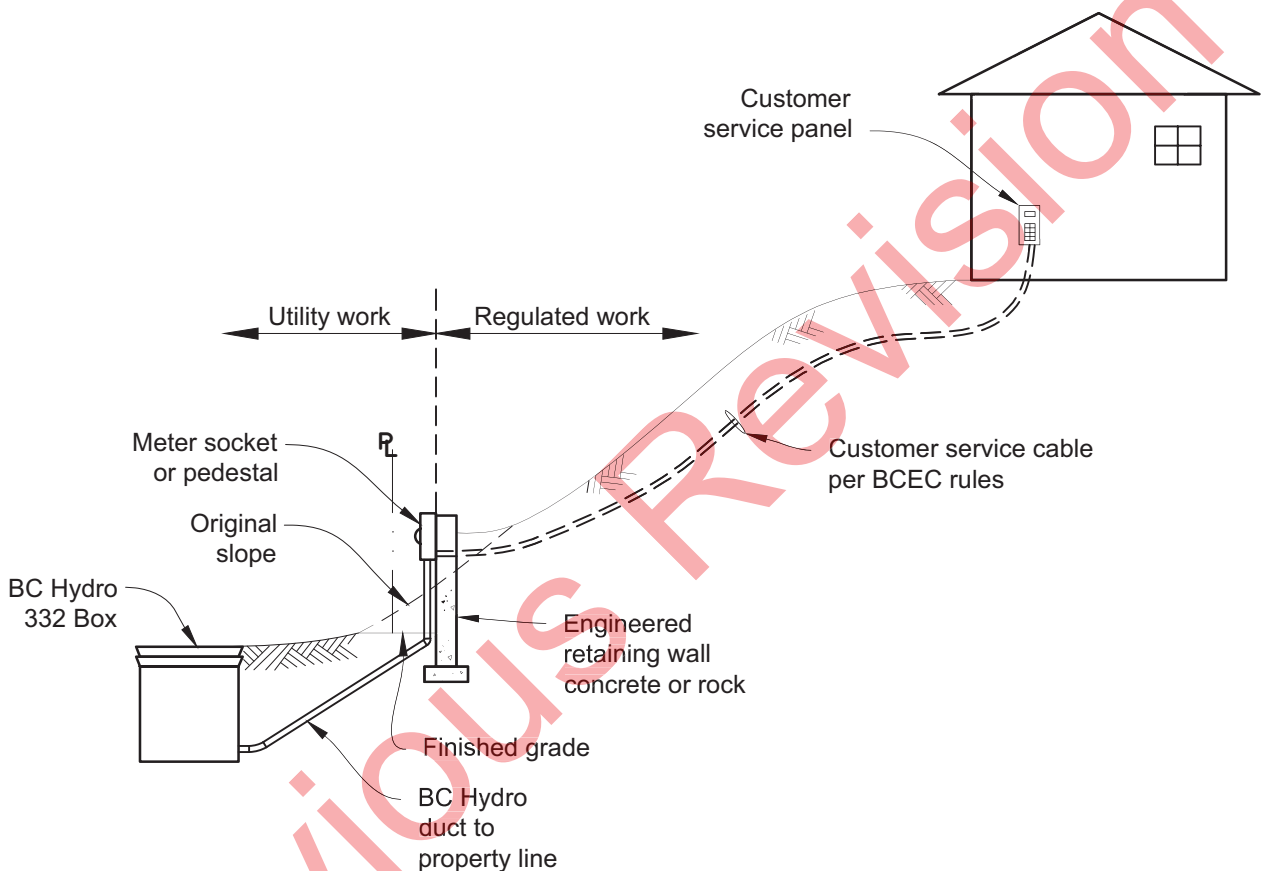


Figure 19 – Example of residential service on difficult terrain

DESIGNED  M. KELVIN	RECOMMENDED  M. STEVENS	ACCEPTED  H. GIESBRECHT	ENGINEER OF RECORD 	SECONDARY SINGLE-PHASE SERVICES 200 A TO 600 A PAD-MOUNTED KIOSK AND PEDESTAL, SELF-CONTAINED AND CT-BASED METER INSTALLATION		
DISTRIBUTION STANDARDS 		ISSUED: NOV 2022 REPLACES: N/A ORIGINALLY ISSUED: NOV 2022		PAGE 18 OF 18	ES54 S1-04.18	R 0