

Section F - Transformer Pads & Vaults

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REVISIONS: R.6 - F3-08 ADDED. MAR '18 MK

DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2018-02-28	TRANSFORMER PADS & VAULTS TABLE OF CONTENTS	
DISTRIBUTION STANDARDS 		ISSUED: MAR 2018 REPLACES: MAR 2016 ORIGINALLY ISSUED: NOV 1979		PAGE 1 OF 1	ES54 F0-01
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Application

This section covers the installation of BC Hydro standard pad-mounted type oil-filled transformers above grade, as well as submersible type oil-filled transformers inside concrete vaults for installation below grade. The physical size and weight of each civil structure, cable capacity, and design load ratings are covered, as well as construction and installation details.

The majority of BC Hydro pad-mounted transformers serving more than one secondary voltage customer are located on public corridors and installed in accordance with applicable BC Hydro distribution standards. All installation details are shown on BC Hydro construction drawings, and the BC Hydro contractor carries out the installation of all civil structures and associated safety grounding.

BC Hydro has developed standards for sub-surface concrete vaults to facilitate the installation of submersible type oil-filled transformers. These concrete vaults, also known as “street vaults”, are suitable for the installation of 3 x 500 kVA and 3 x 333 kVA transformer banks.

Revision Notes

R2 – General layout, formatting, and editing changes for grammar and readability. Added sections *Revision Notes*, *Reference Standards*, and *Reference Documents*. Expanded section *Transformer Installation in Proximity to Customer Buildings and Structures* to include vegetation. September 2022, JY

R1 – Title change. March 2016, MK

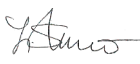
R0 – Original issue. December 1979

Reference Standards

- ES54 F3-06 BC Hydro Transformer Pad on Top of Soil on Private Property Inside Building Alcove
- ES54 F3-07 BC Hydro Pad-Mounted Transformer on Private Property Next to Customer Building
- ES54 F7-01 Fan Equipment Pedestal Installation and Grounding
- ES54 R1-01 Grounding of Pad-Mounted Equipment in Public Corridors
- ES54 R1-02 Grounding of Pad-Mounted Equipment on Private Property
- ES54 U2-02 Concrete Pad Protection Bollards

Reference Documents

- BCEC Canadian Electrical Code, Part I adopted for BC and endorsed by Technical Safety BC

DESIGNED  J. YANG	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  1002449 PROFESSIONAL OF L. STEVANOVIC BRITISH COLUMBIA ENGINEER 2022-09-01	TRANSFORMER PADS AND VAULTS GENERAL NOTES	
DISTRIBUTION STANDARDS 		ISSUED: SEP 2022 REPLACES: MAR 2016 ORIGINALLY ISSUED: DEC 1979		PAGE 1 OF 4	ES54 F0-02.01
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Load Duty

Transformer vaults and boxes are typically installed in boulevards and sidewalks and are designed to sidewalk duty.

Private Property Installations

Large BC Hydro secondary customers occasionally require a designated pad-mounted transformer placed on private property or inside the customer's building. Such installations require unrestricted access for BC Hydro personnel, granted through formal registration of a legal statutory right-of-way (SRW) in the land title office. Electrical installations on private property are regulated by the BC Electrical Code (BCEC) with installation inspections carried out by Technical Safety BC or municipalities that maintain their own electrical inspections. The location of the BC Hydro transformer and the installation details shall be shown on the customer's building permit drawings. The customer is responsible for all aspects of compliance with applicable codes and bylaws for the jurisdiction. The customer's contractor shall install all civil structures and safety grounding, as required by applicable BC Hydro construction standards.

Flat Pads, Pyramid Pads, and Submersible Transformer Vaults

Precast concrete flat pads are the most basic and least expensive civil structures that provide concrete bases for the installation of all types and sizes of pad-mounted transformers.

Flat pads are the preferred choice for level grade and areas with a low groundwater plane.

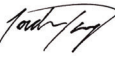
Pyramid pads are preferred for installing low-profile transformers on sloping terrain, in areas subject to high snowfall and freezing, and areas with a high groundwater level. Pyramid pads have a higher cost and require deeper excavation to accommodate the sloping ducts and installation clearance for 90° duct bends.

Submersible transformer vaults were first used on a project-specific basis for the downtown Vancouver H-frame elimination project. They can be used for the installation of submersible type transformers in other areas of the province. BC Hydro designers should consult Distribution Standards for specific installations.

Transformer Installation Near Customer Buildings and Structures

BC Hydro pad-mounted oil-filled transformers are equipped with internal current-limiting fuses and pressure relief valves. Although BCEC Rule 26-242 (2) (b) allows them to be installed at a reduced minimum clearance to the building (1 m or less), BC Hydro transformer pads shall be installed at least 1 m from a customer building or any other structure to maintain minimum maintenance access for electrical equipment as required per BCEC Rule 2-308 (1) and WorkSafeBC.

BC Hydro requires a minimum 3 m unobstructed area in front of each transformer in addition to the above minimum maintenance access, for BC Hydro crews operating loadbreak elbows and installing

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DISTRIBUTION STANDARDS 		ISSUED: SEP 2022 REPLACES: MAR 2016 ORIGINALLY ISSUED: DEC 1979		PAGE 2 OF 4	ES54 F0-02.02
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personnel safety grounds. The dimensions of the unobstructed area indicated are minimum clearances. Any vegetation on the perimeter of the unobstructed area shall be of the type that can be trimmed annually to maintain clearances.

Multiple Transformers

Large mixed development subdivisions occasionally require the installation of several pad-mounted transformers on the same property supplying separate buildings with different service voltages. This type of installation can be grouped into a transformer “farm” of various sized pad-mounted transformers and low-profile transformers, but the minimum 1 m maintenance access clearance between transformers shall be maintained. Each transformer shall have a designated counterpoise and two ground rods (per applicable BC Hydro construction standards), and adjacent counterpoises shall be interconnected below ground to ensure the continuity of the equipotential surface around all enclosures (see ES54 R1-01 for details).

Similar rules apply for the installation and safety grounding of pad-mounted switchgear and TELUS enclosures, as well as SMI routers located in the vicinity of BC Hydro pad-mounted transformers (see ES54 F7-01 and ES54 R1-01).

Border Frame

BC Hydro distribution type pad-mounted oil-filled transformers contain less than 2500 litres of oil and are therefore exempt from environmental requirement for oil spill containment. BC Hydro construction standards facilitate the directing of an oil spill by means of a granular material layer placed around and below the transformer pad. This granular material layer is 300 mm to 600 mm deep and extends 300 mm minimum past the transformer pad. The granular material is held in place by a border frame made of 2" x 8" (minimum) treated lumber sections.

Note: Pad-mounted transformers are filled with mineral oil and are built and tested in accordance with applicable CSA standards. BC Hydro has an excellent historical record of no damage caused by oil spills from distribution transformers.

BC Hydro large submersible oil-filled transformer vaults are not drained so any oil spill would be contained inside the concrete vault.

Mechanical Protection

BC Hydro standards for the protection of pad-mounted equipment are based on the installation of protective steel bollards as per ES54 U2-02. In general, protective bollards are placed in areas exposed to vehicular traffic (deliberate and non-deliberate), such as parking lots, lanes, private driveways, and sidewalks.

Standard protective bollards do not provide adequate protection for areas of high-speed traffic, or for preventing damage from large vehicles such as highway trucks and large forklifts. The BC Hydro designer should consider installing roadway concrete barriers for such installations.

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DISTRIBUTION STANDARDS 		ISSUED: SEP 2022 REPLACES: MAR 2016 ORIGINALLY ISSUED: DEC 1979		PAGE 3 OF 4	ES54 F0-02.03
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Ducting

Primary and secondary ducts are kept separate for ease of installation and cable termination. Secondary ducts entering a building shall be drained outside the building walls with a T-drain as per BCEC Rule 6-300 (3) (b). Secondary service ducts installed inside a customer building shall be concrete-encased, 75 mm minimum as per BCEC Rule 6-208, as BC Hydro service conductors do not have adequate overcurrent protection.

Grounding

BC Hydro pad-mounted transformer safety grounding requires the installation of a standard counterpoise 900 mm away from the concrete pad, and a connection to two BC Hydro standard ground electrodes. This practice is based on a BC Hydro grounding study for the available system fault level, and is designed to meet the necessary step-and-touch potential requirements.

The BC Hydro design representative for pad-mounted transformer installations on public corridors shall follow grounding installation details per ES54 R1-01, including PVC sleeve insulated protective bollards installed by a contractor.

Customers with private property installations where the BC Hydro transformer concrete pad is more than 3 m from a customer building shall follow the installation procedure for pad-mounted transformers per ES54 R1-02. Exposed metal structures less than 3 m from the concrete pad shall be bonded. A grounding report is not required for such installations.

Customers with private property installations where the transformer concrete pad is located less than 3 m from a building with conductive wall surfaces or metal structures shall follow the construction standards for pad-mounted transformers per ES54 F3-07. The customer shall complete and provide BC Hydro with a stamped grounding report per ES54 F3-07.

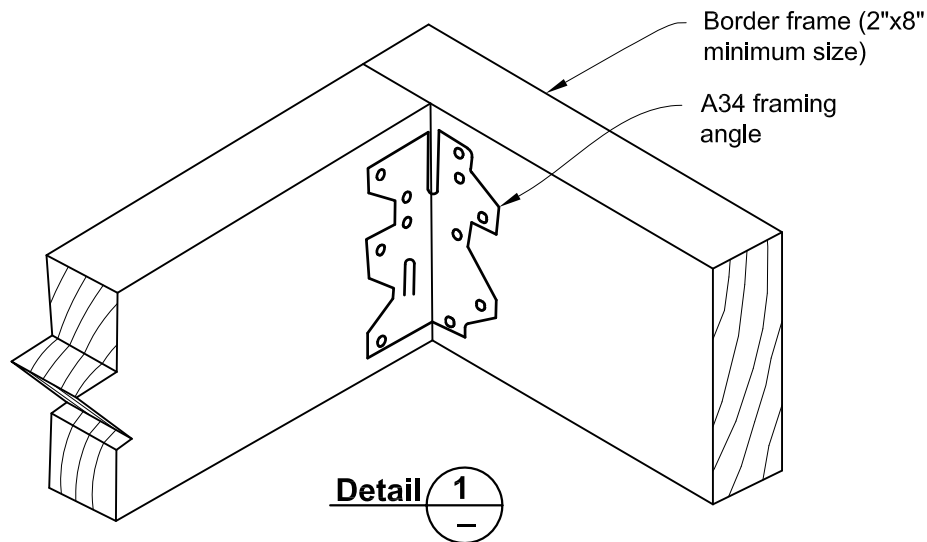
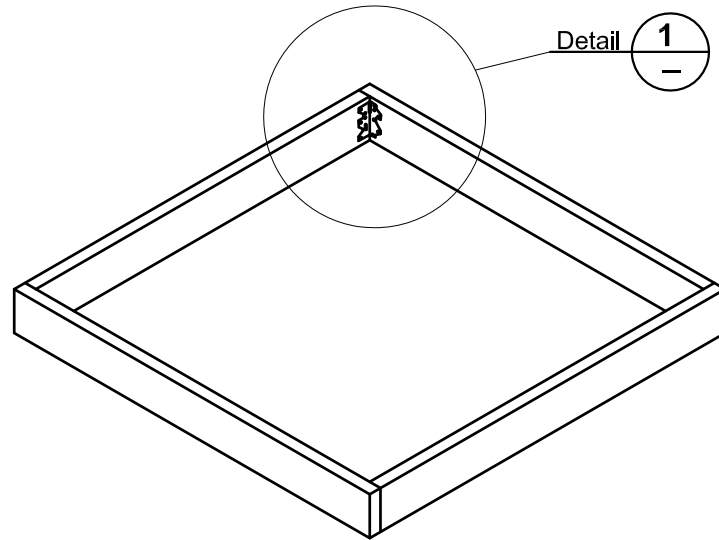
Customers with private property installations where the transformer concrete pad is located within the footprint of a customer building, such as a building alcove or above a building parkade, shall follow the installation procedure for pad-mounted transformers per ES54 F3-06. Installations within the footprint of a building shall comply with the BC Building Code and BCEC rules. The customer shall follow the same design and perform the grounding tests in the same manner as if the pad-mounted transformer was customer owned, and provide a certified grounding report to BC Hydro and an electrical inspector for the authority having jurisdiction.

Pad-mounted transformer installations located less than 3 m from exposed metal structures and conductive surfaces shall have all such components bonded to the BC Hydro equipment ground bus to eliminate dangerous touch potentials.

Level Installation

All transformer vaults shall be installed with the floor leveled and walls plumb, and pads shall be leveled at the finished grade. Transformers are oil filled and designed to sit on a horizontal pad or floor.

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Pad Border Frame

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REVISIONS: DISTRIBUTION STANDARDS 		ISSUED: MAR 2016 REPLACES: N/A ORIGINALLY ISSUED: MAR 2016		PAGE 1 OF 1	ES54 F0-03 R 0

Application

This standard describes installation details for a single-phase low-profile transformer flat pad.

Revision Notes

Added *Application* and *Revision Notes* sections. Updated *References*. Updated Figure 1 due to a renewed design with existing manufacturer to change weights, opening size, sloped edges, and lifting mechanism to incorporate manufacturers' lifting clutches. Substantive changes are marked by green vertical revision lines in the left margin. This standard released concurrently with Standards and Equipment Advisory Information Bulletin 2024-035
Revised ES54 F1-02 Single-Phase Low-Profile Transformer Flat Pad.

Items Required

Item	Description	Material no.	Quantity	Supplied by
1	Precast concrete pads	400-0852	1	BC Hydro
2	Grounding kit	412-0015	1	BC Hydro
	Ground rod	420-1093	2	
	18 m counterpoise	412-0014	1	
3	Border frame	N/A	As required	Contractor
4	75 mm duct caps	401-0173	As required	Contractor
5	75 mm duct, 90° elbow	400-4021	As required	Contractor
6	Bollards	400-0059	As required	BC Hydro
7	Plywood cover	N/A	1	Contractor

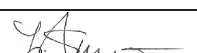
References

BC Hydro Distribution Standards

ES53 F0-03	Transformer Pads and Vaults Border Containment Frame Typical Detail
ES54 H1-03	General Trenching Details Duct Entry at Pads
ES54 R1-01	Grounding of Pad-Mounted Equipment in Public Corridors
ES54 U2-02	Concrete Pad Protection Bollards
ES54 W1-01	Construction Materials Excavation and Backfill

Notes

- There shall be no vegetation or pavement around the pad within the containment frame.
- A BC Hydro designer will specify the transformer protection in accordance with ES54 U2-02.
- A BC Hydro designer will specify pad orientation to provide a safe operating position for crews.

Designed: J. Yang, P. Eng		Professional of Record 	Single-Phase Low-Profile Transformer Flat Pad	
Checked: L. Stevanovic, P. Eng				
Reviewed: L. Stevanovic, P. Eng			DISTRIBUTION STANDARDS 	ES54 F1-02 R9
Approved: H. Giesbrecht, P. Eng		Issued: 2025-08-08 Effective: 2025-08-08		

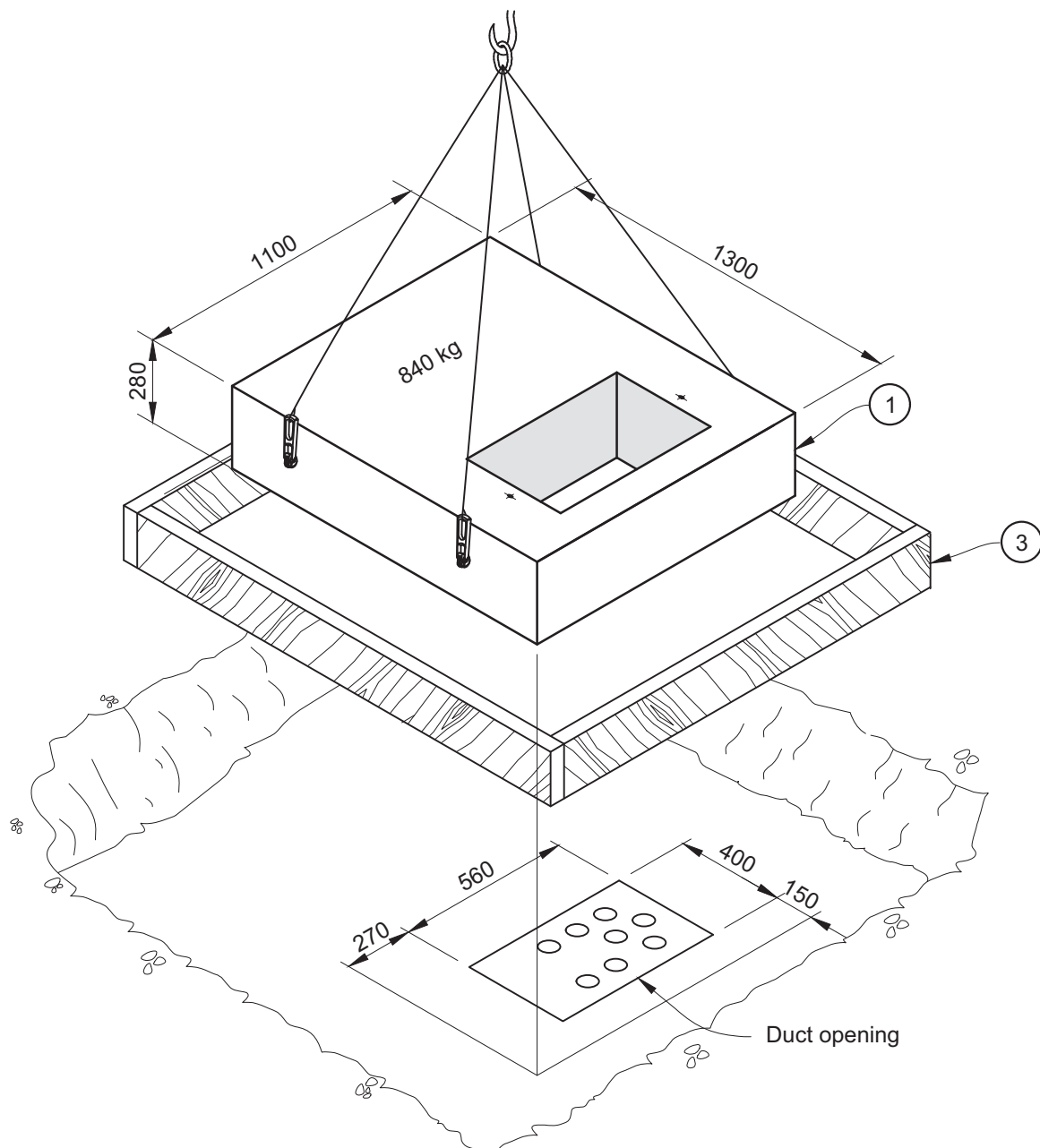


Figure 1 – Transformer pad with frame

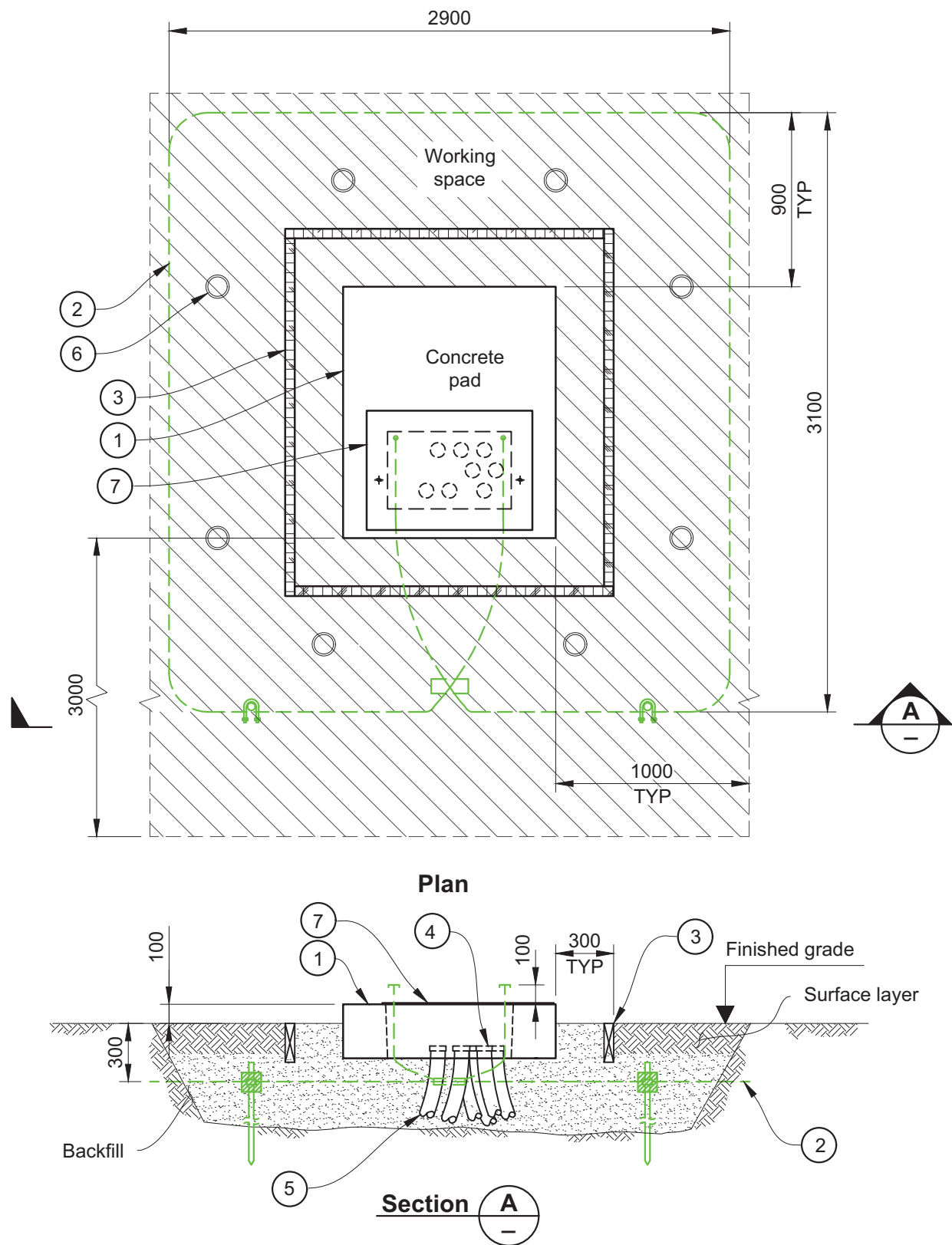
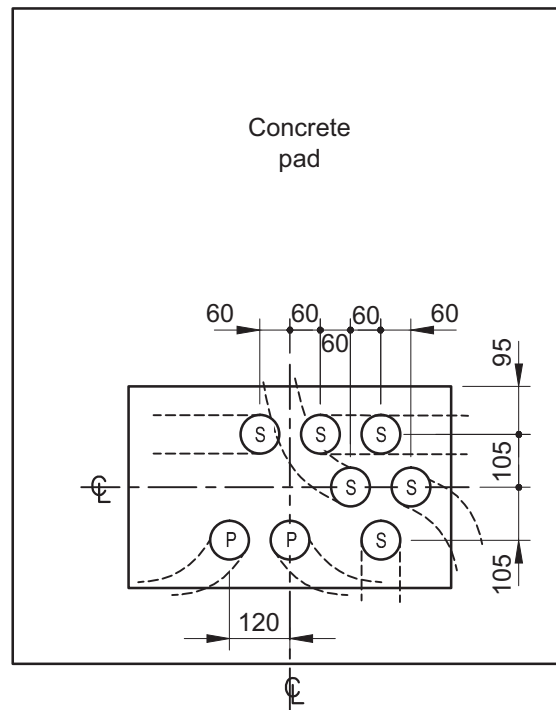


Figure 2 – Pad plan and section views



Legend:
S- Secondary or service
P- Primary

Figure 3 – Ducting plan view

Application

This standard provides construction details for single-phase low-profile transformer pyramid pads.

Revision Notes

R9 – General layout, formatting, and editing changes for grammar and readability. Added sections *Application* and *Revision Notes*. Removed note on concrete encasement of duct entries for higher pulling tensions. Updated reference standards. September 2022, JY

R8 – Added alternate entry for front ducts. October 2018, CC

R7 – Unknown

R6 – Grounding and duct layout revised. Border frame added. Unobstructed area and stanchions revised. March 2016, MK

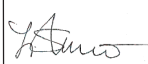
R5 – Updated number of ducts. April 2007, MK

R4 – Redrawn and revised. March 1999, MF

R0 – Original issue. December 1979

Reference Standards

ES54 F0-03	Transformer Pads and Vaults Border Containment Frame, Typical Detail
ES54 H0-02	Duct General Notes
ES54 H1-06	General Trenching Details Duct Entry Details
ES54 R1-01	Grounding of Pad-Mounted Equipment in Public Corridors
ES54 U2-02	Concrete Pad Protection Bollards
ES54 U7	Lifting and Handling
ES54 W1-01	Construction Materials Excavation and Backfill
ES53 F1	Transformers Single-Phase Low-Profile Pad-Mounted

DESIGNED  J. YANG	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  L. STEVANOVIC BRITISH COLUMBIA ENGINEER 2022-09-01	SINGLE-PHASE LOW-PROFILE TRANSFORMER PAD PYRAMID PAD	
DISTRIBUTION STANDARDS 		ISSUED: SEP 2022 REPLACES: OCT 2018 ORIGINALLY ISSUED: MAR 1999		PAGE 1 OF 5	ES54 F1-03.01
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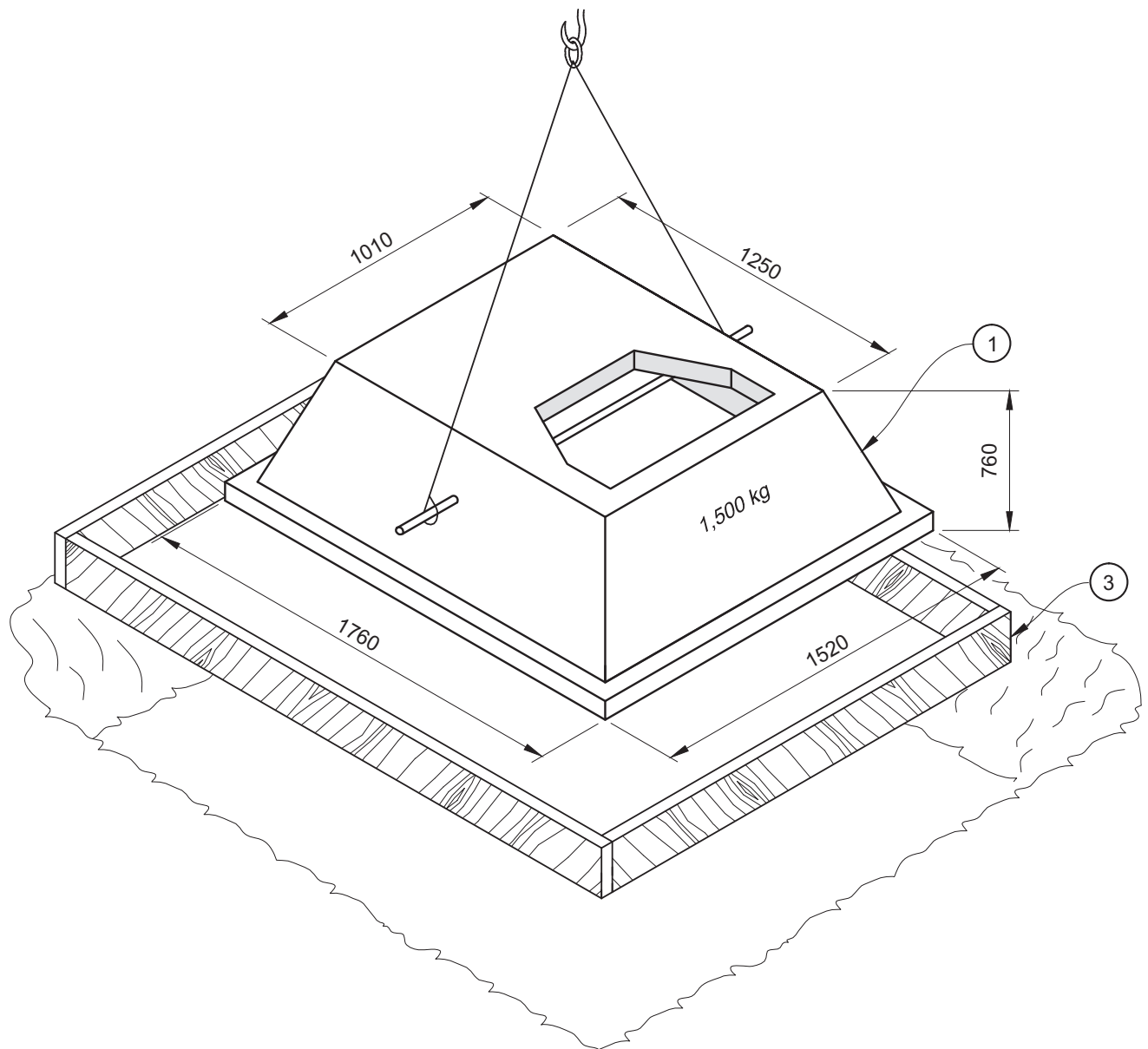
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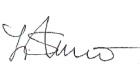
Item	Description	Material No.	Quantity	Supplied By
1	Precast pyramid pad	400-0851	1	BC Hydro
2	Grounding kit	412-0015	1	BC Hydro
	Ground rod	420-1093	2	BC Hydro
	18 m counterpoise	412-0014	1	BC Hydro
3	Border frame	N/A	As required	Contractor
4	75 mm duct bell ends	401-0183	As required	Contractor
	75 mm duct plugs	400-0197		Contractor
5	75 mm duct, 90° elbow	400-4021	As required	Contractor
6	Bollards	400-0059	As required	BC Hydro
7	Plywood cover	N/A	1	Contractor

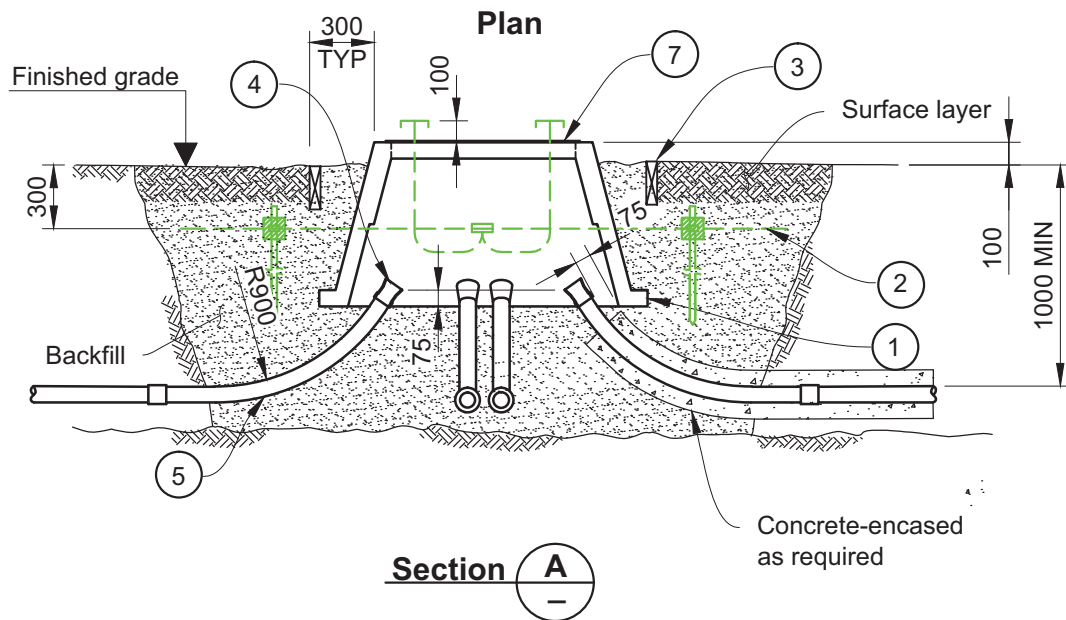
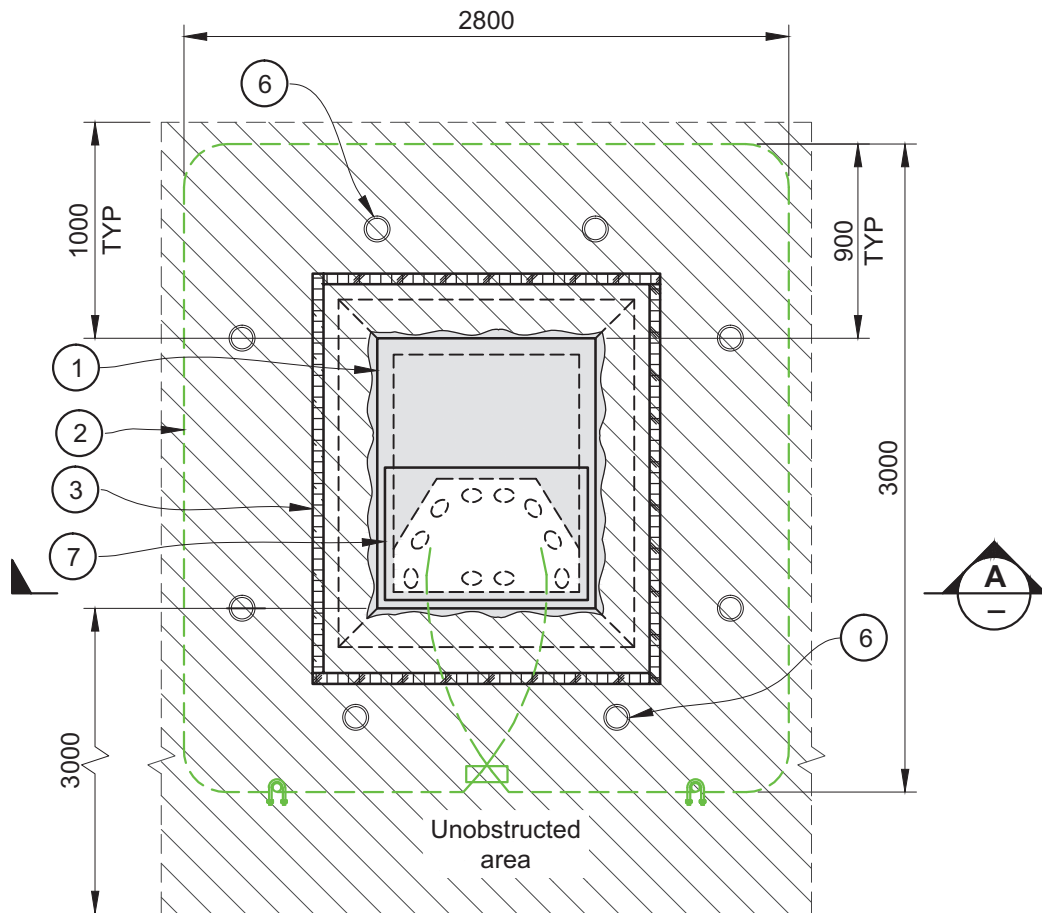
Notes

1. There shall be no vegetation or pavement around the pad within the containment frame.
2. Designer shall specify pad orientation to allow for a safe operating position for crews.
3. Designer shall specify transformer protection in accordance with ES54 U2-02.
4. Primary ducts shall be installed as close to vertical as possible and square cut at entrance to pad.

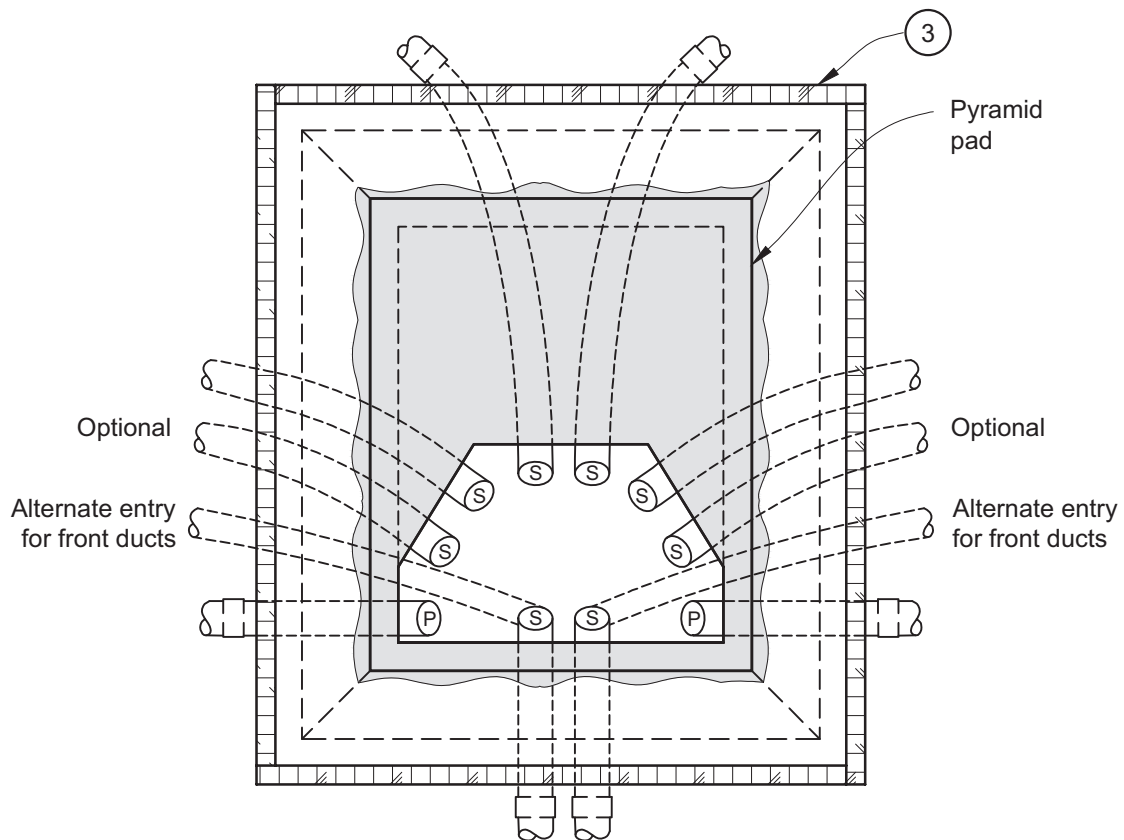
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DISTRIBUTION STANDARDS 		ISSUED: SEP 2022 REPLACES: OCT 2018 ORIGINALLY ISSUED: MAR 1999		PAGE 3 OF 5	ES54 F1-03.03
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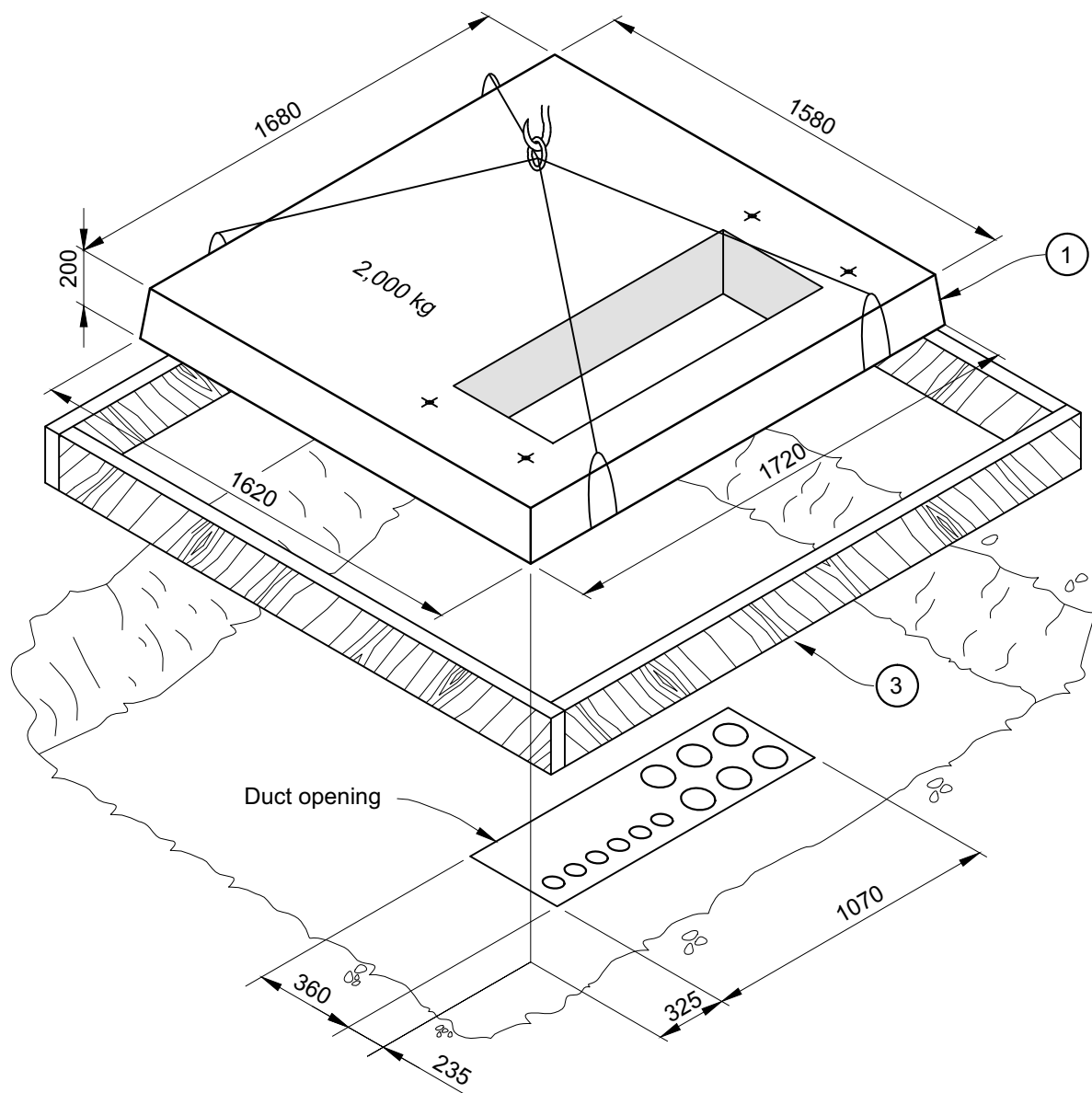
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Duct diagram

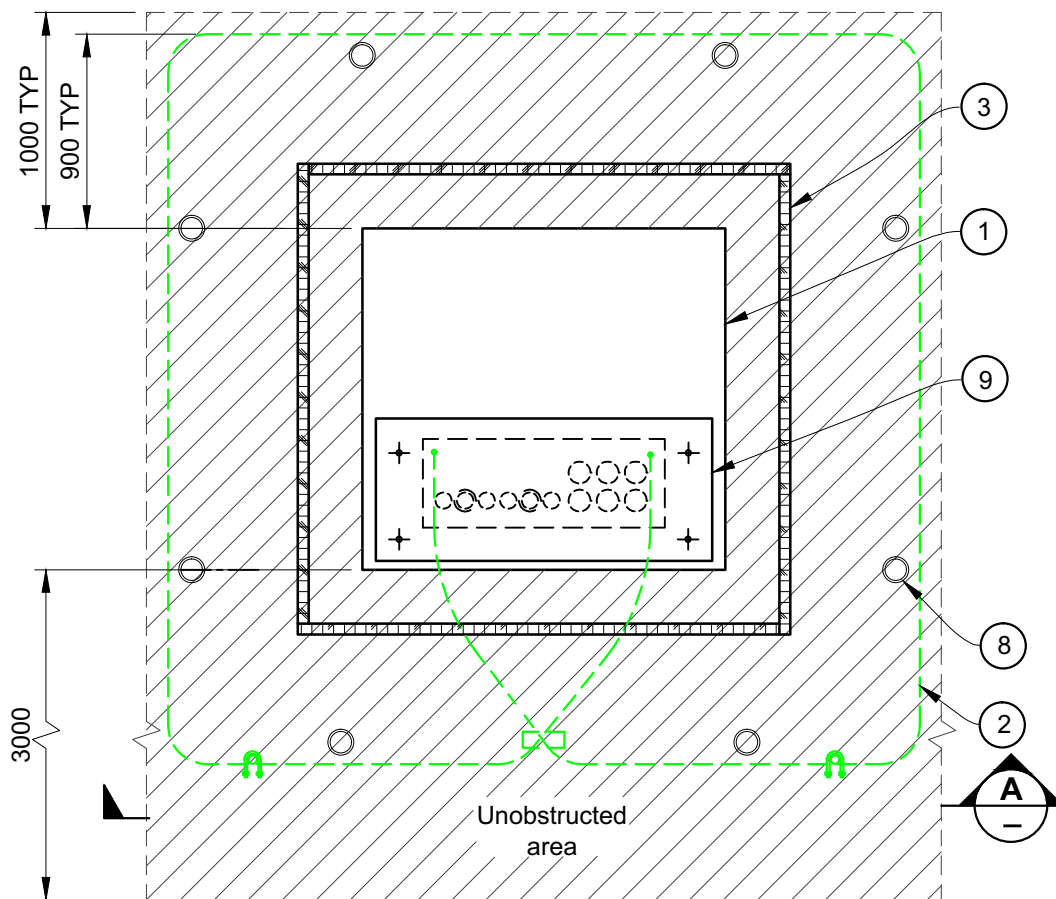
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REVISIONS: R.5-LOOP FEED DUCT DIAGRAM AND BORDER FRAME ADDED, UNOBSERVED AREA AND STANCHIONS REVISED. MAR '16 MK | R.6 - CONTAINMENT PADS LEVELLED WITH FINISHED GRADE. FEB '17 MK

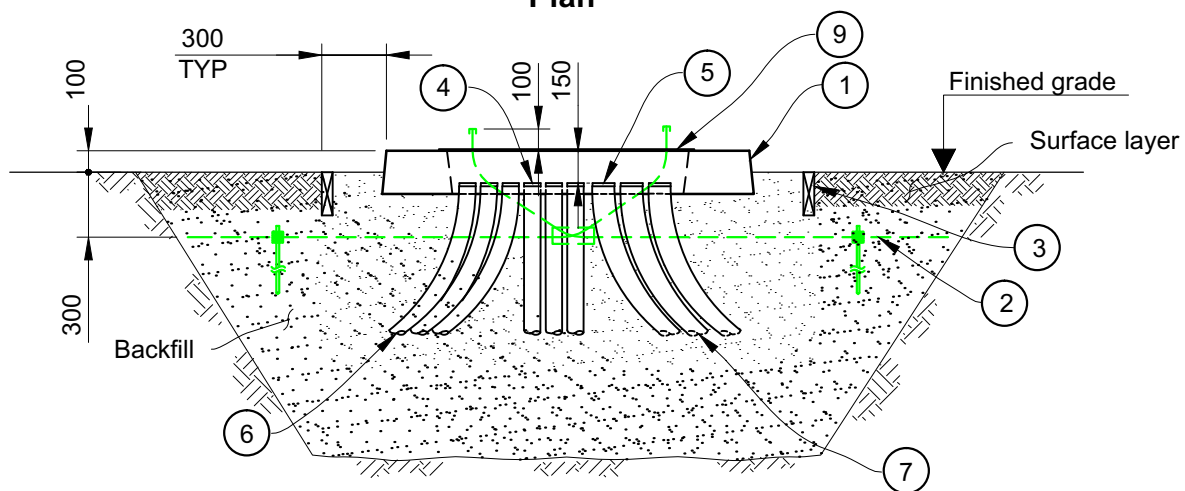


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DISTRIBUTION STANDARDS 	ISSUED: FEB 2017 REPLACES: MAR 2016 ORIGINALLY ISSUED: JUN 1999	PAGE 1 OF 5		ES54 F3-04 .01	R 6

REVISIONS: R.5-LOOP FEED DUCT DIAGRAM AND BORDER FRAME ADDED, UNOBSTRUCTED AREA AND STANCHIONS REVISED. MAR '16 MK | R.6 - CONTAINMENT PADS LEVELLED WITH FINISHED GRADE. FEB '17 MK



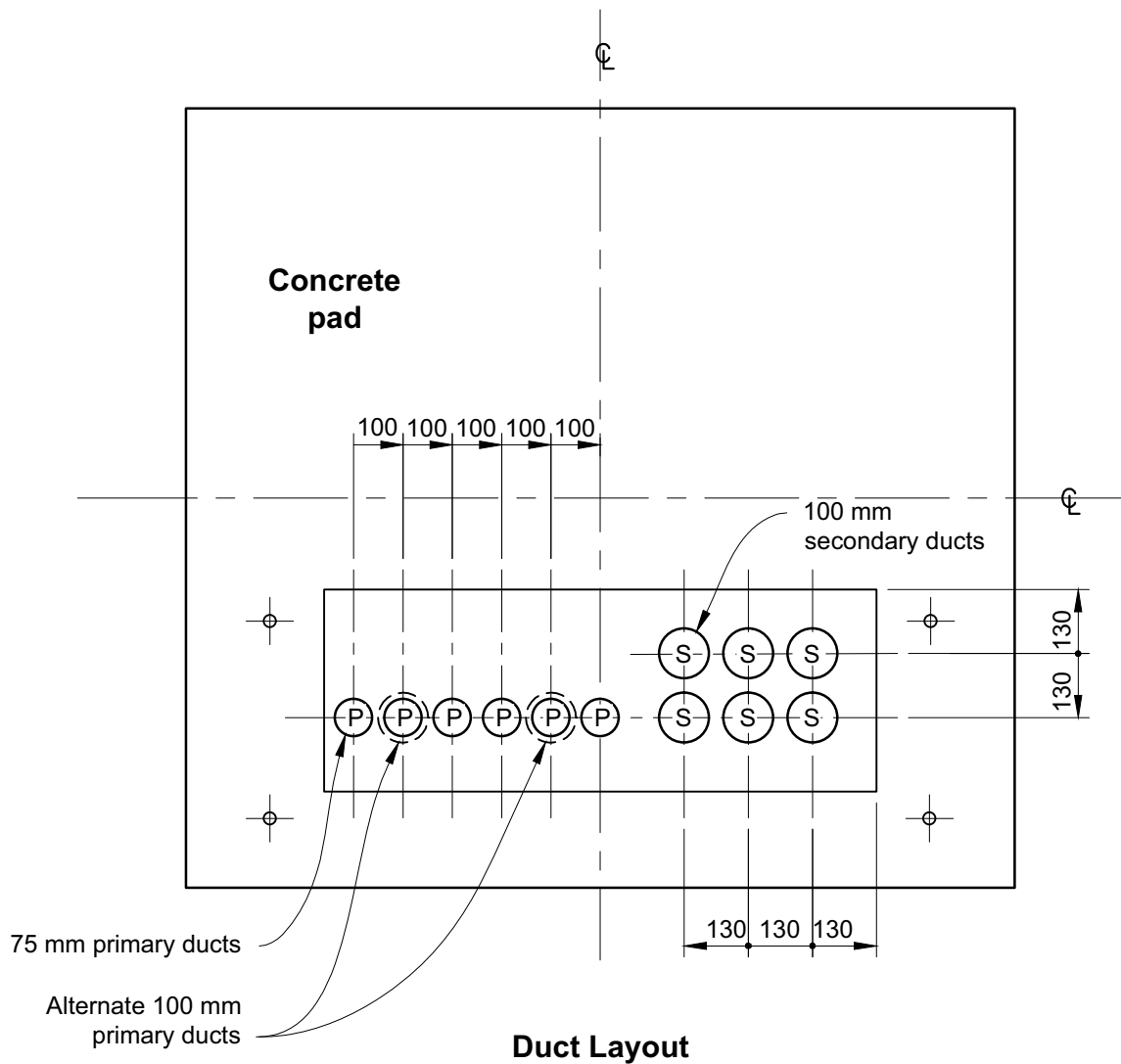
Plan



Section A

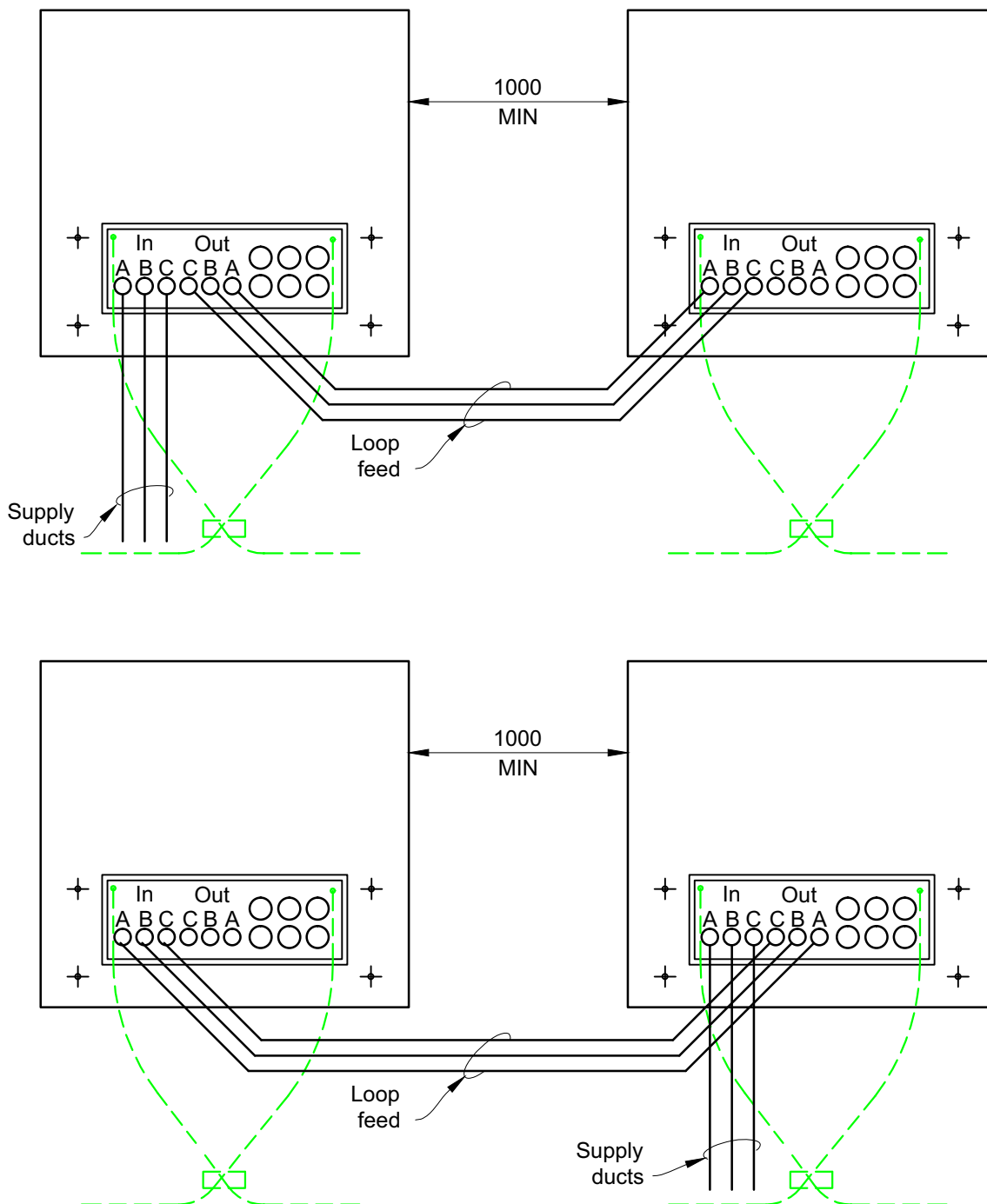
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DISTRIBUTION STANDARDS 	ISSUED: FEB 2017 REPLACES: MAR 2016 ORIGINALLY ISSUED: JUN 1999			PAGE 2 OF 5	ES54 F3-04.02	R 6

REVISIONS: R.5-LOOP FEED DUCT DIAGRAM AND BORDER FRAME ADDED, UNOBSERVED AREA AND STANCHIONS REVISED. MAR '16 MK | R.6 - CONTAINMENT PADS LEVELLED WITH FINISHED GRADE. FEB '17 MK



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DISTRIBUTION STANDARDS 	ISSUED: FEB 2017 REPLACES: MAR 2016 ORIGINALLY ISSUED: JUN 1999	PAGE 3 OF 5		ES54 F3-04.03	R 6

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Loop Feed Duct Diagram

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DISTRIBUTION STANDARDS 	ISSUED: FEB 2017 REPLACES: MAR 2016 ORIGINALLY ISSUED: JUN 1999	PAGE 4 OF 5		ES54 F3-04.04	R 6

Notes

1. There shall be no vegetation or pavement around the pad within the containment frame.
2. Designer is to specify the orientation of the pad to allow for a safe operating position for crews.
3. Designer is to specify transformer protection in accordance with ES54 U2-02.

Bill of Material

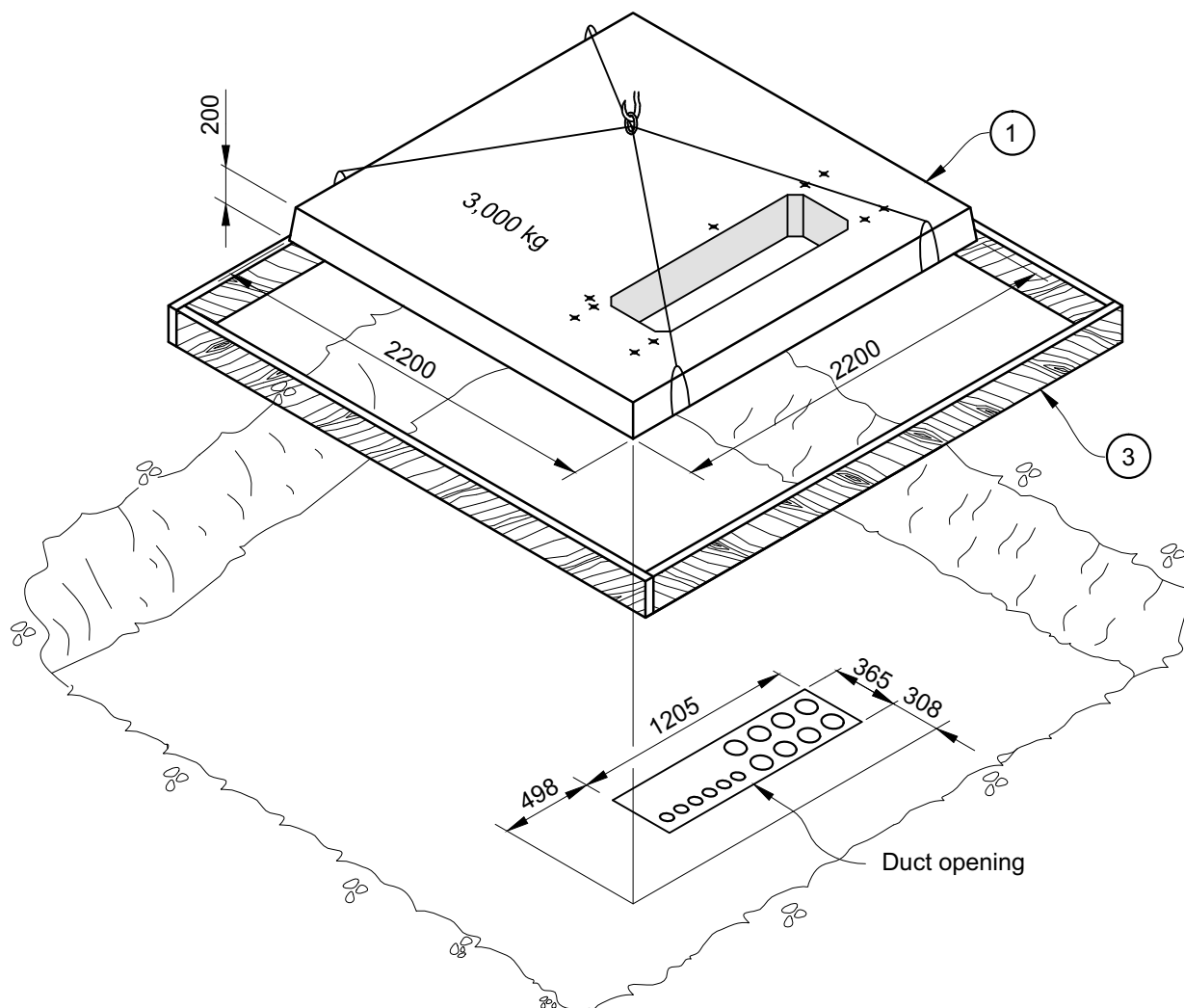
Item	Description	Catalogue ID	Quantity	Supplied By
1	Precast concrete pad	400-0853	1	BC Hydro
2	Grounding kit	412-0015	1	BC Hydro
	Ground rod	420-1093	2	BC Hydro
	18 m counterpoise	412-0014	1	BC Hydro
3	Border frame	N/A	As required	Contractor
4	75 mm duct caps	401-0173	As required	Contractor
5	100 mm duct caps	96021451	As required	Contractor
6	75 mm duct, 90° elbow	400-4021	As required	Contractor
7	100 mm duct, 90° elbow	96021350	As required	Contractor
8	Bollards	400-0059	As required	BC Hydro
9	Plywood cover	N/A	1	Contractor

Reference Standards

ES54 F0-03	Border Containment Frame, Typical Detail
ES54 H1-03	Duct Entry at Pads
ES54 R1-01	Grounding of Pad-Mounted Equipment in Public Corridors
ES54 U2-02	Above-Ground Equipment, Mechanical Protection
ES54 U7	Lifting and Handling
ES54 W1-01	Excavation and Backfill
ES53 F3	Three-Phase Padmount

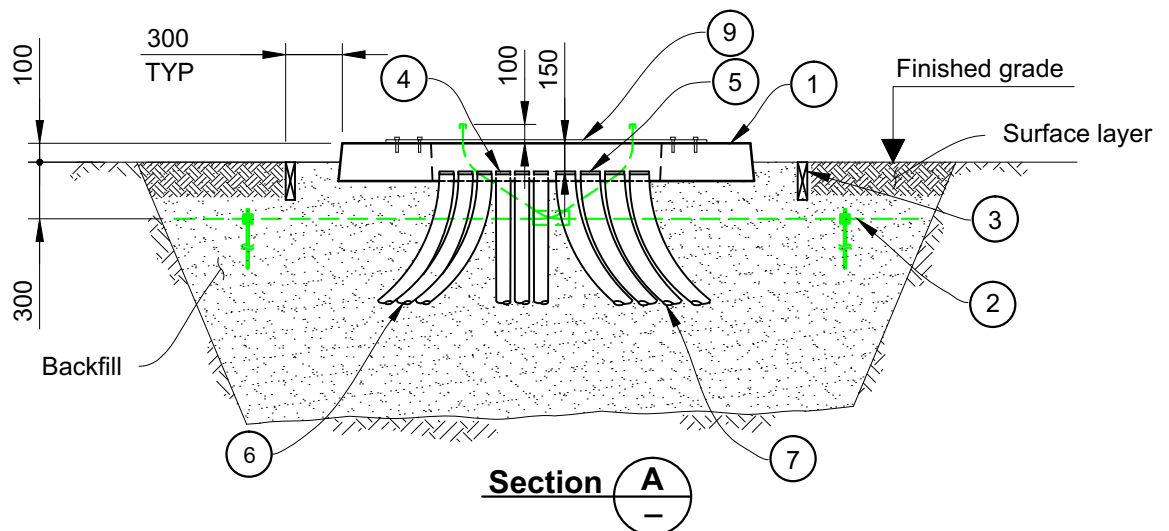
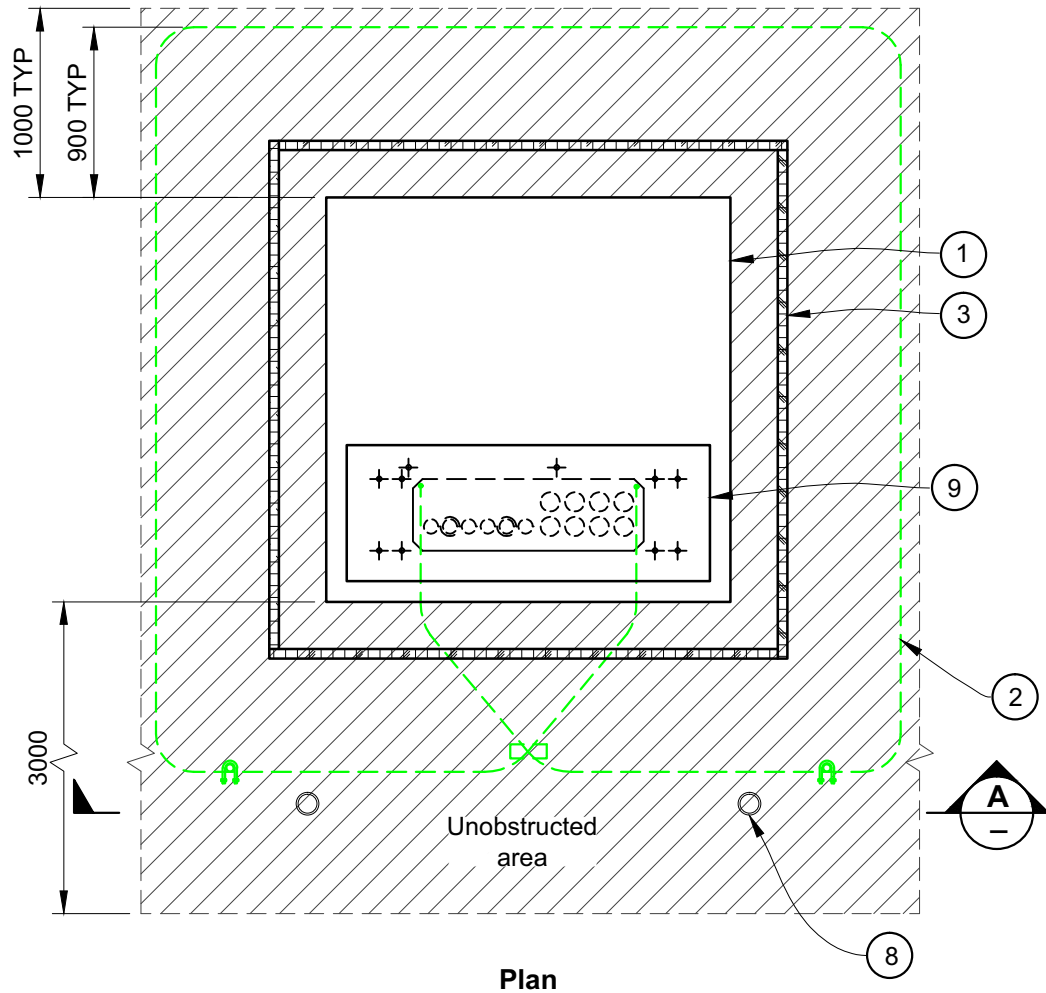
DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2017-07-26	THREE-PHASE TRANSFORMER PAD 500 KVA AND SMALLER	
DISTRIBUTION STANDARDS 		ISSUED: FEB 2017 REPLACES: MAR 2016 ORIGINALLY ISSUED: JUN 1999		PAGE 5 OF 5	ES54 F3-04.05
					R 6

REVISIONS: R.7 - CONTAINMENT PADS LEVELLED WITH FINISHED GRADE. FEB '17 MK | R.8 - BOM REVISED. SEP '17 MK



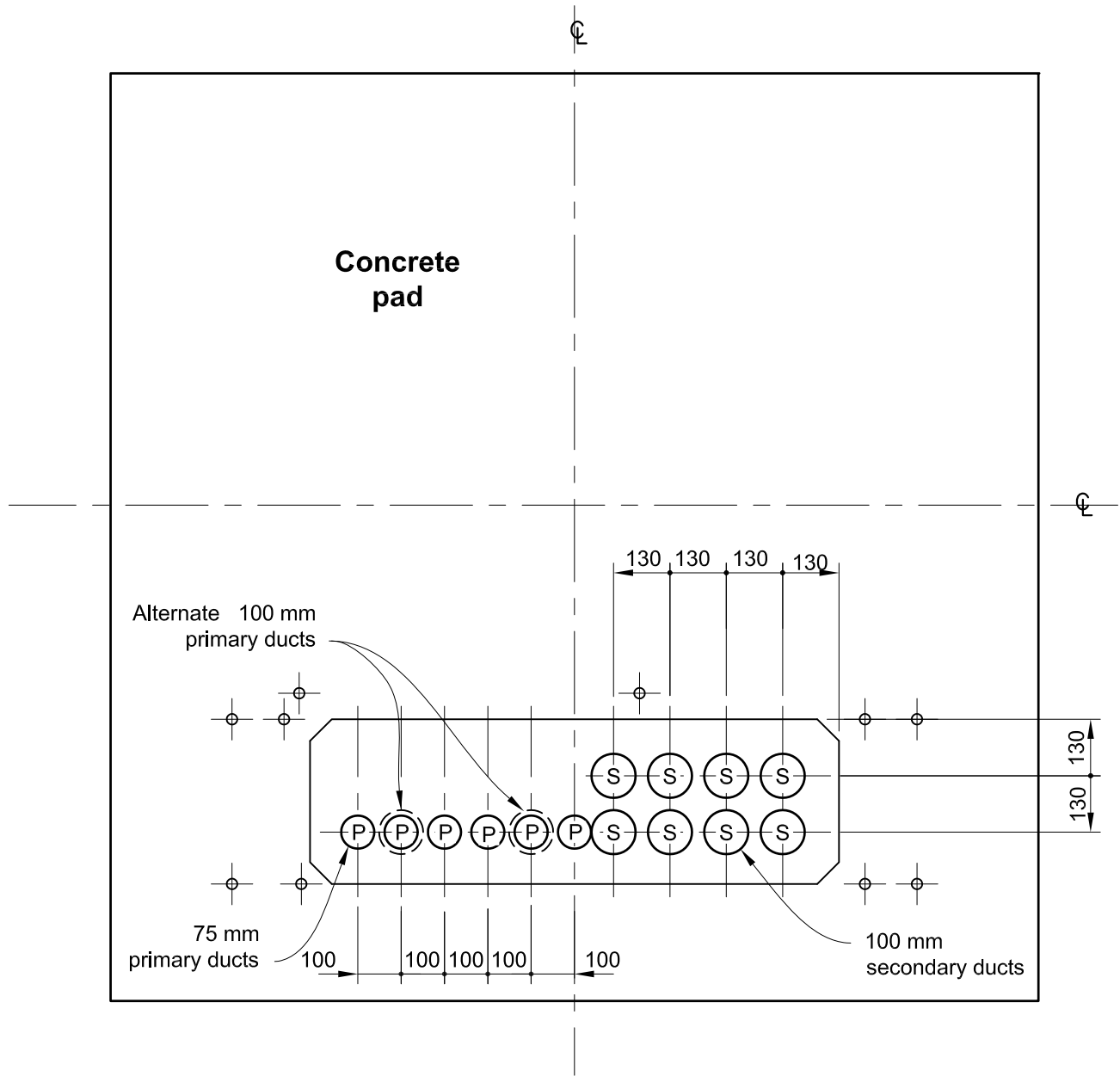
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DISTRIBUTION STANDARDS 	ISSUED: SEP 2017 REPLACES: FEB 2017 ORIGINALLY ISSUED: MAY 2000	PAGE 1 OF 5		ES54 F3-05.01	R 8

REVISIONS: R.7 - CONTAINMENT PADS LEVELLED WITH FINISHED GRADE. FEB '17 MK | R.8 - BOM REVISED. SEP '17 MK



DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2017-10-06	THREE-PHASE TRANSFORMER PAD 750 KVA AND LARGER	
DISTRIBUTION STANDARDS 		ISSUED: SEP 2017 REPLACES: FEB 2017 ORIGINALLY ISSUED: MAY 2000		PAGE 2 OF 5	ES54 F3-05.02
				R 8	

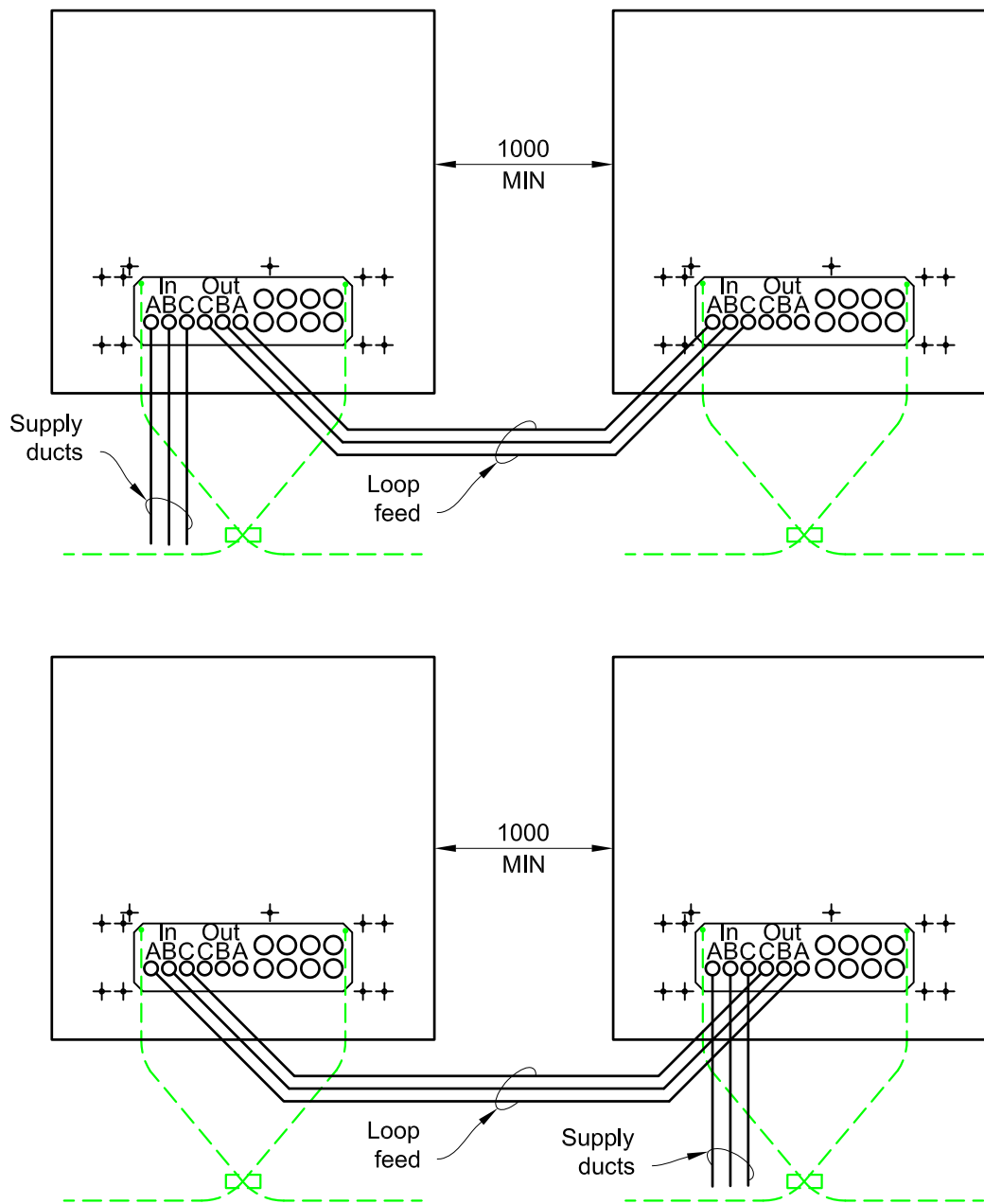
REVISIONS: R.7 - CONTAINMENT PADS LEVELLED WITH FINISHED GRADE. FEB '17 MK | R.8 - BOM REVISED. SEP '17 MK



**Duct Layout
Plan View**

DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2017-10-06	THREE-PHASE TRANSFORMER PAD 750 KVA AND LARGER	
DISTRIBUTION STANDARDS 	ISSUED: SEP 2017 REPLACES: FEB 2017 ORIGINALLY ISSUED: MAY 2000			PAGE 3 OF 5	ES54 F3-05.03
					R 8

REVISIONS: R.7 - CONTAINMENT PADS LEVELLED WITH FINISHED GRADE. FEB '17 MK | R.8 - BOM REVISED. SEP '17 MK



Loop Feed Duct Diagram

DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2017-10-06	THREE-PHASE TRANSFORMER PAD 750 KVA AND LARGER	
DISTRIBUTION STANDARDS 	ISSUED: SEP 2017 REPLACES: FEB 2017 ORIGINALLY ISSUED: MAY 2000	PAGE 4 OF 5		ES54 F3-05.04	R 8

Notes

1. There shall be no vegetation or pavement around the pad within the containment frame.
2. Designer is to specify the orientation of the pad to allow for a safe operating position for crews.
3. Designer is to specify transformer protection in accordance with ES54 U2-02.

Bill of Material

Item	Description	Catalogue ID	Quantity	Supplied By
1	Precast concrete pad	400-0854	1	BC Hydro
2	Grounding kit	412-0015	1	BC Hydro
	Ground rod	420-1093	2	BC Hydro
	25 m counterpoise	412-0017	1	BC Hydro
3	Border frame	N/A	As required	Contractor
4	75 mm duct caps	401-0173	As required	Contractor
5	100 mm duct caps	96021451	As required	Contractor
6	75 mm duct, 90° elbow	400-4021	As required	Contractor
7	100 mm duct, 90° elbow	96021350	As required	Contractor
8	Bollards	400-0059	As required	BC Hydro
9	Plywood cover	N/A	1	Contractor

Reference Standards

ES54 F0-03	Border Containment Frame, Typical Detail
ES54 H1-03	Duct Entry at Pads
ES54 R1-01	Grounding of Pad-Mounted Equipment in Public Corridors
ES54 U2-02	Above-Ground Equipment, Mechanical Protection
ES54 U7	Lifting and Handling
ES54 W1-01	Excavation and Backfill
ES53 F3	Three-Phase Padmount

DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2017-10-06	THREE-PHASE TRANSFORMER PAD 750 KVA AND LARGER	
DISTRIBUTION STANDARDS 		ISSUED: SEP 2017 REPLACES: FEB 2017 ORIGINALLY ISSUED: MAY 2000		PAGE 5 OF 5	ES54 F3-05.05 R 8

REVISIONS: R.7 - CONTAINMENT PADS LEVELLED WITH FINISHED GRADE. FEB '17 MK | R.8 - BOM REVISED. SEP '17 MK

BC Hydro Transformer Pad on Top of Soil on Private Property Inside Building Alcove

ES54 F3-06

Application

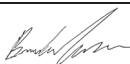
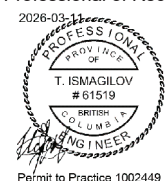
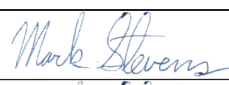
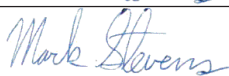
The alcove design described in this standard shall be used under special circumstances on top of the soil within the footprint of the building. This type of design is used where the building is built to the property line. It is not the intention to hide the pad-mounted transformer (PMT) or low-profile transformer (LPT). The customer shall obtain approval from the local BC Hydro designer for each alcove installation.

Revision Notes

Added notes 6d and 6e. Updated Figure 2 minimum distances and added counterpoise cutout reference. Updated Figure 5 minimum distances and added references to new notes 6d and 6e. Updated Figure 6 minimum distances and added references to notes 6d and ES54 S0-05. Substantive changed content is marked by green vertical revision lines in the left margin. This revision released concurrently with Standards and Equipment Advisory Information Bulletin 2026-009 Revised ES54 F3-06 and F3-07 BC Hydro Transformer Pad on Private Property Installation Standards.

Items Required

Item	Description	Material no.	Quantity	Supplied by
1	Transformer concrete pad	Specified by BC Hydro designer	1	BC Hydro
2	Counterpoise, Ø ¾", galvanized steel	106-2510	As required	BC Hydro
3	Ground rod, Ø 5/8" x 8', galvanized steel	420-1093	2	BC Hydro
4	Connector, counterpoise to ground rod, galvanized steel	420-1157	2	BC Hydro grounding kit 420-0015
5	Rope clamp, Ø ¾", galvanized steel	420-0965	2	
6	Cap, heat shrink, 1.2" x 3"	394-0605	2	
7	Protective bollard, precast, grounded	9700-2788	2	BC Hydro
8	2/0 AWG Cu bare stranded	N/A	As required	Contractor
9	Ground connector ¾" rebar to 2/0 Cu bare direct burial, ILSCO GPL-6, Burndy GAR-6429 C-tap or equivalent	N/A	As required	Contractor
10	Compression lug for 2/0 Cu Burndy YGHA26 or equivalent	N/A	As required	Contractor
11	Pipe grounding clamp, Ø 4" pipe to 2/0 Cu bare Burndy GD2226 or equivalent	N/A	As required	Contractor
12	Ground plug direct burial Burndy YGF29-2N	N/A	2	Contractor
13	2/0 AWG Cu insulated 600 V green, stranded	N/A	As required	Contractor
14	Bolt, stainless steel, ½" diameter x 1" long	N/A	4	Contractor
15	Washer, stainless steel, ½" diameter	N/A	8	Contractor

Designed: B. Linforth		Professional of Record 2026-03-13  T. ISMAGILOV #61519 BRITISH COLUMBIA ENGINEER Permit to Practice 1002449	BC Hydro Transformer Pad on Top of Soil on Private Property Inside Building Alcove	
Checked: T. Ismagilov, P. Eng			DISTRIBUTION STANDARDS 	ES54 F3-06 R12
Reviewed: M. Stevens, P. Eng				
Approved: M. Stevens, P. Eng				

Item	Description	Material no.	Quantity	Supplied by
16	Pipe sleeve for protective bollard	N/A	1	Contractor
17	Removable pipe bollard	N/A	1	Contractor
18	Protective bollard, 4" diameter pipe, galvanized steel	400-0059	Optional for field cast	BC Hydro
19	Connector, ERICO wire to counterpoise or precast grounded bollard stud	420-1158	4 (2 per bollard)	BC Hydro
20	Theft deterrent wire, ERICO	9701-1048	13 m	BC Hydro

References

BC Hydro Distribution Standards

ES54 section F	Transformer Pads and Vaults
ES54 F3-07	BC Hydro Pad-Mounted Transformer on Private Property Next to Customer Building
ES54 F3-08	BC Hydro Transformer on Top of Building Slab or Inside Building Alcove on Private Property
ES54 S0-02	Services General Notes
ES54 S0-05	Services General Notes Service Ducts and Trenches
ES54 U2-02	Concrete Pad Protection Bollards

External Documents

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

Alcove design on top of the soil within the footprint of the building.

2. General

- Alcove civil work on private property, including high-voltage (HV) grounding and ducting, is utility work and exempt from TSBC and local electrical inspections. Civil work and HV grounding and ducting shall be supplied, installed, and maintained by the customer per BC Hydro construction standards. See ES54 S0-02 for more information on jurisdiction.
- BC Hydro has the authority to supply other services from each alcove transformer without permission from the building owner.
- Building alcove size varies with BC Hydro transformer size. See Table 1 for minimum alcove dimensions.
- Customer-owned service equipment, bonding, and service grounding conductors shall be installed and terminated on the load side before BC Hydro installs a utility transformer and supply cables, terminates service cables, and locks the utility cable compartment for BC Hydro access only.

3. Building Permit Drawings

- Customer development permit drawings for the local authority having jurisdiction shall show the location of the BC Hydro pad-mounted transformer installation on private property. Pad-mounted transformers located inside the building footprint are subject to the requirements of the BC Building Code and applicable local authority having jurisdiction regulations and bylaws.

- b. BC Hydro will require a specific right-of-way for the alcove area. The customer shall prepare the right-of-way drawing and submit to the BC Hydro designer for acceptance. The customer shall provide an as-constructed survey plan to confirm the specific location of the right-of-way area.
- c. The customer shall provide an engineered building structure inside the building and compacted fill outside to support the weight of the BC Hydro concrete pad, transformer, and cables. Copying and pasting BC Hydro standards is not acceptable for certified construction drawings.
- d. The customer shall provide an oil-resistant coating on the surrounding building and foundation walls. BC Hydro shall not be responsible for damage to the customer building and drainage resulting from transformer oil leakage or excess moisture. The customer shall release and discharge BC Hydro from any liability in this regard in the relevant right-of-way.
- e. BC Hydro requires the installation of BC Hydro standard precast protective bollards for mechanical protection of pad-mounted equipment in traffic areas. Field-cast protective bollards per ES54 U2-02 are also acceptable. The BC Hydro designer shall determine the exact number and layout of the protective bollards around the transformer pad. A chain-link fence or custom-built gates may be acceptable in some areas for improved safety and cleanliness of an alcove installation, in agreement with the BC Hydro designer and subject to the approval of the authority having jurisdiction.

4. Utility Access

- a. BC Hydro requires unobstructed truck access in front of the building alcove for loading and offloading large transformers as shown in Figure 1. The building alcove shall face the street or back lane for easy access.
- b. BC Hydro requires an operating area of 3.0 m in front of the transformer and 1.0 m maintenance access on the sides. The 3.0 m unobstructed operating area may include a city street or lane.

5. Service Ducts

- a. The BC Hydro designer shall advise the customer on duct size, the number of primary and secondary ducts, acceptable duct runs, and the duct drain connection per applicable BCEC rules.
- b. The customer shall supply and install all ducting on private property. Ducting shall be CSA type DB2. Secondary service ducts located inside the building shall be concrete encased. The customer shall provide engineered structural supports to hold the weight of the service cables and ducts, and to withstand the required cable pulling forces during installation and removal of service conductors.
- c. Duct drain installation and connection is subject to approval by the authority having jurisdiction.
- d. Service duct penetration through the building foundation walls shall comply with ES54 S0-05.
- e. Concealed ducting and grounding installations shall be inspected by a BC Hydro civil inspector before pouring concrete and placing backfill. After inspection, the contractor shall complete and submit a signed installer's declaration (see Figure 8) to the BC Hydro designer.

6. Grounding and Bonding

- a. HV safety grounding inside the building alcove shall be constructed according to BC Hydro standards, ensuring equipotential grounding and eliminating hazardous touch potential. This standard provides the minimum BC Hydro grounding requirements for equipotential grounding. The customer could install additional grounding and bonding conductors and connections in compliance with BCEC section 36.
- b. Customer-owned grounding components and materials installed below grade shall be CSA (or equivalent) certified for direct burial. Exposed metal structures, siding, fencing, and poles located within 3.0 m of the BC Hydro transformer concrete pad shall be bonded to the customer concrete-encased Ufer building ground.
- c. The BC Hydro portion of safety ground, supplied by BC Hydro for installation by the customer, includes two ground rods, counterpoise, and connectors (see *Items Required*).
- d. The BC Hydro counterpoise shall be equally spaced between the transformer pad and the nearest adjacent wall or structure. The maximum offset of the BC Hydro counterpoise shall be 900 mm from the transformer pad unless otherwise noted.

- e. Grounding loops shall be installed as shown to reduce step-and-touch potentials in front of the transformer. Bollards shall be installed between the BC Hydro counterpoise and pad-mounted equipment to mitigate the safety hazards caused by high touch potentials.

7. Declarations

The duct and grounding installers declaration (see Figure 8) serves as field confirmation that the BC Hydro transformer pad, civil work, high-voltage safety grounding, and ducting have been installed in compliance with this standard.

Table 1 – Minimum alcove sizes

Transformer		Alcove dimensions (mm)			Transformer pad (mm)	
Size	Mass (kg)	Width (W)	Height (H)	Depth (D)	Width	Depth
LPT	2000	3100	4600	3200	1160	1360
PMT < 500 kVA	4000	3700	4600	3600	1730	1630
750 kVA ≤ PMT ≤ 1500 kVA	7000	4200	4600	4200	2210	2210

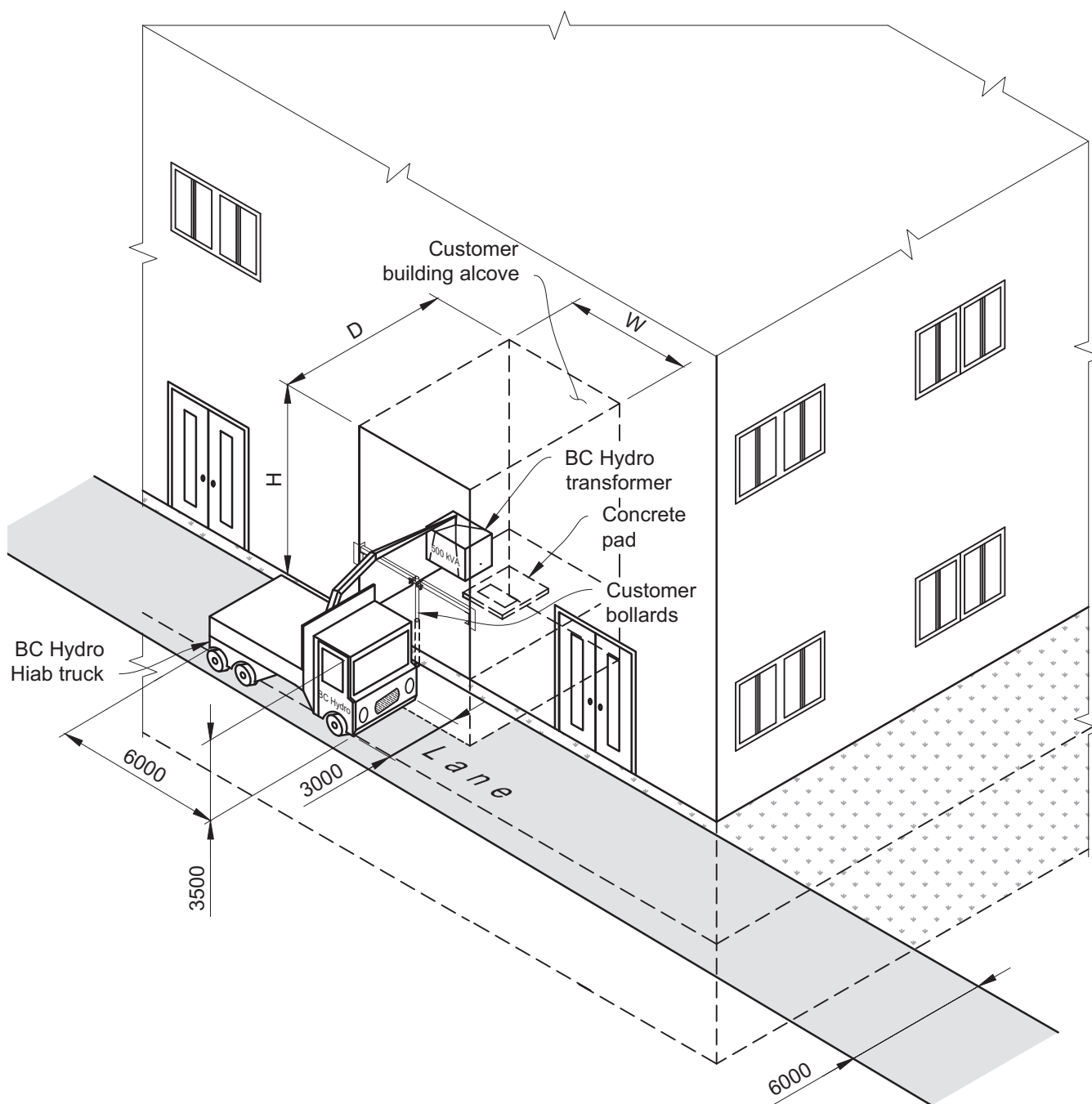


Figure 1 – Building alcove

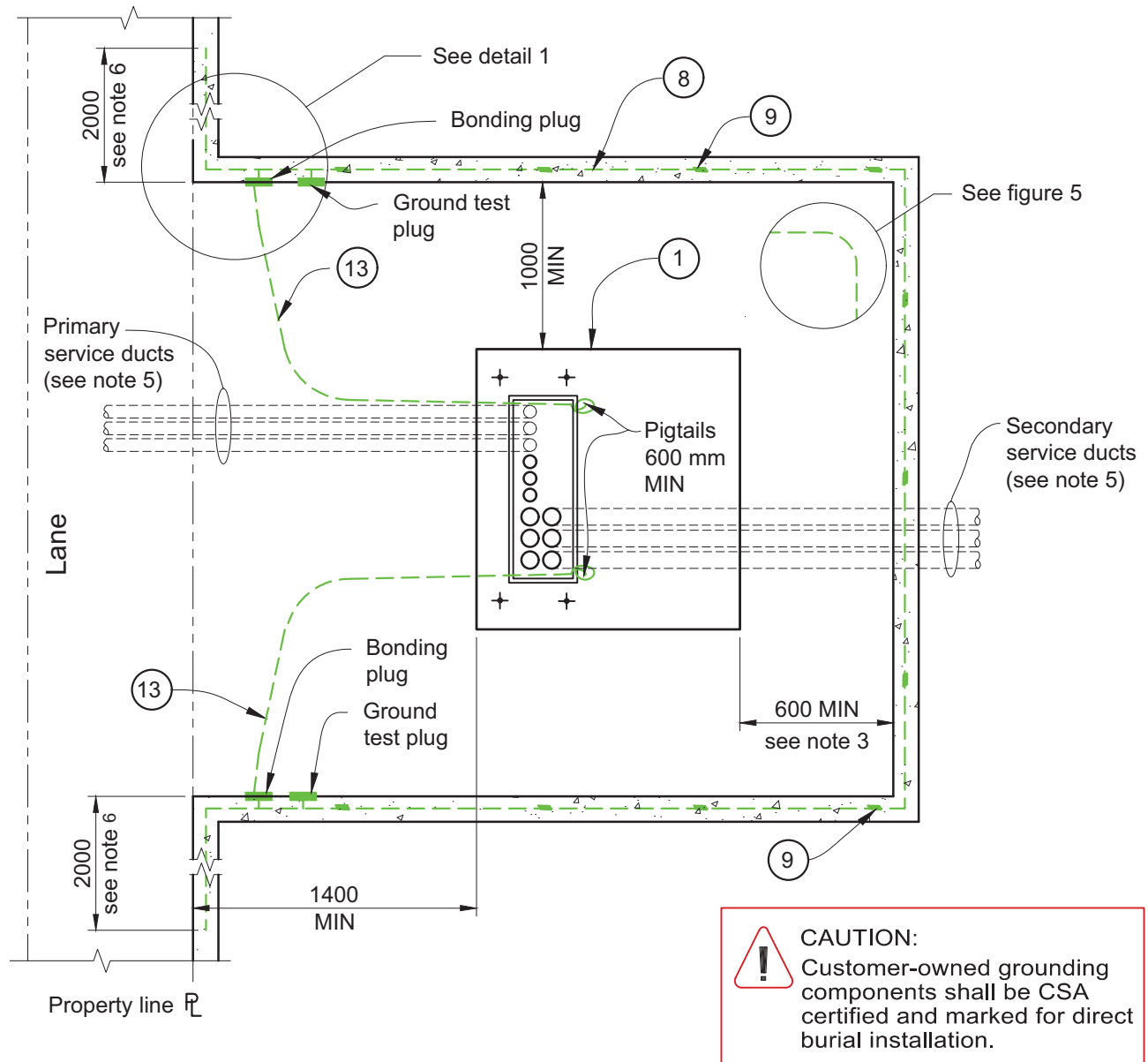


Figure 2 – Customer grounding plan view

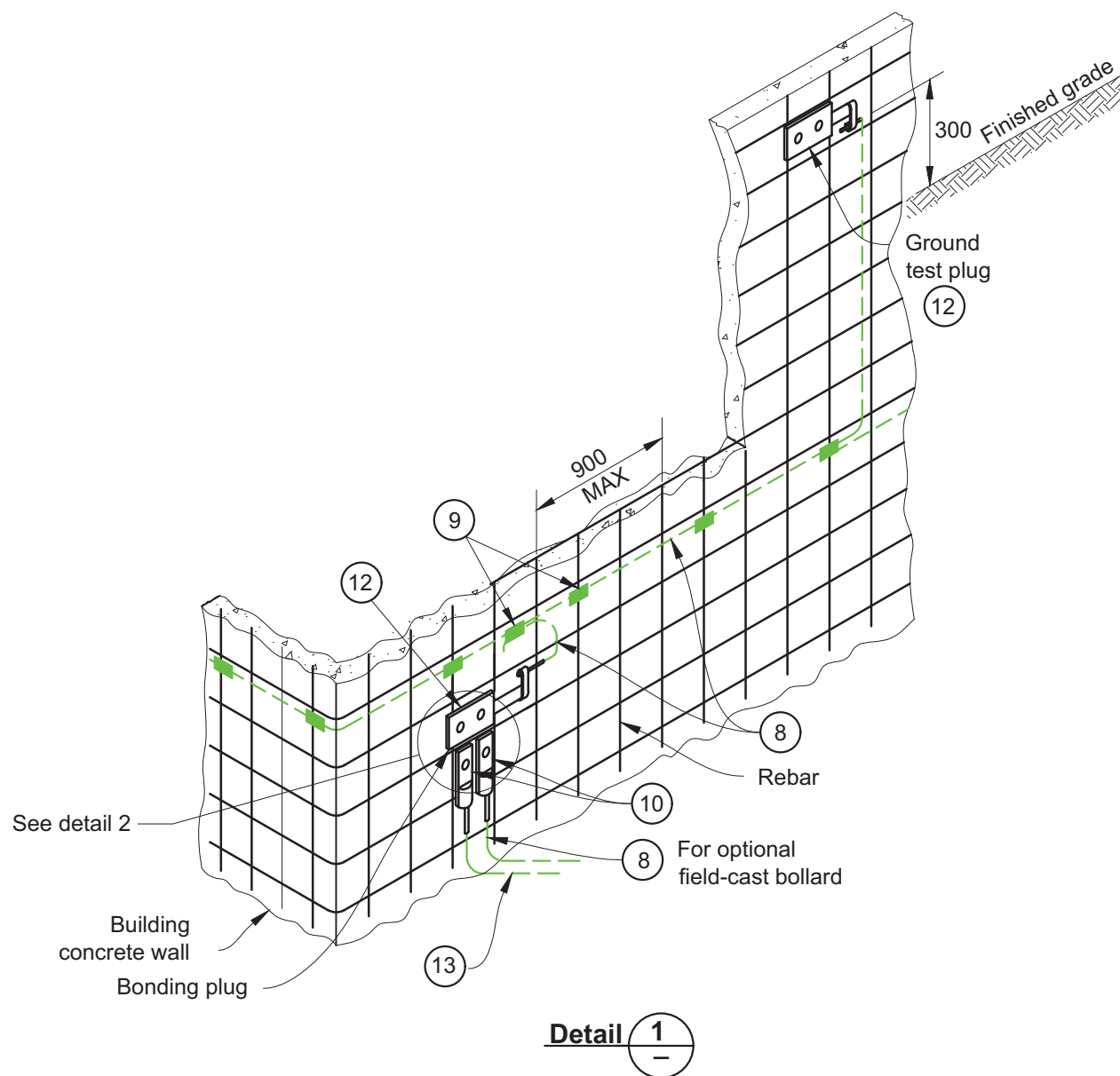


Figure 3 – Rebar grounding

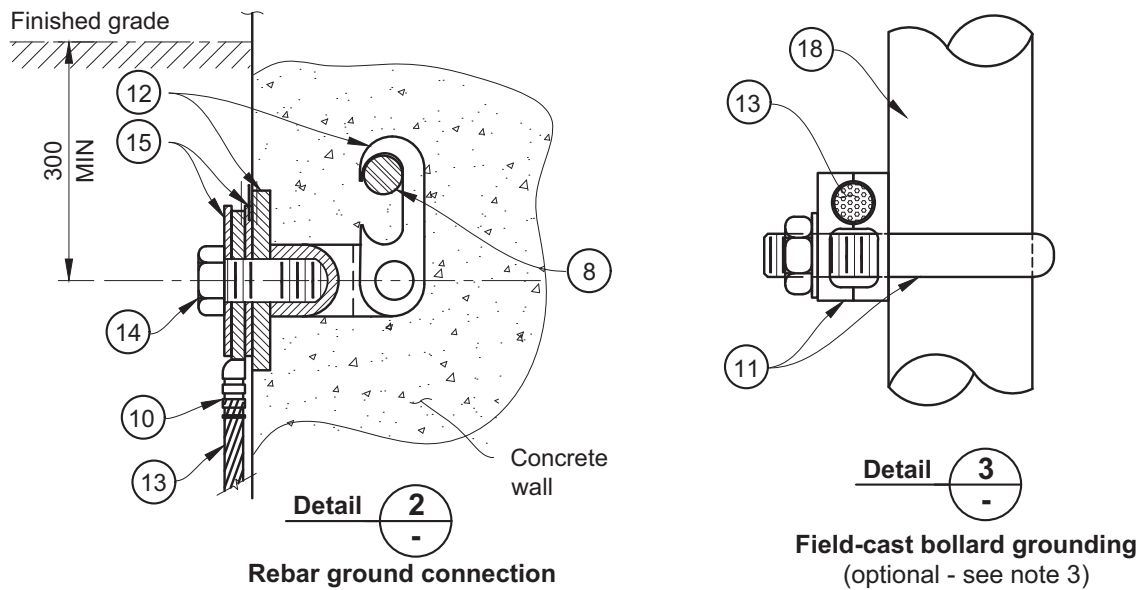


Figure 4 – Rebar ground connection and field-cast bollard grounding

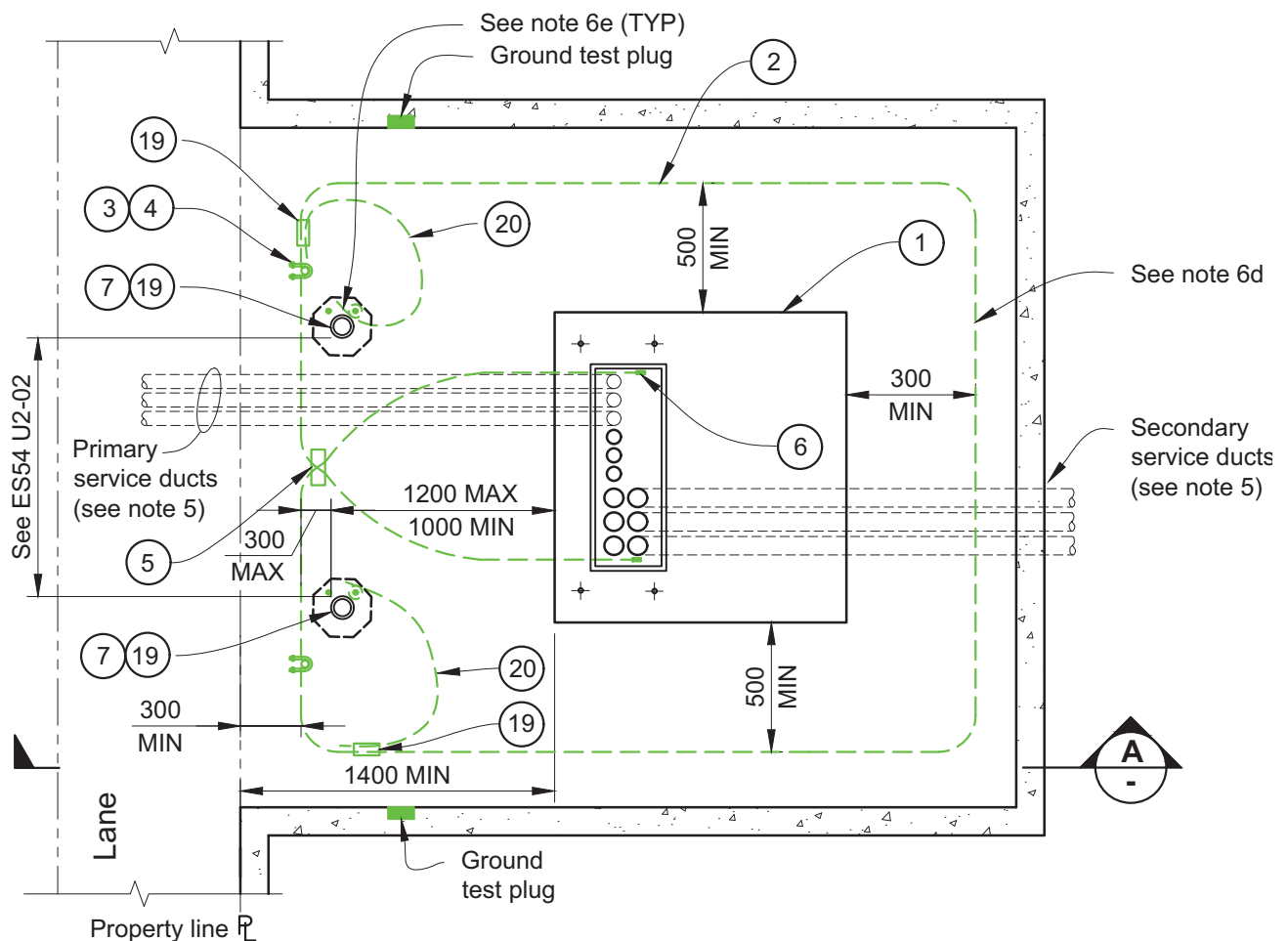


Figure 5 – BC Hydro counterpoise plan view

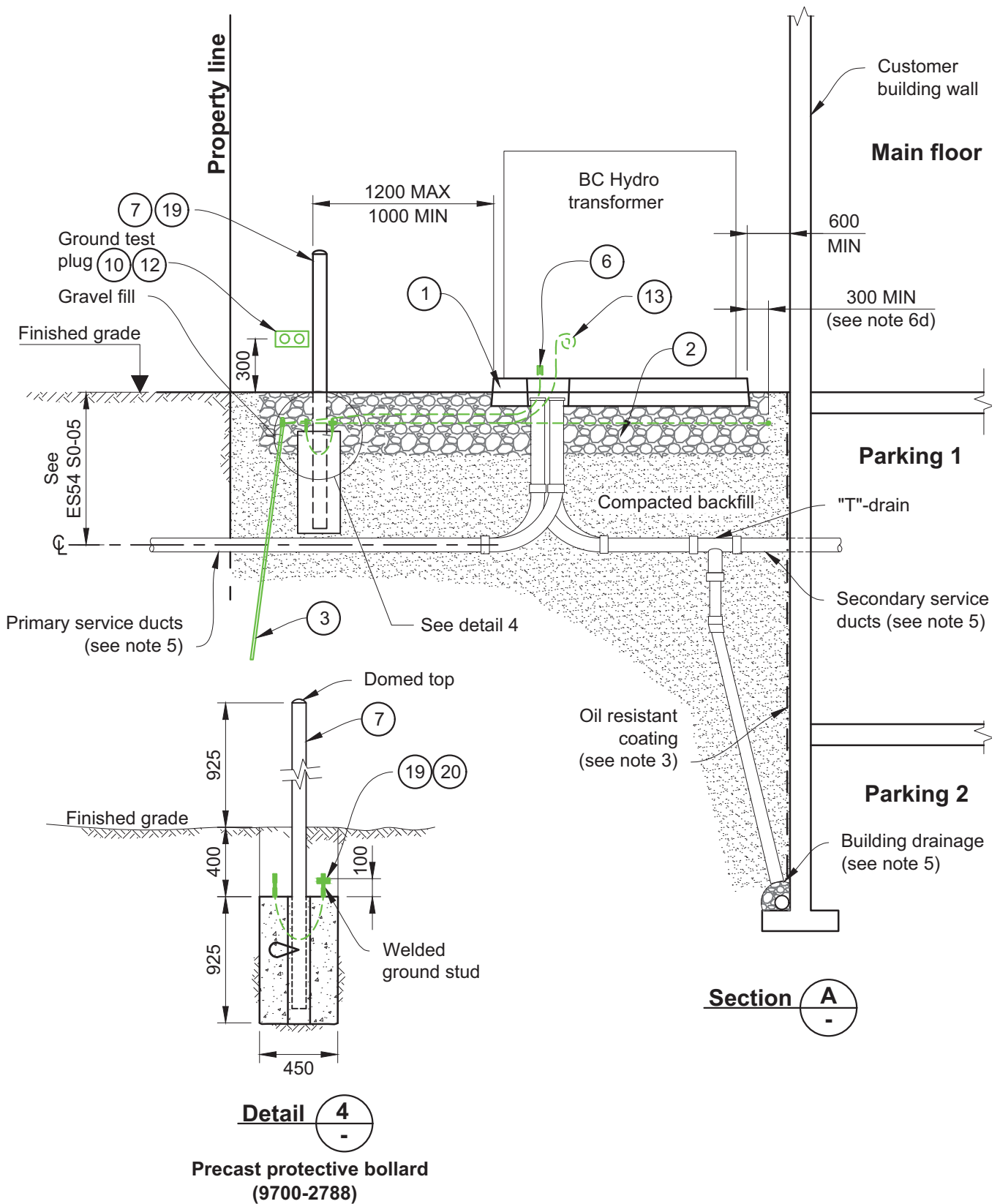


Figure 6 – Elevation cross section

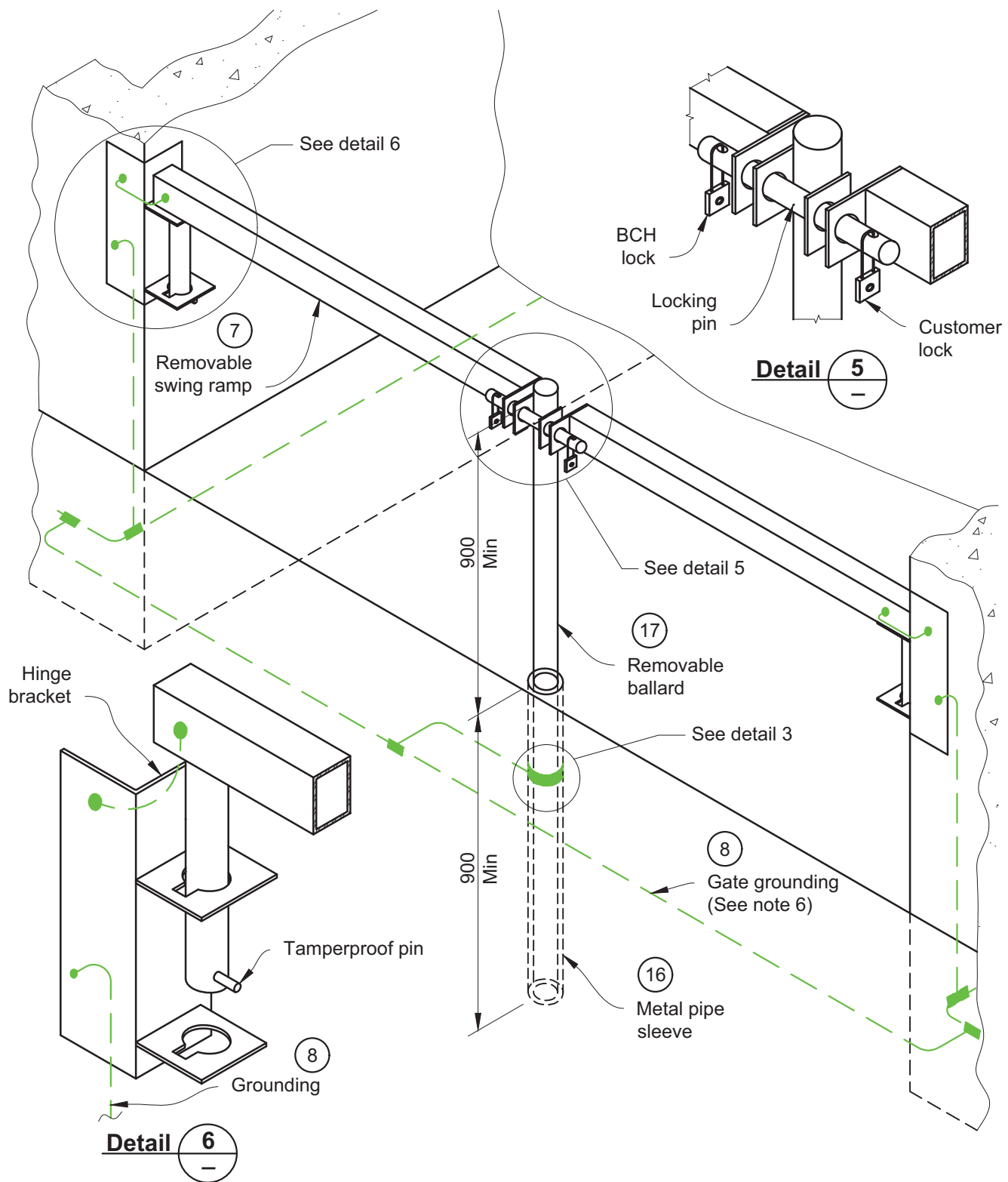


Figure 7 – Removable gate option

Please complete this page and provide to the BC Hydro designer.
All fields on this page are mandatory to avoid processing delays.

DUCT AND GROUNDING INSTALLER'S DECLARATION

BC Hydro reference no. ES54 F3-06		Electrical permit no.:	
Installer name:		Installer phone no.:	Mobile:
Service address:			
Lot no.:		City:	Postal code:
Installers registration no.:		Building permit no.:	
The Electrical Safety Regulations require that persons installing underground electrical raceway shall be registered as an electrical contractor and shall hold a valid certificate of qualification.			
Owner name:		Owner phone no:	

1. This declaration does not constitute an authorization for connection.
2. Any discrepancy between the above BC Hydro reference and the actual installation must be approved in advance by a BC Hydro service representative.

I am the installer and hereby certify that the service duct and grounding installation has been installed to comply with BC Hydro requirements.

Permit holder signature

Print name

Date

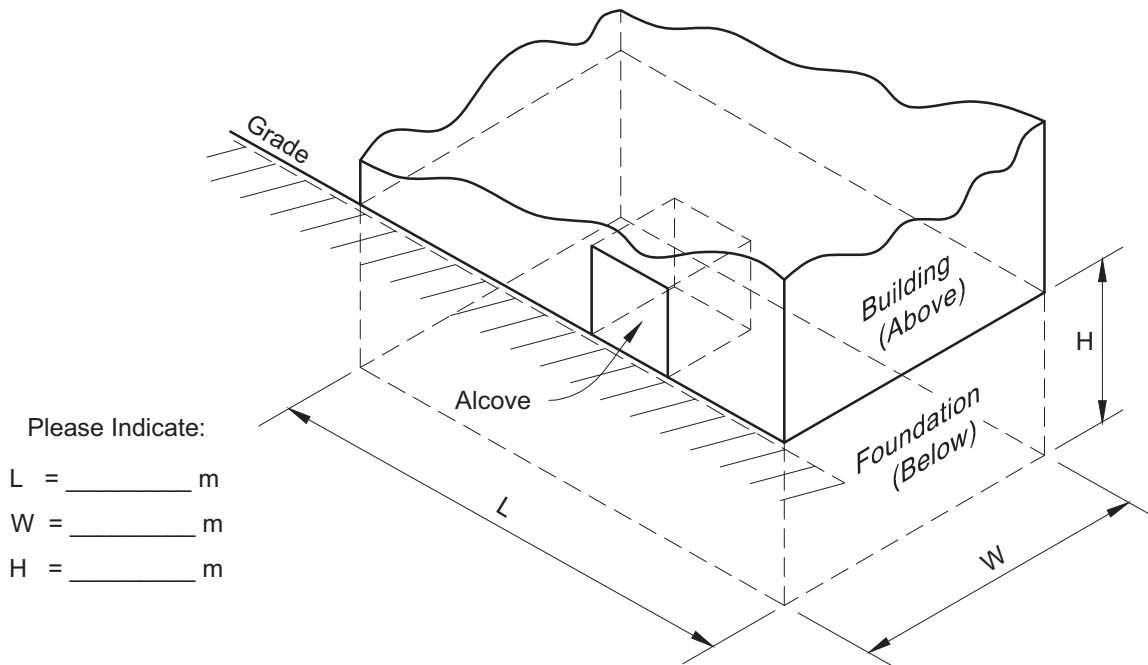


Figure 8 – Duct and grounding installers declaration

BC Hydro Pad-Mounted Transformer on Private Property Next to Customer Building

ES54 F3-07

Application

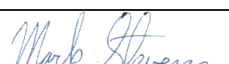
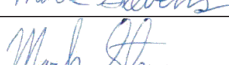
This standard provides installation requirements for BC Hydro pad-mounted transformers (PMT) and low-profile transformers (LPT) located on private property outside the footprint of a building but within 3 m of a customer building structure. Installations inside the footprint of a customer building shall comply with the latest revisions of ES54 F3-06 and F3-08.

Revision Notes

Expanded on note 3e. Added notes 6f, 6g, and 6h. Updated Figure 2 minimum distances, added reference to note 6h, and labelled customer grounding loop. Updated Figure 4 minimum distance and added reference to notes 6f and 6g. Updated Figure 6 minimum distances, updated item reference from 2 to 8, and added reference to ES54 S0-05. Substantive changed content is marked by green vertical revision lines in the left margin. This revision released concurrently with Standards and Equipment Advisory Information Bulletin 2026-009 *Revised ES54 F3-06 and F3-07 BC Hydro Transformer Pad on Private Property Installation Standards*.

Items Required

Item	Description	Material no.	Quantity	Supplied by
1	Transformer concrete pad	Specified by BC Hydro designer	1	BC Hydro
2	Counterpoise, Ø ¾", galvanized steel	106-2510	As required	BC Hydro
3	Ground rod, Ø 5/8" x 8', galvanized steel	420-1093	2	BC Hydro
4	Connector, counterpoise to ground rod, galvanized steel	420-1157	2	BC Hydro grounding kit 420-0012
5	Rope clamp, Ø ¾", galvanized steel	420-0965	2	
6	Cap, heat shrink, 1.2" x 3"	394-0605	2	
7	Protective bollard, precast, grounded	9700-2788	As required	BC Hydro
8	2/0 AWG Cu bare stranded	N/A	As required	Contractor
9	Ground connector ¾" rebar to 2/0 Cu bare direct burial, ILSCO GPL-6, Burndy GAR-6429 C-tap or equivalent	N/A	As required	Contractor
10	Compression lug for 2/0 Cu Burndy YGHA26 or equivalent	N/A	As required	Contractor
11	Pipe grounding clamp, Ø 4" pipe to 2/0 Cu bare Burndy GD2226 or equivalent	N/A	As required	Contractor
12	Ground plug direct burial Burndy YGF29-2N	N/A	2	Contractor
13	2/0 AWG Cu insulated green 600 V, stranded	N/A	As required	Contractor
14	Bolt, stainless steel, ½" diameter x 1" long	N/A	4	Contractor
15	Washer, stainless steel, ½" diameter	N/A	8	Contractor
16	Ground rod, per BCEC	N/A	2	Contractor
17	Connector, 2/0 AWG Cu to ground rod	N/A	2	Contractor

Designed: B. Linforth			BC Hydro Pad-Mounted Transformer on Private Property Next to Customer Building	
Checked: T. Ismagilov, P. Eng				
Reviewed: M. Stevens, P. Eng			DISTRIBUTION STANDARDS 	ES54 F3-07 R6
Approved: M. Stevens, P. Eng				

BC Hydro Pad-Mounted Transformer on Private Property Next to Customer Building

ES54 F3-07

Item	Description	Material no.	Quantity	Supplied by
18	Connector, ERICO wire to counterpoise or precast grounded bollard stud	420-1158	4 (2 per bollard)	BC Hydro
19	Theft deterrent wire, ERICO	9701-1048	13 m	BC Hydro

References

BC Hydro Distribution Standards

ES54 section F	Transformer Pads and Vaults
ES54 F3-06	BC Hydro Transformer Pad on Top of Soil on Private Property Inside Building Alcove
ES54 F3-08	BC Hydro Transformer Pad on Top of Building Slab on Private Property or Inside Building Alcove
ES54 S0-02	Services General Notes
ES54 S0-05	Services General Notes Service Ducts and Trenches
ES54 U2-02	Concrete Pad Protection Bollards

External Documents

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

BC Hydro PMT or LPT installed on private property outside the building footprint and located less than 3.0 m from the customer building. LPT or PMT are placed on top of soil with 1.0 m minimum setback from any property line.

2. General

- Civil work on private property, including high-voltage (HV) grounding and ducting, is utility work and exempt from TSBC and local electrical inspections. Civil work and HV grounding and ducting shall be supplied, installed, and maintained by the customer per BC Hydro construction standards. See ES54 S0-02 for more information on jurisdiction.
- BC Hydro has the authority to supply other services from each transformer located on private property without permission from the owner.
- Customer-owned service equipment, bonding, and service grounding conductors shall be installed and terminated on the load side before BC Hydro installs a utility transformer and supply cables, terminates service cables, and locks the utility cable compartment for BC Hydro access only.

3. Building Permit Drawings

- Customer development permit drawings for the local authority having jurisdiction shall show the location of the BC Hydro pad-mounted transformer installation on private property.
- BC Hydro requires a specific right-of-way for a transformer located on private property. The customer shall prepare the right-of-way drawing and submit to the BC Hydro designer for acceptance. The customer shall provide an as-constructed survey plan to confirm the specific location of the right-of-way area.
- The customer shall provide engineered compacted fill outside the building to support the weight of the BC Hydro concrete pad, transformer, and cables. Copying and pasting BC Hydro standards is not acceptable for certified construction drawings.

- d. The customer shall provide an oil-resistant coating on the surrounding building and foundation walls. BC Hydro shall not be responsible for damage to the customer building and drainage resulting from transformer oil leakage or excess moisture. The customer shall release and discharge BC Hydro from any liability in this regard in the relevant right-of-way.
- e. BC Hydro requires the installation of BC Hydro standard precast protective bollards for mechanical protection of pad-mounted equipment in traffic areas. Field-cast protective bollards per ES54 U2-02 are also acceptable. A minimum of two bollards shall be installed around the pad-mounted equipment. See ES54 U2-02 for bollard placement details. The BC Hydro designer shall determine the exact number and layout of the protective bollards around the transformer pad.

4. Utility Access

- a. BC Hydro requires unobstructed truck access in front for loading and offloading large transformers. A BC Hydro designer shall determine the maximum transformer pad distance from a driveable surface for easy access.
- b. BC Hydro requires an operating area of 3.0 m in front of the transformer and 1.0 m maintenance access on the sides. The 3.0 m unobstructed operating area may include a city street, lane, or public boulevard.

5. Service Ducts

- a. The BC Hydro designer shall advise the customer on duct size, the number of primary and secondary ducts, acceptable duct runs, and the duct drain connection per applicable BCEC rules.
- b. The customer shall supply and install all ducting on private property. Ducting shall be CSA type DB2. Secondary service ducts located inside the building shall be concrete encased. The customer shall provide engineered structural supports to hold the weight of the service cables and ducts, and to withstand the required cable pulling forces during installation and removal of service cables.
- c. Duct drain installation and connection is subject to approval by the authority having jurisdiction.
- d. Service duct penetration through the building foundation walls shall comply with ES54 S0-05.
- e. Concealed ducting and grounding installations shall be inspected by a BC Hydro civil inspector before pouring concrete and placing backfill. After inspection, the contractor shall complete and submit a signed installer's declaration (see Figure 8) to the BC Hydro designer.

6. Grounding and Bonding

- a. HV safety grounding shall be constructed according to BC Hydro standards, ensuring equipotential grounding and eliminating hazardous touch potential. This standard provides the minimum BC Hydro grounding requirements for equipotential grounding. The customer could install additional grounding and bonding conductors and connections in compliance with BCEC section 36.
- b. Customer-owned grounding components and materials installed below grade shall be CSA (or equivalent) certified for direct burial. Exposed metal structures, metal siding, fencing, and poles located within 3.0 m of the BC Hydro transformer concrete pad shall be bonded to the customer ground loop, separate from the BC Hydro counterpoise.
- c. BC Hydro does not require the customer to bond a short rebar reinforced foundation or curb wall that does not project more than 450 mm (18") above finished grade. This exemption applies to buildings having non-conductive exterior surfaces (e.g. wood, plastic siding, brick veneer) on top of the foundation wall.
- d. The BC Hydro portion of safety ground, supplied by BC Hydro for installation by the customer, includes two ground rods, counterpoise, and connectors (see *Items Required*).
- e. If a customer missed making the rebar bonding connections prior to pouring the foundation wall, the customer shall break the concrete surface and complete the rebar bonding connections as shown in Figure 7. BC Hydro has no authority to request that the owners of adjacent existing buildings bond existing foundation rebar that is less than 3.0 m away from proposed new BC Hydro transformer. A BC Hydro designer shall request the owner of the proposed new building relocate the transformer pad away from the existing building.

- f. The BC Hydro counterpoise shall be equally spaced between the transformer pad and the nearest adjacent wall or structure. The maximum offset of the BC Hydro counterpoise shall be 900 mm from the transformer pad unless otherwise noted.
- g. Grounding loops shall be installed as shown to reduce step-and-touch potentials in front of the transformer. Bollards shall be installed either between the BC Hydro counterpoise and pad-mounted equipment or between the customer grounding loop and BC Hydro counterpoise to mitigate the safety hazards caused by high touch potentials.
- h. The building's concrete-encased (Ufer) grounding may be used as part of the customer grounding loop in areas where the minimum clearance between the BC Hydro counterpoise and customer grounding loop cannot be maintained.

7. Declarations

The duct and grounding installers declaration (see Figure 8) serves as field confirmation that the BC Hydro transformer pad, civil work, HV safety grounding, and ducting have been installed in compliance with this standard.

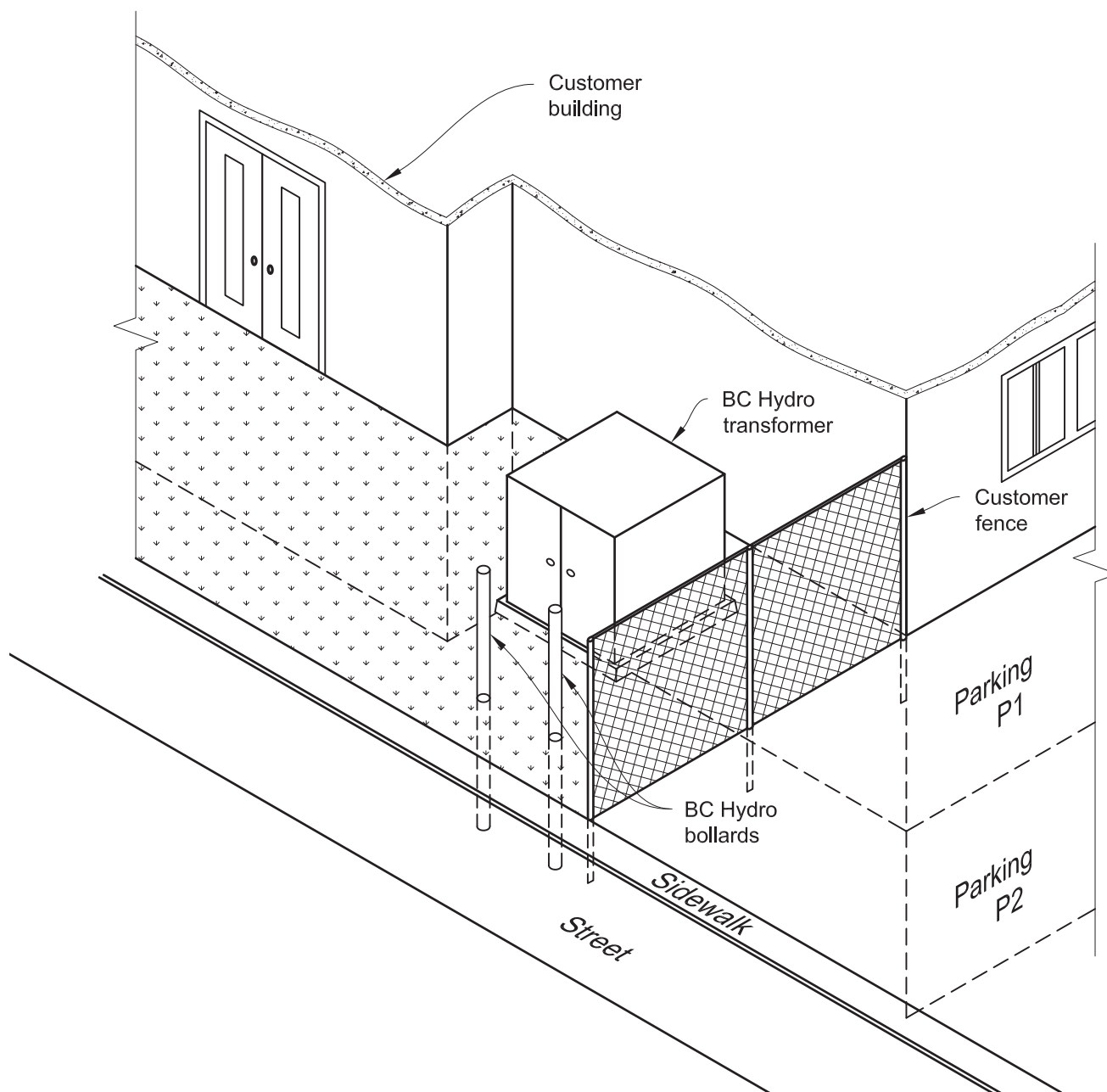


Figure 1 – Pad-mounted transformer

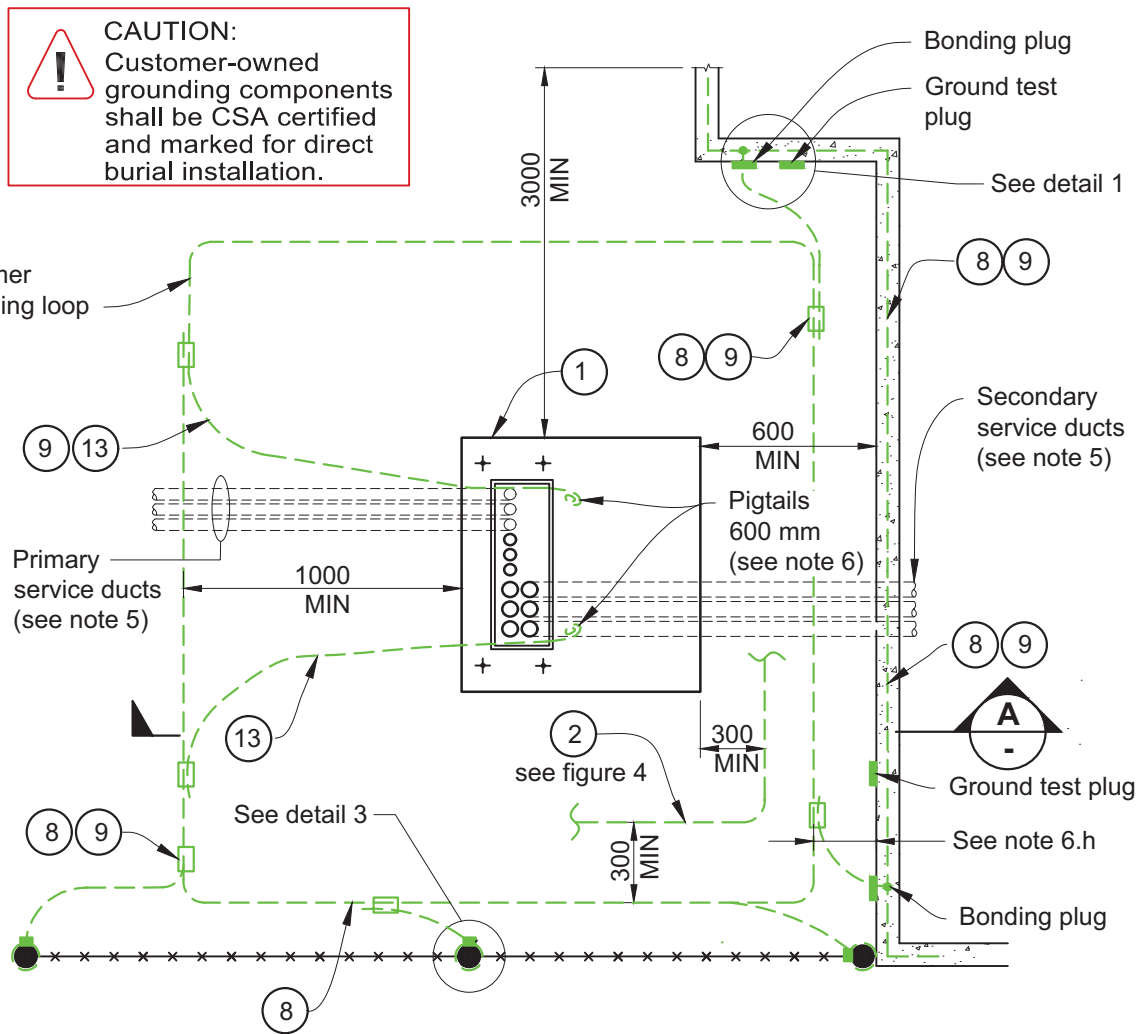


Figure 2 – Customer grounding plan view

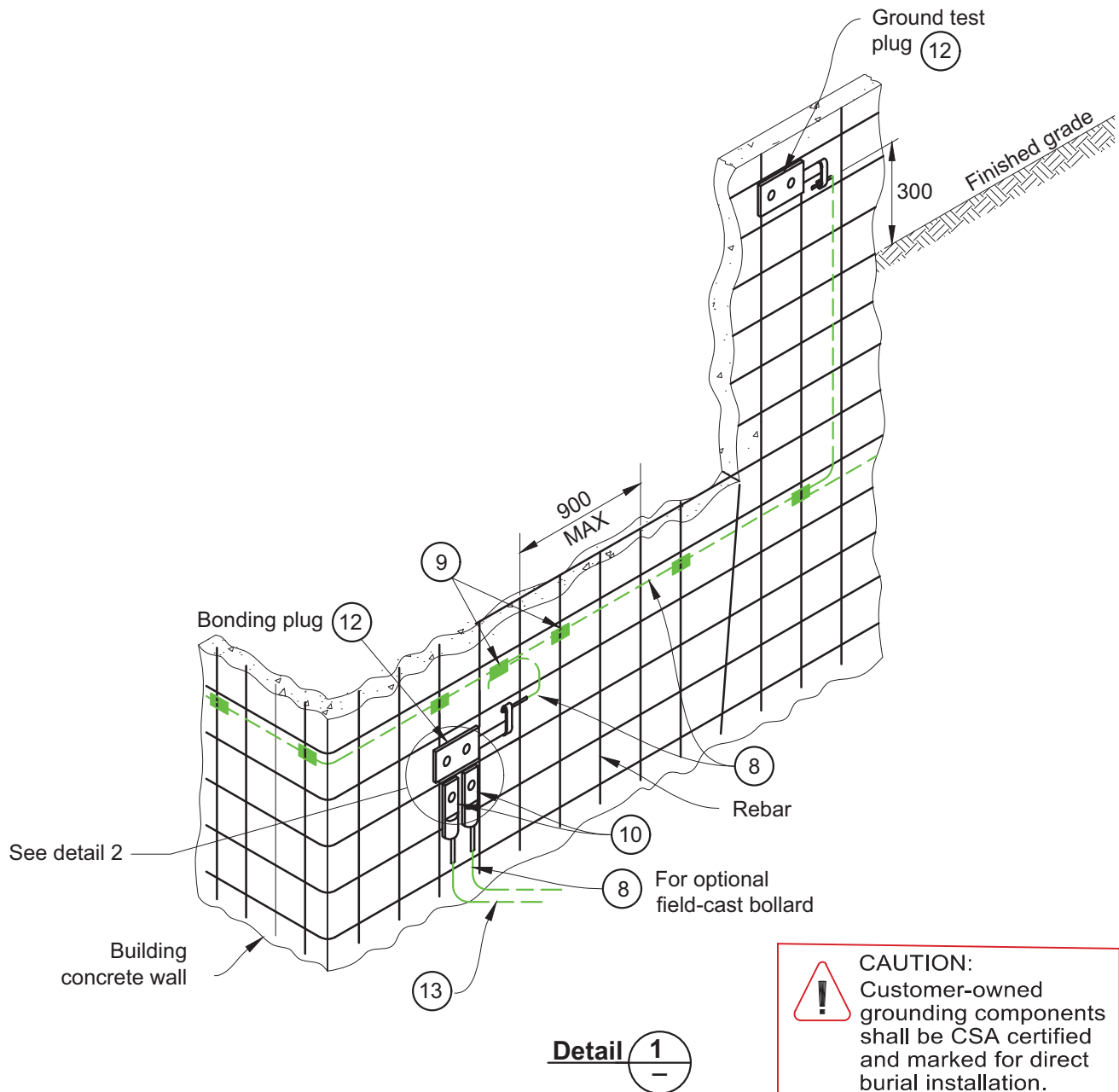


Figure 3 – Rebar grounding

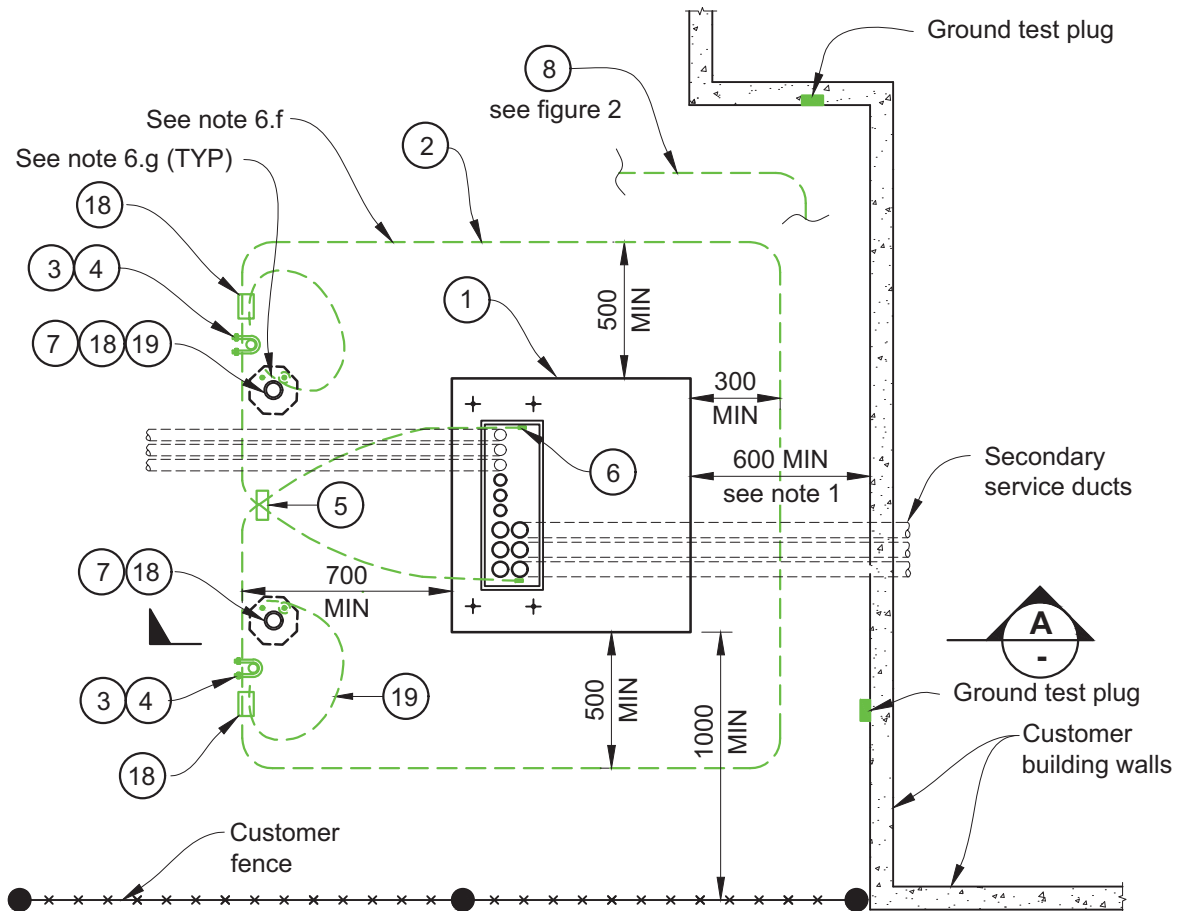


Figure 4 – BC Hydro counterpoise plan view

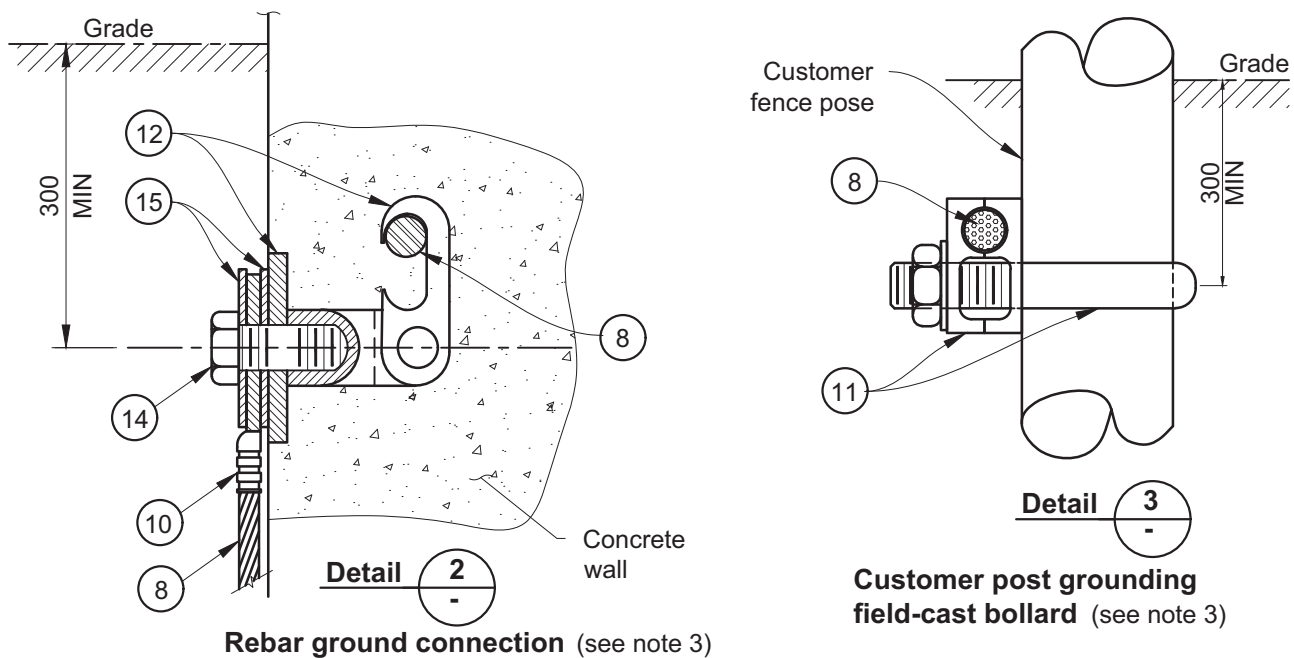


Figure 5 – Rebar ground connection and customer post grounding field-cast bollard

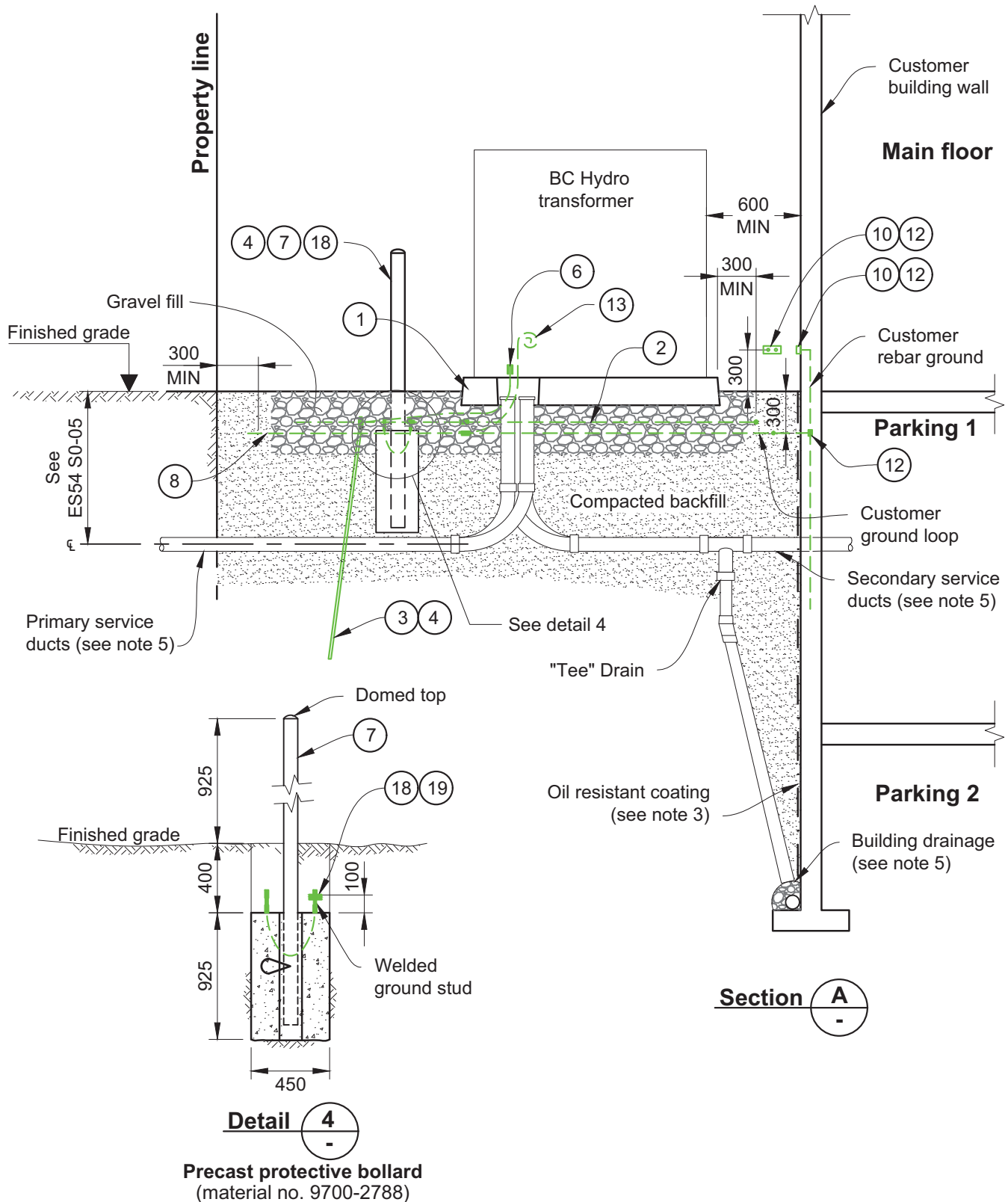


Figure 6 – Section view

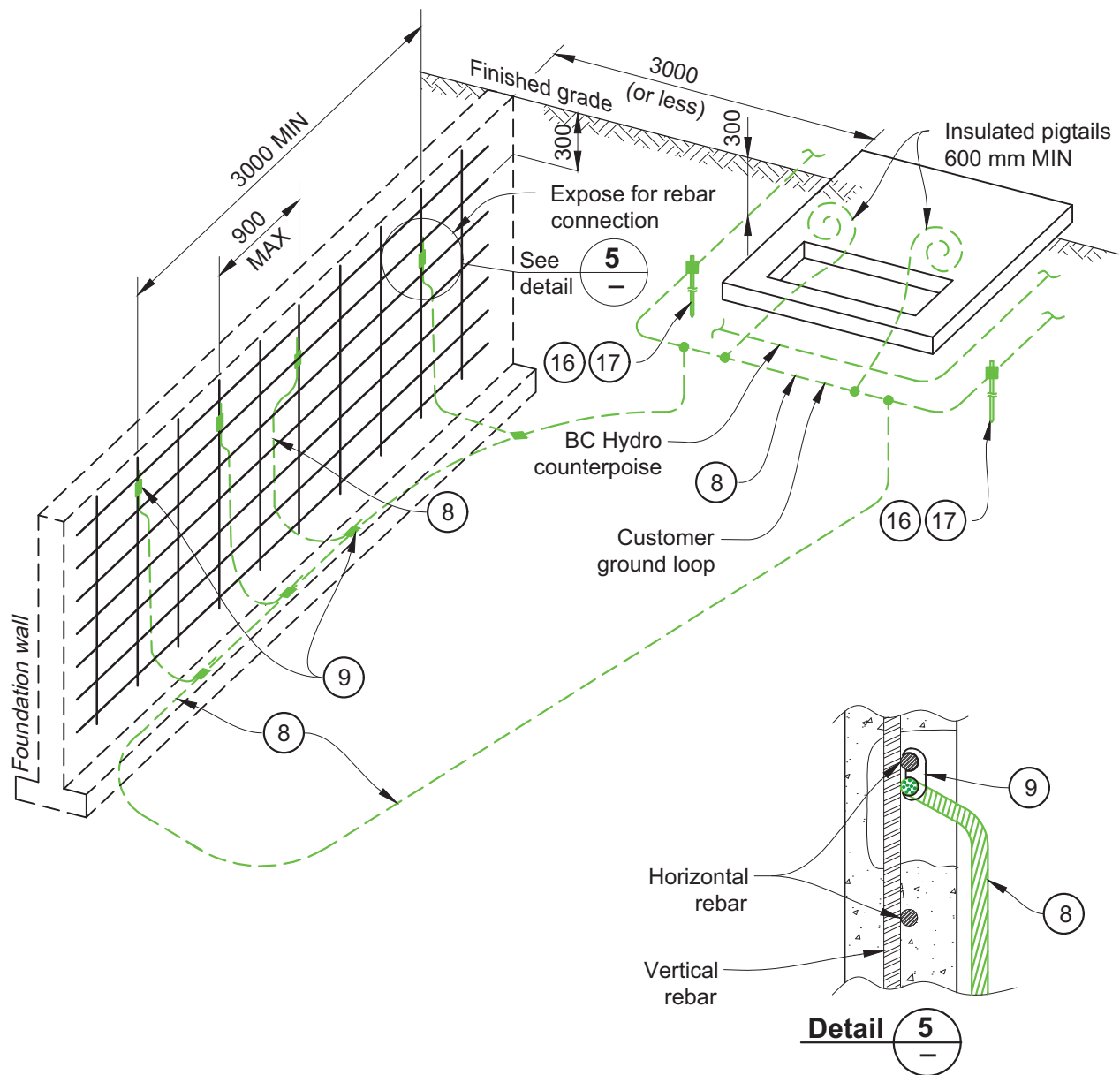


Figure 7 – Foundation wall grounding after the wall is poured

DUCT AND GROUNDING INSTALLER'S DECLARATION

BC Hydro reference no. ES54 F3-07		Electrical permit no.:	
Installer name:		Installer phone no.:	Mobile:
Service address:			
Lot no.:	City:	Postal code:	
Installers registration no.:		Building permit no.:	
The Electrical Safety Regulations require that persons installing underground electrical raceway shall be registered as an electrical contractor and shall hold a valid certificate of qualification.			
Owner name:		Owner phone no:	

1. This declaration does not constitute an authorization for connection.
2. Any discrepancy between the above BC Hydro reference and the actual installation must be approved in advance by a BC Hydro service representative.

I am the installer and hereby certify that the service duct and grounding installation has been installed to comply with BC Hydro requirements.

Permit holder signature

Print name

Date

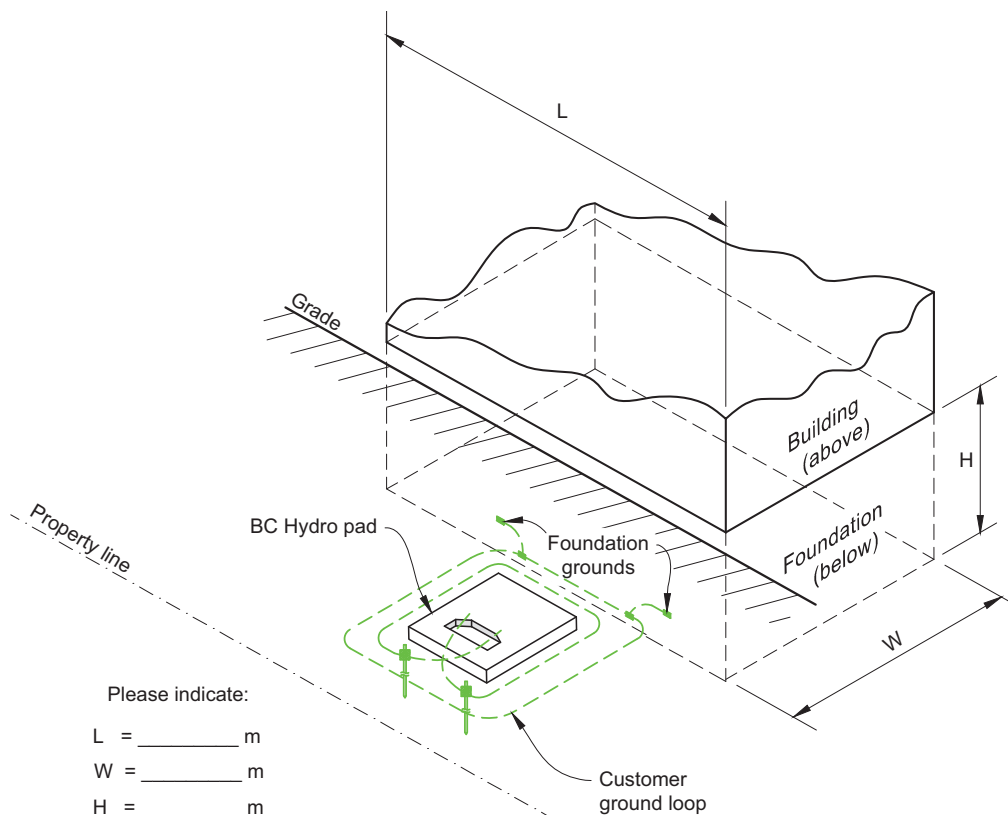


Figure 8 – Duct and grounding installers declaration

BC Hydro Transformer on Top of Building Slab or Inside Building Alcove on Private Property

ES54 F3-08

Application

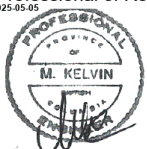
This standard provides requirements to install a BC Hydro transformer on an open concrete slab (floor or parkade) or inside an alcove in a customer-owned building. This design shall be used under special circumstances where the building is built to the property line. This design is not intended for hiding a pad-mounted transformer (PMT) or low-profile transformer (LPT). The customer shall obtain approval from the local BC Hydro designer for each installation.

Revision Notes

Added *Application* and *Revision Notes* sections. Added new items 11 and 18 to *Items Required*. Added new documents to *References* section. Reordered *Notes* for clarity. Expanded note 2a and added new notes 2b, 2c, and 2d. Expanded notes 3c, 3e, and 3f. Added new note 4a and expanded 4b. Expanded note 5b and added new notes 5c, and 5d. Expanded note 6a. Updated note 6b to remove the statement that the customer's permit drawings shall include building foundation details such as length, width, and depth, and vertical and horizontal rebar size and spacing, in order for the BC Hydro engineer to simulate an accurate model of the building HV Ufer ground. Added new notes 6c and 7. Added ground test plugs to Figures 2, 3, and 4. Removed figures *Fall of Potential Report for BC Hydro Equipment* and *Soil Resistivity Report for BC Hydro Equipment*. Substantive changed content is marked by green vertical revision lines in the left margin. Minor grammar and wording adjustments and formatting changes are not marked. This revision released concurrently with Standards and Equipment Advisory Information Bulletin 2025-007 Revised ES54 E4-04, F3-06, F3-07, and F3-08.

Items Required

Item	Description	Material no.	Quantity	Supplied by
1	Transformer concrete pad	Specified by BCH designer	1	BC Hydro
2	BCH precast concrete 332 collar	400-0999	1	BC Hydro
3	Lightweight aluminum lid	9600-7598	1	BC Hydro
4	Lightweight lid hardware	412-0042	1	BC Hydro
5	Protective bollard, Ø 4" pipe, galvanized steel, removable	N/A	1	Contractor
6	Pipe sleeve, 4½" diameter, galvanized steel, bonded, concrete-encased	N/A	1	Contractor
7	Swing ramp, 3" diameter, galvanized steel, removable, double hasp	N/A	1	Contractor
8	2/0 AWG Cu bare stranded	N/A	As required	Contractor
9	Ground connector ¾" rebar to 2/0 Cu bare direct burial, ILSCO GPL-6, T&B 54890 C-tap or equivalent	N/A	As required	Contractor
10	Compression lug for 4/0 Cu Burndy YGHA26 or equivalent	388-1843	As required	BC Hydro
11	Pulling iron	N/A	As required	Contractor

Designed: L. Chiu, P. Eng		Professional of Record 2025-05-05  M. KELVIN Permit To Practice-1002449	BC Hydro Transformer on Top of Building Slab or Inside Building Alcove on Private Property	
Checked: M. Kelvin, P. Eng				
Reviewed: M. Stevens, P. Eng			DISTRIBUTION STANDARDS 	ES54 F3-08 R2
Approved: H. Giesbrecht, P. Eng				
Issued: 2025-05-14 Effective: 2025-08-14				

BC Hydro Transformer on Top of Building Slab or Inside Building Alcove on Private Property

ES54 F3-08

Item	Description	Material no.	Quantity	Supplied by
12	Ground plug direct burial Burndy YGF29-2N or equivalent	N/A	2	Contractor
13	4/0 AWG Cu bare, stranded	380-0175	As required	BC Hydro
14	Bolt ½" diameter x ¾" long, stainless steel	N/A	8	BC Hydro
15	Belleville washer, stainless steel, ½" diameter	102-4131	8	BC Hydro
16	Bell ends, DB2, PVC	N/A	As required	Contractor
17	2" angle, steel, galvanized	N/A	As required	Contractor
18	CSA type DB2, 4" diameter, PVC duct	N/A	As required	Contractor
19	Channel unistrut P-3270	N/A	450 long / 2 piece	Contractor

References

BC Hydro Distribution Standards

ES54 section F	Transformer Pads and Vaults
ES54 F3-06	BC Hydro Transformer Pad on Top of Soil on Private Property Inside Building Alcove
ES54 F3-07	BC Hydro Pad-Mounted Transformer on Private Property Next to Customer Building
ES54 S0-02	Services General Notes
ES54 S0-05	Services General Notes Service Ducts and Trenches
ES54 U2-02	Concrete Pad Protection Bollards

External Documents

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

Alcove design or open building slab on top of the building floor slab or parkade within the footprint of the building.

2. General

- Civil work on private property, including high-voltage (HV) grounding and ducting, is utility work and exempt from TSBC and local electrical inspections. Civil work and HV grounding and ducting shall be supplied, installed, and maintained by the customer per BC Hydro construction standards. See ES54 S0-02 for more information on jurisdiction.
- BC Hydro has the authority to supply other services from each alcove transformer without permission from the building owner.
- The building alcove or open floor slab size varies with the BC Hydro transformer size, see Table 1 for minimum dimensions.
- Customer-owned service equipment, bonding, and service grounding conductors shall be installed and terminated on the load side before BC Hydro installs a utility transformer and supply cables, terminates service cables, and locks the utility cable compartment for BC Hydro access only.

3. Building Permit Drawings

- a. Customer development permit drawings for the local authority having jurisdiction shall show the location of the BC Hydro PMT installation on private property. PMTs located inside the building footprint are subject to the requirements of the BC Building Code and applicable local authority having jurisdiction regulations and bylaws.
- b. BC Hydro requires a specific right-of-way for the alcove or open building slab and tower area, or as a separable structure from the building, in the event of future building demolition. The customer shall prepare the right-of-way drawings, including permanent concrete embedded demolition markers, and forward them to the BC Hydro designer for acceptance. The customer shall provide an as-constructed survey plan to confirm the specific location of the right-of-way area.
- c. The customer shall provide an engineered building structure inside the building to support the weight of the BC Hydro concrete pad, transformer, and cables. Copying and pasting BC Hydro standards is not acceptable for certified construction drawings.
- d. This standard shows a provision for oil containment. The building slab shall include an oil containment curb to stop the spread of oil in the event of oil leakage. The cable pull box below the slab has more than 200% the volume of the oil contained inside a BC Hydro transformer. BC Hydro crew shall seal all cable ducts after the completion of transformer and cable installations.
- e. The customer and building envelope engineer shall specify and install grouting, coatings, drainage, and oil separators as required by the BC Building Code and local authority having jurisdiction bylaws. The customer shall provide an oil-resistant coating on the surrounding building and foundation walls. BC Hydro shall not be responsible for damage to the customer building and drainage resulting from transformer oil leakage or excess moisture. The customer shall release and discharge BC Hydro from any liability in this regard in the relevant right-of-way.
- f. BC Hydro requires the installation of BC Hydro standard precast protective bollards for mechanical protection of pad-mounted equipment in traffic areas. Field-cast or bolted down protective bollards per ES54 U2-02 are also acceptable. The BC Hydro designer shall determine the exact number and layout of the protective bollards around the transformer. A chain-link fence or custom-built gates may be acceptable in some areas for improved safety and cleanliness of an alcove installation, in agreement with the BC Hydro designer and subject to the approval of the authority having jurisdiction.

4. Utility Access

- a. BC Hydro requires unobstructed truck access in front of the building alcove or open building slab for loading and offloading large transformers as shown in Figure 1. The transformer shall face the street or back lane for easy access.
- b. BC Hydro requires an operating area of 3.0 m in front of the transformer and 1.0 m maintenance access on the sides. The 3.0 m unobstructed operating area may include a city street or lane.

5. Service Ducts

- a. The BC Hydro designer shall advise the customer on duct size, the number of primary and secondary ducts, acceptable duct runs, and the duct drain connection per applicable BCEC rules.
- b. The customer shall supply and install all ducting on private property. Ducting shall be CSA type DB2. Secondary service ducts located inside the building shall be concrete encased. The customer shall provide engineered structural supports to hold the weight of the service cables and ducts, and to withstand the required cable pulling forces during installation and removal of service conductors.
- c. Duct drain installation and connection is subject to approval by the authority having jurisdiction.
- d. Service duct penetration through the building foundation walls shall comply with ES54 S0-05.
- e. Concealed ducting and grounding installations shall be inspected by a BC Hydro civil inspector before pouring concrete and placing backfill. After inspection, the contractor shall complete and submit a signed installer's declaration (see Figure 7) to the BC Hydro designer.

6. Grounding and Bonding

- a. HV safety grounding inside the building around the transformer area shall be constructed according to BC Hydro standards, ensuring equipotential grounding and eliminating hazardous touch potential. This standard provides the minimum BC Hydro grounding requirements for equipotential grounding. The customer could install additional grounding and bonding conductors and connections in compliance with BCEC section 36.
- b. Customer-owned grounding components and materials installed below grade shall be CSA (or equivalent) certified for direct burial. Exposed metal structures, metal siding, fencing, and poles located within 3.0 m of the BC Hydro transformer concrete pad shall be bonded to the customer concrete-encased Ufer building ground.
- c. BC Hydro does not supply grounding materials for installation by the customer.

7. Declarations

The duct and grounding installers declaration (see Figure 7) serves as field confirmation that the BC Hydro transformer pad, civil work, HV safety grounding, and ducting have been installed in compliance with this standard.

Table 1 – Minimum alcove sizes

Transformer		Alcove or open building slab dimensions (mm)			Transformer pad (mm)	
Size	Mass (kg)	Width (W)	Height (H)	Depth (D)	Width	Depth
LPT	2000	3100	4600	3200	1160	1360
PMT < 500 kVA	4000	3700	4600	3600	1730	1630
750 kVA ≤ PMT ≤ 1500 kVA	7000	4200	4600	4200	2210	2210

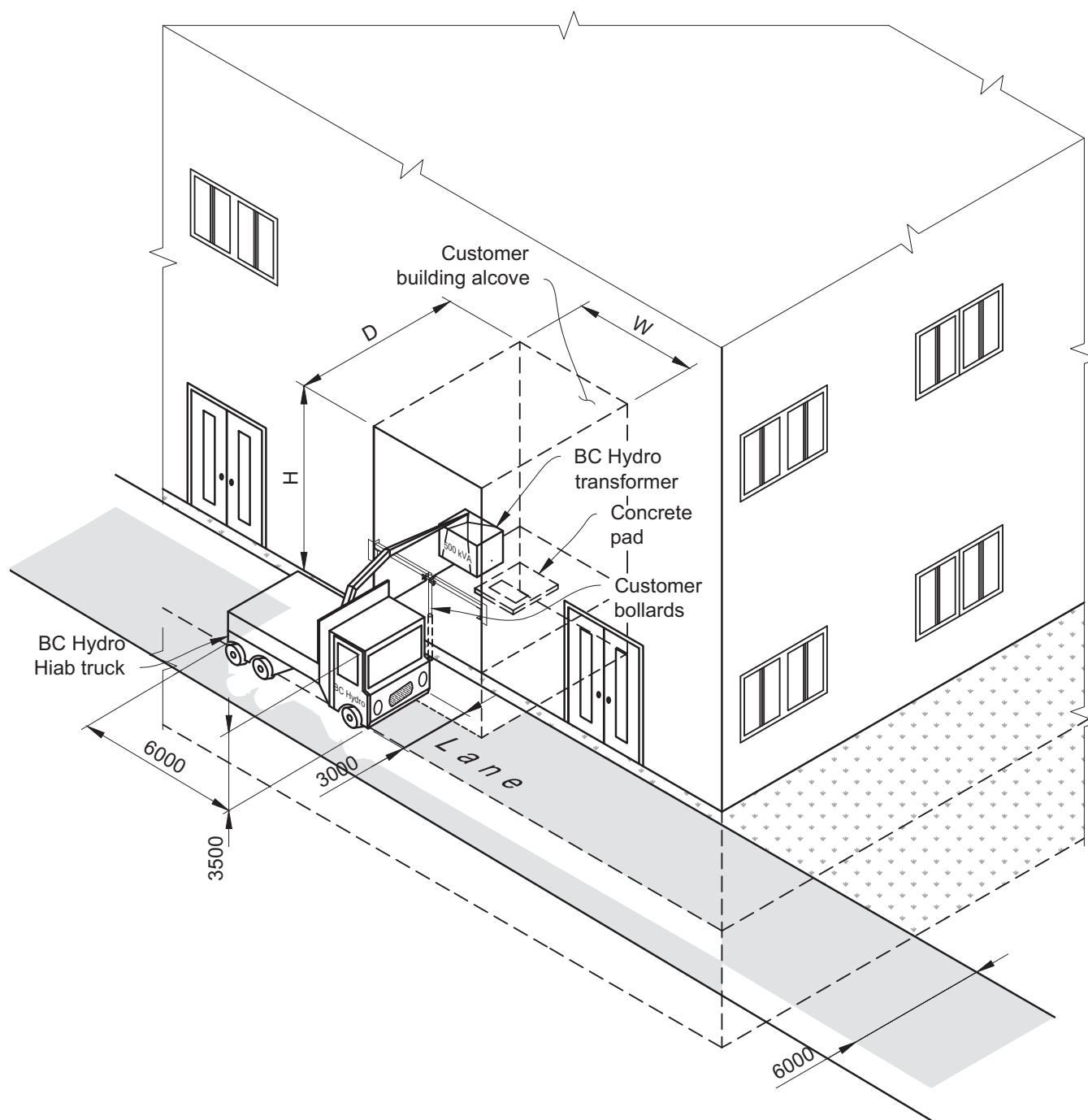


Figure 1 – Pad-mounted transformer with truck access

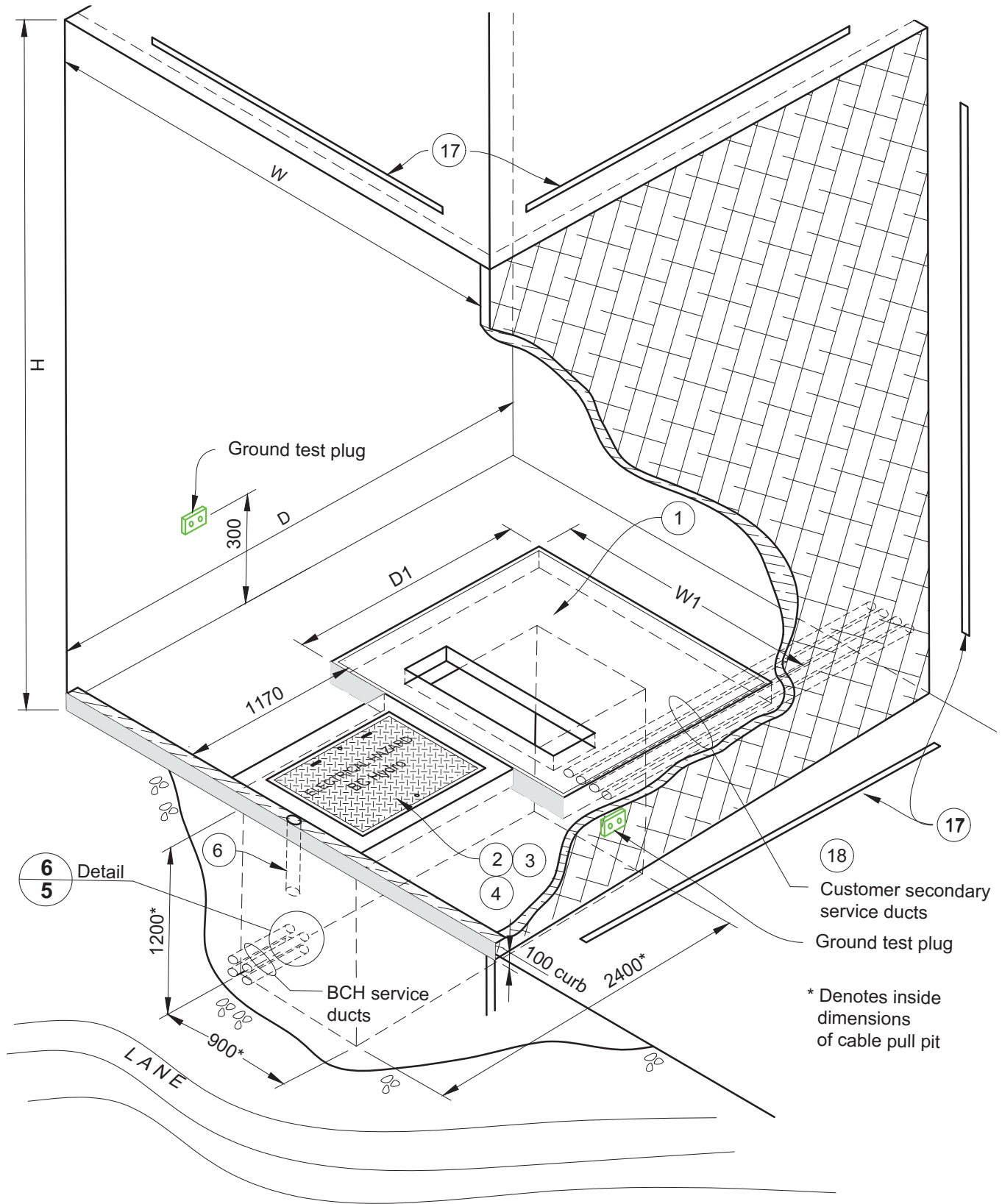


Figure 2 – Building alcove

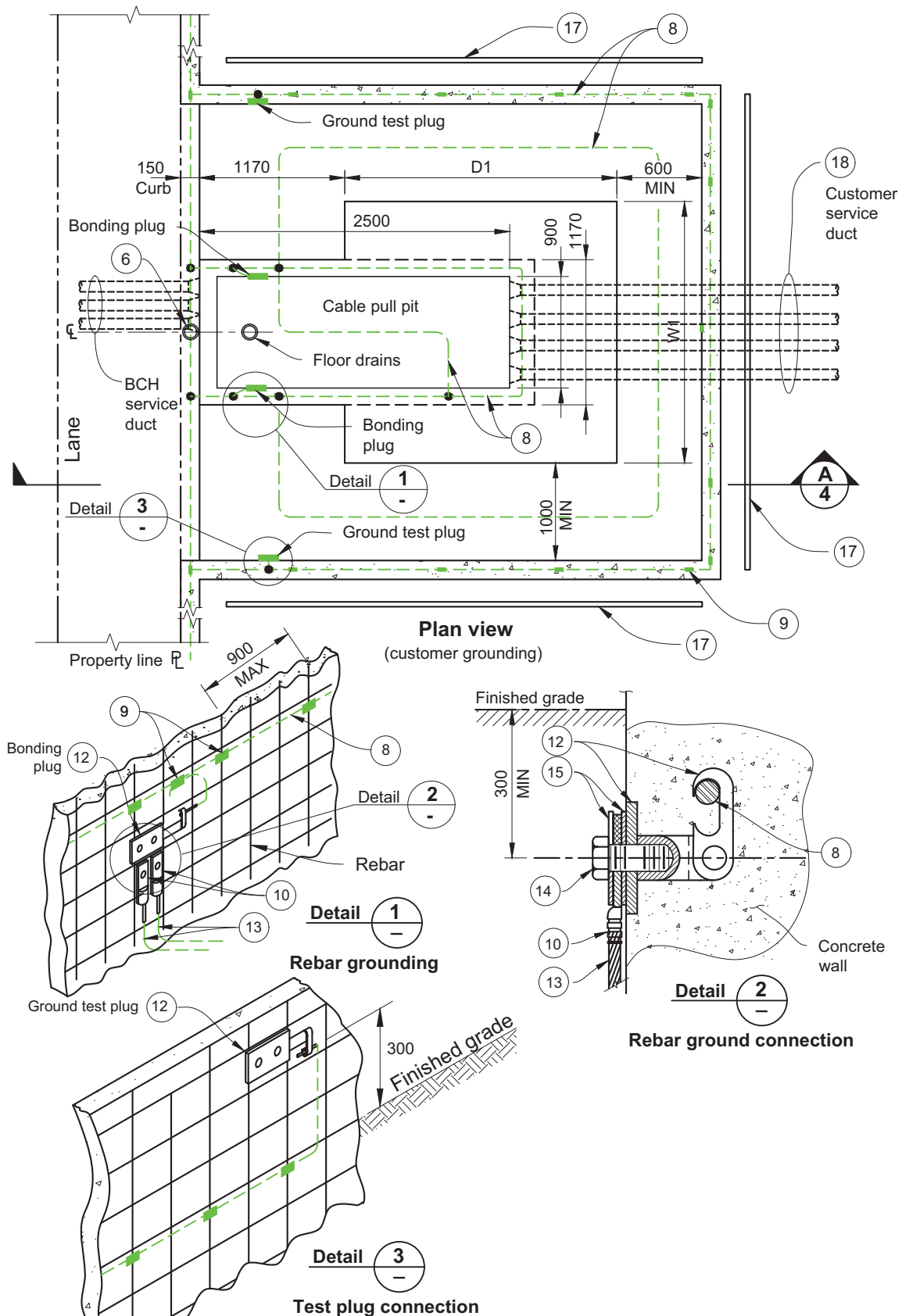
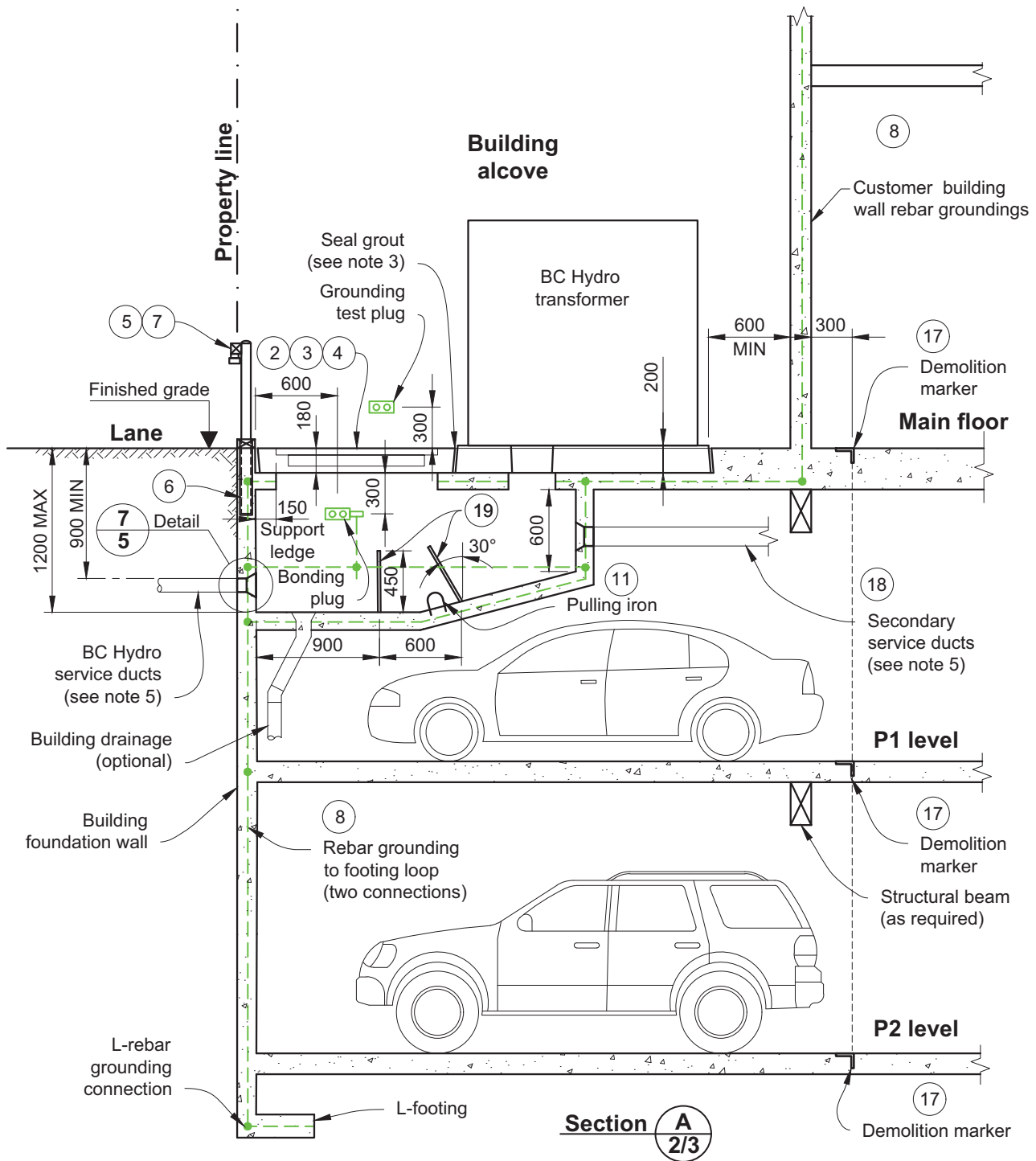


Figure 3 – Grounding



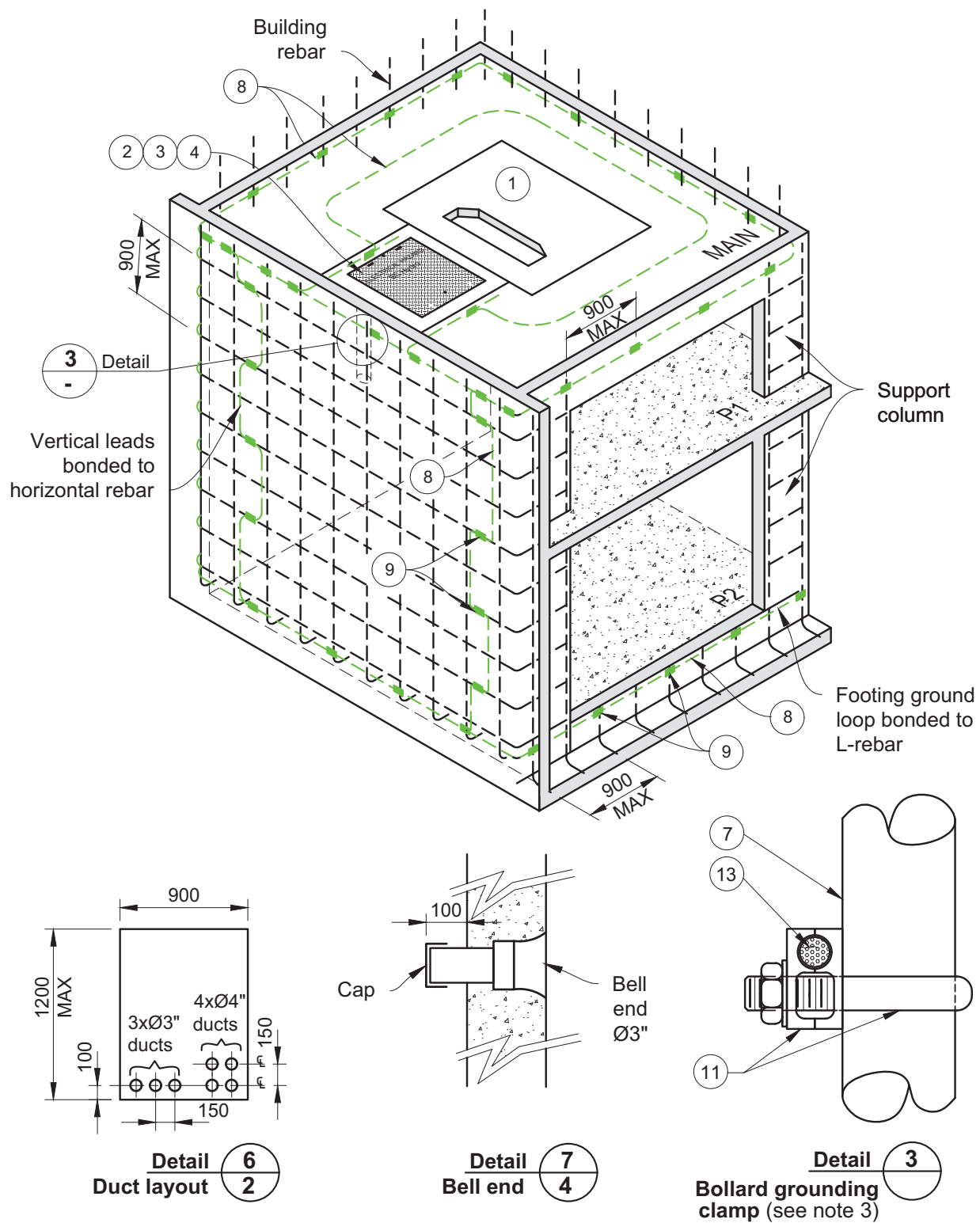


Figure 5 – Alcove tower grounding

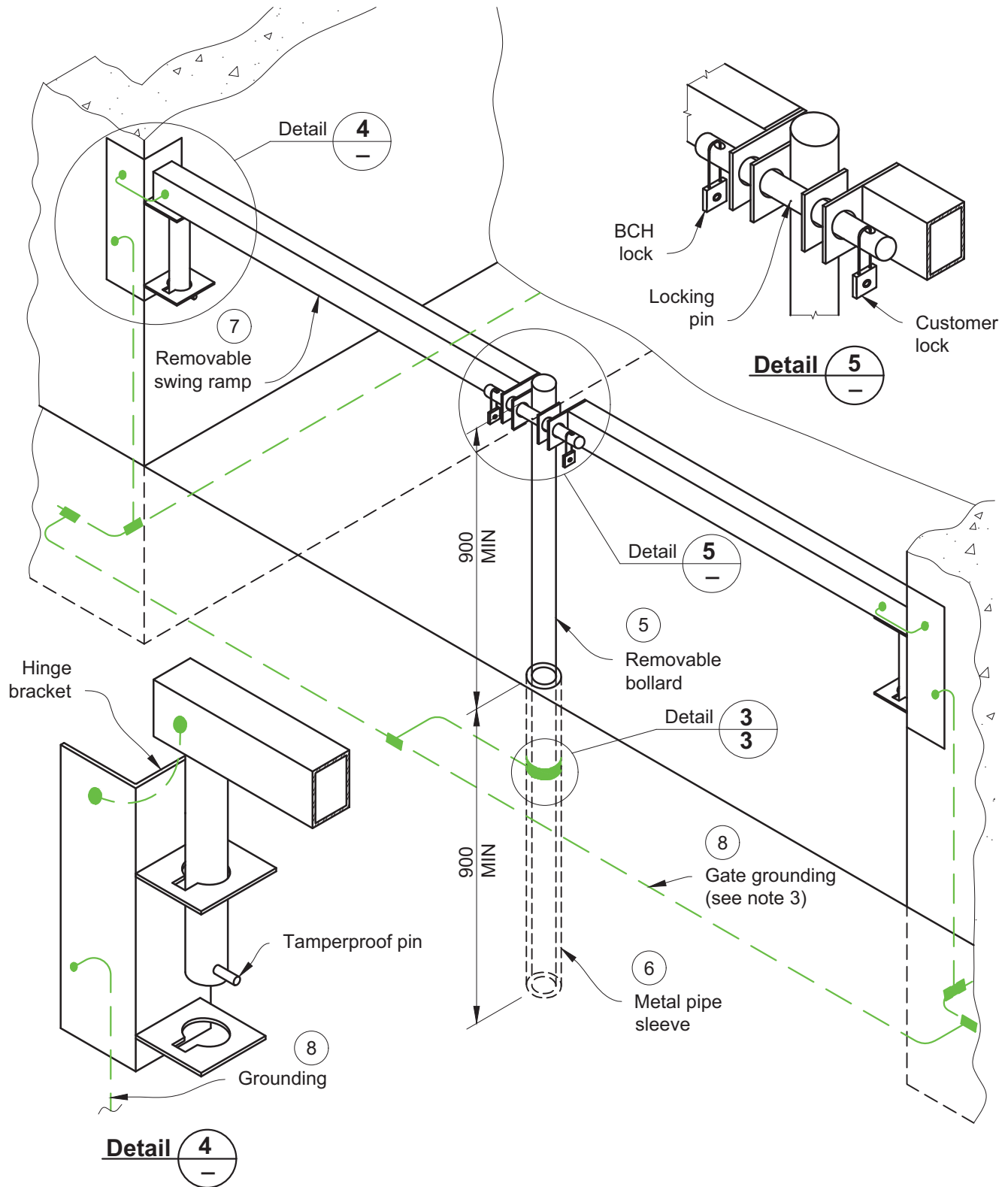


Figure 6 – Optional removable alcove gate

BC Hydro Transformer on Top of Building Slab or Inside Building Alcove on Private Property

ES54 F3-08

Please complete this page and provide to the BC Hydro designer.
All fields on this page are mandatory to avoid processing delays.

DUCT AND GROUNDING INSTALLER'S DECLARATION

BC Hydro reference no. ES54 F3-08		Electrical permit no.:	
Installer name:		Installer phone no.:	Mobile:
Service address:			
Lot no.:		City:	Postal code:
Installers registration no.:		Building permit no.:	
The Electrical Safety Regulations require that persons installing underground electrical raceway shall be registered as an electrical contractor and shall hold a valid certificate of qualification.			
Owner name:		Owner phone no:	

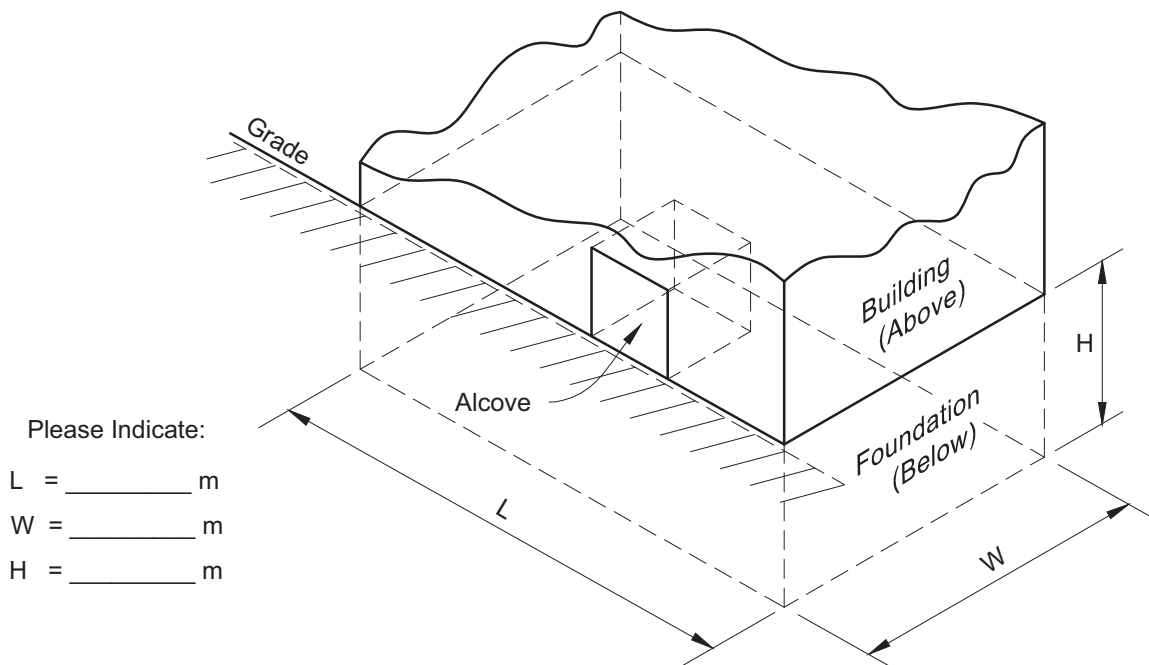
1. This declaration does not constitute an authorization for connection.
2. Any discrepancy between the above BC Hydro reference and the actual installation must be approved in advance by a BC Hydro service representative.

I am the installer and hereby certify that the service duct and grounding installation has been installed to comply with BC Hydro requirements.

Permit holder signature

Print name

Date



Building Foundation Sketch

Figure 7 – Duct and grounding installers declaration

Application

This standard provides construction details for cast-in-place conversion pads for 1000 kVA and smaller transformers.

Revision Notes

R6 – General layout, formatting, and editing changes for grammar and readability. Added sections *Application* and *Revision Notes*. Removed note on vegetation. Updated reference standards. September 2022, JY

R5 – Title change. Border frame and rebar details added. March 2016, MK

R4 – Redrawn. Bill of material revised. June 1999, MF

R0 – Original issue. October 1979

Reference Standards

ES54 F0-03	Transformer Pads and Vaults Border Containment Frame, Typical Detail
ES54 H1-03	Duct Entry at Pads
ES54 R1-01	Grounding of Pad-Mounted Equipment in Public Corridors
ES54 U2-02	Concrete Pad Protection Bollards
ES54 W1-01	Construction Materials Excavation and Backfill
ES54 W1-05	Construction Materials Concrete

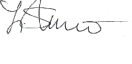
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DISTRIBUTION STANDARDS 		ISSUED: SEP 2022 REPLACES: MAR 2016 ORIGINALLY ISSUED: NOV 1979		PAGE 1 OF 5	ES54 F5-01.01
					R 6

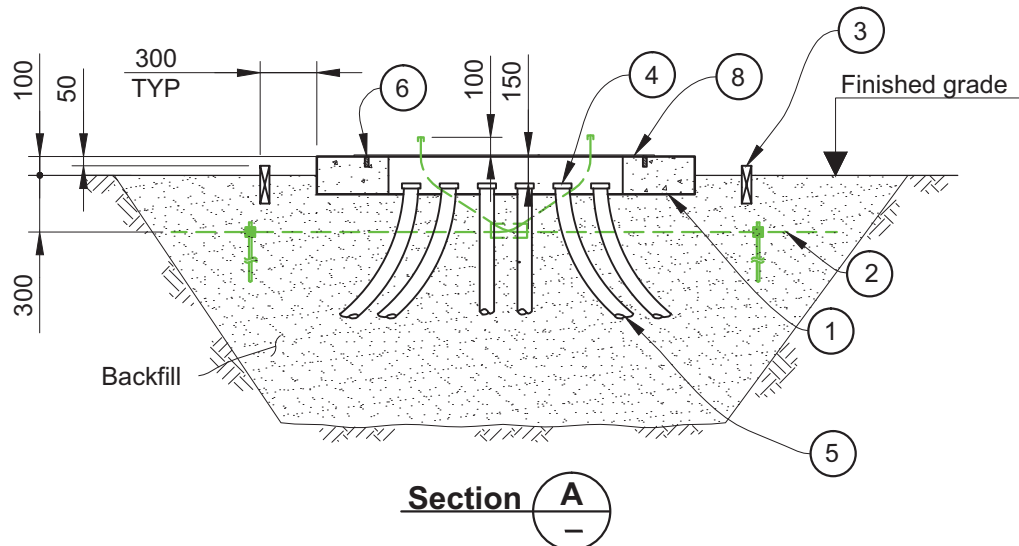
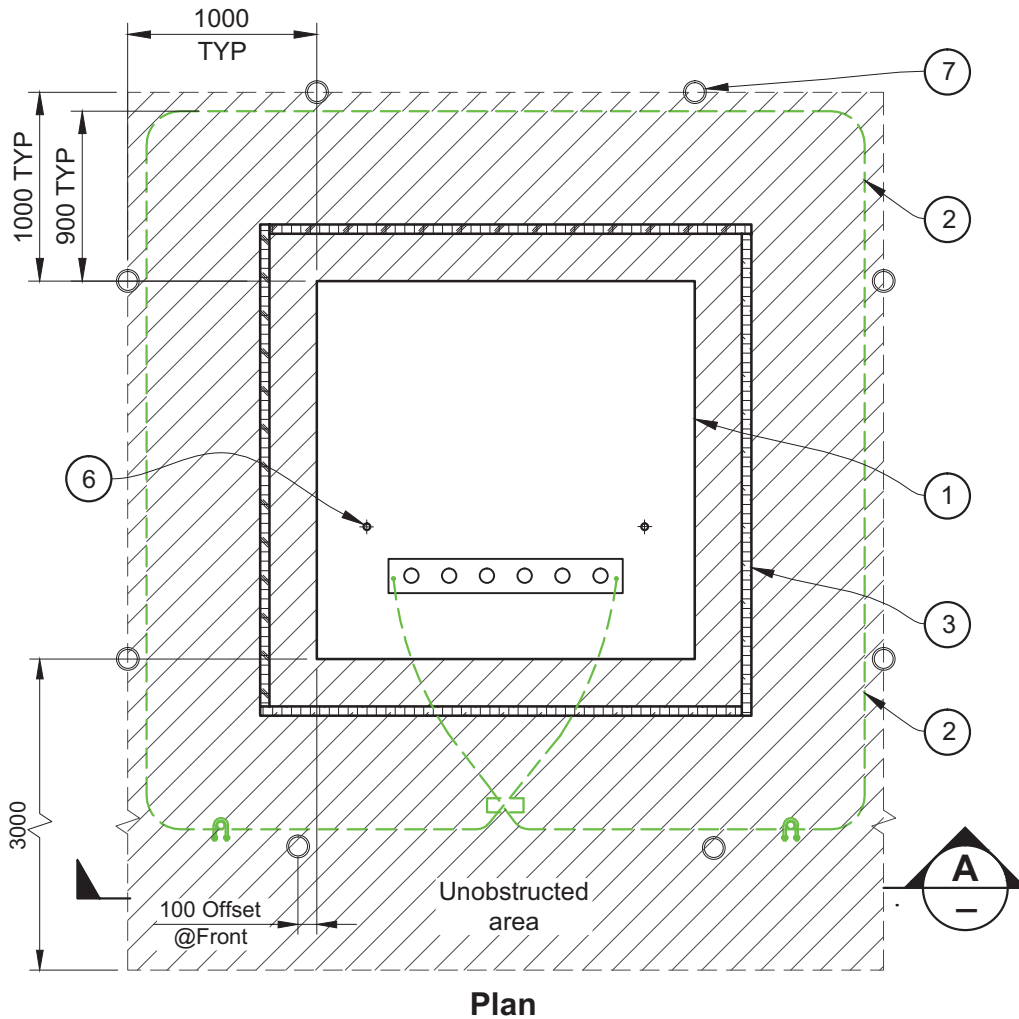
Items Required

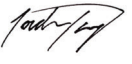
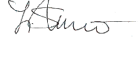
Item	Description	Material No.	Quantity	Supplied By
1	Concrete pad	N/A	1	Contractor
2	Grounding kit	412-0015	1	BC Hydro
	Ground rod	420-1093	2	BC Hydro
	18 m counterpoise	412-0014	1	BC Hydro
3	Border frame	N/A	1	Contractor
4	75 mm duct caps	401-0173	As required	Contractor
	100 mm duct caps	96021451	As required	Contractor
	125 mm duct cap	401-0175	As required	BC Hydro
5	75 mm duct, 90° elbow	400-4021	As required	Contractor
	100 mm duct, 90° elbow	96021350	As required	Contractor
	125 mm duct, 90° elbow	400-4035	As required	BC Hydro
6	Stainless steel insets 1" diameter x 50 mm long threaded to UNC	N/A	2	Contractor
7	Bollards	400-0059	As required	BC Hydro
8	Plywood cover	N/A	1	Contractor

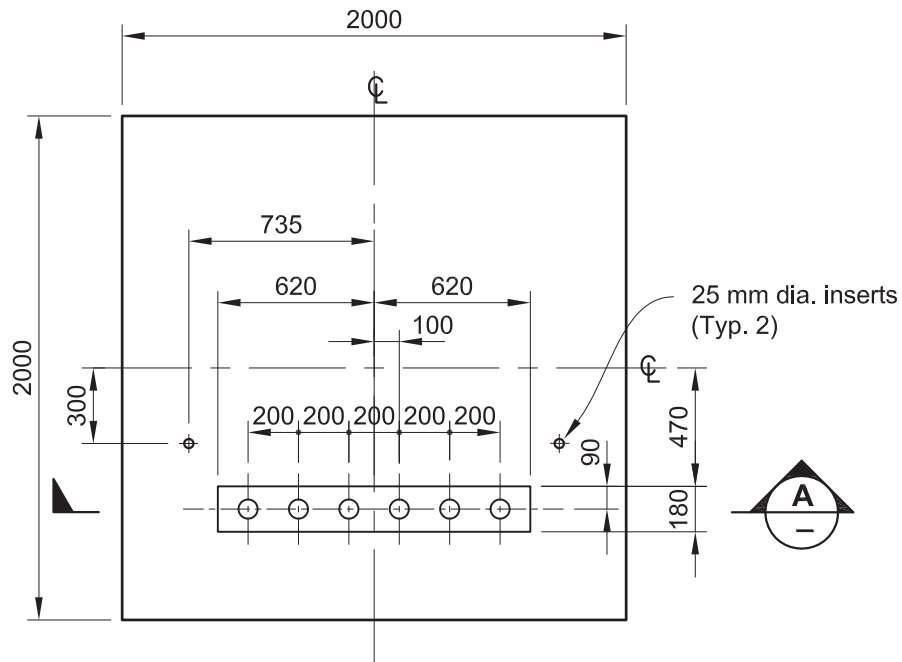
Notes

- Maximum number of stanchions shown. Designer shall determine the number of stanchions required. Stanchions shall be installed in accordance with ES54 U2-02. Stanchions are required when transformer is less than 1.5 m from a rectangular curb.
- Primary ducts may be either 2 x 100 mm, 2 x 125 mm, or 6 x 75 mm, arranged as shown on plan view.

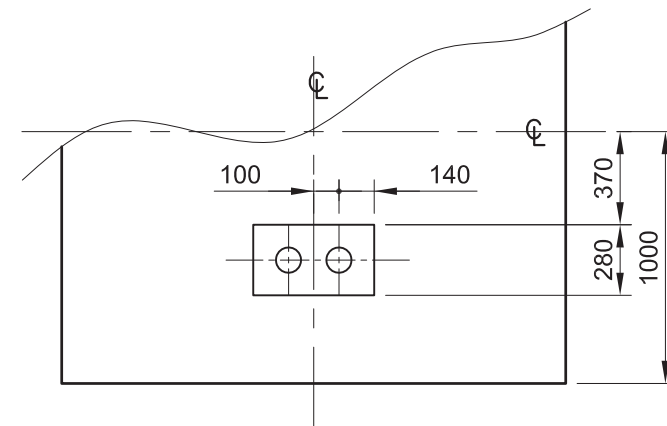
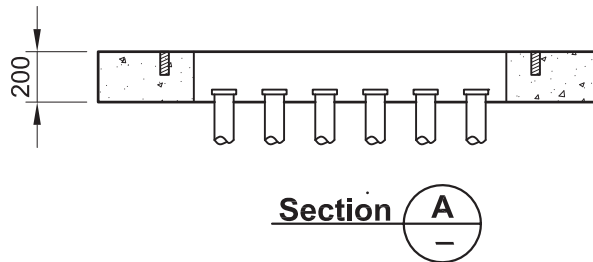
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DISTRIBUTION STANDARDS 		ISSUED: SEP 2022 REPLACES: MAR 2016 ORIGINALLY ISSUED: NOV 1979		PAGE 2 OF 5	ES54 F5-01.02
					R 6



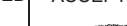
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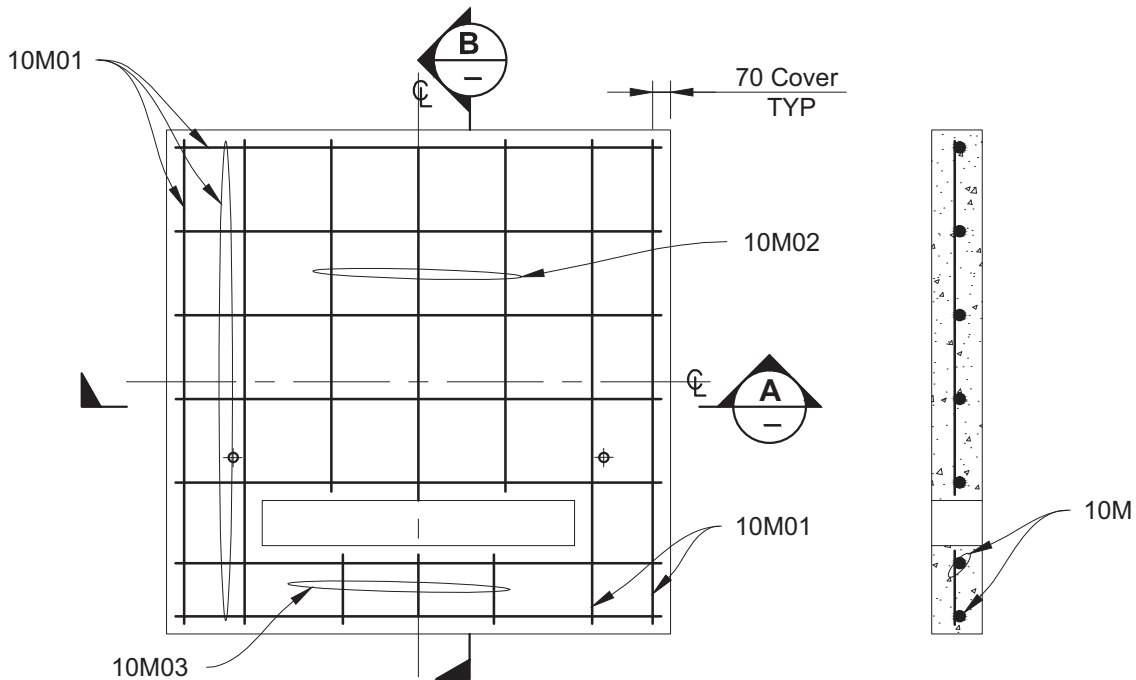


Plan View for 6X75 mm Ducts



Plan View for 2X100 mm (125 mm) Ducts

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DISTRIBUTION STANDARDS 		ISSUED: SEP 2022 REPLACES: MAR 2016 ORIGINALLY ISSUED: NOV 1979		PAGE 4 OF 5	ES54 F5-01.04
				R 6	



Plan

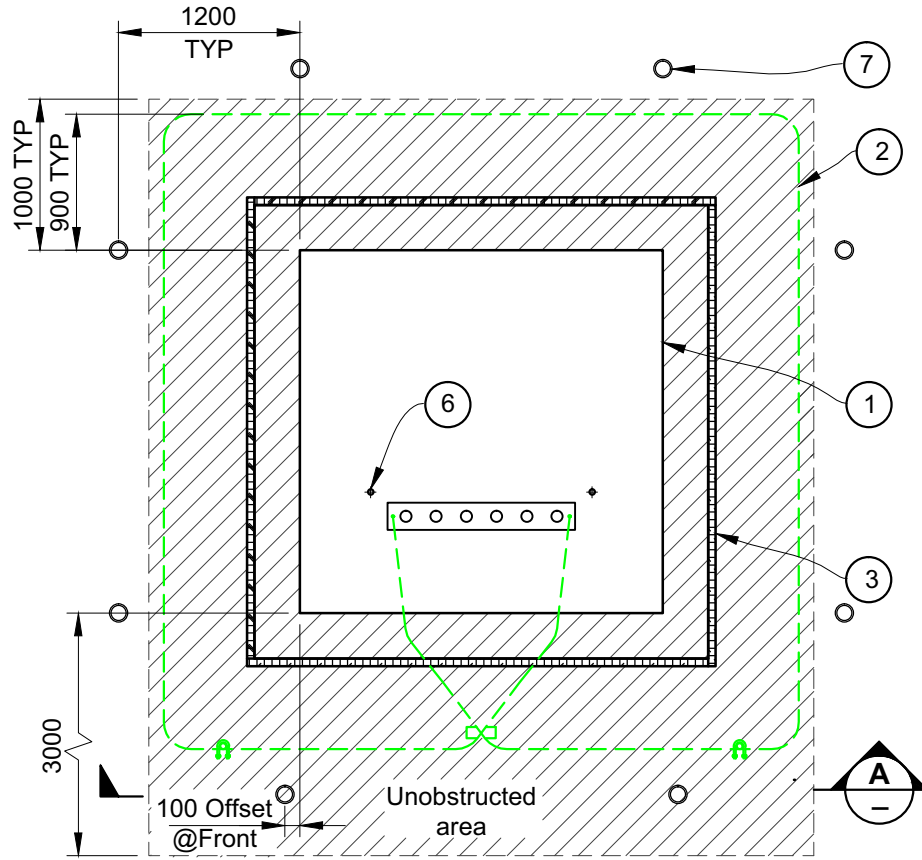
Section B

Section A

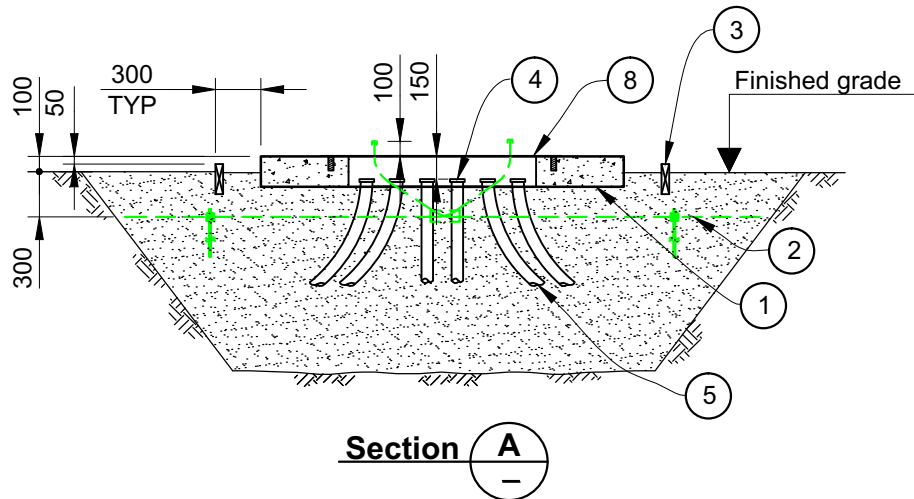
Rebar Chart

	Quantity	Shape	Length
10M01	11	I - bar	1920
10M02	3	I - bar	1390
10M03	3	I - bar	270

DESIGNED J. YANG	RECOMMENDED L. STEVANOVIC	ACCEPTED F. DENNERT	ENGINEER OF RECORD 1002449 L. STEVANOVIC 2022-09-01	CAST-IN-PLACE CONVERSION PAD 1000 kVA AND SMALLER CONSTRUCTION DETAILS	
DISTRIBUTION STANDARDS 		ISSUED: SEP 2022 REPLACES: MAR 2016 ORIGINALLY ISSUED: NOV 1979		PAGE 5 OF 5	ES54 F5-01.05
					R 6



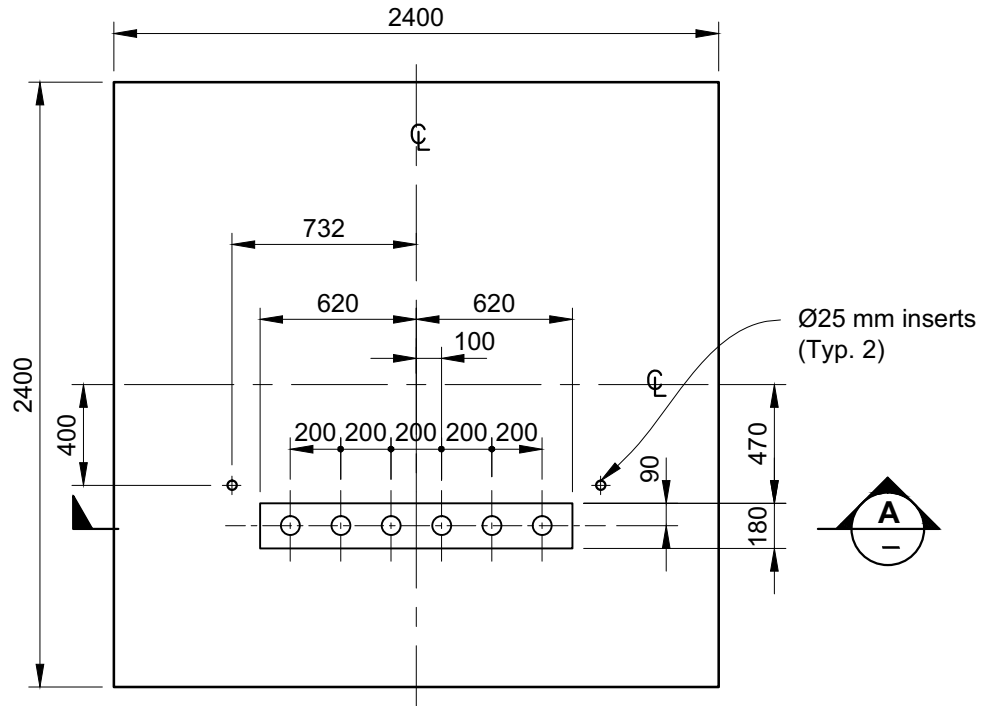
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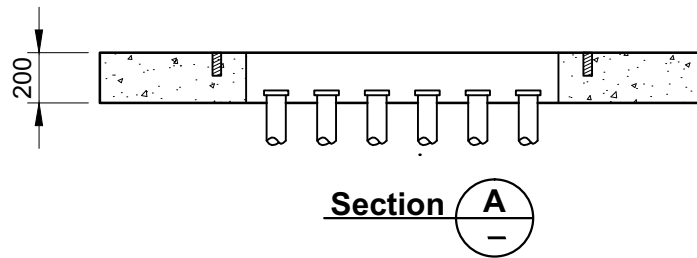
Section A

REVISIONS: R.5-TITLE CHANGE, BORDER FRAME AND AND REBAR DETAILS ADDED. MAR '16 MK

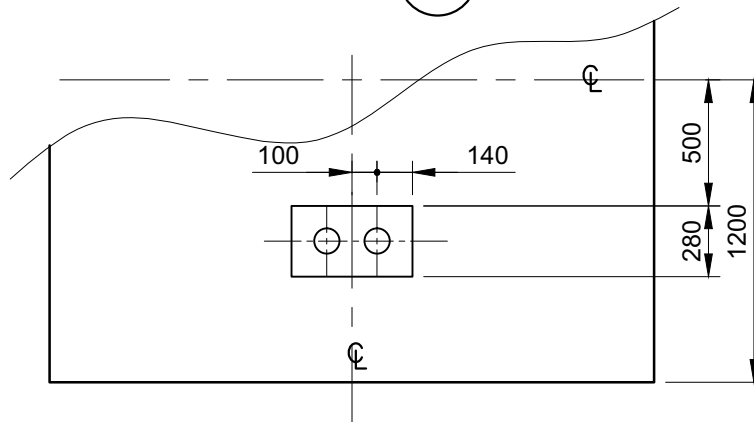
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Plan View for 6 X 75 mm Ducts



Section A

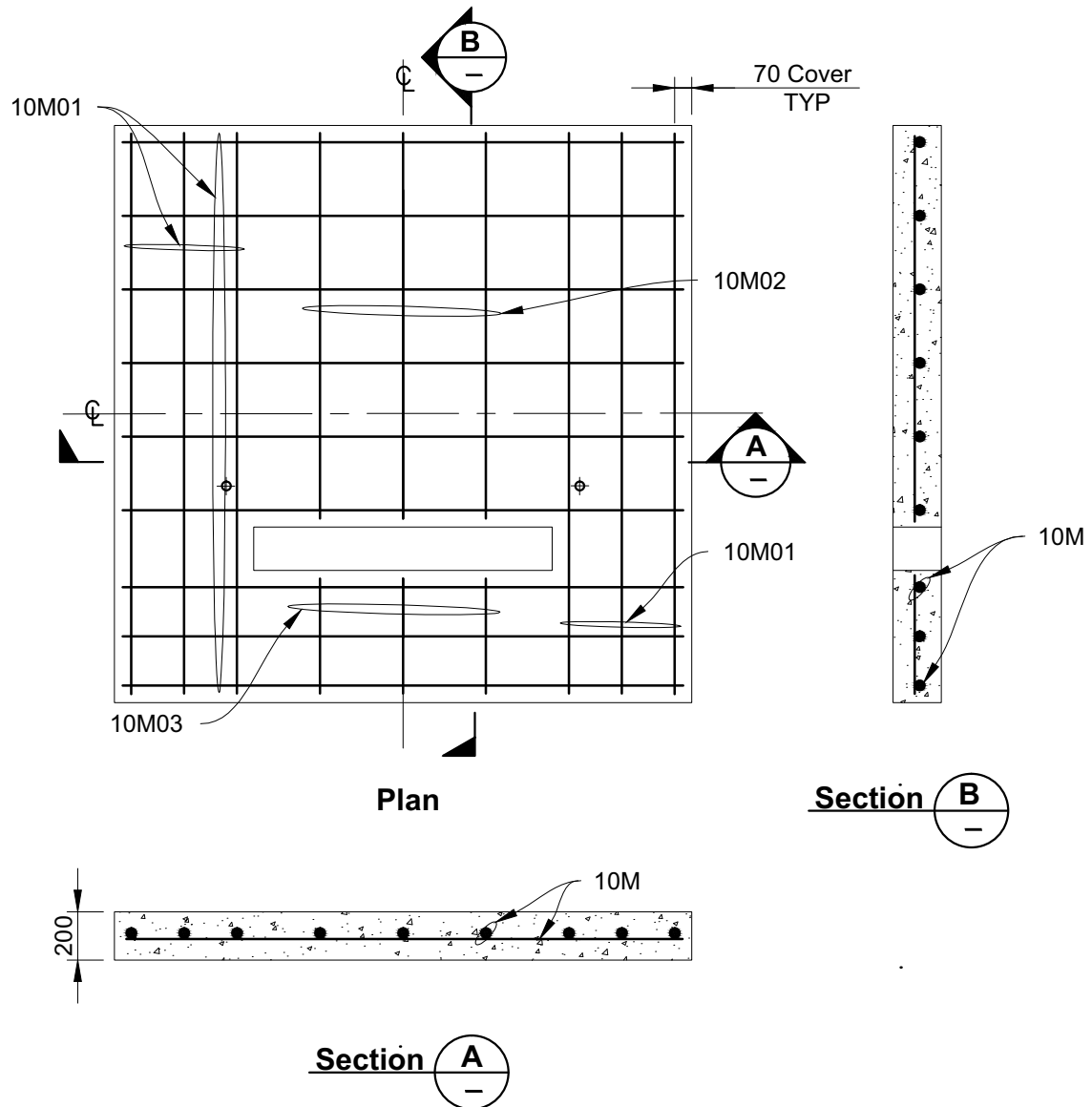


Plan View for 2 X 100 mm (5'') Ducts

REVISIONS: R.5-TITLE CHANGE, BORDER FRAME AND AND REBAR DETAILS ADDED. MAR '16 MK

DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2017-02-15	CAST IN PLACE CONVERSION PAD 1500 KVA AND LARGER CONSTRUCTION DETAILS	
DISTRIBUTION STANDARDS 		ISSUED: MAR 2016 REPLACES: OCT 2002 ORIGINALLY ISSUED: NOV 1979		PAGE 2 OF 4	ES54 F5-02.02
					^R 5

REVISIONS: R.5-TITLE CHANGE, BORDER FRAME AND AND REBAR DETAILS ADDED. MAR '16 MK



Rebar Chart			
	Quantity	Shape	Length (mm)
10M01	15	I - bar	2330
10M02	3	I - bar	1600
10M03	3	I - bar	480

DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2017-02-15	CAST IN PLACE CONVERSION PAD 1500 KVA AND LARGER CONSTRUCTION DETAILS	
DISTRIBUTION STANDARDS 	ISSUED: MAR 2016 REPLACES: OCT 2002 ORIGINALLY ISSUED: NOV 1979			PAGE 3 OF 4	ES54 F5-02.03
					^R 5

Notes

1. There shall be no vegetation or pavement around the pad within the containment frame.
2. Designer is to specify transformer protection in accordance with ES54 U2-02.
3. Primary ducts may be 2 x 100 mm, 2 x 125 mm or 6 x 75 mm, arranged as shown on Page 1.

Bill of Material

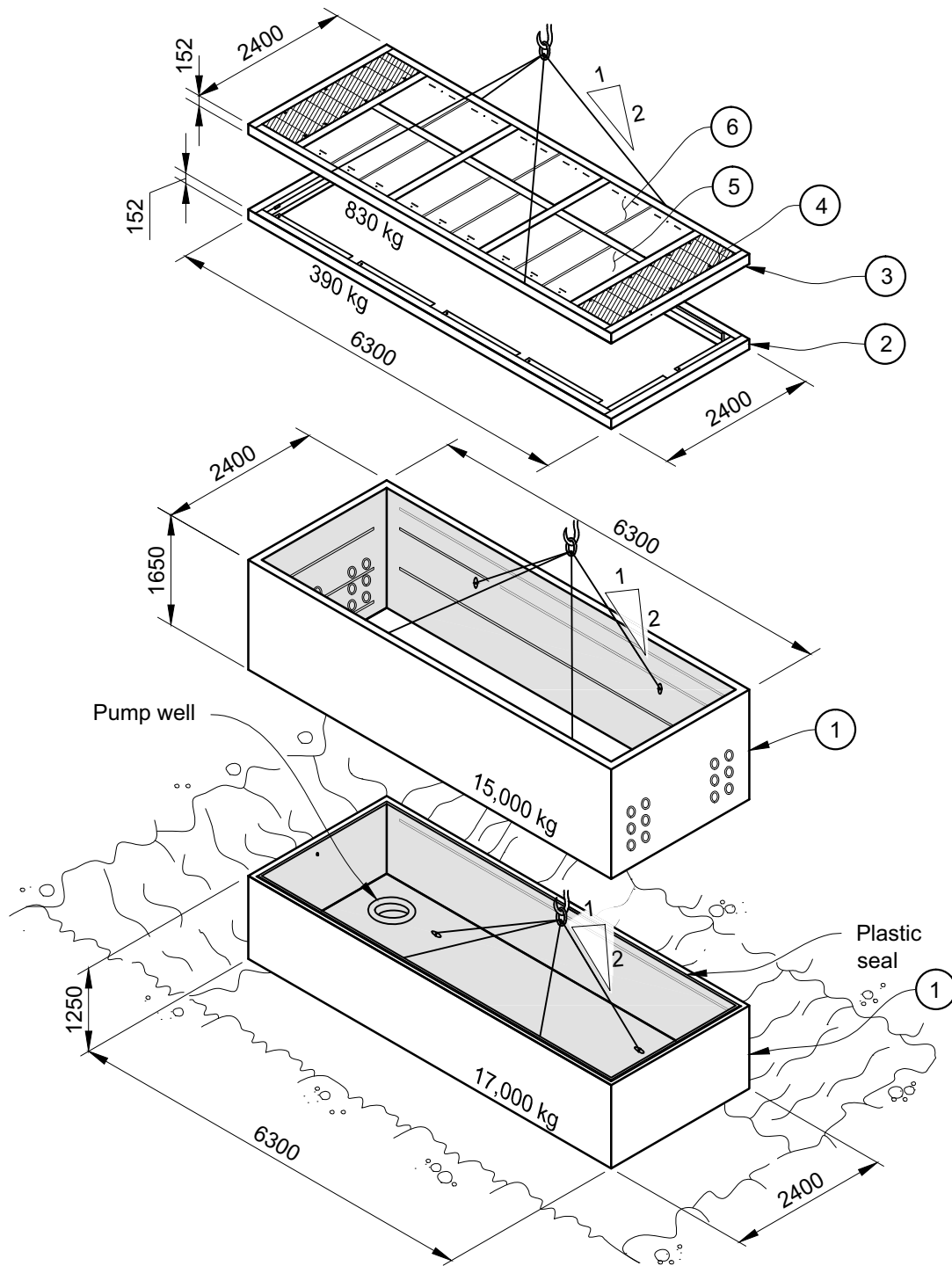
Item	Description	Catalogue ID	Quantity	Supplied By
1	Concrete pad	N/A	1	Contractor
2	Grounding kit	412-0015	1	BC Hydro
	Ground rod	420-1093	2	BC Hydro
	20 m counterpoise	412-0016	1	BC Hydro
3	Border frame	N/A	1	Contractor
4	75 mm duct caps	401-0173	As required	Contractor
	100 mm duct caps	96021451	As required	Contractor
	125 mm duct caps	401-0175	As required	BC Hydro
5	75 mm duct, 90° elbow	400-4021	As required	Contractor
	100 mm duct, 90° elbow	96021350	As required	Contractor
	125 mm duct, 90° elbow	400-4035	As required	BC Hydro
6	Stainless steel insets 1"dia. x 50 mm lg. threaded to UNC	N/A	2	Contractor
7	Bollards	400-0059	As required	BC Hydro
8	Plywood cover	N/A	1	Contractor

Reference Standards

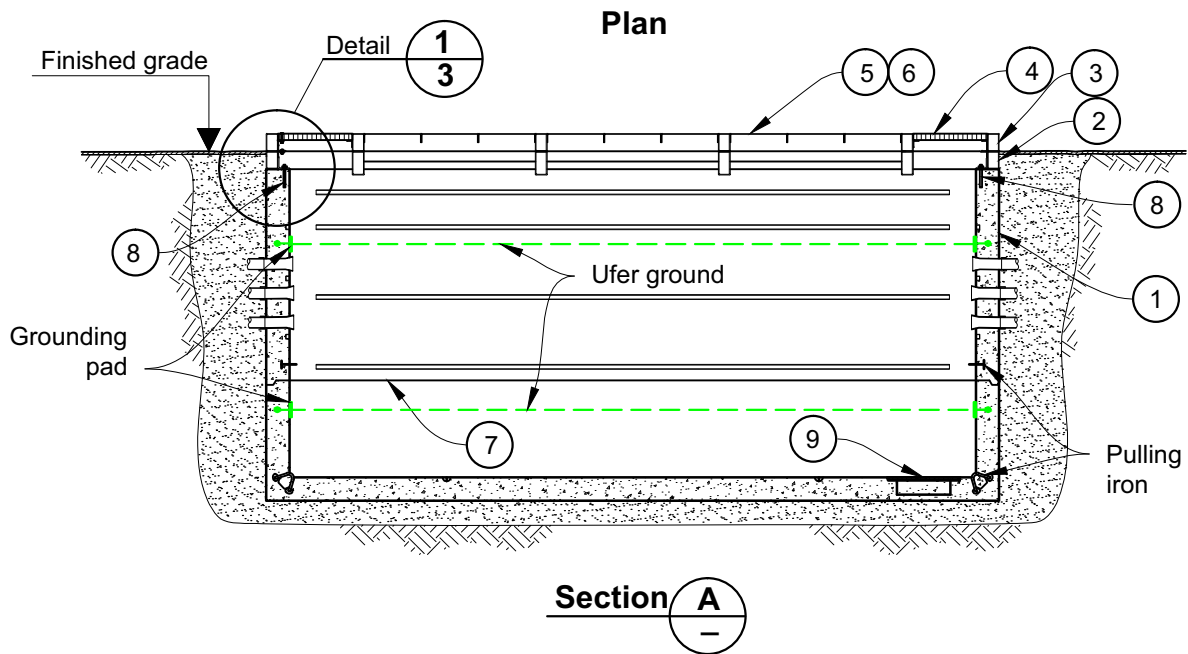
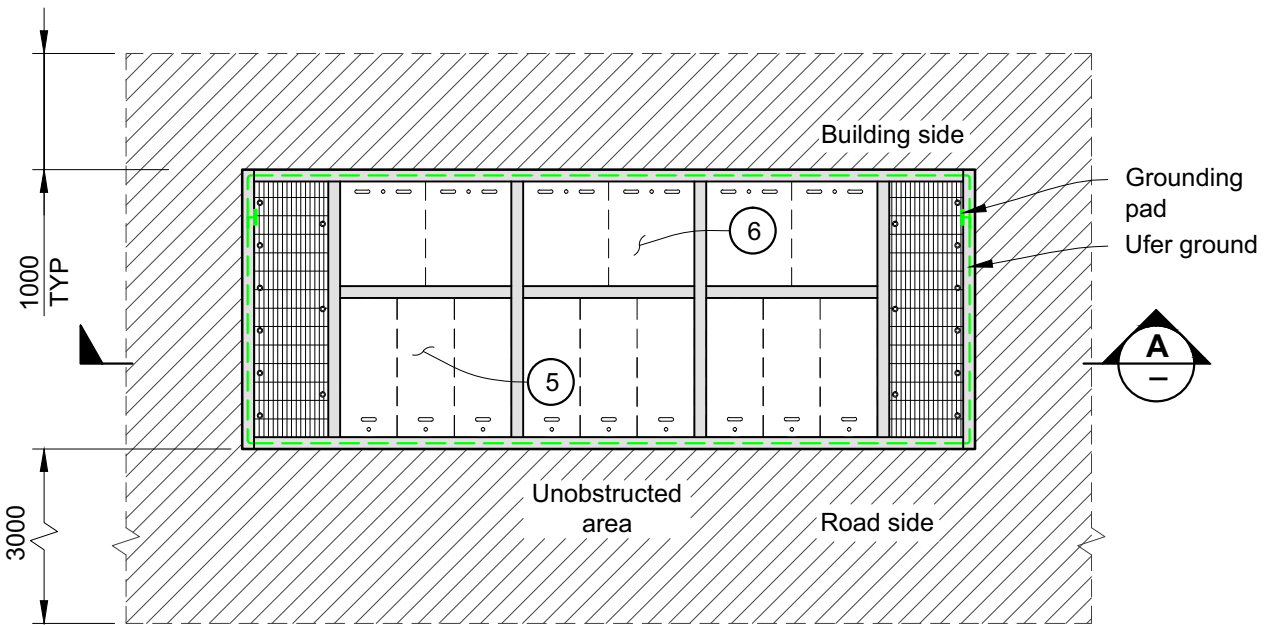
ES54 F0-03	Border Containment Frame, Typical Detail
ES54 H1-03	Duct Entry at Pads
ES54 R1-01	Grounding of Pad-Mounted Equipment in Public Corridors
ES54 U2-02	Above-Ground Equipment, Mechanical Protection
ES54 W1-01	Excavation and Backfill
ES54 W1-05	Concrete

DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2017-02-15	CAST IN PLACE CONVERSION PAD 1500 KVA AND LARGER CONSTRUCTION DETAILS	
DISTRIBUTION STANDARDS 		ISSUED: MAR 2016 REPLACES: OCT 2002 ORIGINALLY ISSUED: NOV 1979		PAGE 4 OF 4	ES54 F5-02.04
					R 5

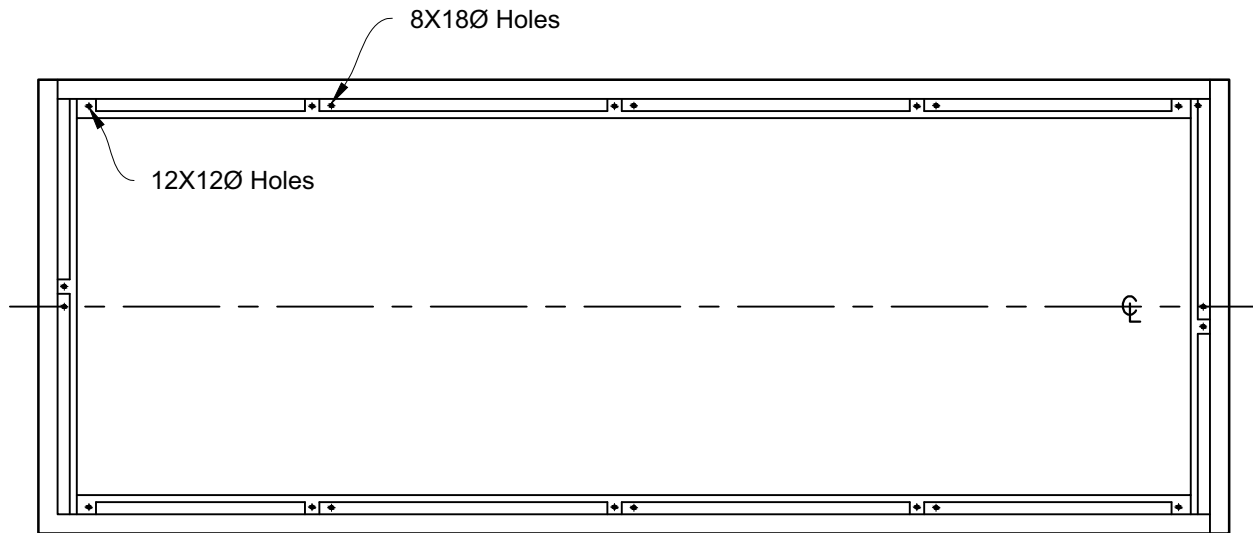
REVISIONS: R.5-TITLE CHANGE, BORDER FRAME AND AND REBAR DETAILS ADDED. MAR '16 MK



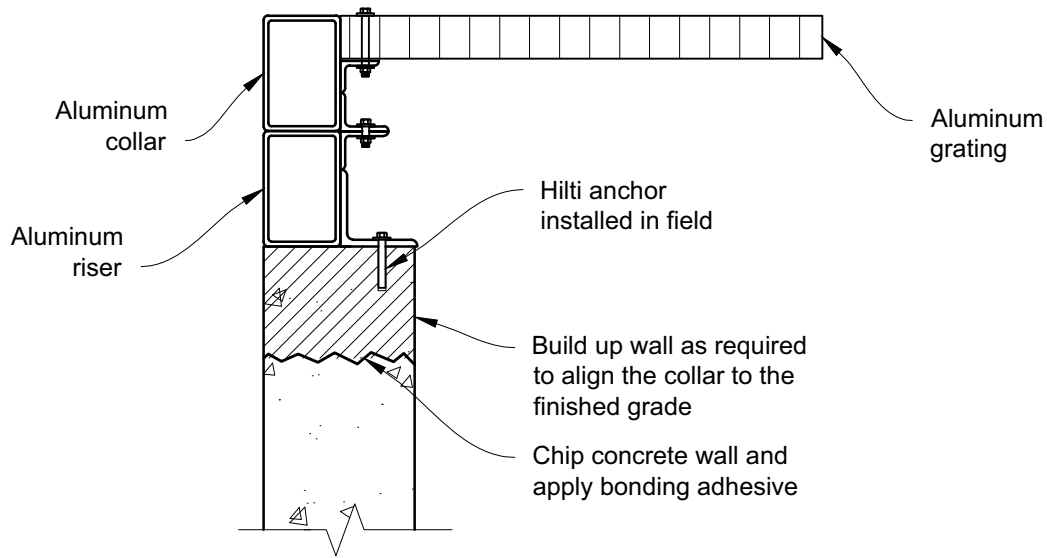
DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2017-02-15	THREE PHASE SUBMERSIBLE TRANSFORMER VAULT 2018 VAULT CIVIL INSTALLATION SIDEWALK DUTY	
REVISIONS: DISTRIBUTION STANDARDS BC Hydro		ISSUED: MAR 2016 REPLACES: N/A ORIGINALLY ISSUED: MAR 2016		PAGE 1 OF 4	ES54 F6-01.01 R 0



REVISIONS: 	DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2017-02-15	THREE PHASE SUBMERSIBLE TRANSFORMER VAULT 2018 VAULT CIVIL INSTALLATION SIDEWALK DUTY		
	DISTRIBUTION STANDARDS 	ISSUED: MAR 2016 REPLACES: N/A ORIGINALLY ISSUED: MAR 2016			PAGE 2 OF 4	ES54 F6-01.02	R 0



**Aluminum Riser
Plan**



Detail 1/2

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REVISIONS: DISTRIBUTION STANDARDS 		ISSUED: MAR 2016 REPLACES: N/A ORIGINALLY ISSUED: MAR 2016		PAGE 3 OF 4	ES54 F6-01.03 R 0

Notes

1. Build-up concrete wall to align the collar with the finished grade.
2. Connect riser to concrete wall with twelve (12) Hilti screw anchors, applying the following procedure:
 - a. Drill 5 ½" deep holes in the concrete wall.
 - b. Clean holes of dust and debris using a hand pump, compressed air or vacuum.
 - c. Install anchor screws into the predrilled holes using a power impact wrench or manual torque wrench until the screw is completely tightened. The impact and manual wrench torque shall be 114 ft-lb and 40 ft-lb respectively. If needed for riser realignment, the screws shall be loosened by a maximum of one turn and retightened.

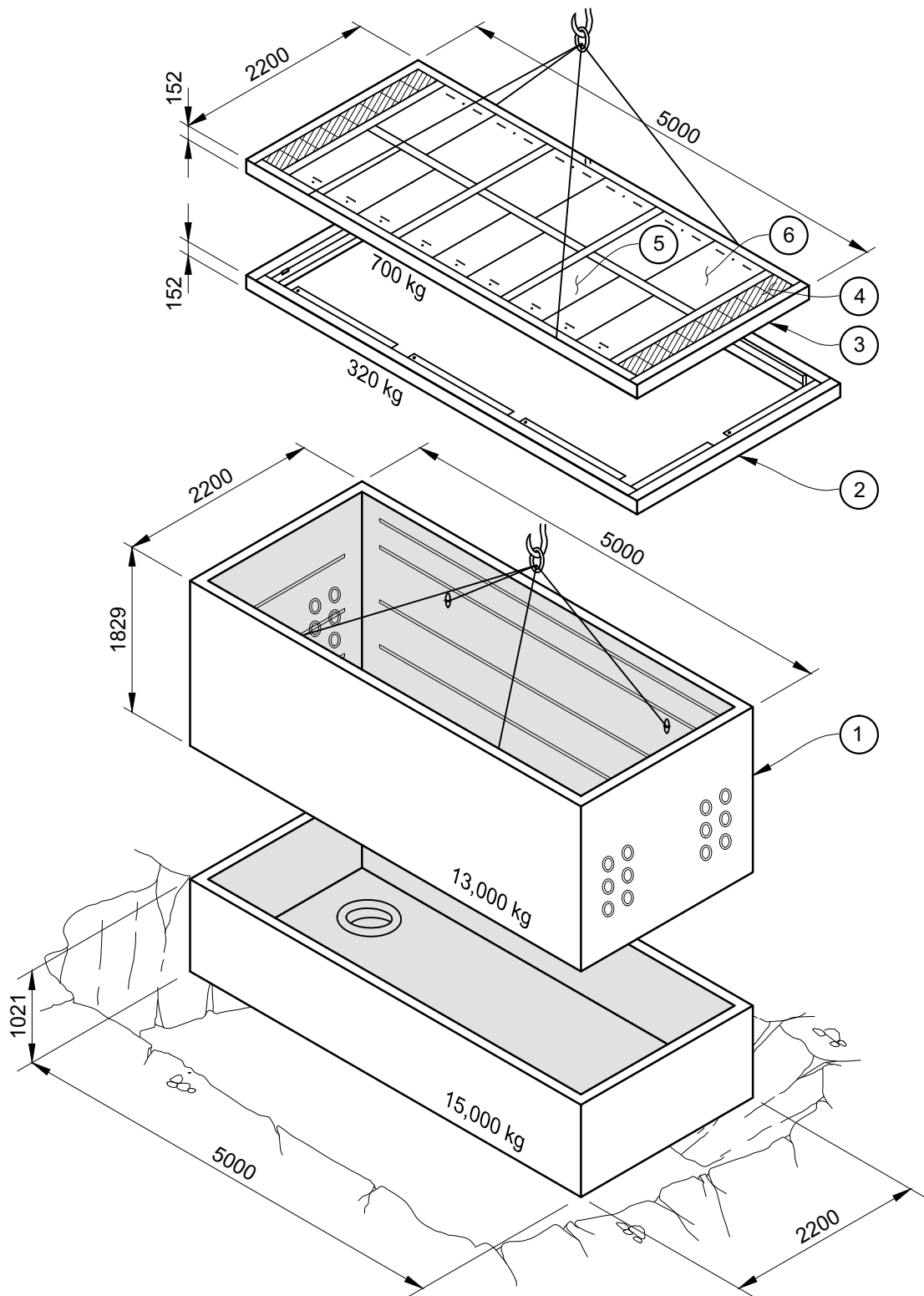
Bill of Material

Item	Description	Catalogue ID	Quantity	Supplied By
1	Precast concrete chamber	96018201	1	BC Hydro
2	Aluminum riser	96018200	1	BC Hydro
3	Aluminum collar c/w bolts and nuts	96018199	1	BC Hydro
4	Ventilation louvres		2	BC Hydro
5	Transformer access lids		9	BC Hydro
6	Personnel access lids		6	BC Hydro
7	Vault joint sealant	141-1346	As required	BC Hydro
8	Hilti KH-EZ ⅝" x 6 ½"	N/A	As required	Contractor
9	Sump cover	400-0426	2	BC Hydro

Reference Standards

ES54 H1-06	Duct Entry Details
ES54 U7	Lifting and Handling
ES54 W1-01	Excavation and Backfill
ES54 R3-02	Grounding of Concrete Vaults with Internal Ground Electrode

REVISIONS:	DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2017-02-15	THREE PHASE SUBMERSIBLE TRANSFORMER VAULT 2018 VAULT CIVIL INSTALLATION SIDEWALK DUTY	
	DISTRIBUTION STANDARDS 		ISSUED: MAR 2016 REPLACES: N/A ORIGINALLY ISSUED: MAR 2016		PAGE 4 OF 4	ES54 F6-01.04



DESIGNED

M. Kelvin

M. KELVIN

RECOMMENDED

L. Stevanovic

L. STEVANOVIC

ACCEPTED

F. Dennert

F. DENNERT

ENGINEER OF RECORD



2017-02-15

**THREE-PHASE SUBMERSIBLE
TRANSFORMER VAULT
1617 VAULT, CIVIL INSTALLATION
SIDEWALK DUTY**

**DISTRIBUTION
STANDARDS**
BC Hydro

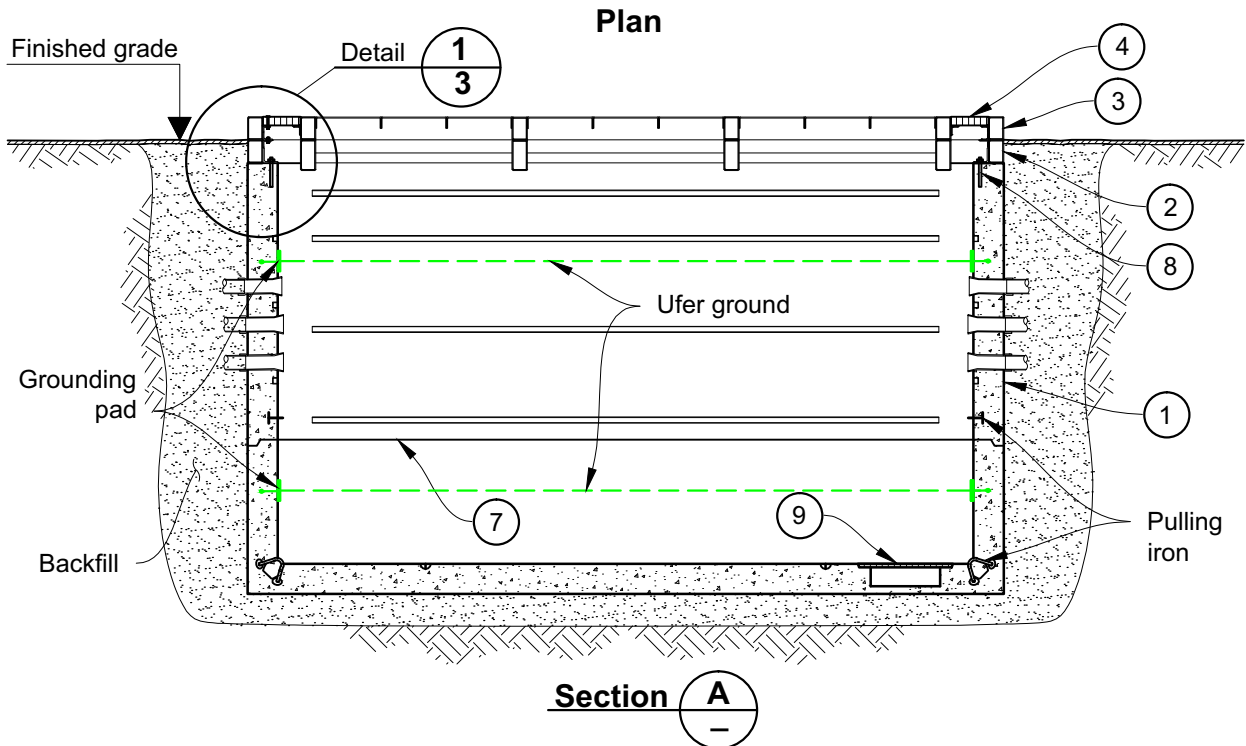
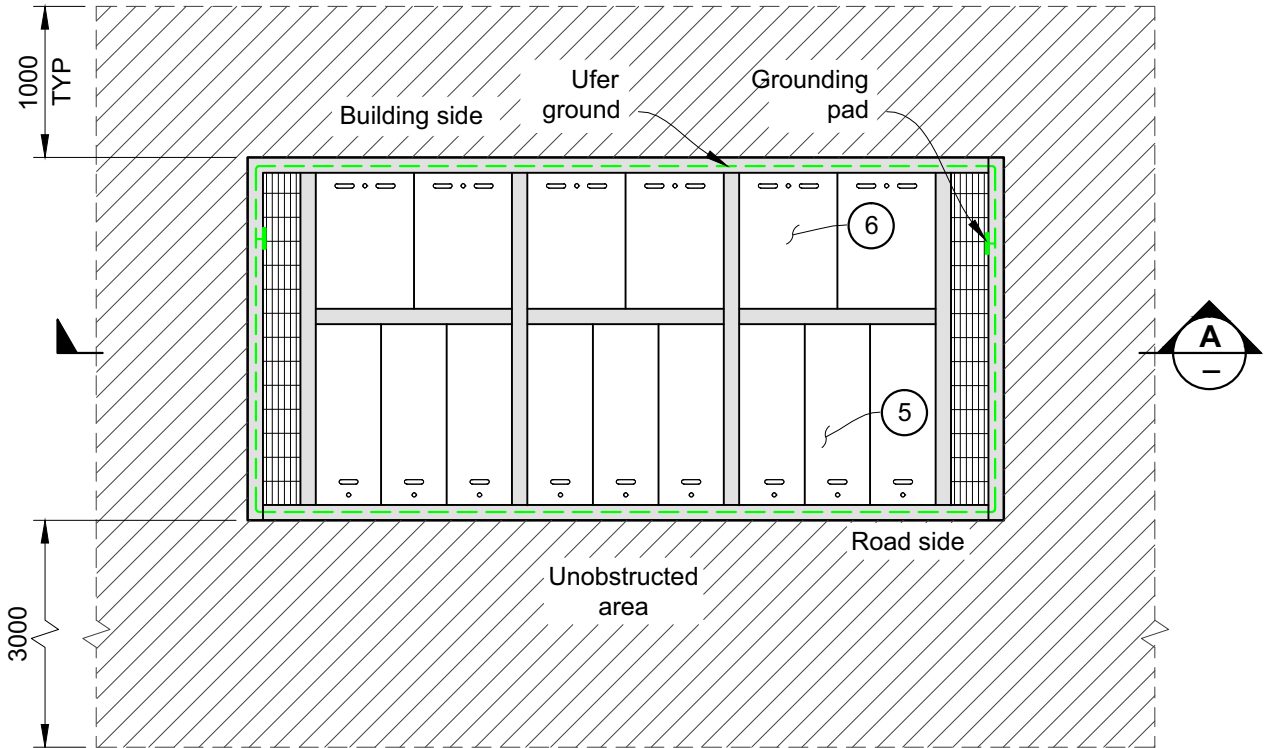
ISSUED: MAR 2016
REPLACES: N/A
ORIGINALLY ISSUED:
MAR 2016

PAGE 1
OF 4

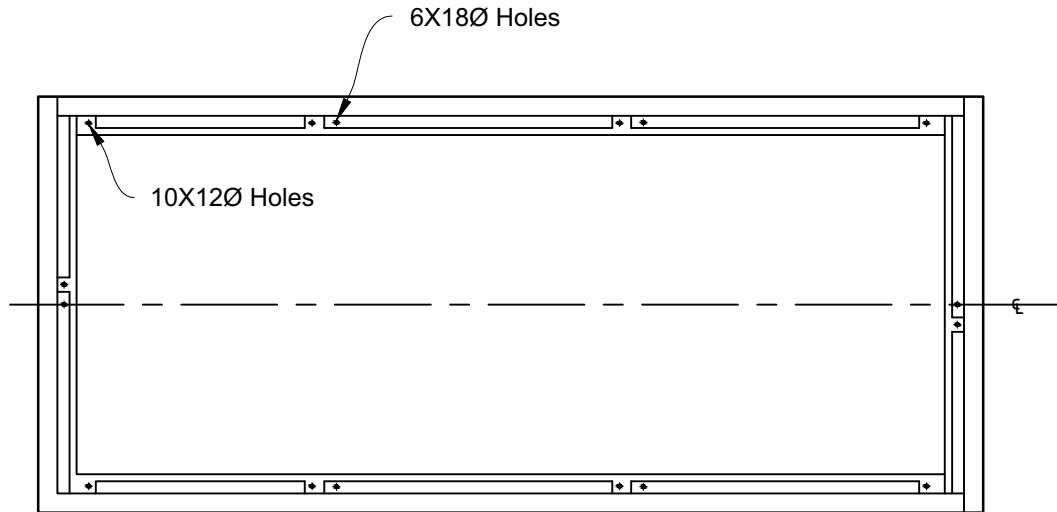
ES54 F6-02.01

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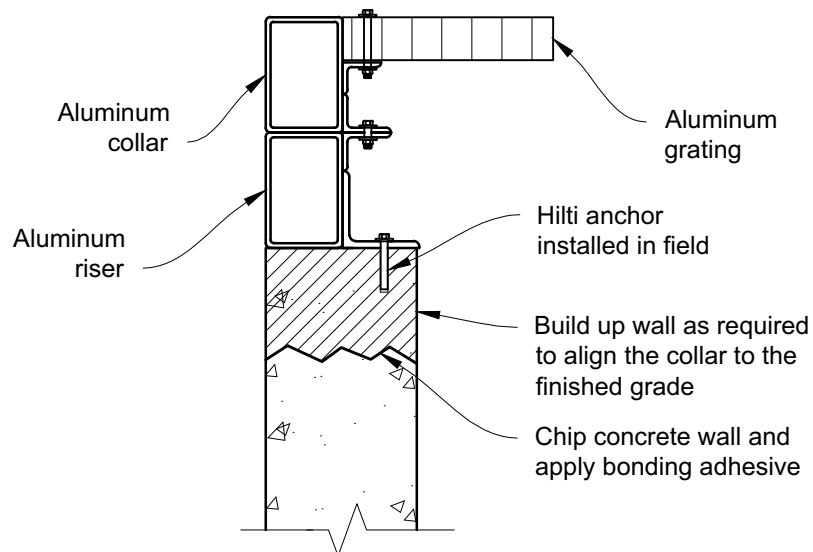
REVISIONS:



DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2017-02-15	THREE-PHASE SUBMERSIBLE TRANSFORMER VAULT 1617 VAULT, CIVIL INSTALLATION SIDEWALK DUTY	
REVISIONS: DISTRIBUTION STANDARDS 		ISSUED: MAR 2016 REPLACES: N/A ORIGINALLY ISSUED: MAR 2016		PAGE 2 OF 4	ES54 F6-02.02 R 0



**Aluminum Riser
Plan**



Detail 1
2

DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIĆ	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2017-02-15	THREE-PHASE SUBMERSIBLE TRANSFORMER VAULT 1617 VAULT, CIVIL INSTALLATION SIDEWALK DUTY	
REVISIONS: DISTRIBUTION STANDARDS 		ISSUED: MAR 2016 REPLACES: N/A ORIGINALLY ISSUED: MAR 2016		PAGE 3 OF 4	ES54 F6-02.03 R 0

Notes

1. Build up concrete wall to align the collar with the finished grade.
2. Connect riser to concrete wall with ten (10) Hilti screw anchors, applying the following procedure:
 - a. Drill 5 ½" deep holes in the concrete wall.
 - b. Clean holes from dust and debris using a hand pump, compressed air or vacuum.
 - c. Install anchor screws into the predrilled holes using a power impact wrench or manual torque wrench until the screw is completely tightened. The impact and manual wrench torque shall be 114 ft-lb and 40 ft-lb respectively. If needed for riser realignment, the screws shall be loosened by a maximum of one turn and retightened.

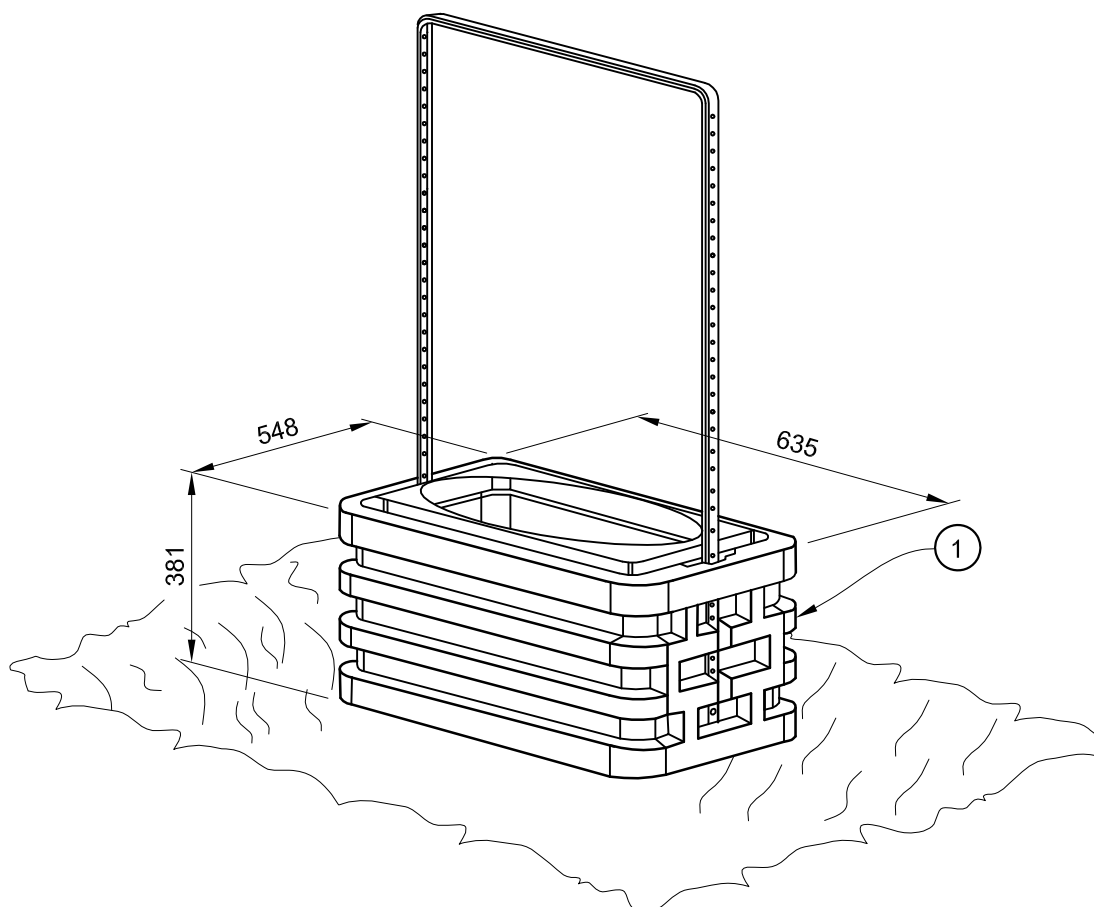
Bill of Material

Item	Description	Catalogue ID	Quantity	Supplied By
1	1000 kVA submersible precast concrete transformer vault	96021201	1	BC Hydro
2	Aluminum riser	96021268	1	BC Hydro
3	Aluminum collar c/w bolts and nuts	96021269	1	BC Hydro
4	Ventilation louvres		2	BC Hydro
5	Transformer access lids		9	BC Hydro
6	Personnel access lids		6	BC Hydro
7	Vault joint sealant	141-1346	As required	BC Hydro
8	Hilti KH-EZ ⅝" x 6 ½"	N/A	As required	Contractor
9	Sump cover	400-0426	2	BC Hydro

Reference Standards

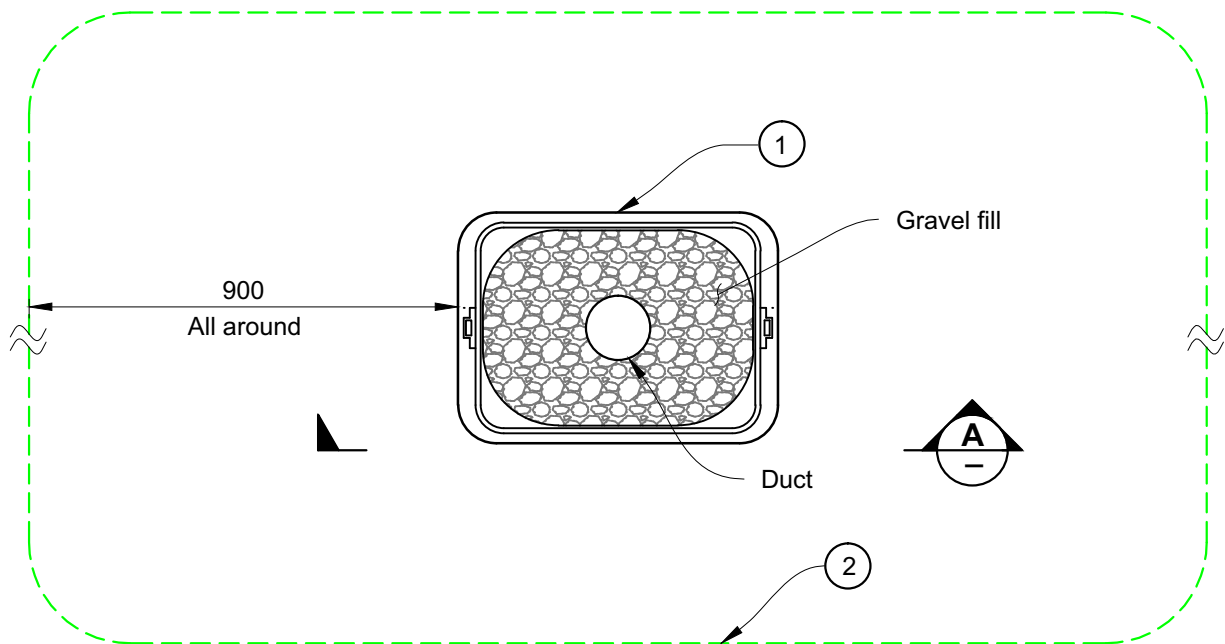
ES54 H1-06	Duct Entry Details
ES54 R3-02	Grounding of Concrete Vaults with Internal Ground Electrode
ES54 U7	Lifting and Handling
ES54 W1-01	Excavation and Backfill

REVISIONS:	DESIGNED	RECOMMENDED	ACCEPTED	ENGINEER OF RECORD	THREE-PHASE SUBMERSIBLE TRANSFORMER VAULT 1617 VAULT, CIVIL INSTALLATION SIDEWALK DUTY		
	 M. KELVIN	 L. STEVANOVIC	 F. DENNERT	 2017-02-15			
	DISTRIBUTION STANDARDS 		ISSUED: MAR 2016 REPLACES: N/A ORIGINALLY ISSUED: MAR 2016		PAGE 4 OF 4	ES54 F6-02.04	R 0

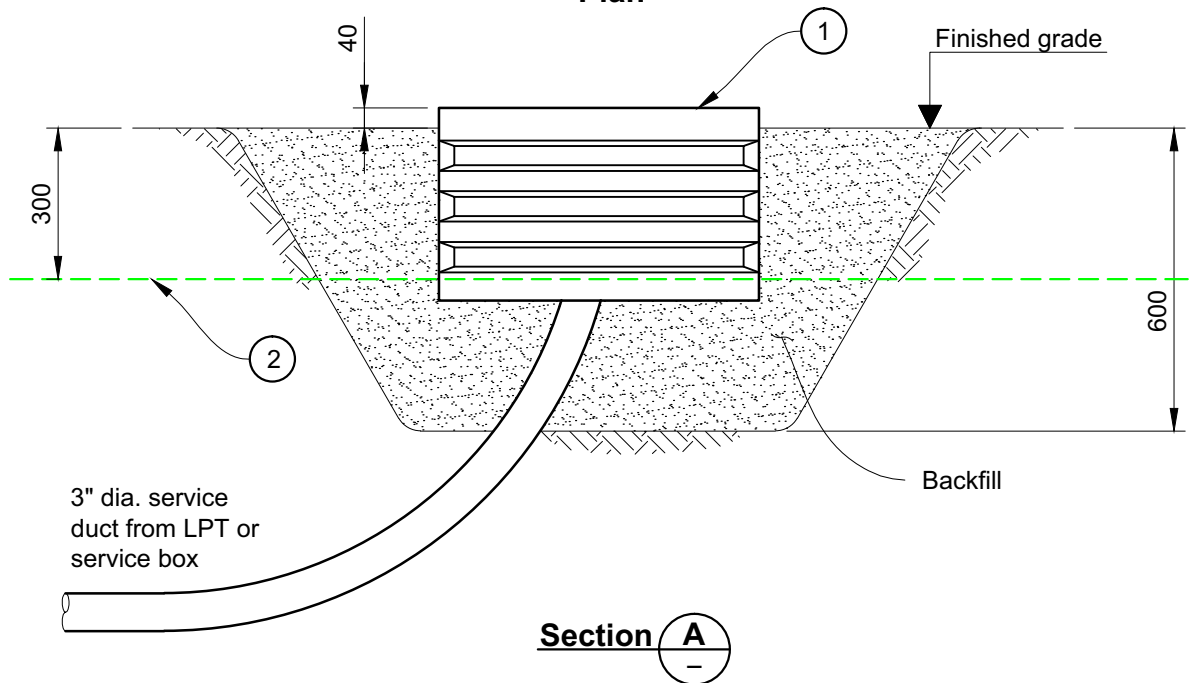


REVISIONS:

DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2017-02-15	FAN EQUIPMENT PEDESTAL INSTALLATION AND GROUNDING	
DISTRIBUTION STANDARDS 	ISSUED: MAR 2016 REPLACES: N/A ORIGINALLY ISSUED: MAR 2016	PAGE 1 OF 4		ES54 F7-01.01	R 0



Plan



Section A

DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2017-02-15	FAN EQUIPMENT PEDESTAL INSTALLATION AND GROUNDING	
REVISIONS: DISTRIBUTION STANDARDS BC Hydro		ISSUED: MAR 2016 REPLACES: N/A ORIGINALLY ISSUED: MAR 2016		PAGE 2 OF 4	ES54 F7-01.02 R 0



DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2017-02-15	FAN EQUIPMENT PEDESTAL INSTALLATION AND GROUNDING	
DISTRIBUTION STANDARDS 	ISSUED: MAR 2016 REPLACES: N/A ORIGINALLY ISSUED: MAR 2016			PAGE 3 OF 4	ES54 F7-01.03
					R 0

Notes

1. For grounding details for LPT and PMT, see ES54 Section R.
2. The FAN equipment pedestal does not require an additional ground electrode. The pedestal neutral is effectively grounded by the LPT or PMT ground electrode via the 3 x 1C-1 AWG service supply from the PMT or LPT. All pedestal metal components shall be bonded.
3. The pedestal counterpoise must be connected to the PMT or LPT counterpoise when it is installed within 2.0 m of the PMT or LPT. If installed more than 2.0 m away, the pedestal counterpoise must be connected to the pedestal ground or neutral block inside the pedestal enclosure.
4. Install the pedestal counterpoise 300 mm below grade.
5. Bedding shall be 25 mm minus well graded granular material and shall be compacted to 85 per cent laboratory density conforming to ASTM D1557.

Bill of Material

Item	Description	Catalogue ID	Quantity	Supplied By
1	FAN equipment pedestal	96018499	1	BC Hydro
2	2/0 AWG Cu bare stranded	380-0174	1	BC Hydro
3	Ground connector counterpoise to 2/0 AWG Cu	420-1159	2	BC Hydro
4	2/0 to 2.0 compression "C"-Tap	388-0459	1	BC Hydro

Reference Standards

ES54 H1-03	Duct Entry at Pads
ES54 R1-01	Grounding of Pad Mounted Equipment in Public Corridors
ES54 U2-02	Above-Ground Equipment, Mechanical Protection

DESIGNED  M. KELVIN	RECOMMENDED  L. STEVANOVIC	ACCEPTED  F. DENNERT	ENGINEER OF RECORD  2017-02-15	FAN EQUIPMENT PEDESTAL INSTALLATION AND GROUNDING	
DISTRIBUTION STANDARDS 			ISSUED: MAR 2016 REPLACES: N/A ORIGINALLY ISSUED: MAR 2016	PAGE 4 OF 4	ES54 F7-01.04
					R 0