Application

This standard describes requirements for installing secondary three-phase services up to 1600 A 120/208 V and 347/600 V supply on private property.

Revision Notes

Removed 1400 mm dimension from bottom of service main to middle of splitter box in Figure 5. Updated details 1 and 2 in Figure 7. Updated some dimensions in Figures 5, 6, and 8 with references to new dimension tables 2, 3, and 4. Substantive changes are marked by green vertical revision lines in the left margin. This revision released concurrently with Standards and Equipment Advisory Information Bulletin 2023-049 R2 *Revised ES54 S2-01 Secondary Three-Phase Services 120/208 V and 347/600 V up to 1600 A Private Property Installation*.

References

BC Hydro Distribution Standards

ES53 S1-01	Secondary Services Single-Phase up to 600 A 120/240 V Wiring and Revenue Metering Connections
ES53 S2-01	Secondary Services Three-Phase to 1600 A
ES53 U1-01	Cable and Conductor Data, New Construction
ES53 Z8-03	Cable Grips, Ties, and Tie Mount
ES54 section B	Pull/Splice, Service, and Junction Boxes
ES54 section F	Transformer Pads and Vaults
ES54 S0-02	Services General Notes
ES54 S0-04	General Notes Secondary Services
ES54 S0-05	Services General Notes Service Ducts and Trenches
ES54 S3-04	Primary Services Service Duct to Rear Yard Narrow Side Yard Installation
ES55 section D3	Conductor Data, Cable Pulling

Other BC Hydro Documents

DI S10-4	Electric Service Connections – Voltages
Secondary Metering	Requirements for Secondary Voltage Revenue Metering (750 V and less)

External Documents

BCEC	Canadian Electrical Code, Part I (CSA C22.1) adopted for BC and endorsed by Technical Safety BC (TSBC)

Notes

Table 1 – Size of pull boxes and wireways installed in a building at service entrance equipment or mid-cable run

Main switch / breaker size, up to	Minimum pull box size (mm)					Minimum wireway bottom entry size (mm)		Minimum height (H) [3]
	Duct size and qty [2]	Side and top entry		Rear entry				
		Width (W)	Depth (D)	Width (W)	Depth (D)	Width (WW)	Depth (D)	
200A	1 x 4"	800	500	500	800	300 [1]	300	1400
400 A	1 x 4"	800	500	500	800	300 [1]	300	1400
600 A	2 x 4"	800	500	500	800	450	300	1400
800 A	2 x 4"	800	500	500	800	450	300	1400
1200 A	3 x 4"	800	500	500	800	600	450 [1]	1400
1600 A	4 x 4"	800	500	500	800	750	450 [1]	1400

Table notes

1. 300 mm minimum wireway width acceptable for vertically staggered bus extensions.
   450 mm minimum wireway width required for horizontally staggered bus extensions.
   450 mm minimum wireway depth required for 1200 A and 1600 A services.
2. 900 W x 1800 H x 800 D minimum size for any customer-owned mid-run pull boxes wall-mounted inside customer building.
   632 box minimum size for mid-run pull boxes placed inside on building floor slab or in an outside yard, subject to BC Hydro field manager approval.
3. Minimum height refers to the height of pullbox, wireway, or bottom of the lowest switchboard bus.

1. Materials

a. All materials from the stub-off on private property shall be supplied and installed by the customer.

b. Materials installed on private property, including meter socket, service panels, and switchgear, shall be CSA certified. Material and electrical equipment up to the utility's point of connection to customer-owned equipment, including grounding and duct work, is exempt from the BC Electrical Safety Regulation. This equipment is not within the jurisdiction of electrical inspection authorities and permits are not required for this work.

2. Installation Requirements

2.1 General

a. Building parkade vehicle access shall be 2100 mm minimum.

b. A customer building elevator cannot be the only point of access for BC Hydro crews performing utility work and carrying out their duty as the utility.

2.2 Service in Duct

See ES54 S0-05 for BC Hydro requirements for service in ducts on private property.

2.3 Wall Entry

The customer shall ensure a smooth transition to avoid service duct and cable damage caused by differential settlement wherever service ducts enter a building foundation wall or where differential settlements are expected to occur. See ES54 S0-05 for BC Hydro requirements for direct burial of supply service ducts on private property.

2.4 Pull Boxes

A pull box is required at service entrance equipment locations for cable installation crews to pull in the required service cable safely and effectively. See ES54 S0-04 for requirement details.

2.5 Pull Boxes in Wireway Service Entrance

Wireways can have top, bottom, back, or side entry, and either a wireway or integral pull box. Requirements apply to all service entry assemblies except where noted. See ES54 S0-04 for requirement details.

2.6 Utility Wireway

BC Hydro does not terminate utility supply cables directly onto a customer-owned service main switch or breaker lugs due to liability and restricted access. See ES54 S0-04 for requirement details.

2.7 Pulling Irons

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. See ES54 S0-04 for requirement details.

2.8 Cable Clamps

BC Hydro will supply and install the cable clamps required for service cables. The cable clamps shall be installed in customer-supplied 1⅝" x 1⅝" C-channels mounted on a slotted adjustable angle bracket, suitable for facing either outward or upward. See ES53 S1-01.

3. Information Supplied by Customer

a. The customer shall submit copies of the proposed duct service run from the property line to the point of utility connection for approval by BC Hydro, containing the following information:

b. Duct lengths and duct bend angles; and

c. Location and size of pull boxes and the service entrance enclosure, and the position of incoming and outgoing service ducts at each pull box, in both plan view and profile.

d. The customer shall submit information about other adjacent utilities, existing and proposed, located in the vicinity of the proposed BC Hydro service ducts.

4. Restrictions

a. Service duct entry from the top and bottom, back or side.

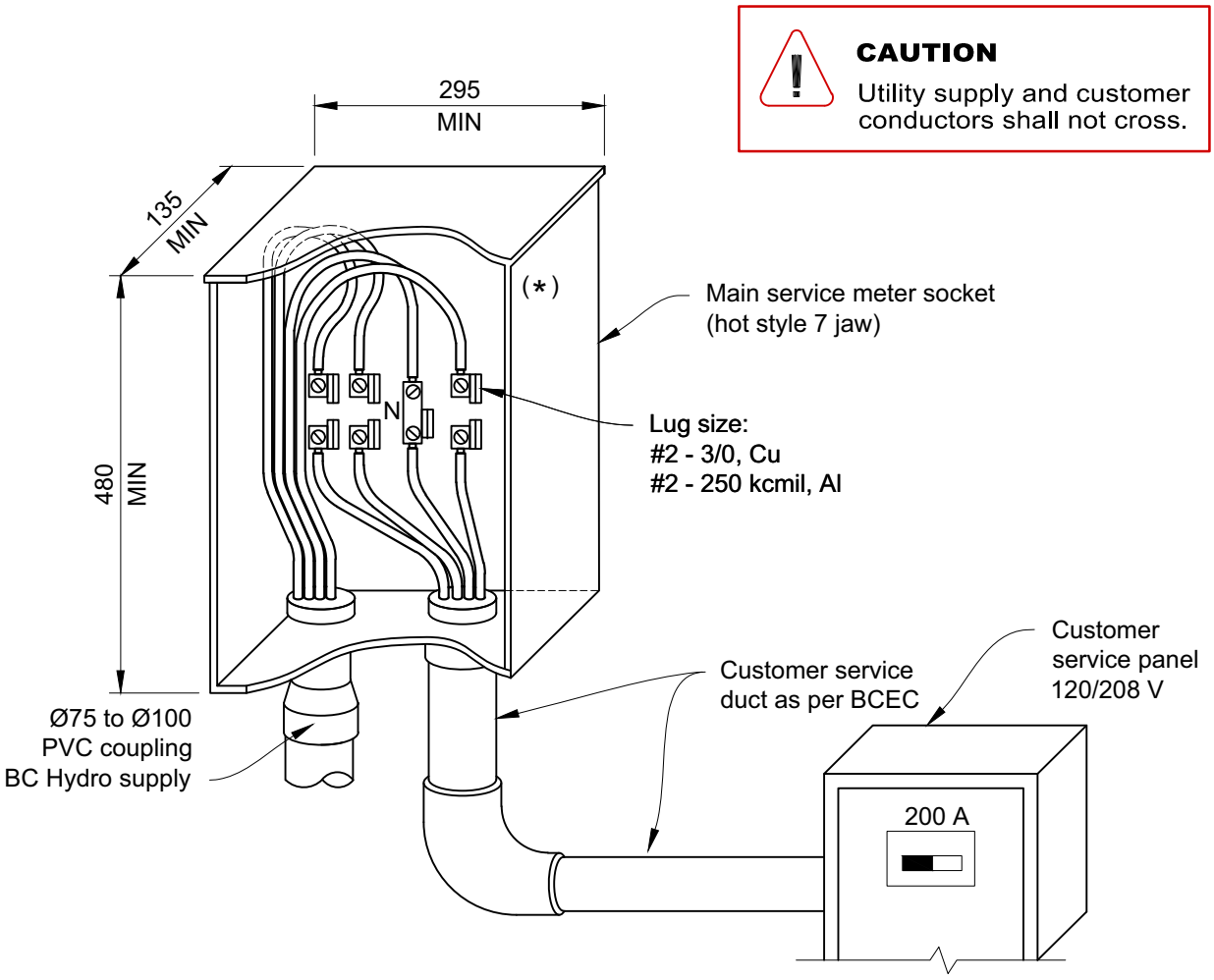
b. See Table 1 for pull box, wireway, and other dimensions.

c. The maximum installation capacity for a pole dip supply configuration is 800 A, consisting of two runs of 500 kcmil cables. Underground supply 1600 A services shall be limited to those installations that can be supplied from pad-mounted transformers.

d. The maximum installation capacity for 1600 A underground secondary supply service comprises four runs of 500 kcmil cables.

e. The customer shall provide a means for cable restraining grip support in the wireway compartment for upper-level installations. See ES54 S0-02.

f. Utility wireways and pull boxes shall be reserved for utility purposes only and have access restricted to utility personnel.



(*) All 347/600 V 200 A services meter sockets shall be cold style metering regardless of available fault level.

Figure 1 – Single 200 A three-phase service for 120/208 V, fault level <10 kA

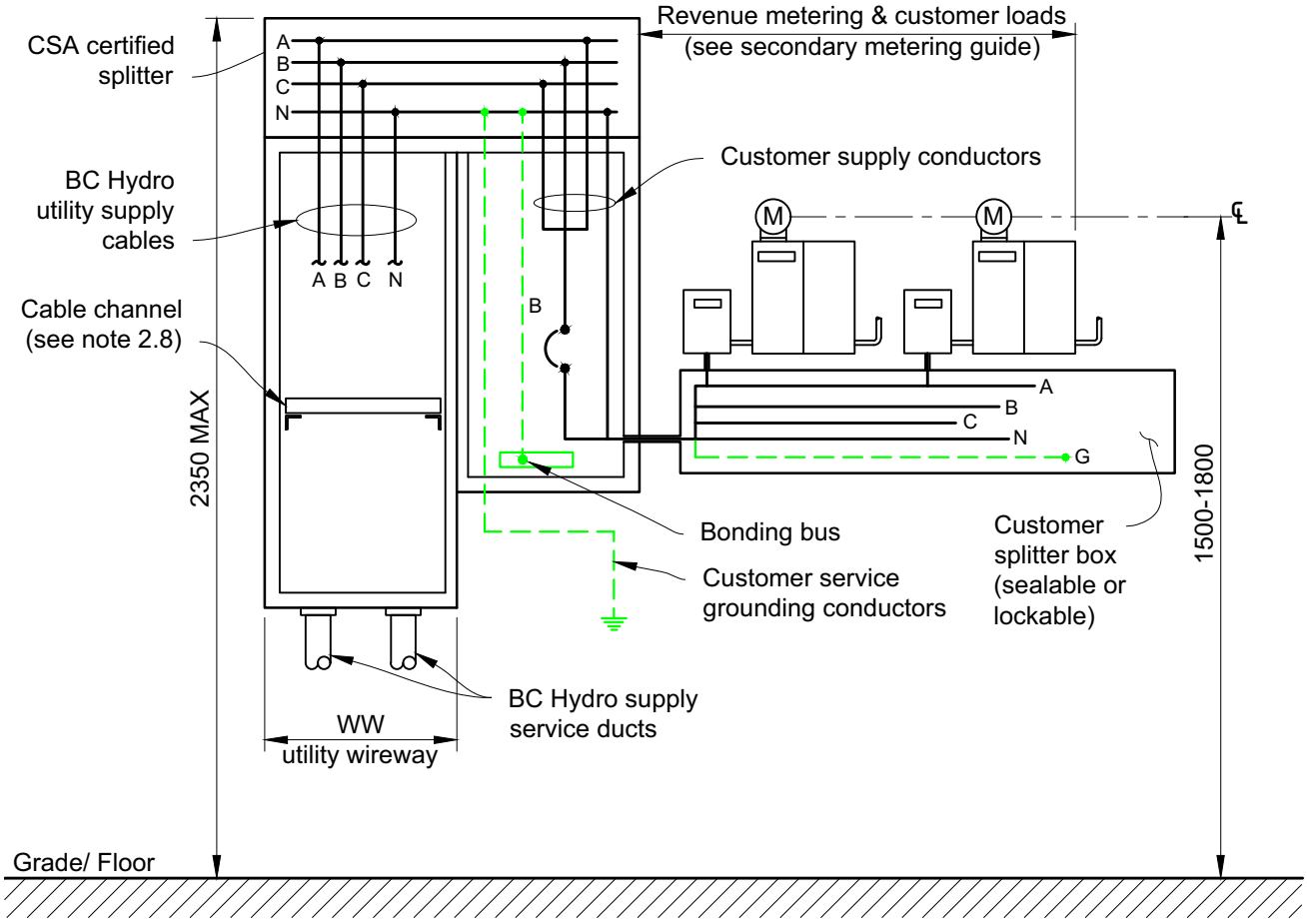


Figure 2 – Multiple main splitter box three-phase up to 1600 A, field assembled

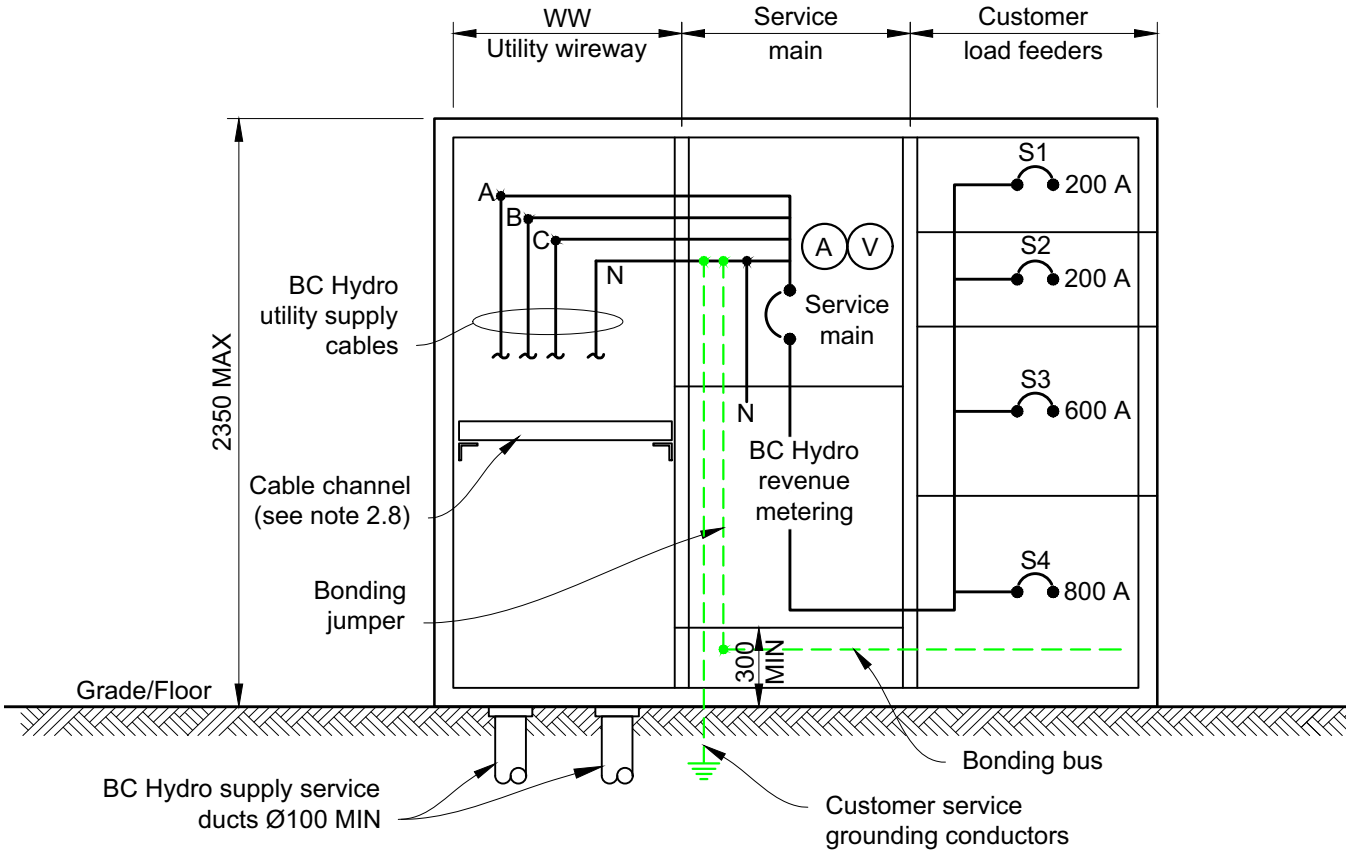
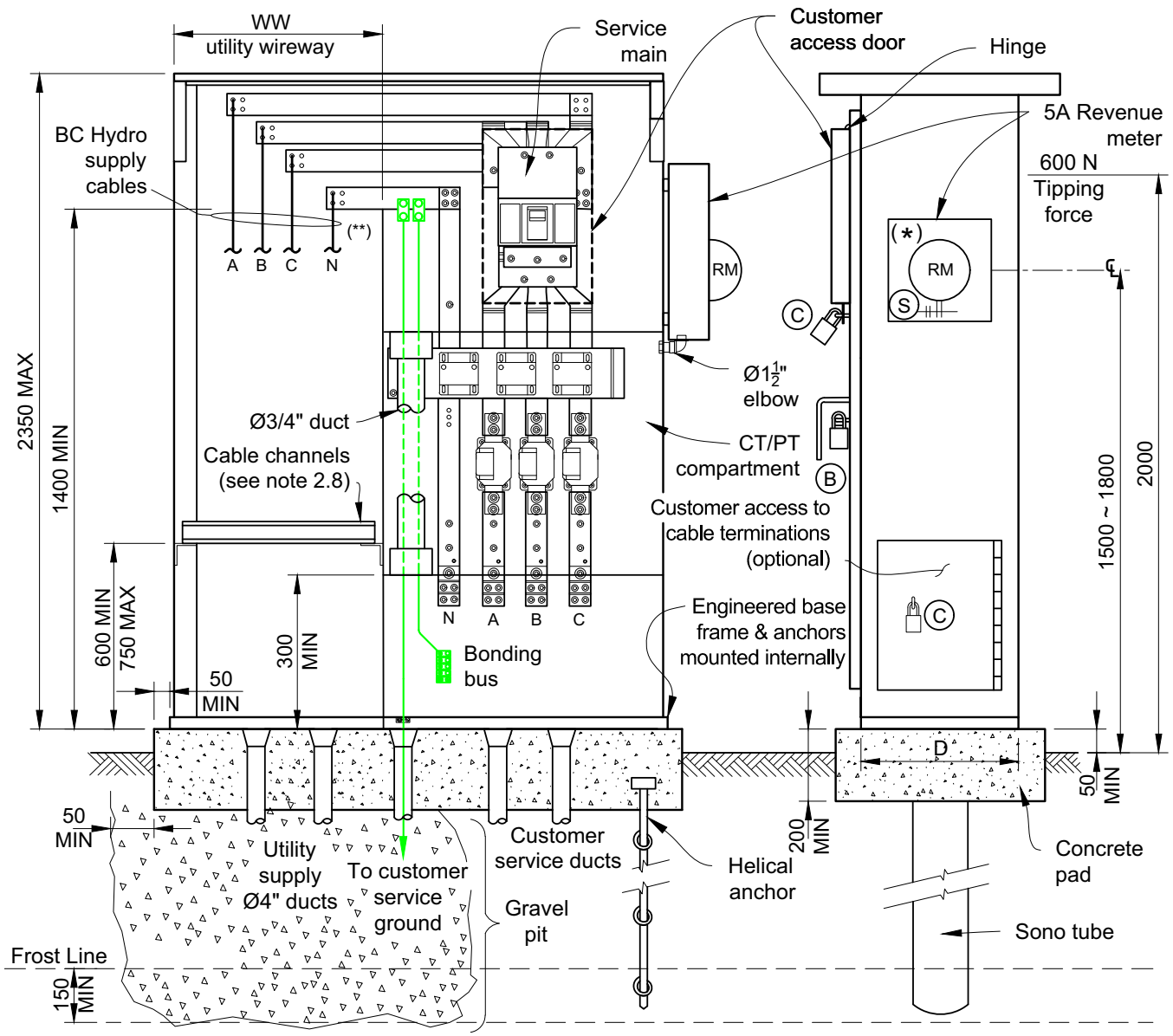


Figure 3 – Service switchboard up to 347/600 V 1600 A, field assembled



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

(**) For bus bar configuration refer to Figures 10, 11, and 12

Ⓢ BC Hydro Seal
Ⓑ BC Hydro Lock
Ⓒ Customer Lock

Figure 4 – Outdoor kiosk

Table 2

Service main (A)	X (mm)	Y (mm)
Up to 400	250	250
Up to 800	330	250
Up to 1600	450	380

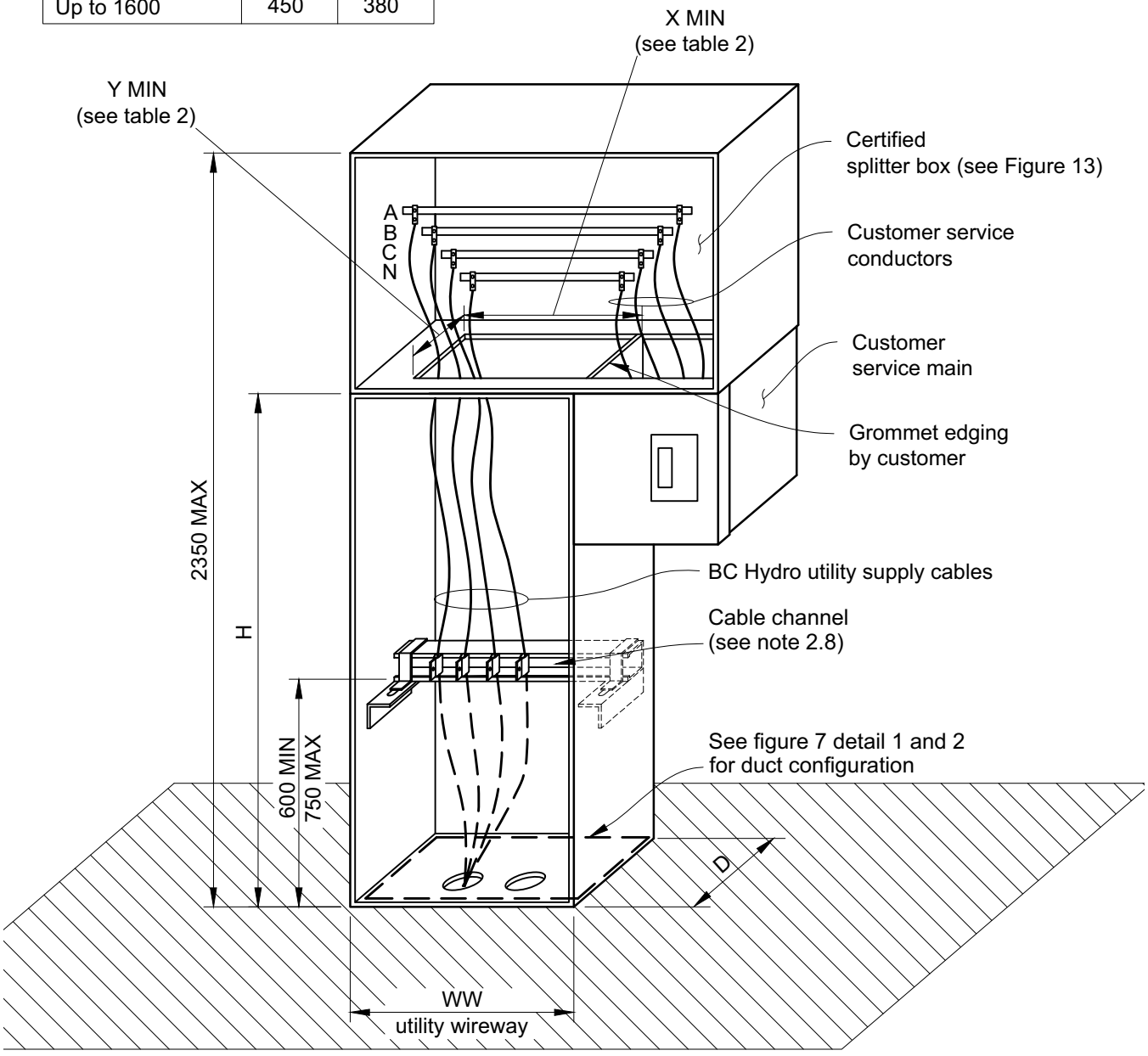


Figure 5 – Customer service main bottom entry

Table 3

Service main (A)	XX (mm)	YY (mm)
Up to 400	450	250
Up to 800	450	250
Up to 1600	450	380

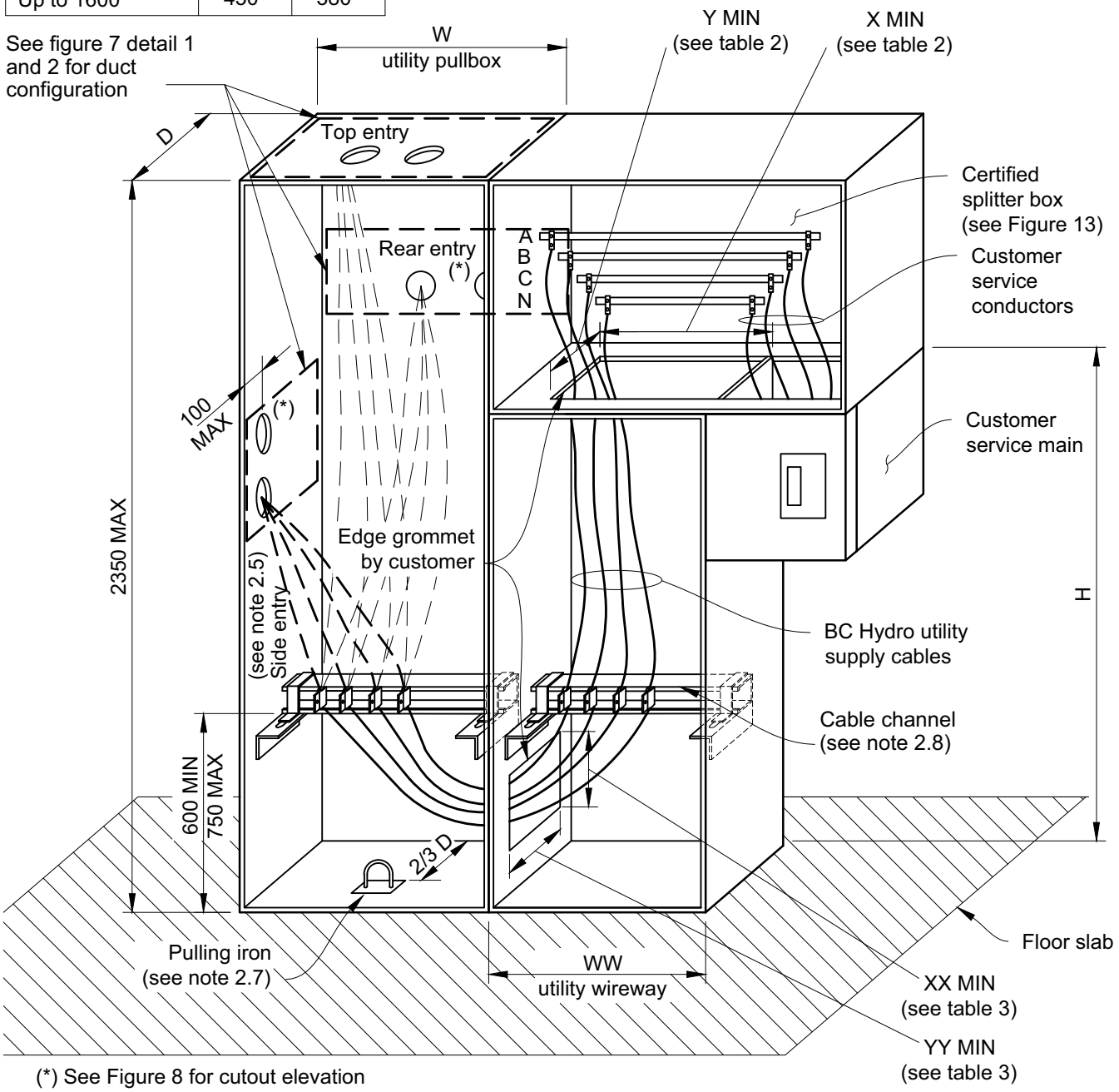


Figure 6 – Customer service main top, rear, or side entry

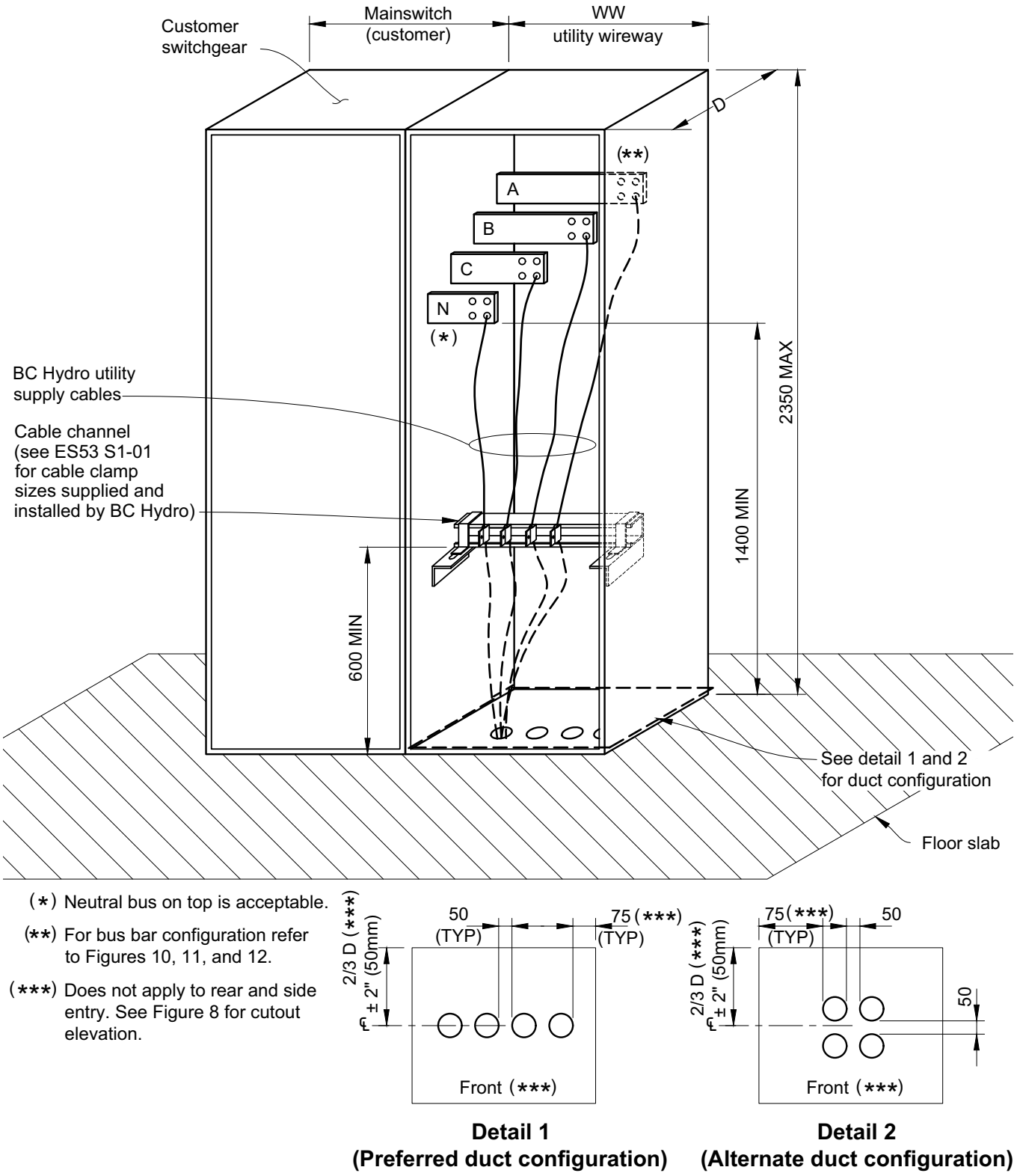
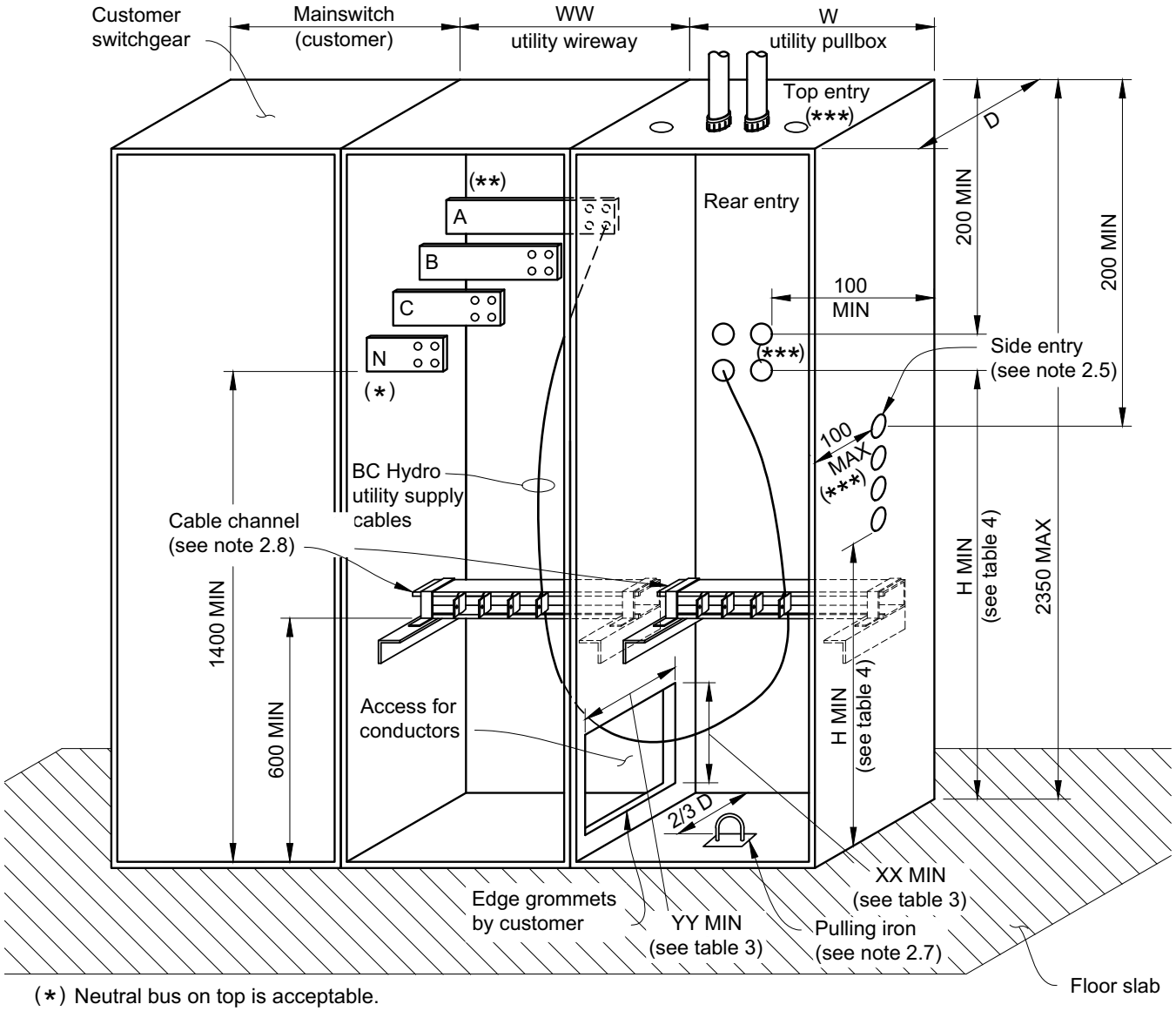


Figure 7 – Customer service switchboard bottom entry, field assembled



(*) Neutral bus on top is acceptable.
(**) See Figures 10, 11, and 12 for bus bar configuration.
(***) See Figures 7 detail 1 and 2 for duct configuration.

Table 4

Conductor size	H (mm)
#1-350 kcm	1000
500 kcm	1400

Figure 8 – Customer service switchboard top, rear, or side entry

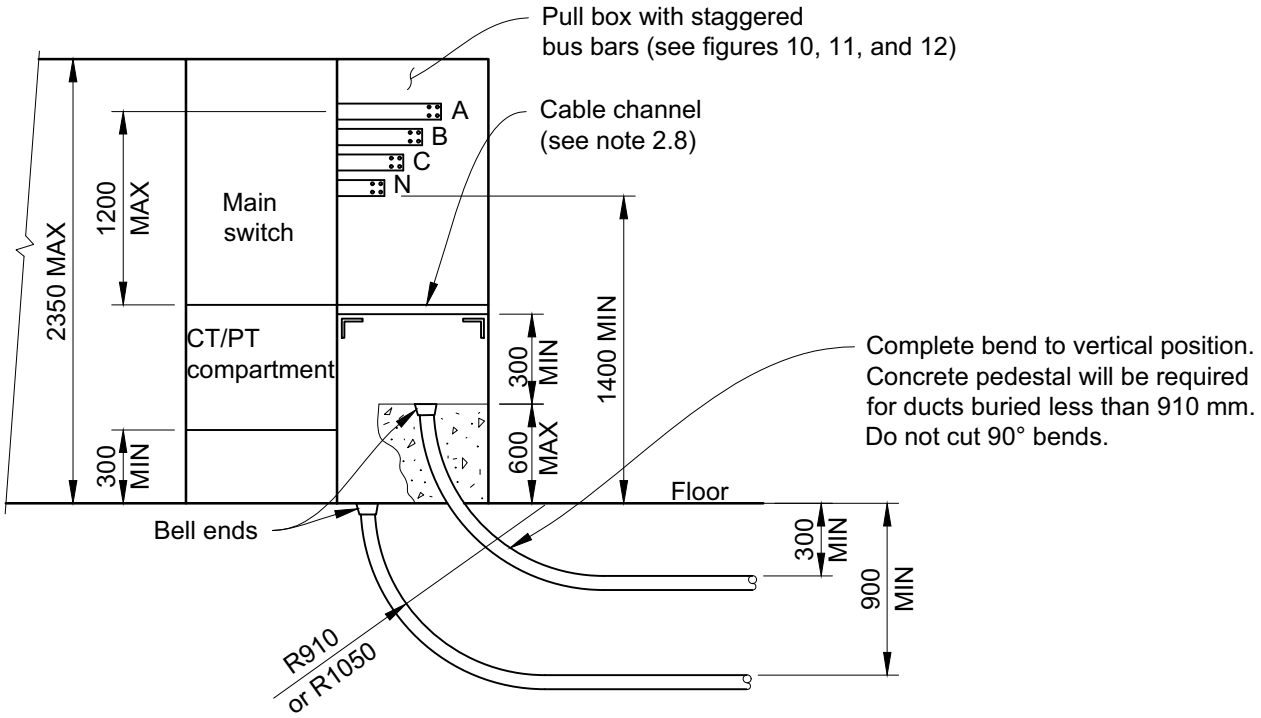


Figure 9 – Bottom entry duct details

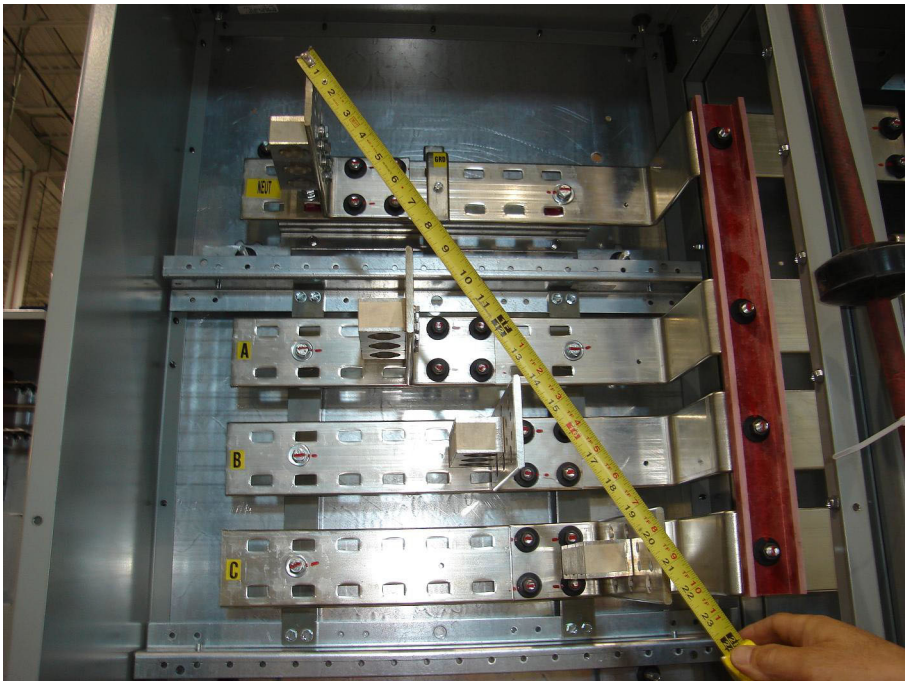


Figure 10 – Acceptable vertically spaced buses with cable lugs mounted on bus flags
(see ES54 S1-03 Figure 10 for vertically mounted splitter)

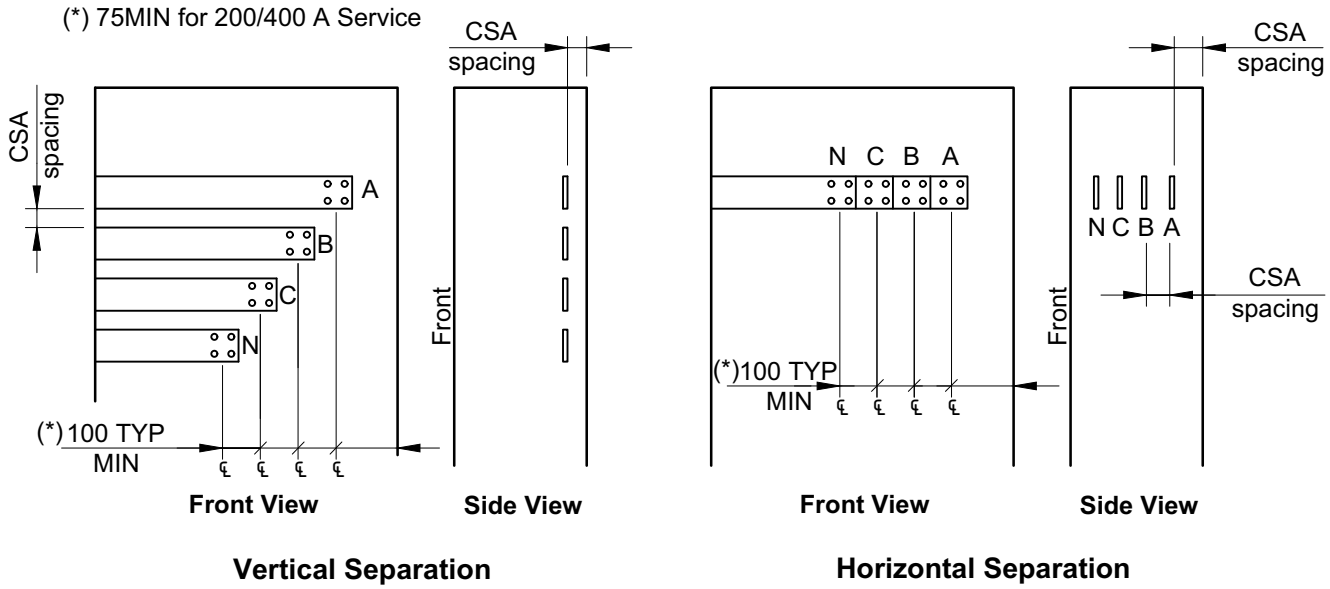


Figure 11 – Staggered bus bar details

Figure 12 – Acceptable cable bus option for splitter, 100 mm (4") on centre for bus spacing (cable bus from service main breaker terminating into double-sided terminal block inside BC Hydro wireway is unacceptable)

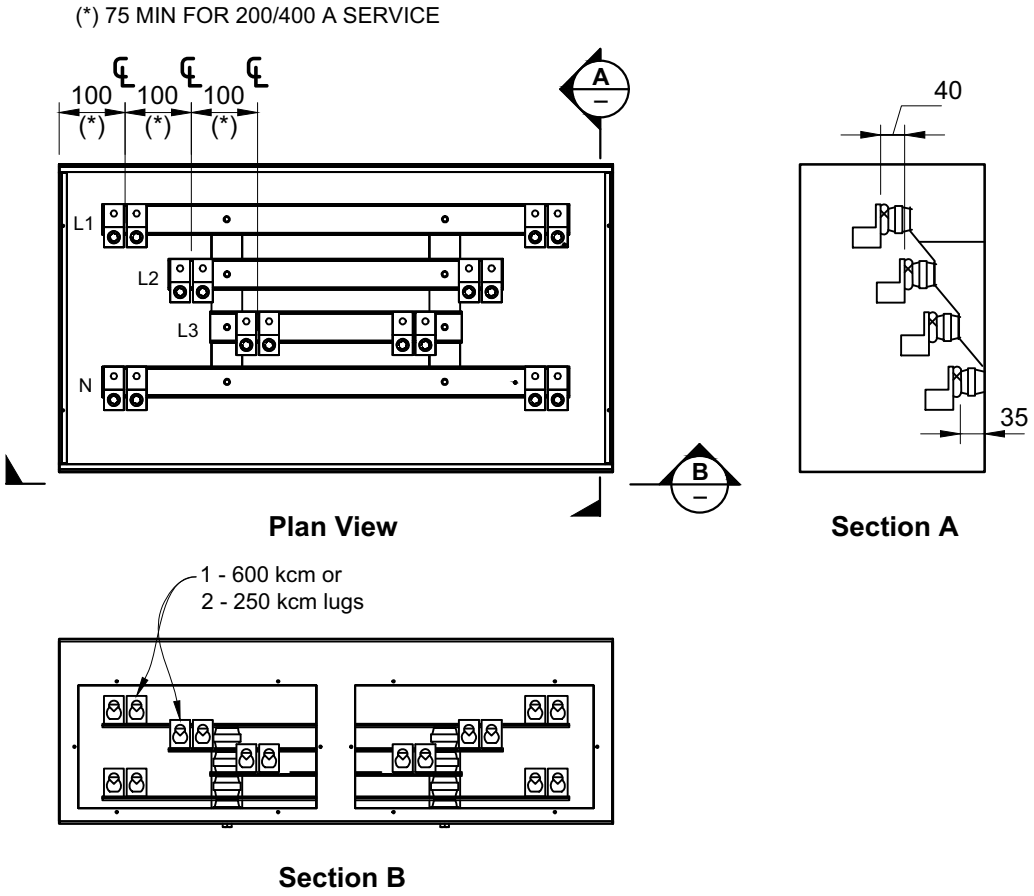
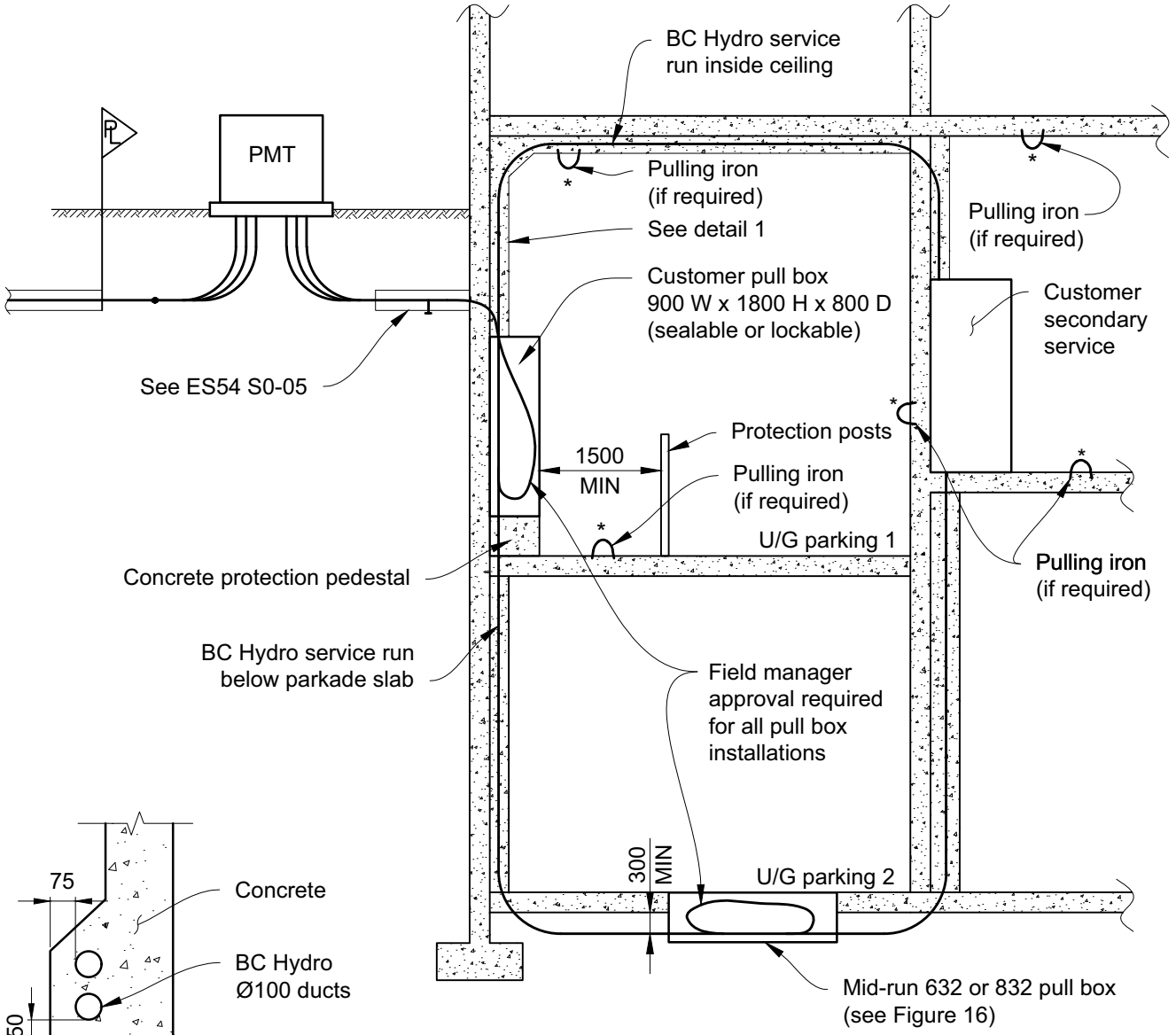
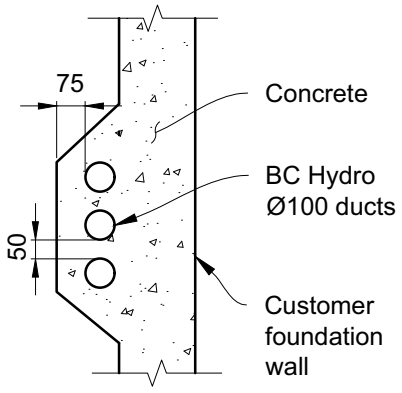


Figure 13 – Minimum requirements for service splitter





Detail 1
Service Duct Inside Wall
(see ES54 S3-04)

Figure 14 – Typical service duct profile

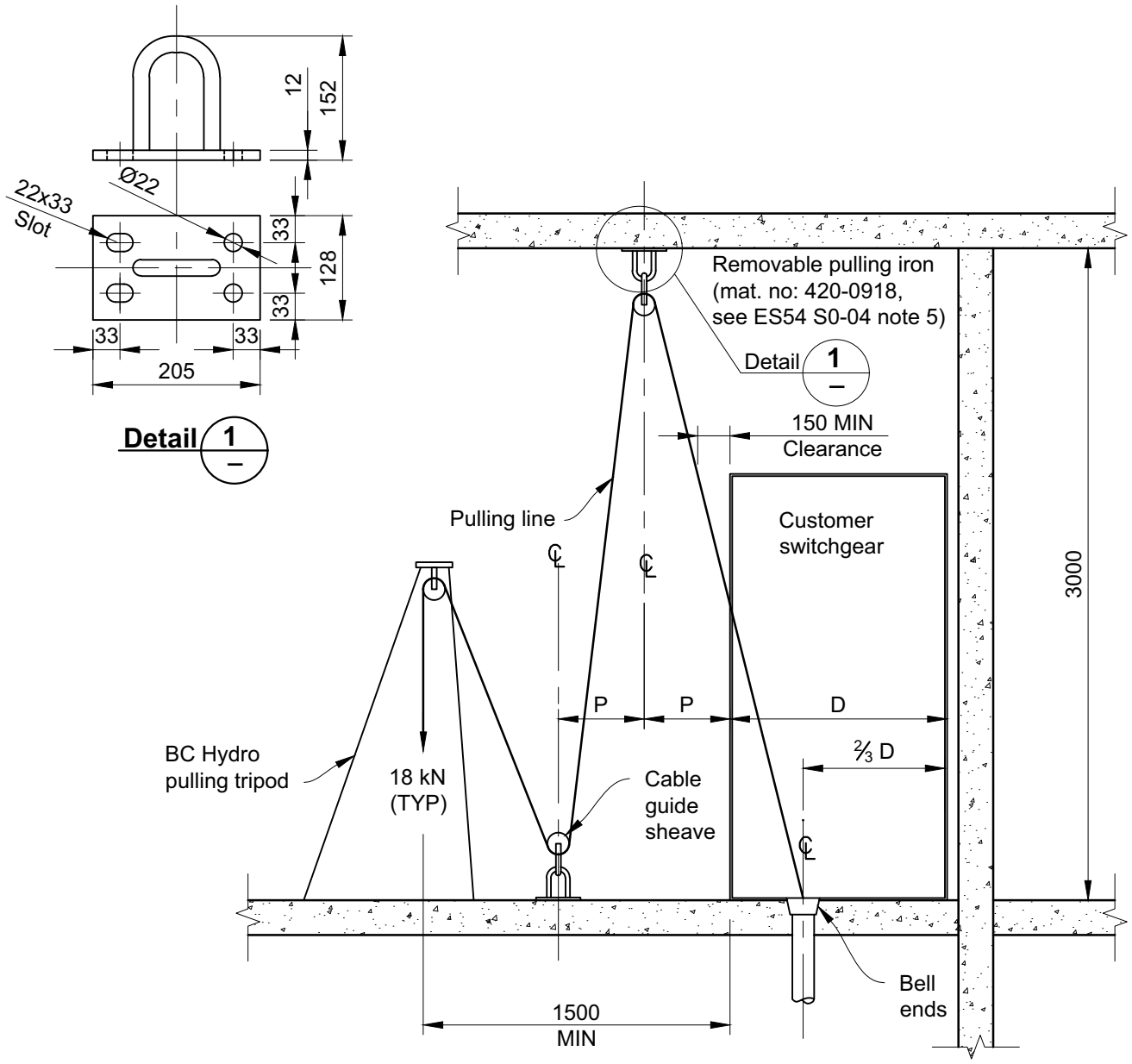


Figure 15 – Service cable pulling requirements (see ES54 S0-04 note 5)

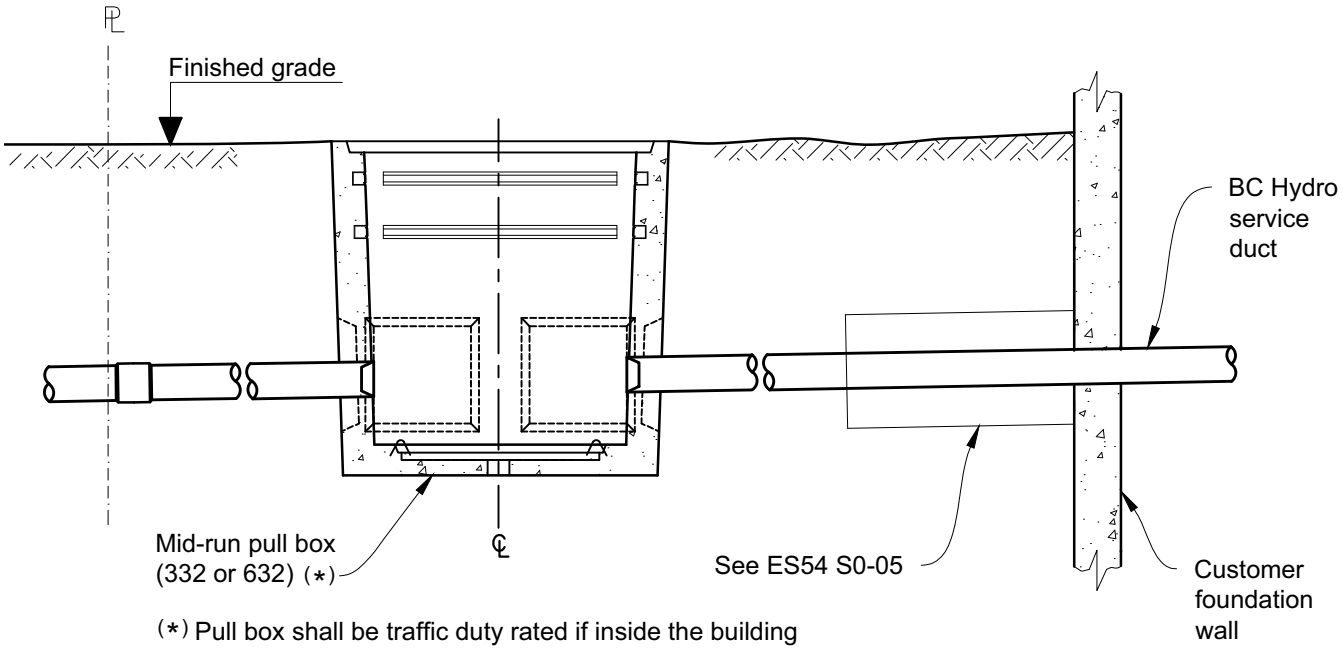


Figure 16 – Mid-run pull box inside or outside building