

Ontario Provincial Standards for Roads and Public Works



- Volume 4 -

MUNICIPAL AND PROVINCIAL COMMON

DRAWINGS FOR ELECTRICAL WORK



OPS is co-owned by the
Ministry of Transportation, Ontario
and the
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Municipal
Engineers
Association

MANUAL REVISION RECORD

Municipal and Provincial Common

Volume 4 – Drawings for Electrical

This record should remain in the manual at all times. Revisions are numbered sequentially. This sheet should be filled in after each revision has been placed into the manual. It will quickly indicate to users whether the contents of the manual are up-to-date.

REVISION NUMBER	REVISION DATE	ENTERED BY	REVISION NUMBER	DATE	ENTERED BY
19	NOV 2004	Included in new manuals	45		
20	NOV 2005	Included in new manuals	46		
21	NOV 2006	Included in new manuals	47		
22	APRIL 2007	Included in new manuals	48		
23	NOV 2007	Included in new manuals	49		
24	NOV 2008	Included in new manuals	50		
25	APR 2009	Included in new manuals	51		
26	NOV 2009	Included in new manuals	52		
27	APR 2010	Included in new manuals	53		
28	NOV 2010	Included in new manuals	54		
29	NOV 2011	Included in new manuals	55		
30	NOV 2012	Included in new manuals	56		
31	NOV 2013	Included in new manuals	57		
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33	NOV 2015	Included in new manuals	59		
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REVISION INFORMATION SHEET

ONTARIO PROVINCIAL STANDARDS FOR ROADS AND PUBLIC WORKS

VOLUME 4 MUNICIPAL AND PROVINCIAL COMMON DRAWINGS FOR ELECTRICAL WORK

MANUAL REVISION #33

NOVEMBER 2015

UPDATING ONTARIO PROVINCIAL STANDARDS FOR YOUR USE

Each roads and public works owner (Owner) is responsible for determining implementation dates and directions for use of Ontario Provincial Standards; therefore, manual holders are cautioned about immediately discarding superseded and cancelled standards.

ACCESSING AND OBTAINING ONTARIO PROVINCIAL STANDARDS

The Ontario Provincial Standards for Roads and Public Works (OPS) manuals and the latest published updates for each of the eight OPS manuals are available as follows:

- Available electronically on the OPS/MTO website. Online access to the current, updated, and archived standards; indexes; OPS User Notes; and publication Revision Information Sheets are available free of charge at the site.
(<http://www.raqs.mto.gov.on.ca/techpubs/ops.nsf/OPSHomepage>)
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(www.publications.serviceontario.ca)
- The eight OPS manuals of standards are available on one CD in PDF format. The OPS drawings published in Volumes 3 and 4 are available in AutoCAD format on a separate CD. These CDs are available from Publications Ontario or by telephone at 1-800-668-9938 or online for a cost-recovery fee. The updates are not available on CDs as an update package.
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MTO employees should contact Simon Leung, Account Representative at Publications Ontario, by email (simon.leung@ontario.ca) to set up an account in order to receive the MTO purchase price for technical publications, including the Ontario Provincial Standards.

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Users of OPS do not receive notices of OPS updates as they had in the past. Methods of notification from Publications Ontario for the future are being investigated, and you will be informed of them as they become available. In the interim, an email will be sent to OPS users who have registered their OPS manuals and CDs with OPS.

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WAITING TO HEAR FROM YOU

If you have a suggestion to revise a standard or you have a standard that works in your ministry, municipality, or area, send it to the Head, OPS Administration, for review and possible inclusion into the Ontario Provincial Standards.

THIS MANUAL IS REVISED AS FOLLOWS:

Index Pages Volume 4

Please remove the entire index and replace with the attached revised index.

Standard Drawings Volume 4

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
2100.06	1	2100.06	2	“RIGID DUCTS ENCASED IN CONCRETE” This drawing has been reaffirmed. No changes to technical information.
		2102.020	0	“UNDERGROUND RIGID DUCT CONNECTION AT CONCRETE STRUCTURE WITHOUT EXPANSION JOINT” This is a New Drawing.
2103.01	-	2103.010	0	“RIGID DUCT TERMINATION FOR HIGH VOLTAGE CABLES AT UTILITY POLES” This drawing has been reaffirmed. No changes to technical information. Renumbered to OPSD 2103.010.
2103.02	-	2103.02	1	“DUCT INSTALLATION PROFILES” This drawing has been reaffirmed. No changes to technical information.
2103.030	-	2103.030	1	“RIGID DUCT INSTALLATION IN EXISTING PAVED AREA, UNSHRINKABLE BACKFILL METHOD” This drawing has been reaffirmed. No changes to technical information. Title revised.
2103.04	-	2103.040	0	“RIGID DUCT INSTALLATION IN EXISTING PAVED AREA, GRANULAR BACKFILL METHOD” This drawing has been reaffirmed. No changes to technical information. Renumbered to OPSD 2103.040.
2103.05	-	2103.050	0	“DUCT INSTALLATION AT UTILITY CROSSINGS” See Summary of Revisions. Renumbered to OPSD 2103.050.

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
2103.06	-	2103.060	0	“AUGERING PITS FOR SUBSURFACE INSTALLATION OF DUCTS AND ENCASEMENTS” This drawing has been reaffirmed. No changes to technical information. Renumbered to OPSD 2103.060.
2110.010	-			“ELECTRICAL MAINTENANCE HOLE CAST IN PLACE, 1200mm X 1200mm” This drawing has been cancelled.
2110.050	-			“ELECTRICAL MAINTENANCE HOLE CAST IN PLACE, 600mm X 1450mm” This drawing has been cancelled.
2110.060	-			“ELECTRICAL MAINTENANCE HOLE CAST IN PLACE, 1800mm X 2440mm” This drawing has been cancelled.
2110.070	-			“ELECTRICAL MAINTENANCE HOLE CAST IN PLACE, 1200mm X 1650mm” This drawing has been cancelled.
2111.020	-	2111.020	1	“ELECTRICAL MAINTENANCE HOLE, PRECAST CONCRETE, 600 x 1450mm” See Summary of Revisions.
2111.030	-	2111.030	1	“ELECTRICAL MAINTENANCE HOLE, PRECAST CONCRETE, 1200mm DIA” See Summary of Revisions.
2111.040	-	2111.040	1	“ELECTRICAL MAINTENANCE HOLE, PRECAST CONCRETE, 1200 x 1650mm” Plan view, drain hole knock-out label revised.
2111.050	-	2111.050	1	“ELECTRICAL MAINTENANCE HOLE, PRECAST CONCRETE, 1800 x 2400mm” Section B-B, drain hole knock-out label revised.
2215.02	3	2215.02	4	“ANCHORAGE ASSEMBLY FOR LIGHTING AND SIGNAL POLES” See Summary of Revisions.

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
		2215.025	0	“ANCHORAGE ASSEMBLY FOR HEAVY CLASS STEEL POLE AND SECTIONAL STEEL POLE” This is a New Drawing.
2216.010	1	2216.010	2	“ANCHORAGE ASSEMBLY FOR POLE FOOTING IN CONCRETE BARRIER” Plan view, hole diameter revised from 33 to 38mm.
		2414.010	0	“3.3m ALUMINUM AND SECTIONAL STEEL POLES, BASE MOUNTED” This is a New Drawing.
2442.01	-	2442.010	0	“DUCT HANGER” This drawing has been reaffirmed. No changes to technical information. Renumbered to OPSD 2442-010.
2529.010	0	2529.010	1	“SIGNAL WIRING FOR PEDESTRIAN FACILITIES” Wire size #18 revised to #14 throughout drawing.
2532.010	0			“FLASHER BEACON AND DOWNLIGHT FOR ROADWAY SIGN AND WIRING DIAGRAM” This drawing has been cancelled.
2534.010	1			“SIGN LIGHT ASSEMBLY FOR KEEP RIGHT SIGN AND WIRING DIAGRAM” This drawing has been cancelled.
2536.010	1	2536.010	2	“FLASHER BEACONS FOR ROADWAY SIGN AND DOWNLIGHT AND WIRING DIAGRAM” Sectional steel pole revised to metal pole.
		2536.030	0	“SOLAR POWERED LED FLASHER BEACON AND WIRING DIAGRAM FOR ROADWAY SIGN, BASE MOUNTED POLE” This is a New Drawing.

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
		2536.032	0	“SOLAR POWERED LED FLASHER BEACON AND WIRING DIAGRAM FOR ROADWAY SIGN, DIRECT BURIED POLE” This is a New Drawing.
		2902.322	0	“ADVANCED TRAFFIC MANAGEMENT SYSTEM, SUPPLY CONTROL CABINET, 120/240V, 100A, 1-PHASE, 3 WIRE” This is a New Drawing.

SUMMARY OF REVISIONS TO OPSD 2103.050

DUCT INSTALLATION AT UTILITY CROSSINGS

- Renumbered to OPSD 2103.050.
- Loose fill revised from Styrofoam to expanded polystyrene foam.

SUMMARY OF REVISIONS TO OPSD 2111.020

ELECTRICAL MAINTENANCE HOLE, PRECAST CONCRETE, 600 X 1450mm

- Section A-A, WWF 250mm²/m revised to WWR 254mm²/m.
- Section B-B, drain holes labelled.
- New Notes A and B added. Other note reordered.

SUMMARY OF REVISIONS TO OPSD 2111.030

ELECTRICAL MAINTENANCE HOLE, PRECAST CONCRETE, 1200mm DIA

- Drain hole knock-outs labelled throughout drawing.
- Section A-A, WWF 250mm²/m revised to WWR 254mm²/m and stranded copper wire label converted into Note 3.
- New Notes A and B added. Other note reordered.

SUMMARY OF REVISIONS TO OPSD 2215.02

ANCHORAGE ASSEMBLY, FOR LIGHTING AND SIGNAL POLES

- Title revised.
- Table, Stud Length and Ferule Length columns added.
- Existing Notes 1 and 3 deleted and new Note B added. Other notes reordered.
- Note 1 revised.



DATE	OPSD NO.	REV.	TITLE
DIVISION 2000 - ABBREVIATIONS			
2009 11	2000.001	0	Abbreviations, General
2009 11	2011.101	0	General Symbols, Ducts and Cables
2009 11	2011.201	0	General Symbols, Maintenance Holes, Junction Boxes, Pads, and Footings
2009 11	2011.401	0	General Symbols, Poles and Guying
2009 11	2011.501	0	General Symbols, Power Supply Equipment
2013 11	2011.601	1	General Symbols, Control Equipment
2014 11	2011.701	2	General Symbols, Traffic Actuation Devices
2009 11	2012.101	0	Highway Lighting Symbols, Luminaires
2009 11	2013.101	0	Electrical Traffic Control Symbols, Traffic Control Devices
2009 11	2013.201	0	Electrical Traffic Control Symbols, Traffic Signal Displays
2009 11	2014.101	0	Wiring Symbols, Wiring Diagrams 1
2009 11	2014.102	0	Wiring Symbols, Wiring Diagrams 2
2009 11	2015.201	0	Advanced Traffic Management Symbols, Universal Traffic Management System, Equipment Identifier 1
2009 11	2015.202	0	Advanced Traffic Management Symbols, Universal Traffic Management System, Equipment Identifier 2
2009 11	2015.301	0	Advanced Traffic Management Symbols, Layout Drawings
2009 11	2015.302	0	Advanced Traffic Management Symbols, Wiring Diagrams
2009 11	2016.301	0	Communications Symbols, Fibre Optic Communications Schematic 1
2009 11	2016.302	0	Communications Symbols, Fibre Optic Communications Schematic 2
DIVISION 2100 - UNDERGROUND WORK, ETC.			
2013 11	2100.010	0	Cable Installation in Trenches
2013 11	2100.050	0	Cable and Duct Protection and Marking
2015 11	2100.06	2	Rigid Ducts Encased in Concrete



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2013 11	2101.01	1	Duct Installation in Trenches
2013 11	2101.020	0	Extension of Existing Rigid Ducts Encased in Concrete
2013 11	2102.01	1	Underground Rigid Duct Connection at Concrete Structure
2015 11	2102.020	0	Underground Rigid Duct Connection at Concrete Structure Without Expansion Joint
2015 11	2103.010	0	Rigid Duct Termination for High Voltage Cables at Utility Poles
2015 11	2103.02	1	Duct Installation Profiles
2015 11	2103.030	1	Rigid Duct Installation in Existing Paved Area, Unshrinkable Backfill Method
2015 11	2103.040	0	Rigid Duct Installation in Existing Paved Area - Granular Backfill Method
2015 11	2103.050	0	Duct Installation at Utility Crossings
2015 11	2103.060	0	Augering Pits for Subsurface Installation of Ducts and Encasements
92 12 15	2104.01	-	Re Ducts Surface Mounted on Structures
2015 11	2111.020	1	Electrical Maintenance Hole - Precast Concrete - 600 x 1450 mm
2015 11	2111.030	1	Electrical Maintenance Hole - Precast Concrete - 1200 mm Dia.
2015 11	2111.040	1	Electrical Maintenance Hole - Precast Concrete - 1200 x 1650 mm
2015 11	2111.050	1	Electrical Maintenance Hole - Precast Concrete - 1800 x 2400 mm
2009 11	2112.01	2	Electrical Handhole, Precast Concrete with Cover, 300 mm Dia.
2009 11	2112.02	2	Electrical Handhole, Precast Concrete with Cover, 460 mm Dia.
2004 11	2112.030	0	Electrical Handhole Precast Concrete - 675 mm Dia.
2004 11	2112.040	0	Electrical Handhole Precast Concrete - 600 x 600 mm
2009 11	2112.05	1	Electrical Handhole, Precast Concrete with Cover, 300 x 500 mm
2004 11	2113.010	0	Electrical Handhole, Non and Semi-Concrete, General Requirements



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2013 11	2116.01	1	Drainage Facilities for Electrical Maintenance Holes
2013 11	2116.02	1	Electrical Maintenance Hole, Drains to Drainage Pockets, Embankment Outlets, and Ditches
2013 11	2116.03	1	Electrical Maintenance Hole, Drains to Storm Sewer Systems
2013 11	2117.01	2	Electrical Maintenance Holes, General Installation Requirements
2013 11	2117.02	3	Electrical Handholes, General Installation Requirements
2009 11	2118.010	0	Electrical Chamber Installation in Median
2009 11	2118.020	0	Electrical Chamber Installation in Slope
2013 11	2123.01	1	Electrical Maintenance Holes, Entry of Direct Buried Ducts
2013 11	2123.02	1	Electrical Maintenance Holes, Entry of Encased Ducts
2013 11	2123.03	2	Electrical Handholes, Entry of Direct Buried and Encased Ducts
2010 11	2126.010	2	Distribution Assembly, Concrete Pad and Ducts, Plan and Section A-A
2010 11	2126.020	2	Distribution Assembly, Concrete Pad and Ducts, Section B-B
2013 11	2130.010	0	Supply Control Cabinet Installation Overhead Services, Top Entry Metering
2013 11	2130.011	0	Supply Control Cabinet Installation, Underground Services, Bottom Entry Metering
2013 11	2130.012	0	Supply Control Cabinet Installation, Overhead Services, Bottom Entry Metering
DIVISION 2200 - FOUNDATIONS, ETC.			
2012 11	2200.01	2	Concrete Footing for Base Mounted Lighting and Signal Poles
2010 11	2200.011	0	Raised Concrete Footing for Base Mounted Lighting Poles
2013 11	2200.02	1	Concrete Foundation for Direct Buried Lighting Poles Where Rock is Encountered
2012 11	2200.03	2	Concrete Foundation for Base Mounted Lighting Poles Where Rock is Encountered
2014 11	2200.04	2	Concrete Footing and Anchorage Assembly for 3.3 m Base Mounted Metal Pole



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2014 11	2200.041	0	Concrete Footing for 1.5 m Base Mounted Pedestrian Push Button Pole
2001 11	2200.070	0	Pole Footing in Earth for Cast-In-Place Concrete Barrier
2001 11	2200.080	0	Pole Footing in Rock for Cast-In-Place Concrete Barrier
2013 11	2210.010	0	Local Grading at Pole Foundations
2007 04	2210.020	1	Installation of Direct Buried Poles in Slopes
2005 11	2210.030	0	High Mast Lighting Pole, Apron
2015 11	2215.02	4	Anchorage Assembly for Lighting and Signal Poles
2015 11	2215.025	0	Anchorage Assembly for Heavy Class Steel Pole and Sectional Steel Pole
2014 11	2215.03	4	Pole Mounting Details for Base Mounted Metal Pole
2015 11	2216.010	2	Anchorage Assembly for Pole Footing in Concrete Barrier
2003 11	2218.010	0	High Mast Lighting Pole Anchorage Assembly Placement
2010 11	2220.01	1	Pole Handhole Locations
2006 11	2225.010	0	Concrete Lighting Pole, Direct Buried
2006 11	2228.010	0	Metal Lighting Pole, Base Mounted
2006 11	2232.010	0	Sectional Steel Pole with Brackets, Luminaire, and Traffic Signal Head
2012 11	2235.01	2	Pole Guying Details
2013 11	2236.010	0	Wooden Pole and Anchorage Settings in Solid Rock 1
2013 11	2236.020	0	Wooden Pole and Anchorage Settings in Solid Rock 2
2010 11	2238.01	1	Wooden Pole in Earth
2013 11	2239.010	0	Cribbing for Wood Poles in Muskeg
2013 11	2239.020	0	Log Anchor for Guy in Muskeg
2006 11	2240.01	2	Wood Pole with Elliptical Bracket, Overhead and Underground Circuits
2013 11	2242.01	1	Wooden Pole with Neutral Supported Cable



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DATE	OPSD NO.	REV.	TITLE
2013 11	2242.02	2	Wooden Poles with Aerial Signal Cables Lashed on Messenger
2004 11	2245.01	2	Installation of Aerial Cable Systems
2011 11	2245.020	1	Minimum Vertical Clearances for Aerial Cable Systems
2006 11	2250.01	5	Aluminum Tapered Elliptical Brackets on Metal and Concrete Poles, Mounting Details
2013 11	2255.010	1	Pole Wiring Diagram - 120V System
2013 11	2255.020	1	Pole Wiring Diagram - 120/240V System
2013 11	2255.030	1	Pole Wiring Diagram - 347/600V System
2013 11	2255.040	1	Pole Wiring Diagram, Lighting Pole on Bridge Structure

DIVISION 2300 - WORK ON STRUCTURE

2013 11	2300.010	1	Rigid PVC Junction Box, Type P1
2013 11	2300.020	1	Rigid PVC Junction Box, Type P2
2013 11	2300.030	1	Rigid PVC Junction Box, Type P4
2010 11	2302.010	1	Embedded Work Detail for Rigid PVC Junction Box, Type P3-1, for Use in Concrete Barrier Wall
2013 11	2302.020	0	Expansion and Deflection Fitting Assembly for 50 and 75 mm Rigid Ducts
2013 11	2302.040	1	Embedded Work in Structure, New Jersey Type Concrete Barrier Wall
2014 11	2302.045	0	Embedded Work in Structure, Parapet Wall
2001 11	2305.020	1	Underpass Luminares Wall Mounted Installation
2001 11	2310.010	0	Underpass Luminaire Ceiling Mounted Installation with Tee Bracket
2009 11	2310.020	1	Tee Bracket for Ceiling Mounted Underpass Luminaire
2001 11	2310.030	0	Wedge Mounting Bracket for Underpass Luminaire
2001 11	2310.040	0	Support Bracket for Column Mounted Underpass Luminaire
2002 11	2315.010	0	Underpass Luminaire Wiring Detail



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DIVISION 2400 - PURCHASING STANDARDS			
2013 11	2400.000	2	Distribution Assembly Legend
2010 11	2400.010	2	Distribution Assembly, Cabinet
2008 11	2400.020	1	Distribution Assembly, Equipment Layout
2013 11	2400.030	2	Distribution Assembly Wiring Schematic
2008 11	2400.100	0	Warning Signs for Electrical Equipment
2010 11	2400.101	0	Warning Signs Outside Electrical Equipment
2012 11	2410.01	3	Spun Concrete Pole
2012 11	2410.020	0	18.3 m Spun Concrete Pole for TV Camera Mounting
2015 11	2414.010	0	3.3m Aluminum and Sectional Steel Poles, Base Mounted
93 12 15	2415.010	-	Steel Pole - Base Mounting
2010 11	2415.011	0	Steel Pole, Base Mounted Without Gussets
93 12 15	2416.010	-	Steel Pole - Concrete Barrier Mounting
2010 11	2416.011	0	Steel Pole, Concrete Barrier Base Mounted Without Gussets
2007 04	2418.010	1	1.8 m and 2.7 m Steel Truss Bracket for Steel Poles
2007 04	2420.01	4	1.8 m and 2.7 m Aluminum Tapered Elliptical Bracket
2005 11	2421.010	0	Lamp Wattage Label for Luminaire
2010 11	2428.01	3	Frangible Bases
2010 11	2432.010	1	Aluminum Pole - Base Mounted
2014 11	2440.010	1	Supply Control Cabinet Assembly Type 1, 120/240V, 100A, 1-Phase, 3-Wire
2014 11	2440.020	1	Supply Control Cabinet Assembly Type 2, 120/208V, 100A, 3-Phase, 4-Wire
2014 11	2440.021	0	Supply Control Cabinet Assembly Type 2, 347/600V, 100A, 3-Phase, 4-Wire
2014 11	2440.030	1	Supply Control Cabinet Assembly Type 1 and 2, Enclosure
2014 11	2440.04	1	Pole Mounting Bracket for Supply Control Cabinet Assembly



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2014 11	2440.050	1	Supply Control Cabinet Assembly Type 1 and 2, Dead Front Panels
2014 11	2440.060	1	Supply Control Cabinet Assembly Type 1 and 2, 3-Point Door Latch
2014 11	2440.061	0	Supply control Cabinet Assembly Type 1, 2, and 3, 3-Point Stainless Steel Door Handle
2014 11	2441.000	1	Supply Control Cabinet Assembly Type 3, 120/240V, 100A, 1-Phase, 3-Wire
2014 11	2441.010	1	Supply Control Cabinet Assembly Type 3, Enclosure
2014 11	2441.020	1	Supply Control Cabinet Assembly Type 3, Dead Front Panels
2014 11	2441.030	0	Supply Control Cabinet Assembly Type 3, 3-Point Door Latch
2015 11	2442.010	0	Duct Hanger
2003 11	2450.010	0	High Mast Lighting, 25, 30, and 35 m Octagonal Pole with Double Base Plate
2003 11	2450.011	0	High Mast Lighting Pole, 25, 30, and 35 m 8-Sided Pole
2003 11	2450.020	0	High Mast Lighting, 40 and 45 m Octagonal Pole with Double Base Plate
2003 11	2450.021	0	High Mast Lighting Pole, 40 and 45 m 12-Sided Pole
2003 11	2452.010	0	High Mast Lighting, 25, 30, and 35 m Round Pole with Double Base Plate
2003 11	2452.020	0	High Mast Lighting, 40 and 45 m Round Pole with Double Base Plate
2004 11	2453.000	0	High Mast Lighting Pole, Luminaire and Handhole Orientation
2003 11	2453.010	0	High Mast Lighting Pole, Cable Holder, and Storage Hook Details
2004 11	2453.020	0	High Mast Lighting Pole, Handhole Cover Hinges, Latches, and Padlock
2003 11	2453.050	0	High Mast Lighting Pole, Nameplate Details
2005 11	2453.060	0	High Mast Lighting Pole, Flood Light Luminaire Mounting Details
2006 11	2453.070	1	High Mast Lighting Pole, Luminaire Support Ring
2009 04	2453.080	1	High Mast Lighting Pole, Head Frame and Ring Assembly
2005 11	2453.090	0	High Mast Lighting Pole, Luminaire Shroud



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2005 11	2453.091	0	High Mast Lighting Pole, Luminaire Shroud Details
2004 11	2453.140	0	High Mast Lighting Pole, Internal Drive Raising and Lowering Equipment - List of Components
2004 11	2453.150	0	High Mast Lighting Pole, Internal Drive Raising and Lowering Equipment - Layout
2004 11	2453.160	0	High Mast Lighting Pole, Internal Motor and Winch Details
2005 11	2453.170	0	High Mast Lighting Pole, Internal Drive Raising and Lowering Equipment, 347/600V, 3-Phase, Wiring Diagram
2005 11	2453.180	0	High Mast Lighting Pole, Internal Drive Raising and Lowering Equipment, 120/240V, 1-Phase, Wiring Diagram
2004 11	2453.190	0	High Mast Lighting Pole, External Drive Raising and Lowering Equipment - List of Components
2004 11	2453.200	0	High Mast Lighting Pole, External Drive Raising and Lowering Equipment - Layout
2005 11	2453.210	0	High Mast Lighting Pole, External Drive Raising and Lowering Equipment, 347/600V, 3-Phase, Wiring Diagram
2005 11	2453.220	0	High Mast Lighting Pole, External Drive Raising and Lowering Equipment, 120/240V, 1-Phase, Wiring Diagram
2003 11	2454.010	0	High Mast Lighting Pole, Double Base Plate Details
2003 11	2456.010	0	High Mast Lighting Pole Anchorage Assembly Details for Double Base Plate
2003 11	2456.011	0	High Mast Lighting Pole Anchorage Assembly Details
DIVISION 2500 - TRAFFIC SIGNALS			
2011 11	2500.010	1	600 mm Signal Arm and Signal Head
2009 11	2500.020	1	600 mm Signal Arm Attachment to Poles
2011 11	2501.01	2	Single Member Arm and Signal Head
2011 11	2501.02	2	Aluminum Single Member Arm Attachment Details
2007 11	2502.010	0	Traffic Signal, Adjustable Mid-Section Hanger
2007 11	2502.011	0	Traffic Signal, Dual-End Hanger
2014 11	2505.010	1	Traffic Signal, Pedestrian Head and Push Button Mounted on Pole
2011 11	2508.010	0	Traffic Signal, Sectional Steel Poles with Primary and Secondary Signal Heads for Ramp Metering
2012 11	2510.010	0	Pole Mounted Controller Cabinet



**ONTARIO
PROVINCIAL
STANDARD
SPECIFICATION**

**VOLUME 4 INDEX
MUNICIPAL AND PROVINCIAL COMMON
DRAWINGS FOR ELECTRICAL WORK**

DATE	OPSD NO.	REV.	TITLE
2011 11	2510.020	0	Mounting Bracket for Pole Mounted Controller Cabinet
2012 11	2514.010	0	Controller Cabinet on Pad
2012 11	2514.020	0	Concrete Pad for Controller Cabinet
2012 11	2516.102	0	Traffic Data Collection, Data Station, Traffic Counting Station Type 2
2012 11	2518.101	0	Prefabricated Detector Loop
2012 11	2518.102	0	Traffic Data Collection, Detector Loops, Heavy Duty Rubber
2012 11	2520.010	0	Loop Detector Installation Details I
2012 11	2520.02	4	Loop Detector Installation Details II
2007 11	2522.010	0	Traffic Signal, Cushion Hanger
2009 11	2524.01	1	Traffic Signal, Double Arm Bracket
2012 11	2526.01	1	Traffic Signal Bracket for Mounting Pedestrian Instruction Sign on Pole
2010 11	2528.01	2	Traffic Signal Equipment, Pole Wiring Diagram
2015 11	2529.010	1	Signal Wiring for Pedestrian Facilities
2012 11	2529.020	0	Signal Wiring Using 4/C Cable Connected Radially, 2 Phase
2012 11	2529.030	0	Signal Wiring Using 12/C Cable Tapped, 2 to 8 Phase
2012 11	2529.040	0	Signal Wiring Using 4/C and 12/C Cable Tapped, 2 to 8 Phase
2012 11	2529.050	0	Signal Wiring Using 4/C Cable Connected Radially, 2 to 8 Phase
2012 11	2529.060	0	Signal Wiring Using 4/C Cable Connected Radially, and 12/C Cable Tapped, 2 to 8 Phase
2012 11	2529.070	0	Signal Wiring Using 19/C Cable Tapped, 2 to 8 Phase
2012 11	2529.080	0	Signal Wiring Using 7/C Cable Connected Radially T-Intersection, 2 to 3 Phase
2012 11	2529.090	0	Signal Wiring Using 4/C Cable Connected Radially T-Intersection, 2 Phase
2013 11	2530.01	1	Splices for Traffic Signal Cable and Extra Low Voltage Cable
2015 11	2536.010	2	Flasher Beacons for Roadway Sign and Downlight and Wiring Diagram



**ONTARIO
PROVINCIAL
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SPECIFICATION**

**VOLUME 4 INDEX
MUNICIPAL AND PROVINCIAL COMMON
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DATE	OPSD NO.	REV.	TITLE
2015 11	2536.030	0	Solar Powered LED Flasher Beacon and Wiring Diagram for Roadway Sign, Base Mounted Pole
2015 11	2536.032	0	Solar Powered LED Flasher Beacon and Wiring Diagram for Roadway Sign, Direct Buried Pole
2013 11	2540.01	4	Aerial Traffic Signal Installation
2013 11	2540.02	2	Aerial Flasher Beacon Installation
2013 11	2540.030	0	Aerial Suspension Mounting Bracket, Signal Heads and Flashing Beacons
2009 11	2540.100	0	Aerial Suspension Mounting Bracket, Emergency Pre-Emption Unit
2012 11	2545.01	1	PVC Junction Box for Signal Cable Splicing
2014 11	2547.010	1	Traffic Signal and Illumination Grounding System
2011 11	2552.01	2	Traffic Signal System Equipment on Wooden or Concrete Poles, Overhead Wiring Installation
2011 11	2554.010	0	Traffic Signal System Equipment on Wooden or Concrete Poles, Underground Wiring Installation
2014 11	2558.000	0	Pole for Accessible Pedestrian Signal Push Button

DIVISION 26 - SIGN LIGHTING

CURRENTLY NO DRAWINGS

DIVISION 29 – ADVANCED TRAFFIC MANAGEMENT SYSTEM (ATMS)

2015 11	2902.322	0	Advanced Traffic Management System, Supply Control Cabinet, 120V, 100A, 1-Phase, 3 Wire

A	ampere	JB	junction box
AC	alternating current	LAN	local area network
Al	aluminum	LCS	lane control sign
AMB	amber	LD	loop detector
APS	accessible pedestrian signal	LED	light emitting diode
ATMS	Advanced Traffic Management System	LS	light standard
AWG	American Wire Gauge	LV	low voltage
BGRD	bare ground	MH	electrical maintenance hole
BLK	black	NEUT	neutral
BLU	blue	NIC	not included in contract
CCT	circuit	OESC	Ontario Electrical Safety Code
CCTV	closed-circuit television	Ω	ohm
CDT	conduit	PB	pedestrian push button
CEC	Canadian Electrical Code	PCS	permanent counting station
COMM	communication	PUC	public utilities commission
COND	conductor	PVC	polyvinyl chloride
CONT	control	PVMS	portable variable message sign
C/W	complete with	PWR	power
Cu	copper	PXO	pedestrian crossover
DB	direct buried	QWS	queue warning sign
DC	direct current	RF	radio frequency
DET	detector	RFI	radio frequency interference
EC	electrical chamber	RLC	red light camera
EL	electrical	RMS	ramp metering station
ELV	extra-low voltage	TC	traffic signal controller cabinet
EMI	electromagnetic interference	TD	transit detector
EQPT	equipment	TS	traffic signal
EXP	expansion joint	XFMR	transformer
F	farad	UPC	underpavement crossing
GRD	ground	UPS	uninterruptible power supply
GRN	green	V	volt
μH	micro henry	VA	volt ampere
HAR	highway advisory radio	VD	video detector
HEC	hydro electric commission	VDS	vehicle detector station
HH	electrical handhole	VMS	variable message sign
HV	high voltage	W	watt
Hz	hertz	Wh	watt hour
IGRD	insulated ground, green	WHT	white
IMPD	impedance	WWR	welded wire reinforcement
IND	inductance	YEL	yellow
IPS	iron pipe size		
ITS	Intelligent Transportation Systems		

ONTARIO PROVINCIAL STANDARD DRAWING

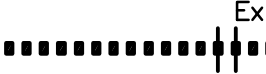
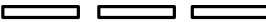
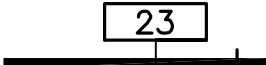
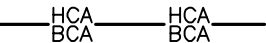
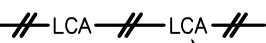
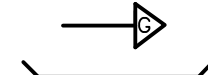
Nov 2009 Rev 0

ABBREVIATIONS

GENERAL



OPSD 2000.001

	ducts and/or cables, underground
	ducts and/or cables, surface mounted
	ducts and/or cables embedded, Exp indicates expansion joint
	cables, installed in existing ducts
	cables, aerial
	cables, in pavement slot
	ducts and/or cables, future by others
	underpavement crossing identification code, Note 1
	reference point with identification code, Note 1
	duct stub with plug
	existing cables and/or ducts to remain in place
	existing cables and/or ducts to be removed
	existing cables and/or ducts to be abandoned
identification codes	
identification codes for existing duct or cable usage, Note 2	
BC	Bell cable
CC	communications cable
DC	extra-low voltage detector cable
FO	fiber optic cable
GC	guy cable
HC	hydro cable
LC	lighting cable
PC	power cable
TS	traffic signal cable
TV	television cable
	ground electrodes
	cable protection bricks, concrete cap, or marker tape in trench
	identification code for removal equipment

NOTES:

- 1 Identification codes may be used with any duct or cable symbol.
- 2 Add suffix U for underground or suffix A for aerial.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2009

Rev 0

GENERAL SYMBOLS

DUCTS AND CABLES

OPSD 2011.101



	MH32	electrical maintenance hole with identification code
	JB36	junction box, embedded or surface mounted with identification code
	HH21	electrical handhole, underground with identification code
	CP33	concrete pad with identification code
	F43	footing in earth or rock with identification code
	F44	footing on structure with identification code
	SF3	sign footing with identification code

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2009

Rev 0



GENERAL SYMBOLS

MAINTENANCE HOLES, JUNCTION BOXES,
PADS, AND FOOTINGS

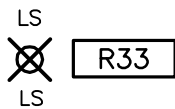
OPSD 2011.201



pole with identification code



existing pole to remain with identification code



existing pole to be removed with identification code

identification codes for existing pole usage:

- A authority owned pole
- B Bell pole
- C communications pole
- GP guy pole
- H hydro pole
- HM high mast lighting pole
- LS lighting pole
- TS traffic signal pole
- TV television pole



single guy with single anchor



double guy with single anchor



double guy with double anchor



single guy with sidewalk strut and single anchor

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2009

Rev 0

GENERAL SYMBOLS

POLES AND GUYING

OPSD 2011.401





solar power



power supply equipment, pole mounted



transformer



generator



power supply equipment, pad and/or footing mounted

SUPPLY 'A'
120/240V, 1Ø 3W
METERED

power supply equipment identification code, other applicable description may be used for transformer, generator, etc.



photoelectric controller

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2009

Rev 0

GENERAL SYMBOLS
POWER SUPPLY EQUIPMENT

OPSD 2011.501





controller cabinet, front door opens on side indicated



controller cabinet with adjacent power supply cabinet on side indicated, front door opens on side indicated



controller cabinet with attached external communications interface box on side indicated, front door opens on side indicated



controller cabinet, pad and/or footing mounted



two controller cabinets, pad and/or footing mounted, side by side type



two controller cabinets, pad and/or footing mounted, in-line type



identification code for traffic signal controller cabinet



UPS uninterruptible power supply cabinet



UPS controller cabinet with uninterruptible power supply cabinet



UPS controller cabinet, pad and/or footing mounted complete with internal uninterruptible power supply

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2013

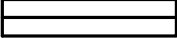
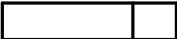
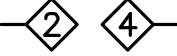
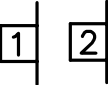
Rev 1

GENERAL SYMBOLS

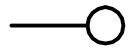
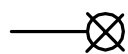
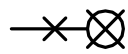
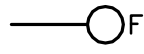
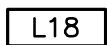
CONTROL EQUIPMENT



OPSD 2011.601

	LD2	simple loop detector with identification code
	LD3	duplex loop detector with identification code
	LD4	powerhead loop detector with identification code
	LD5	diamond loop detector with identification code
		numbers shown within loops indicate loop numbers in a set
	EV1	emergency vehicle pre-emption with identification code
	MD1	non-intrusive traffic sensor: microwave, light wave, or sonic wave detector with identification code
		micro loop detector, number shown inside loop indicates loop number in a set
	PB1	accessible pedestrian push button and direction arrow with identification code
	VD1	video camera or video camera detector with identification code
		multi-leg detection camera
 or 		red light camera

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2014	Rev	2	
GENERAL SYMBOLS TRAFFIC ACTUATION DEVICES	----- -----				
	OPSD 2011.701				

	luminaire
	luminaire with photoelectric controller
	luminaire with shield
	floodlighting luminaire
	underpass or surface mounted luminaire
	luminaire, number shown indicates luminaire location on high mast ring with respect to pole handhole
	luminaire with bracket
	existing luminaire to be removed, bracket to remain
	existing luminaire and bracket to be removed
	future luminaire and bracket
	luminaire identification code

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2009

Rev 0

HIGHWAY LIGHTING SYMBOLS

LUMINAIRES

OPSD 2012.101



	TS4	illuminated traffic sign, single side with identification code
	TS5	illuminated traffic sign, double side with identification code
	FB3	illuminated traffic sign with flashing beacon with identification code
	FB4	flashing beacon with identification code
	FB5	flashing beacons, 4-way, with identification code
	FM2	flasher mechanism with identification code
	PX03	pedestrian crossover with identification code
	TS8	traffic sign, overhead sign support with static sign and identification code
	TS9	traffic sign, overhead sign support with changeable message sign and identification code
	TS10	traffic sign, overhead sign support with lane control signs and identification code; may be used in combination with static or changeable message sign

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2009	Rev	0	
ELECTRICAL TRAFFIC CONTROL SYMBOLS TRAFFIC CONTROL DEVICES		----- -----			
		OPSD 2013.101			

	highway signal head, 300mm red, 200mm amber and green lenses, with backboard
	highway signal head, all 300mm lenses, with backboard
	standard signal head, all 200mm lenses
	standard signal head, all 200mm lenses, with backboard
	special signal head with backboard, lens sizes as per Table 1; number indicates type of signal head as per Table 1
	pedestrian signal head, two section or bimodal type
	pedestrian signal head, two section type c/w pedestrian countdown
	span wire mounting, highway signal head with backboard, Note 1
	mast arm mounting, highway signal head with backboard shown, Note 1
	double arm bracket mounting, highway signal head with backboard shown, Note 1

TABLE 1 – SPECIAL SIGNAL HEAD CONFIGURATIONS

Type	No. of Sections	Lens Size in mm and Arrow Indication						
		Transit Bar	Red	Amber	Green	Arrow		
1	3		300	300	—	300 ↑	GRN	—
2	3		300	300	—	300 ←	GRN	—
3	3		300	300	—	300 →	GRN	—
4	4		300	300	—	300 ↑	GRN	300 ← GRN
5	4		300	300	—	300 ↑	GRN	300 → GRN
6	4		300	300	—	300 ←	GRN	300 → GRN
7	5		300	300	—	300 ↑	GRN	300 ← GRN
8	5		300	200	200	300 ←	AMB	300 → GRN
8A	5		300	300	300	300 ←	AMB	—
9	4		300	200	200	300 ←	AMB/GRN	—
9A	4		300	300	300	300 ←	AMB/GRN	—
10	4		300	200	200	300 ←	GRN	—
10A	4		300	300	300	300 ←	GRN	—
11	4		300	200	200	300 →	GRN	—
11A	4		300	300	300	300 →	GRN	—
12	4	200	300	200	200	—	—	—
12A	4	300	300	300	300	—	—	—

AMB—Amber GRN—Green AMB/GRN— Amber and Green

NOTE:

1 Highway signal head symbol shown is for illustration only, other signal head symbols may be used.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2009	Rev	0	
ELECTRICAL TRAFFIC CONTROL SYMBOLS TRAFFIC SIGNAL DISPLAYS	-----			

OPSD 2013.201				



cables to be installed in the same duct



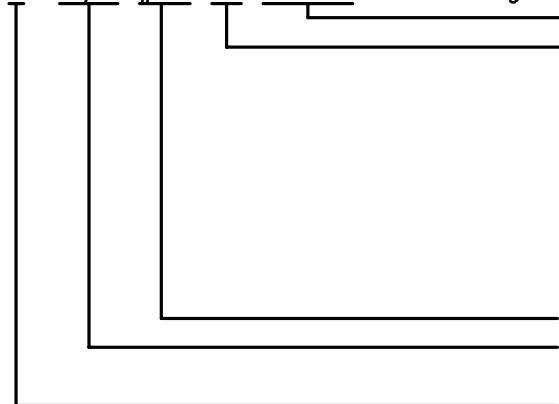
spare duct for future use



conductors, single or multiple, identified by note

2-19/C #14 TS-75mm

wiring identification note



duct size, aerial or direct buried

type of cable:

TS traffic signal

HV high voltage

LV low voltage

ELV extra-low voltage

CONT control

BGRD bare ground

IGRD insulated ground (green)

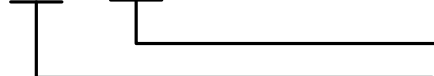
AWG size of conductor

number of conductors in cable,

not required for single conductor

number of cables

8SM, 16MM



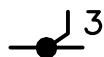
fiber optic cable

number of multi-mode fibres

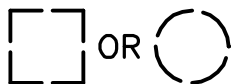
number of single mode fibres



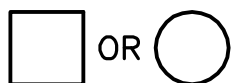
in-line cable splice, number denotes number of cables



tap cable splice, number denotes number of cables



wiring enclosure and electrical chambers
identification code matches layout drawings



equipment item, (e.g., poles and cabinets)
identification code matches layout drawings

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2009

Rev 0

WIRING SYMBOLS

WIRING DIAGRAMS 1

OPSD 2014.101



single phase 2 wire system:

BLK	black, line
WHT	white, neutral
GRN	green, ground

single phase 3 wire system:

RED	red, line 1
BLK	black, line 2
WHT	white, neutral
GRN	green, ground

three phase 4 wire system:

RED	red, line 1, phase a
BLK	black, line 2, phase b
BLU	blue, line 3, phase c
WHT	white, neutral
GRN	green, ground

A RED 7

circuit identification code:

A denotes supply location A

RED denotes red, line 1

7 denotes breaker or switching device no. 7

NOTES:

- A Wiring diagrams use electrical and electronic symbols common to industry practice. Refer to CSA Z99 for symbols not included in this legend.
- B Symbols for existing and future items are included only for widely used items. In general, existing features are shown in screened or light lines and/or shown with a letter E, new construction is shown in bold or heavy lines, and future work by others is shown in light dashed lines and/or shown with a letter F. Prefix E or F in identification code indicates existing or future respectively
- C Where quantity sheets are not used, location, size, quantity, and type of equipment to be installed may be indicated by notation on the layout drawings.
- D Symbols crossed out with an X indicates removal. Symbols crossed out with a double stroke // indicates abandoned.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2009

Rev 0

WIRING SYMBOLS

WIRING DIAGRAMS 2

OPSD 2014.102



XXXLLNNNNMMLL

freeway identification

(e.g., QEW, 401, and 400)

equipment (station) type

D = vehicle detection station
L = LCS/QWS station
V = VMS station
T = CCTV station
R = ramp metering station
C = cabinet site
M = central equipment

direction from reference point

E = east
W = west
N = north
S = south
T = Toronto
B = border
X = for central equipment

equipment (station) number, Note 1

143 = station number 143
007 = station number 7

interspace (station) number, Note 3

0 = no interspaced devices
(original design)
5 = first interspace number
1 to 4 = station interspaced between
station 0 and 5 (future use)
6 to 9 = station interspaced between
station 5 and next station

type of roadway

E = express lanes
C = collector lanes
R = ramp
T = transfer roadway
A = connecting arterial
F = connecting freeway
S = standard freeway
X = for central equipment

direction of traffic

E = eastbound
W = westbound
N = northbound
S = southbound
X = for central equipment
T = Toronto bound
B = border bound

type of devices or
element number

Note 2

C = comm
D = VDS type
E = VDS, VMS
G = VDS, CCTV
H = VDS, RMS, VMS
I = interface (others)
J = VDS, RMS, CCTV
K = VDS, VMS, CCTV
L = LCS/QWS type
M = TPR type
N = RMS, VMS
O = VDS, CCTV, QWS
P = power (UPS station)
Q = RMS, VMS, CCTV
R = RMS and VDS type
S = LCS/QWS and VDS type
T = CCTV type
U = lift bridge
V = VMS type
W = CCTV and VMS type
X = RMS, LCS/QWS, and VDS type
Y = CCTV and LCS/QWS type
Z = VMS and LCS/QWS type
1 to 0 = VDS element number
of the first 5 lanes
A and B = VDS element number
of the 6th lane

NOTES:

- 1 Numbering begins at the reference points. For D, L, and V stations, devices related to roadway usage are numbered sequentially in the same set of lanes with transitions between a single roadway and an express – collector type freeway, the count is increased by 100 from last similar situation. For T, R, and C stations, devices not related to lanes are numbered sequentially along the roadway.
 - 2 The element number applies to lane usage for detector stations; individual loops are numbered starting in the upstream passing lane.
 - 3 The interspace number is normally 0. This number may be used in future if it is found necessary to interspace any equipment.
- A This OPSD to be read in conjunction with OPSD 2015.202.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2009

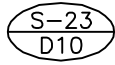
Rev 0

ADVANCED TRAFFIC MANAGEMENT SYMBOLS
UNIVERSAL TRAFFIC MANAGEMENT SYSTEM
EQUIPMENT IDENTIFIER I

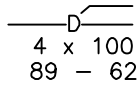
OPSD 2015.201



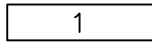
	HIGHWAY	REFERENCE POINT	DIRECTION FROM REFERENCE POINT
CENTRAL REGION	400	Highway 401	north and south
	401	Toronto Traffic Operations Centre	east and west
	403 – Burlington – Hamilton to Oakville	Freeman Interchange	east and west
	403 – Mississauga – Highway 401 to QEW	Highway 401	west
	404	Highway 401	north and south
	409	Highway 401	west
	410	Highway 401	north
	420	QEW	east
	427	Highway 401	north and south
	QEW – Mississauga/Burlington	Burlington Traffic Operations Centre	Toronto bound (T) border bound (B)
NORTH REGION	400/69	Sudbury	south
	11	Sudbury	north and south
	17	Sudbury	east and west
EAST REGION	416	Highway 417	south
	417	Ottawa Traffic Operations Centre	east and west
WEST REGION	401	London Traffic Operations Centre	east and west
	401 – Windsor	Highway 3	east
	402	Blue Water Bridge	east
	403	Highway 401	east
	405	QEW	east
	406	QEW	south
	58 – Thorold Tunnel	QEW	east
	QEW – Niagara Region	Burlington Traffic Operations Centre	Toronto bound (T) border bound (B)



detail cross – reference:
upper number indicates detail number
lower number indicates ATMS drawing number



identification code for duct usage: underground ducts, existing number and size of existing ducts contract number of duct installation



simple loop detector, number shown inside loop indicates loop number in a set



simple loop detector, number shown inside loop indicates loop number in a set



conventional camera with pan and tilt unit



conventional camera, fixed location, aiming direction indicated by arrow



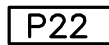
portable variable message sign



dome camera



dome camera with lowering device



communications pedestal with identification code

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2009	Rev	0	
ADVANCED TRAFFIC MANAGEMENT SYMBOLS LAYOUT DRAWINGS		-----			

		OPSD 2015.301			

Identification codes:

C – communications

S – spare

M – municipality (name municipality)

G – Government of Ontario (spare)

D – detector

V – VMS/PVMS

L – LCS/QWS

R – RMS

P – power

TS – traffic signals

T – CCTV

H – HAR

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2009

Rev 0

ADVANCED TRAFFIC MANAGEMENT SYMBOLS

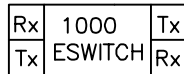
WIRING DIAGRAMS

OPSD 2015.302

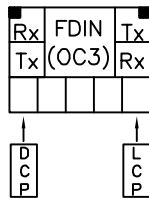




modem with identification codes
M_S fibre optic serial modem
M_B telco modem
M_E fibre optic Ethernet modem



Ethernet switch
numerical value denotes device bandwidth



field drop and insert node

■ indicates primary transmitter (Tx) and receiver (Rx)



data channel port

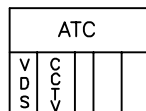
label denotes related subsystem or agency



LAN channel port



port server/protocol converter



advanced traffic controller

RMS – beacon and signal control

VDS – vehicle detection station

CCTV– closed–circuit television camera

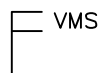
EXT – external devices

QWS – queue warning sign

NITS – non–intrusive traffic sensor



port sharing device



drop cable for future connection
label denotes subsystem type

ONTARIO PROVINCIAL STANDARD DRAWING

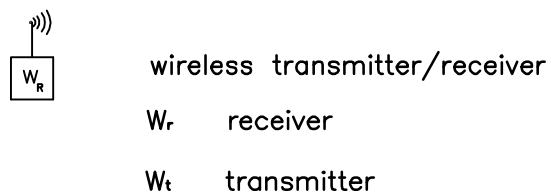
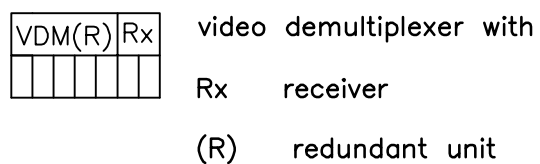
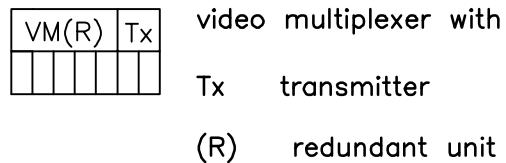
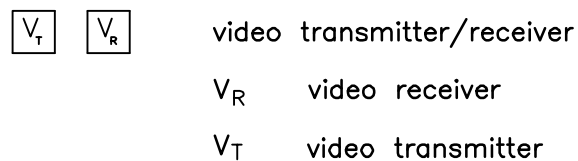
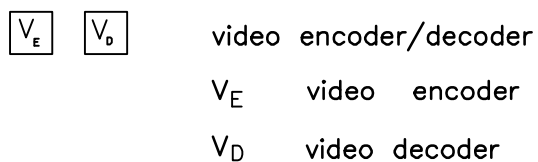
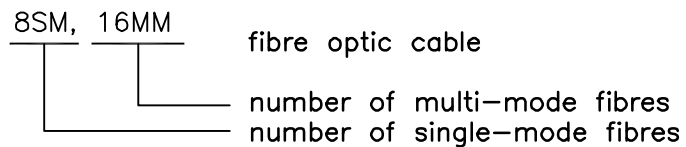
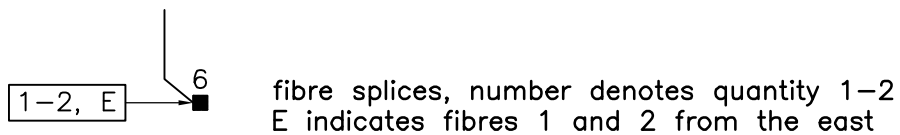
Nov 2009

Rev 0

COMMUNICATIONS SYMBOLS
FIBRE OPTIC COMMUNICATIONS SCHEMATIC 1

OPSD 2016.301





ONTARIO PROVINCIAL STANDARD DRAWING

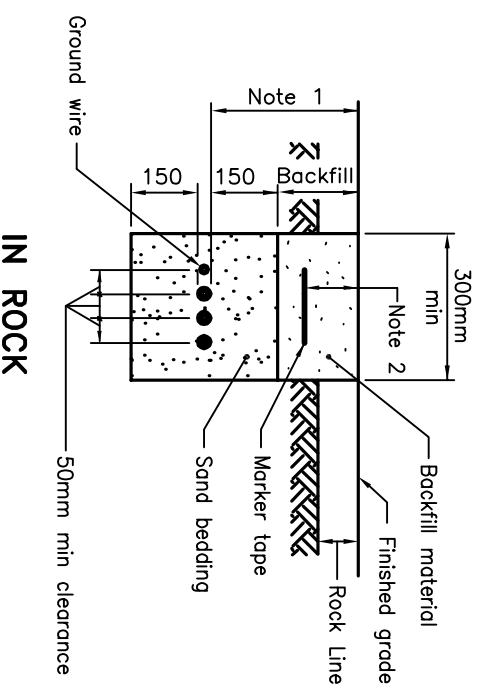
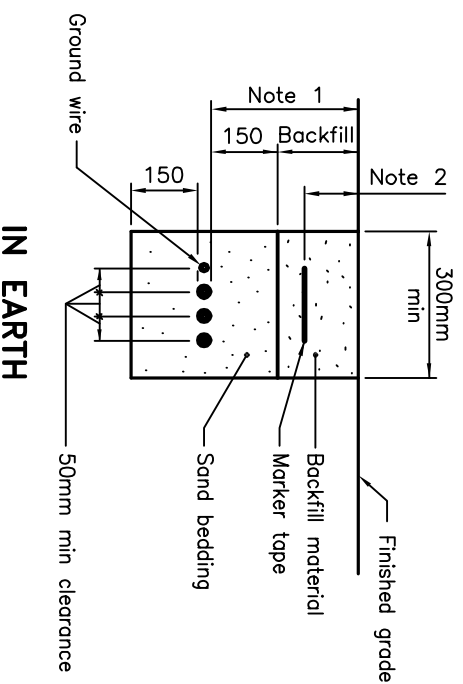
Nov 2009

Rev 0

COMMUNICATIONS SYMBOLS
FIBRE OPTIC COMMUNICATIONS SCHEMATIC 2

OPSD 2016.302



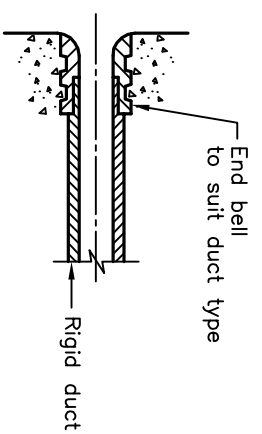
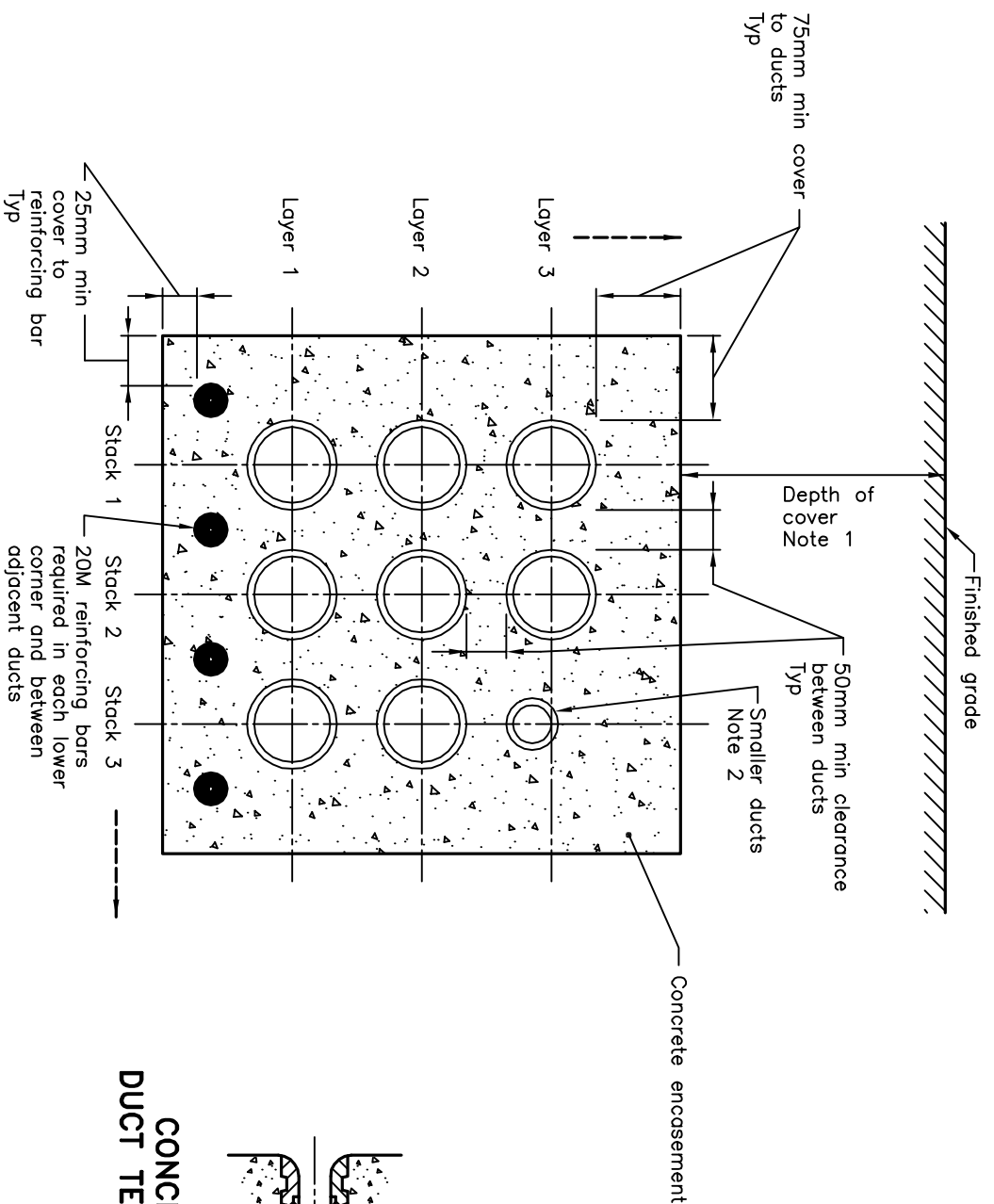


NOTES:

- 1 Depth of cable shall be as specified in the Ontario Electrical Safety Code.
- 2 Depth of marker tape shall be as specified in the Ontario Electrical Safety Code.
- A Ground wire shall be installed as specified in the Contract Documents.
- B Cable brick or concrete slab shall be installed where specified in the Contract Documents. See OPSD 2100.050.
- C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2013	Rev 0
CABLE INSTALLATION IN TRENCHES			
		OPSD 2100.010	





NOTES:

- 1 For depth of cover see OPSD 2103.02.
- 2 Smaller ducts shall be installed in uppermost layers.
- A Maximum number of layers shall be 4, maximum number of stacks shall be 4.
- B All dimensions are in millimetres unless otherwise shown.

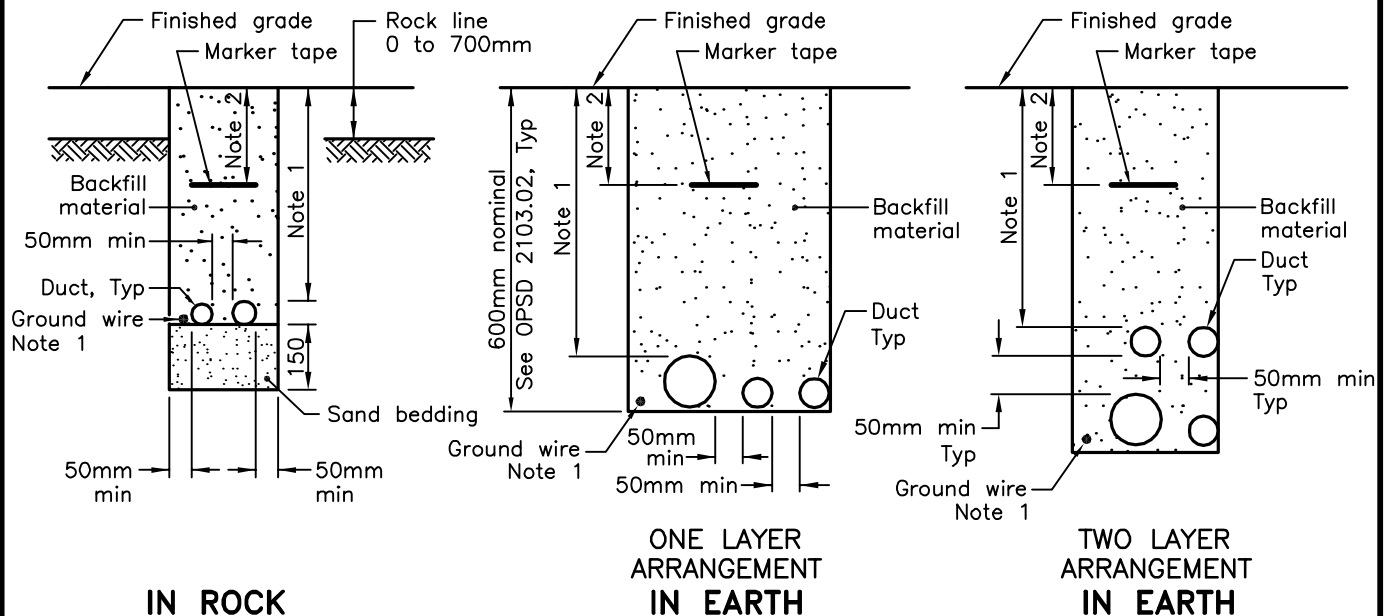
SECTION

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2015	Rev 2
RIGID DUCTS ENCASED IN CONCRETE		-----	

OPSD 2100.06			

MINIMUM TRENCH WIDTH FOR ONE LAYER AND TWO LAYER DUCT ARRANGEMENT

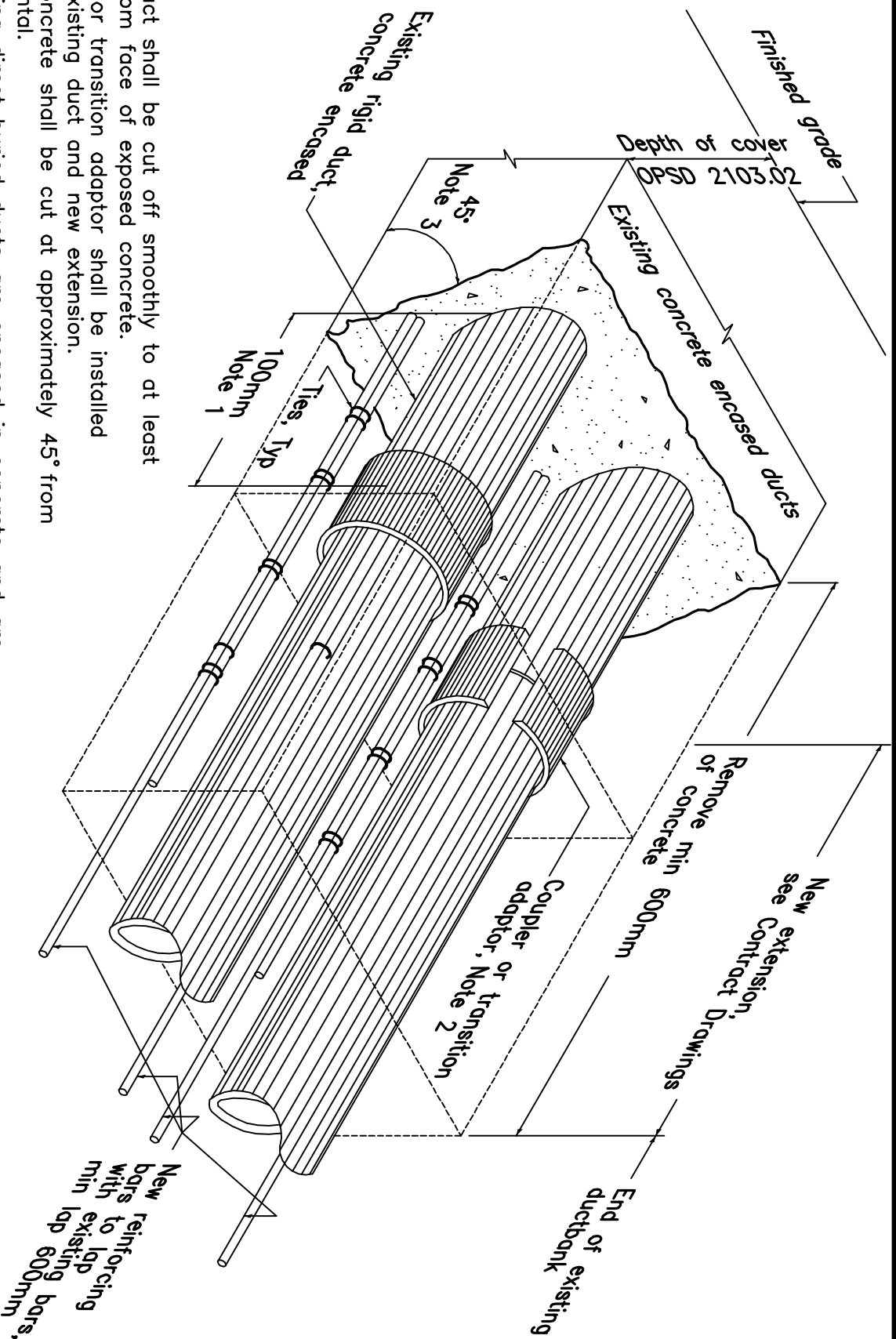
No. OF 100 mm DUCTS	No. OF LAYERS	NUMBER OF 50 mm DUCTS											
		0	1	2	3	4	5	6	7	8	9	10	
0	1	N/A	150	205	300	460	610	N/A	N/A	N/A	N/A	N/A	
	2	N/A	N/A	N/A	N/A	205	300	350	460	460	610	610	
1	1	150	255	460	610	610	N/A	N/A	N/A	N/A	N/A	N/A	
	2	N/A	N/A	205	255	300	460	460	610	610	610	N/A	
2	1	300	460	610	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	2	150	255	255	460	460	610	610	610	N/A	N/A	N/A	
3	1	460	610	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	2	300	300	460	460	610	610	610	N/A	N/A	N/A	N/A	
4	1	610	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	2	300	460	460	610	610	N/A	N/A	N/A	N/A	N/A	N/A	



NOTES:

- 1 Ground wire shall be installed in the duct or trench as specified in the Contract Documents.
 - 2 Depth of marker tape shall be as specified in the Ontario Electrical Safety Code.
- A Cable brick or concrete slab shall be installed where specified in the Contract Documents.
See OPSD 2100.050.
- B This OPSD shall be read in conjunction with OPSD 2103.02.
- C Contractor has the option of installing one or two layer duct arrangement.
- D N/A – Not Applicable, undesirable or exceeding equipment limits.
- E All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2013	Rev	1	
DUCT INSTALLATION IN TRENCHES					
		OPSD 2101.01			



NOTES:

- 1 Existing duct shall be cut off smoothly to at least 100mm from face of exposed concrete.
 - 2 A coupler or transition adaptor shall be installed between existing duct and new extension.
 - 3 Existing concrete shall be cut at approximately 45° from the horizontal.
- A When existing direct buried ducts are encased in concrete and are connected to existing duct bank, Note 1 shall be applied and split duct shall be used as a coupler. Split duct shall be taped.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

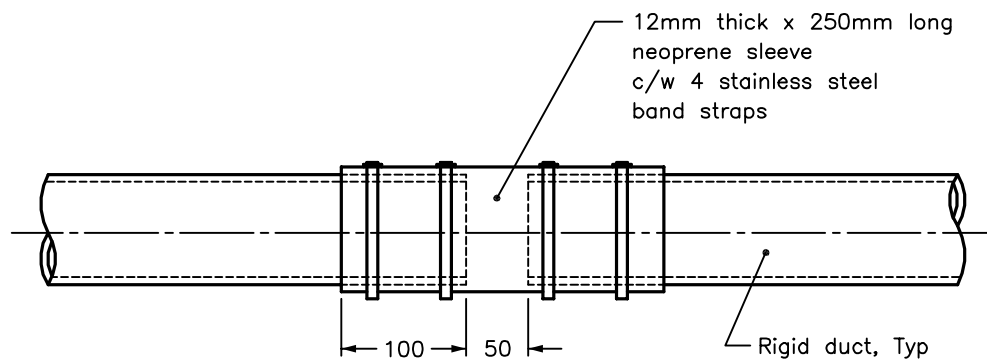
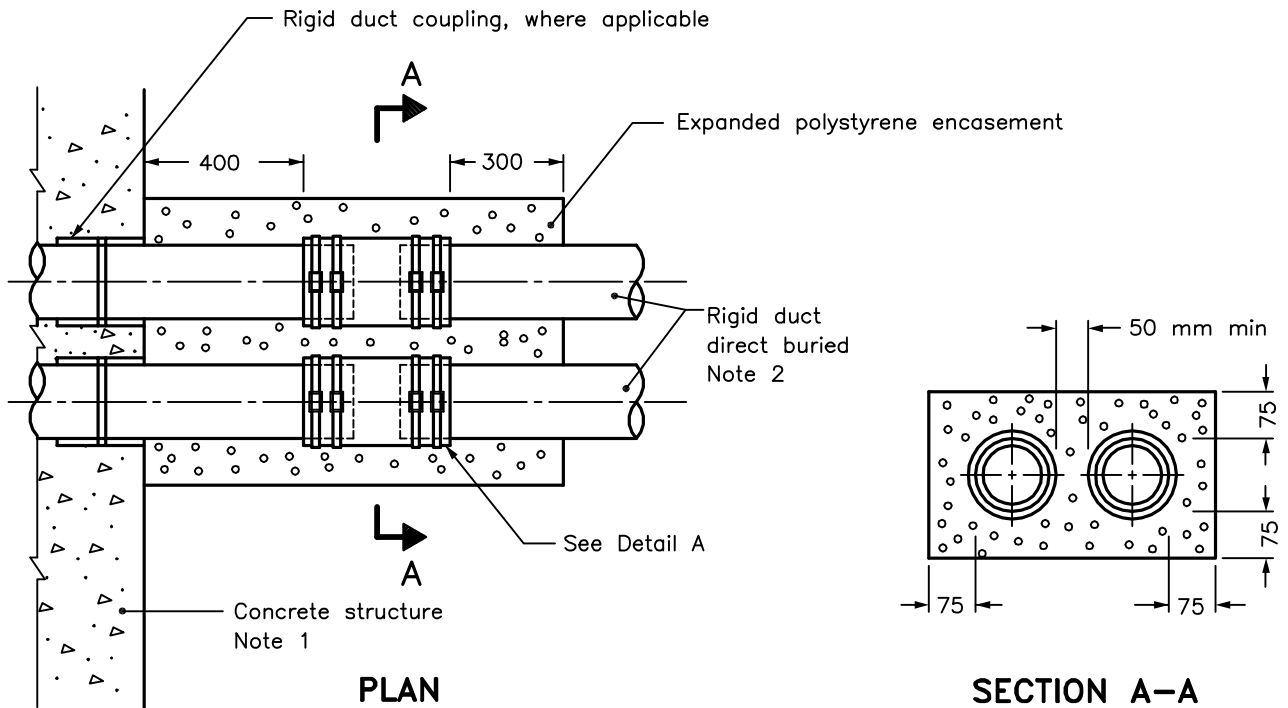
Nov 2013

Rev 0

EXTENSION OF EXISTING RIGID DUCTS ENCASED IN CONCRETE

OPSD 2101.020



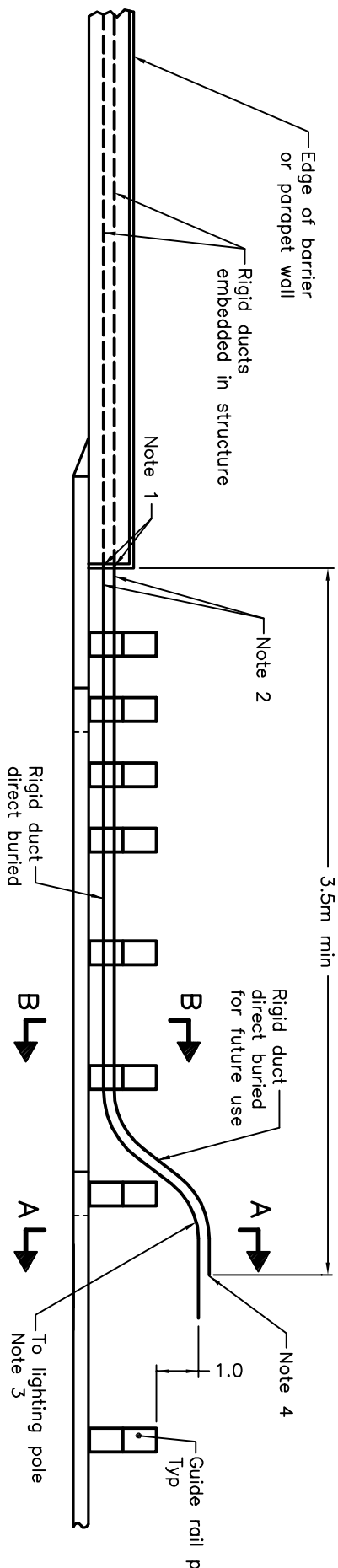


**DETAIL A
WOBBLE JOINT**

NOTES:

- 1 Concrete structures include bridge structure, concrete footing, electrical chamber, concrete duct bank, etc.
- 2 For number, sizes, and orientation of ducts, refer to Contract Drawings.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev	1	
UNDERGROUND RIGID DUCT CONNECTION AT CONCRETE STRUCTURE	----- -----			
	OPSD 2102.01			

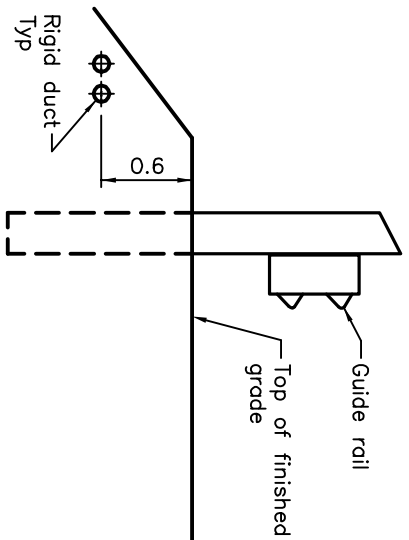


PLAN

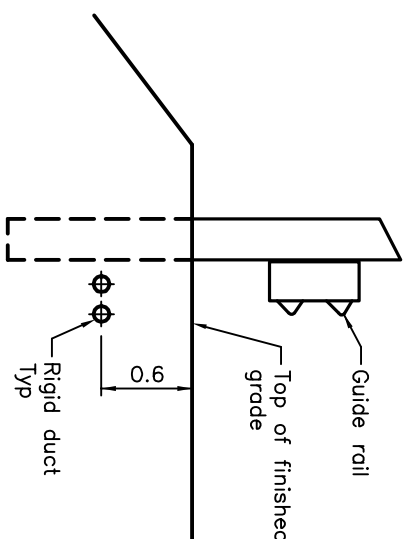
DUCT EXTENSION AT END OF STRUCTURE

NOTES:

- 1 Buried ducts shall be connected to the embedded ducts at end of structure. Refer to Contract Documents for the termination detail of the embedded ducts. Hand dig or hydrovac to expose termination of embedded ducts.
 - 2 Expansion and deflection fitting assemblies shall be installed along straight section of buried ducts within 0.3m of structure. Provide local loose expanded polystyrene foam fill bedding for the fitting assembly.
 - 3 Extend the fish wire and trace wire through the duct to the pole handhole.
 - 4 Terminate the rigid duct direct buried behind the guide rail, 600mm below grade. Extend the fish wire and trace wire through and plug the end of the duct.
- A All dimensions are in metres unless otherwise shown.



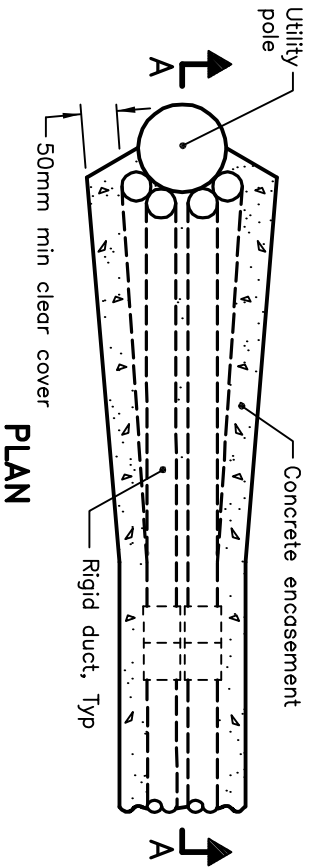
SECTION A-A



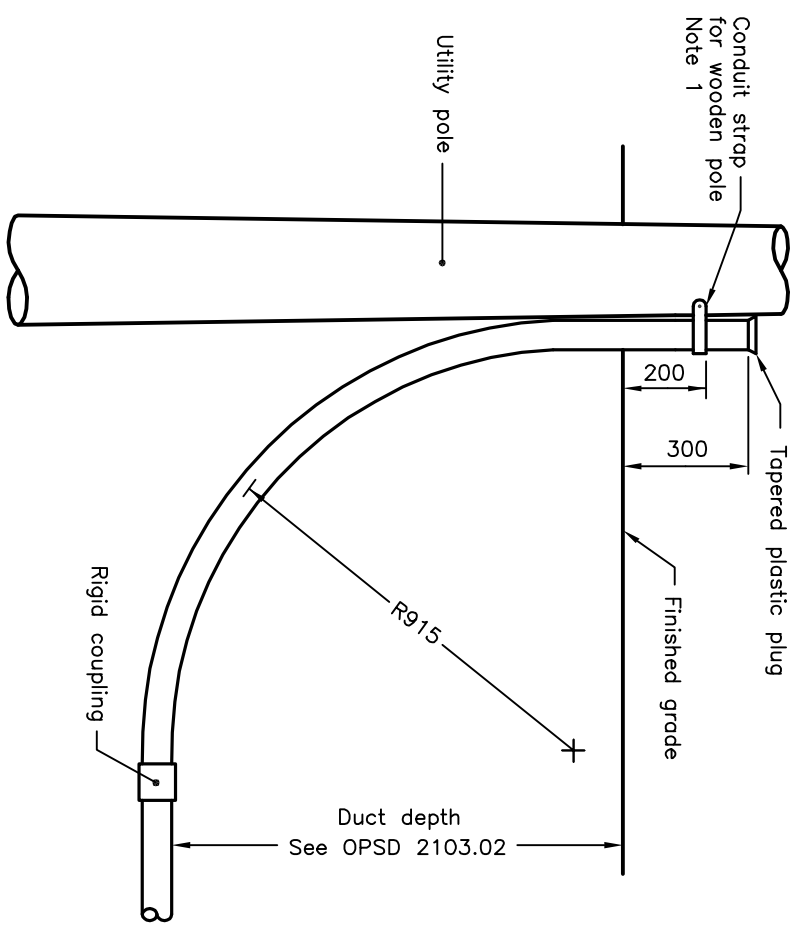
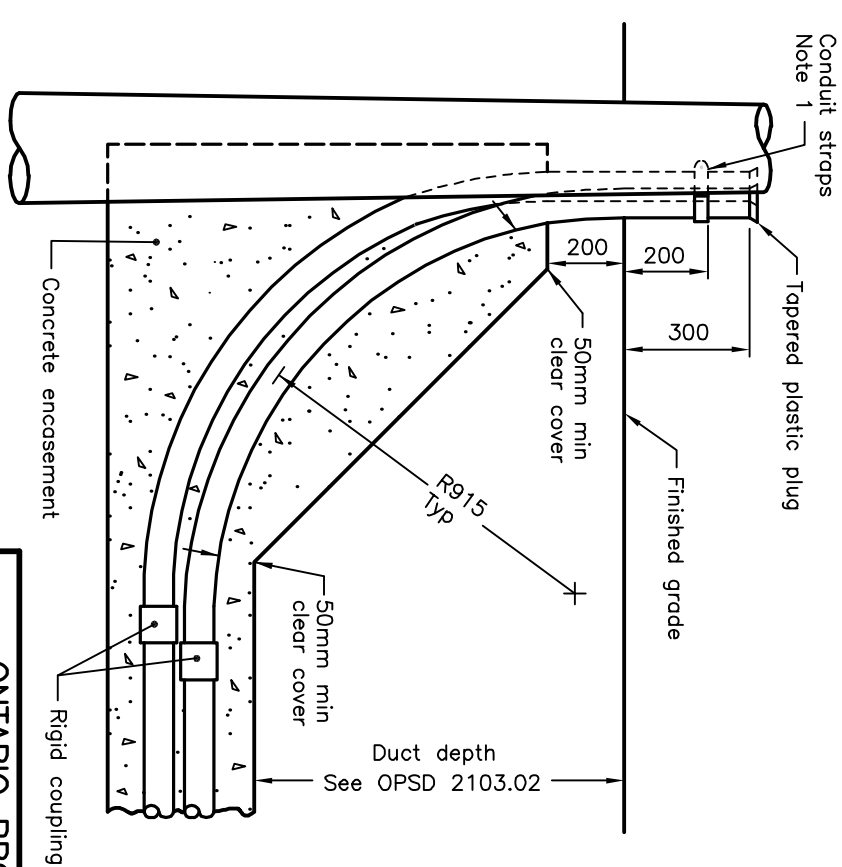
SECTION B-B

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2015	Rev 0	
UNDERGROUND RIGID DUCT CONNECTION AT CONCRETE STRUCTURE WITHOUT EXPANSION JOINT				
OPSD 2102.020				





PLAN



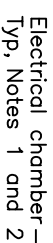
DIRECT BURIED DUCT

NOTES:

- 1 For other than wooden poles, stainless steel banding shall be used.
- A Size and number of ducts shall be as specified.
- B This OPSD shall be read in conjunction with OPSD 2100.06 and 2101.01.
- C All dimensions are in millimetres unless otherwise shown.

SECTION A-A
CONCRETE ENCASED DUCT

ONTARIO PROVINCIAL STANDARD DRAWING			Nov 2015	Rev 0	
RIGID DUCT TERMINATION FOR HIGH VOLTAGE CABLES AT UTILITY POLES					
OPSD 2103.010					



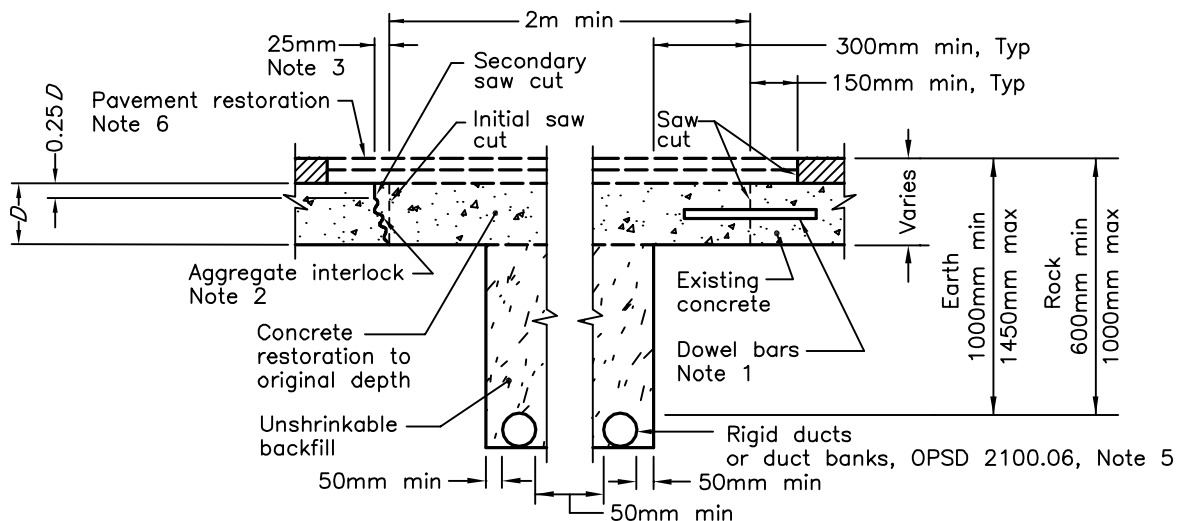
NOTE 5

1 Type and size of electrical chambers shall be as specified.

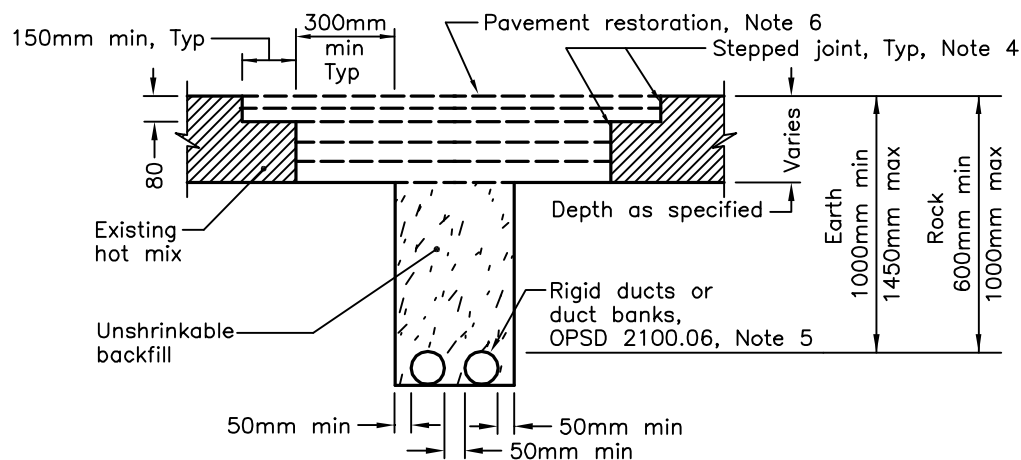
- A All dimensions are in millimetres unless otherwise shown.

Nov 2015	Rev	1	

OPSD 2103.02



UNDOWELLED TREATMENT, NOTE 2 DOWELLED TREATMENT, NOTE 1
COMPOSITE OR CONCRETE PAVEMENT



NOTES:

BITUMINOUS PAVEMENT

- 1 Dowelled treatment is only required in existing concrete pavement or concrete base that contains load transfer devices. Dowels shall be 32mm diameter, 450mm long, epoxy coated, installed at 300mm intervals at mid depth of the concrete slab, in plane to the pavement surface, parallel to the centre line of the road, and set 225mm in 35mm holes with epoxy grout.
- 2 Undowelled treatment is only required in existing concrete pavement or concrete base that is constructed without load transfer devices at joints. Aggregate interlock is created by chipping the vertical concrete face with a light 15kg maximum pneumatic hammer.
- 3 The initial saw cut shall be full depth. The secondary saw cut shall be 1/4 of existing pavement depth with 25mm of chipping for aggregate interlock.
- 4 Where existing pavement depth is between 80 and 120mm, the 150mm wide stepped joint shall be 40mm deep.
- 5 In rock, the ducts shall be placed on 150mm sand bedding.
- 6 Bituminous pavement restoration shall match existing type unless otherwise specified. The surface and top binder courses shall be placed in 40mm lifts with other lifts placed at 80mm maximum.

A All voids below the pavement shall be filled with unshrinkable backfill.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

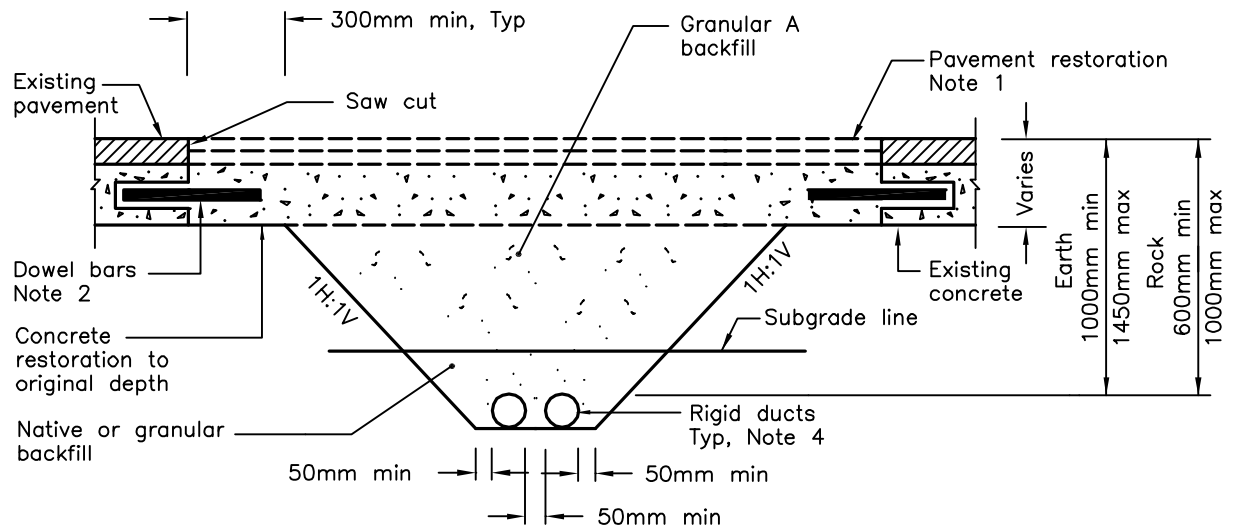
Nov 2015

Rev 1

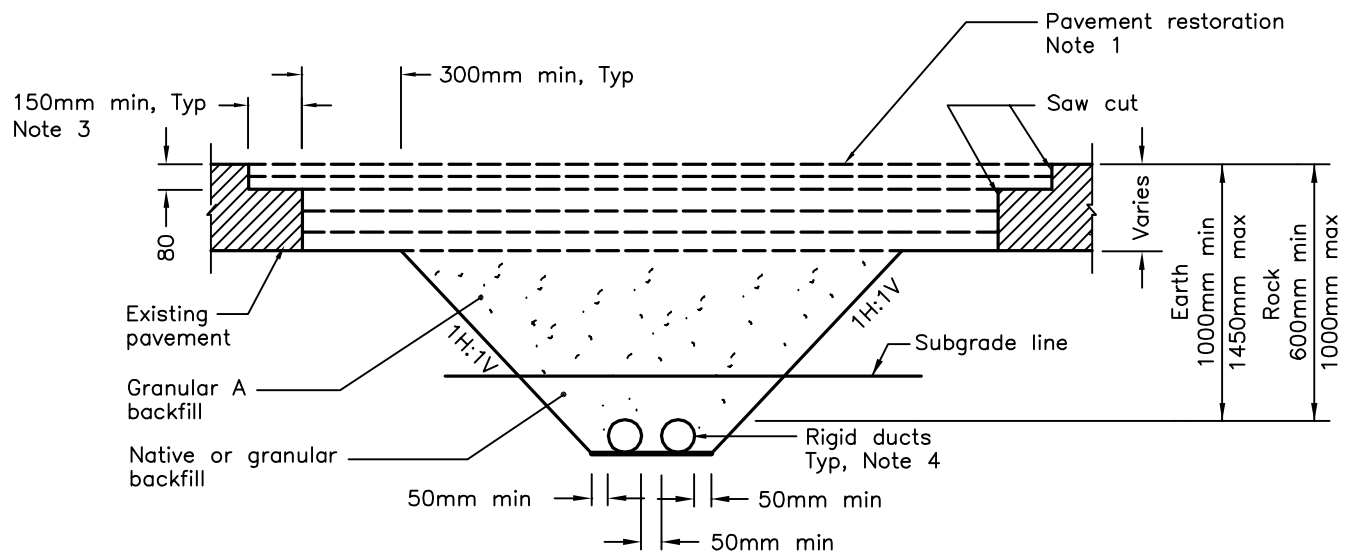
**RIGID DUCT INSTALLATION
 IN EXISTING PAVED AREA
 UNSHRINKABLE BACKFILL METHOD**

OPSD 2103.030





COMPOSITE OR CONCRETE PAVEMENT



BITUMINOUS PAVEMENT

NOTES:

- 1 Bituminous pavement restoration shall match existing type unless otherwise specified. The surface and top binder courses shall be placed in 40mm lifts with other lifts placed at 80mm maximum.
 - 2 Dowel bars are required only in concrete base or pavement with load transfer devices at joints. Dowels shall be 32mm diameter, 450mm long, epoxy coated, installed at 300mm intervals, centred vertically in concrete base, and set 225mm in 35mm holes with epoxy grout. Dowels shall be aligned parallel to the longitudinal axis of the pavement.
 - 3 Where existing pavement depth is between 80 and 120mm, the 150mm wide step joint shall be 40mm deep.
 - 4 In rock, the ducts shall be placed on 150mm sand bedding.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

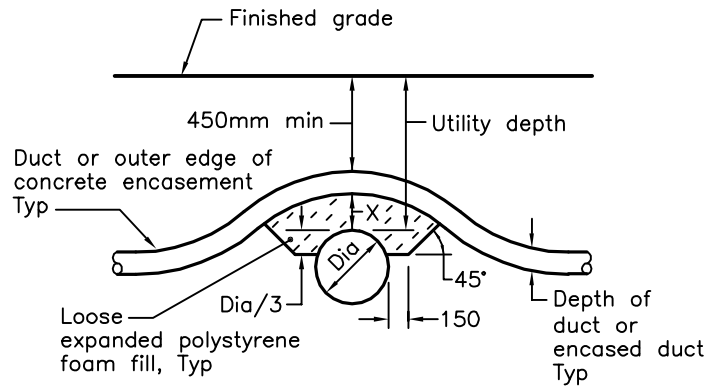
Nov 2015

Rev 0

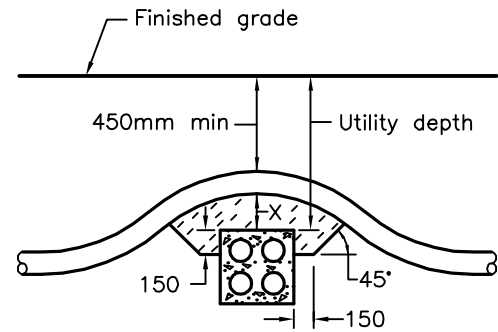
**RIGID DUCT INSTALLATION
IN EXISTING PAVED AREA
GRANULAR BACKFILL METHOD**



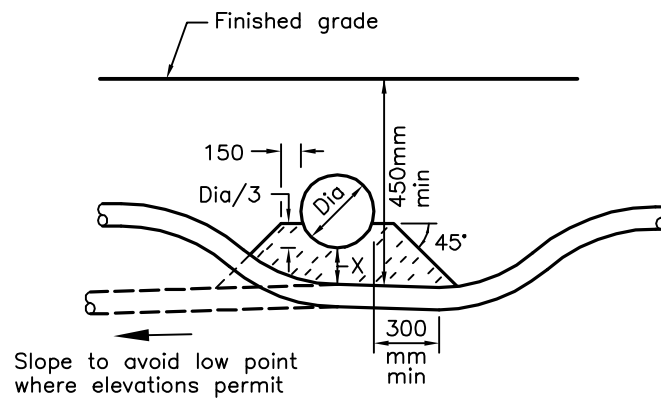
OPSD 2103.040



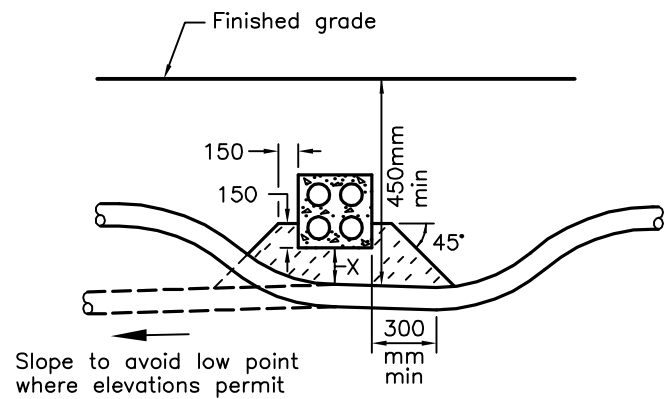
CROSSING OVER UTILITY



CROSSING OVER CONCRETE ENCASED UTILITY



CROSSING UNDER UTILITY



CROSSING UNDER CONCRETE ENCASED UTILITY

NOTES:

A The required clearance between the utility and the ducts or concrete encasement shall be as follows:

UTILITY	X mm min
Ducts, direct buried or encased	100
All other pipes	300
High voltage cables	300
All other cables	300

B Trench widths shall be kept to the minimum required for working space. Manual excavation and backfill methods shall be used with the utility supported in place, when required, when crossing under a utility is necessary.

C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

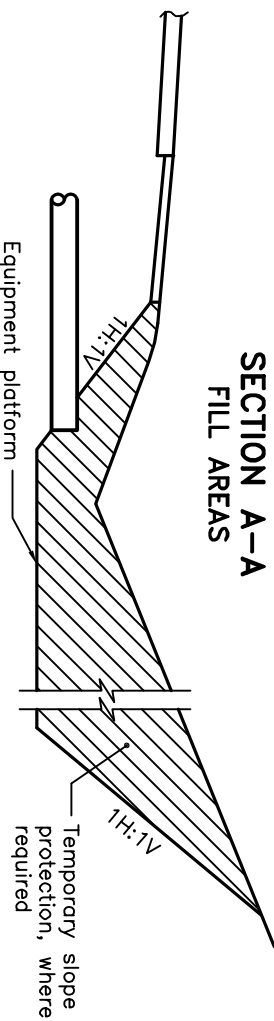
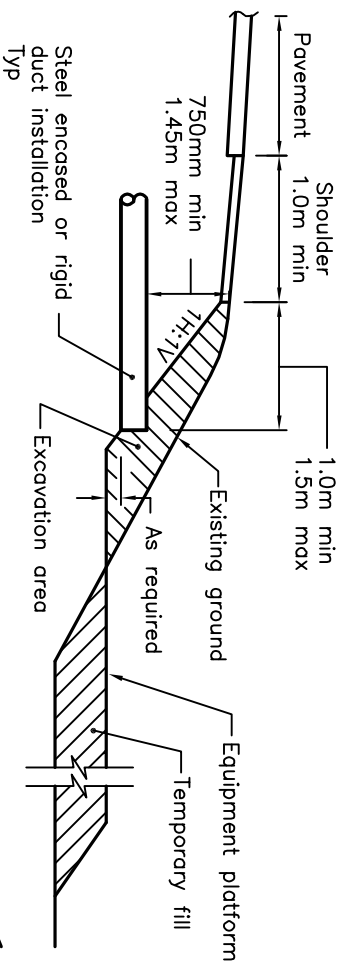
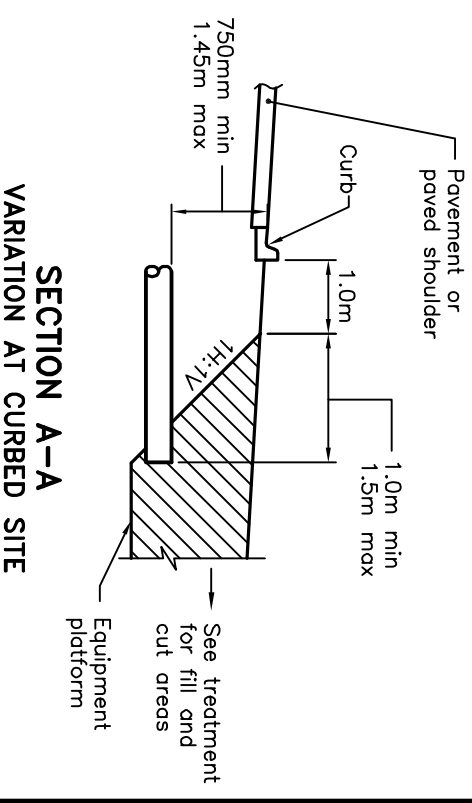
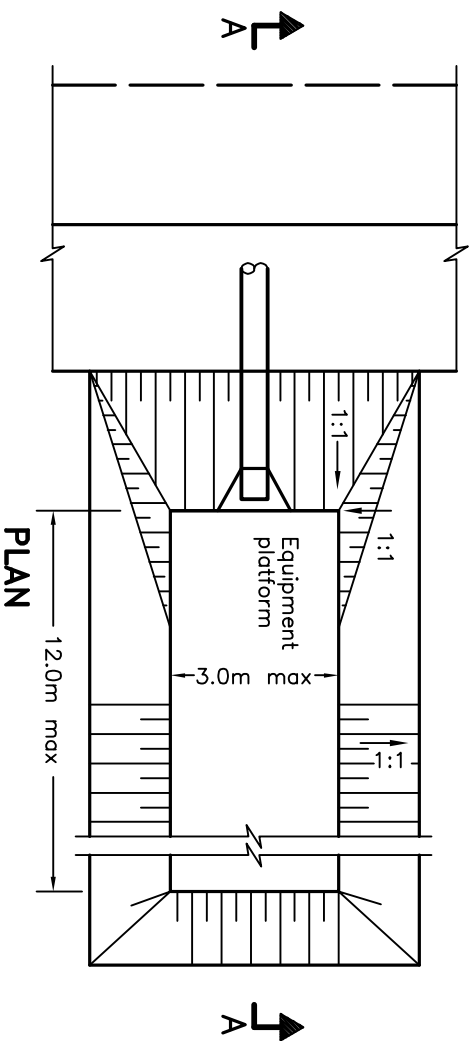
Nov 2015

Rev 0

**DUCT INSTALLATION
AT UTILITY CROSSINGS**



OPSD 2103.050



SECTION A-A CUT AREAS

ONTARIO PROVINCIAL STANDARD DRAWING

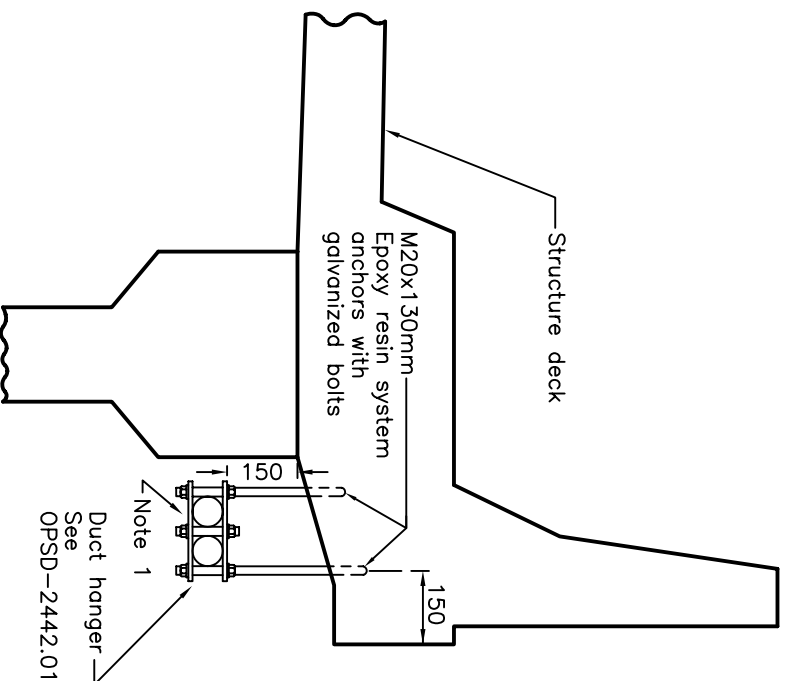
AUGERING PITS FOR
SUBSURFACE INSTALLATION
OF DUCTS AND ENCASEMENTS

NOTES:
A All dimensions are in millimetres
unless otherwise shown.

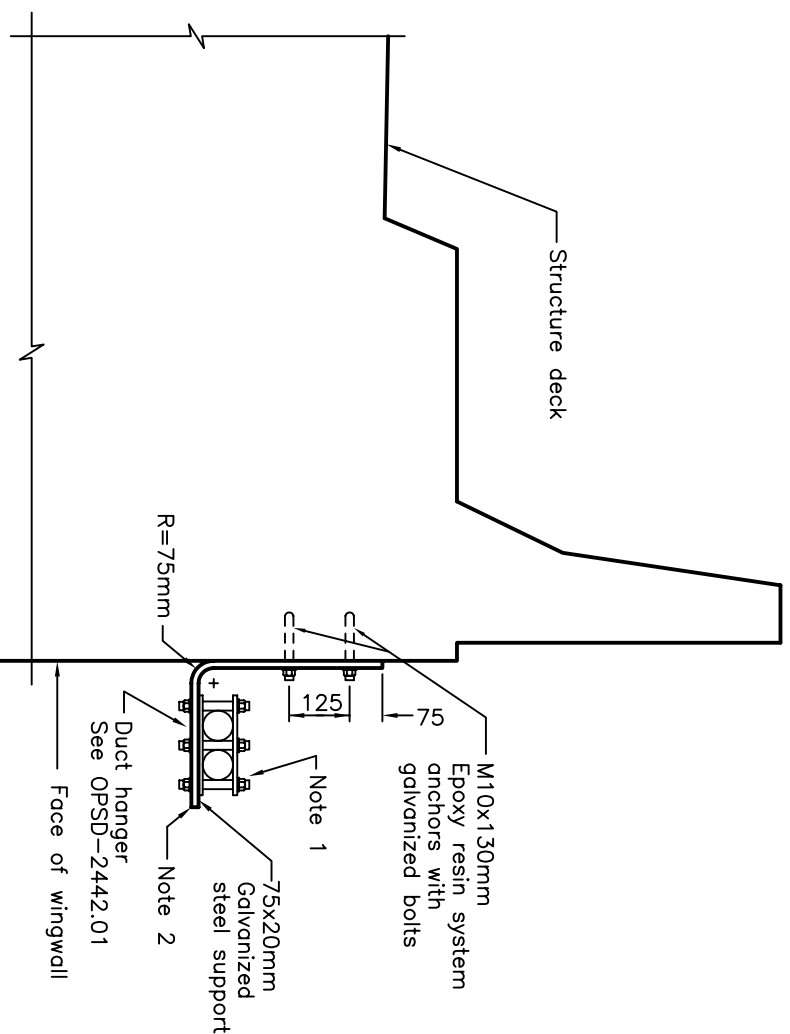
Nov 2015 Rev 0



OPSD 2103.060



UNDER BRIDGE DECK



AT WINGWALL

NOTES:

1 Where required, attach duct system to underside of structure deck and swing out to outside of wingwall location at abutment wall. Use 22.5° bends maximum.

2 Support system shall be installed at a maximum spacing of 3.0m.

A The number and size of ducts are as indicated in the contract.

B Split stop rings shall be installed midway between expansion joints at support bracket.

C All dimensions are in millimetres or metres unless otherwise shown.

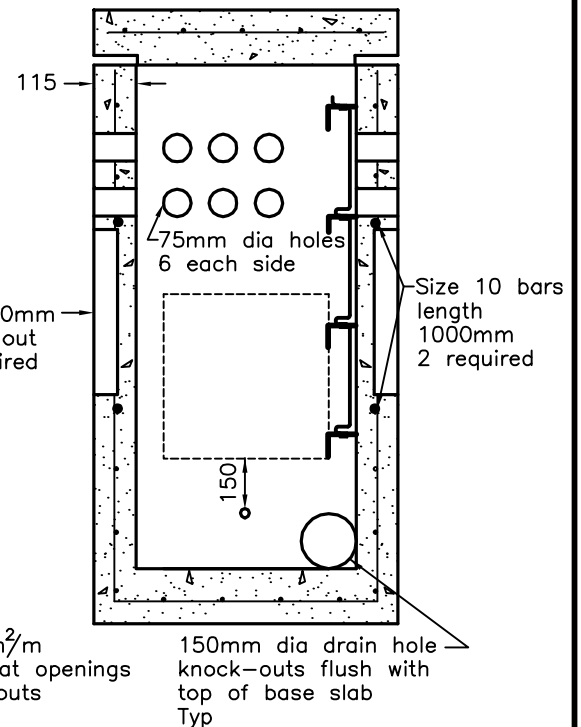
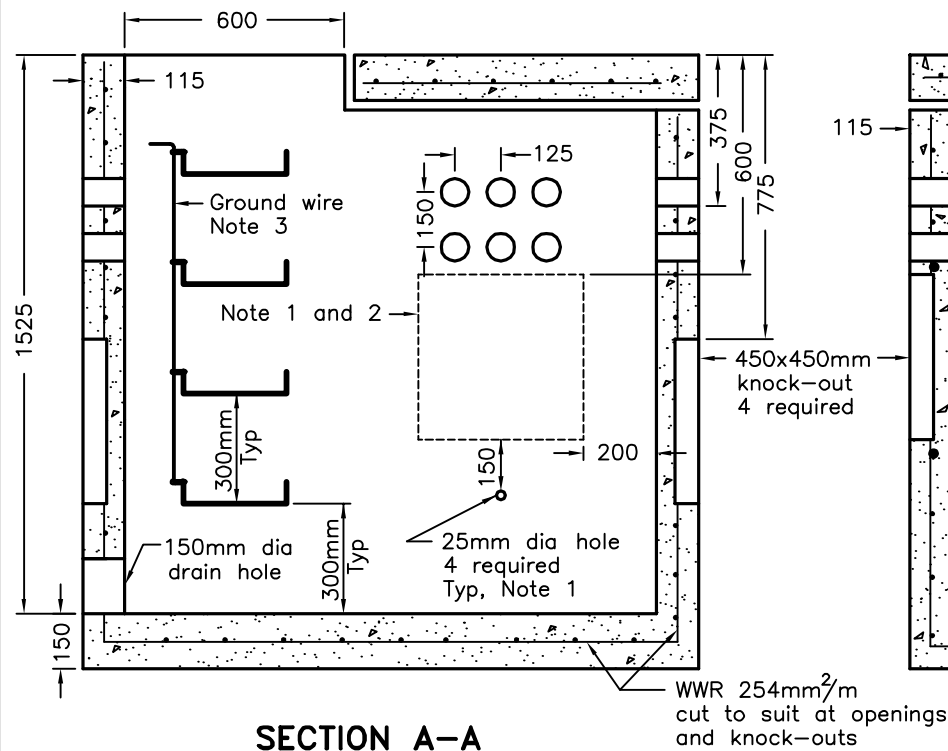
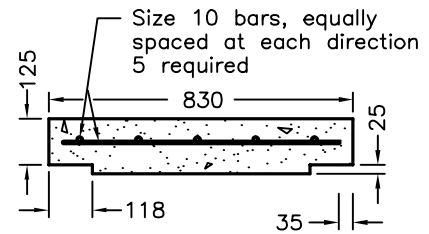
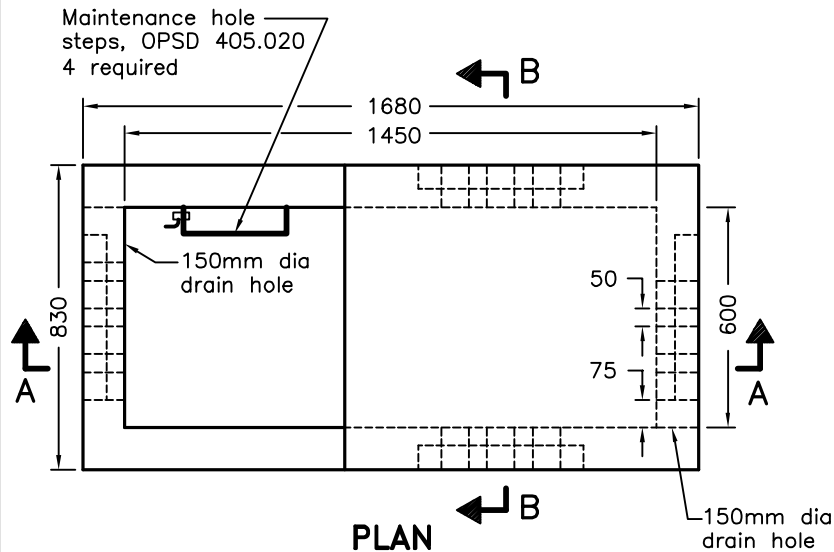
ONTARIO PROVINCIAL STANDARD DRAWING

Date 1992 12 15 Rev

RE DUCTS SURFACE MOUNTED ON STRUCTURES

Date -----

OPSPD - 2104.01



NOTES:

- 1 For general installation details see OPSD 2117.01.
- 2 For duct installation profiles see OPSD 2103.02.
- 3 1/0 AWG stranded copper bare wire shall be fastened to steps using aluminum parallel groove clamps and anti-oxidant component.
- A Minimum cover for reinforcing steel shall be 35mm external surface, 25mm internal surface.
- B All reinforcing bars shall be cut to suit openings.
- C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

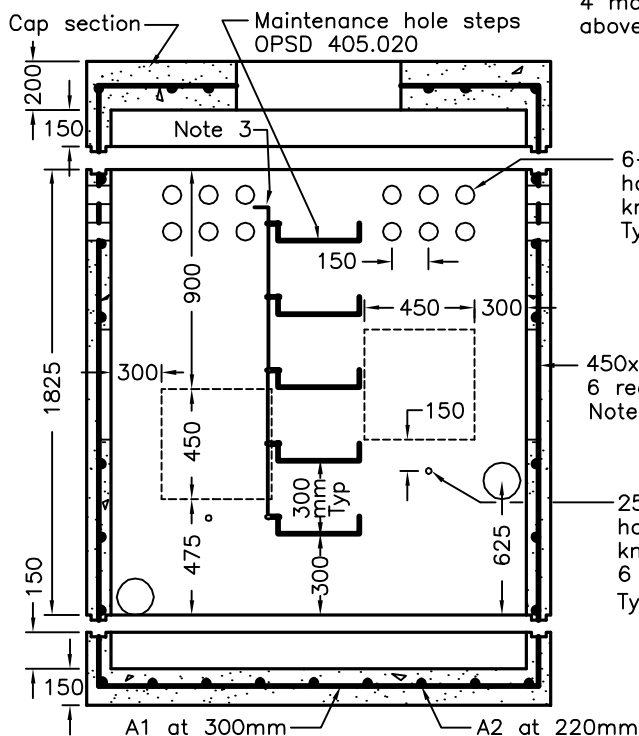
Nov 2015

Rev 1

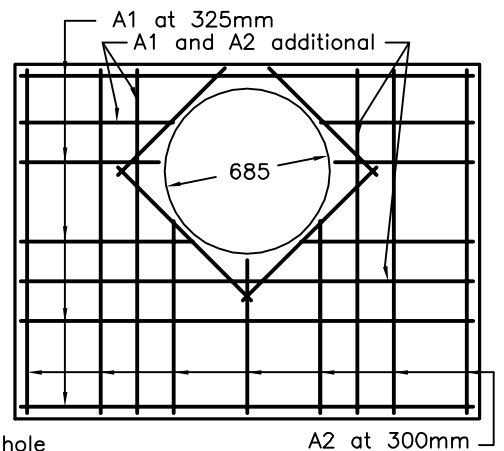
ELECTRICAL MAINTENANCE HOLE
PRECAST CONCRETE
600 x 1450mm

OPSD 2111.020



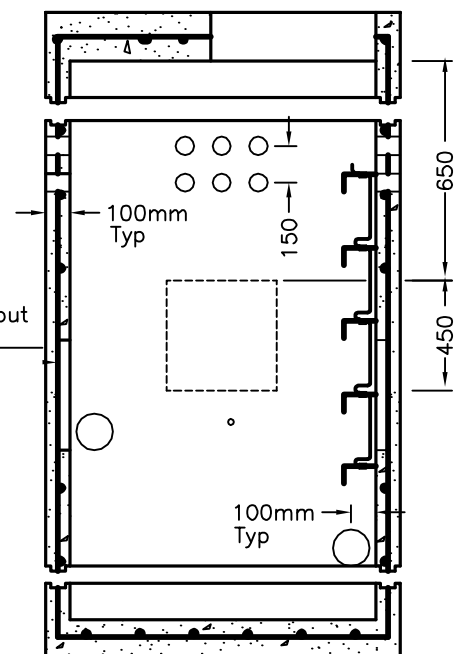


SECTION A-A



PLAN

CAP SECTION



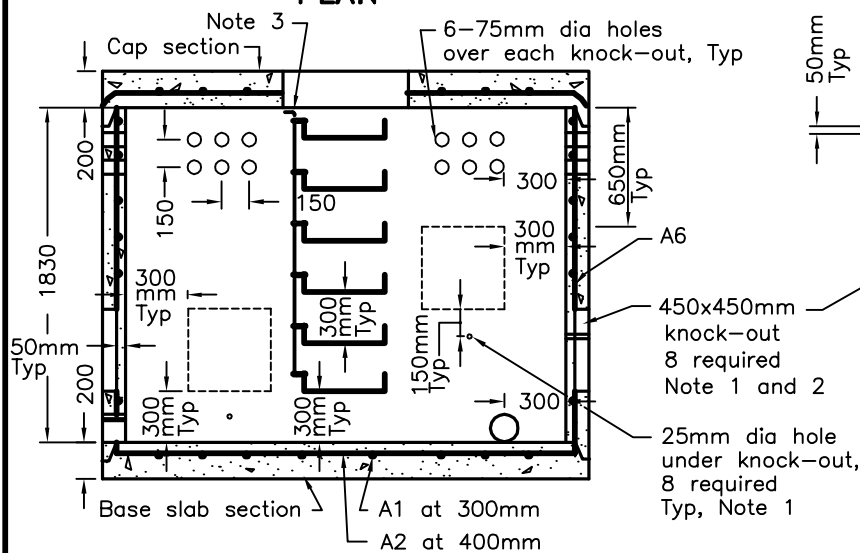
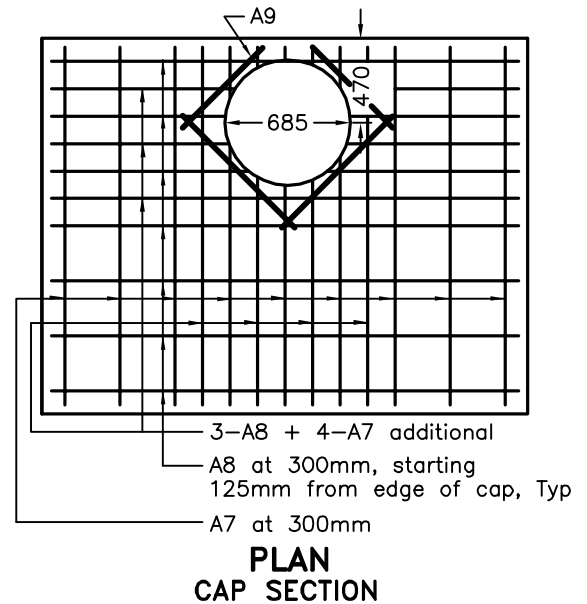
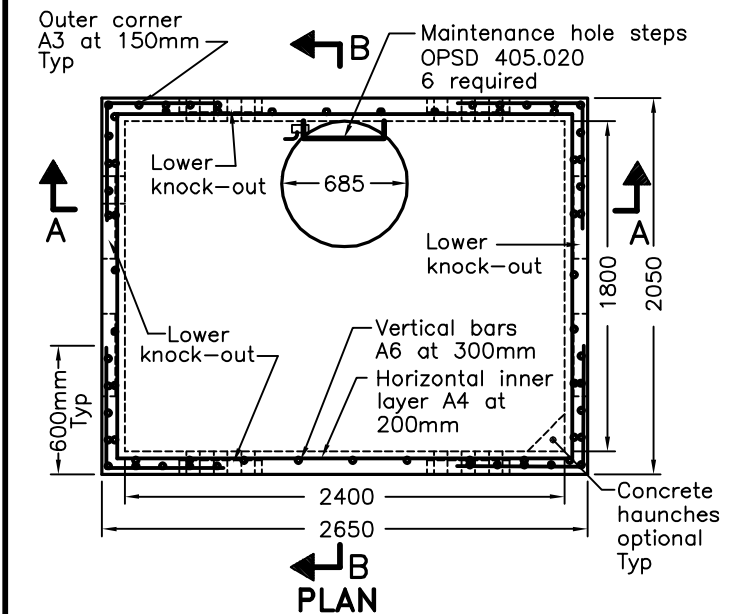
SECTION B-B

NOTES:

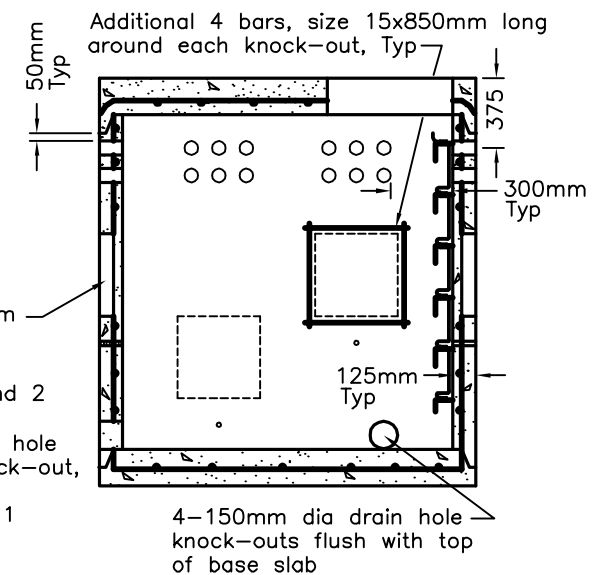
- 1 For general installation details see OPSD 2117.01.
- 2 For duct installation profiles see OPSD 2103.02.
- 3 1/0 AWG stranded copper bare wire shall be fastened to steps using aluminum parallel groove clamps and anti-oxidant component.
- A Minimum cover for reinforcing steel shall be 35mm external surface, 25mm internal surface.
- B All reinforcing bars shall be cut to suit openings.
- C All dimensions are in millimetres unless otherwise shown.

REINFORCING TABLE					
Mark	Quant	Size	Length m	Mass kg	Detail
A1	13	10	2.15	21.94	0.2 
A2	18	10	1.68	23.74	0.19 
A3	24	15	1.2	45.21	0.6 
A4	12	10	1.83	17.24	0.28 
A5	12	15	1.72	32.40	Straight
A6	34	10	1.77	47.24	Straight





SECTION A-A



SECTION B-B

NOTES:

- 1 For general installation details see OPSD 2117.01.
 - 2 For duct installation profiles see OPSD 2103.02.
 - 3 1/0 AWG stranded copper bare wire shall be fastened to steps using aluminum parallel groove clamps and anti-oxidant component.
- A Minimum cover for reinforcing steel shall be 35mm external surface, 25mm internal surface.
- B All reinforcing bars shall be cut to suit openings.
- C All dimensions are in millimetres unless otherwise shown.

REINFORCING TABLE					
Mark	Quant	Size	Length (m)	Mass (kg)	Detail
A1	10	15	2.48	38.62	Straight
A2	6	15	1.86	17.52	Straight
A3	52	15	1.2	17.97	
A4	20	20	2.45	115.4	Straight
A5	20	20	2.51	118.22	
A6	36	10	1.78	50.3	Straight
A7	13	15	2.82	57.55	
A8	10	15	2.22	34.85	
A9	4	15	1.0	6.28	Straight

ONTARIO PROVINCIAL STANDARD DRAWING

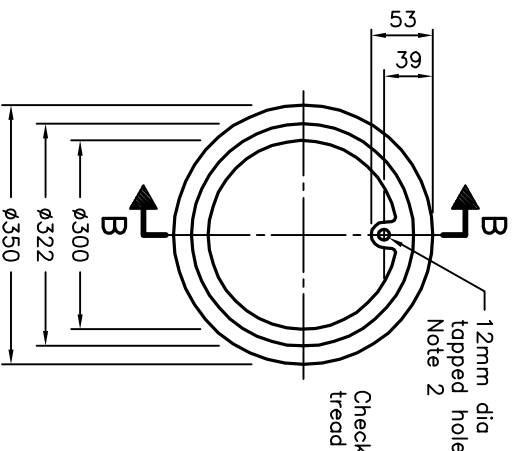
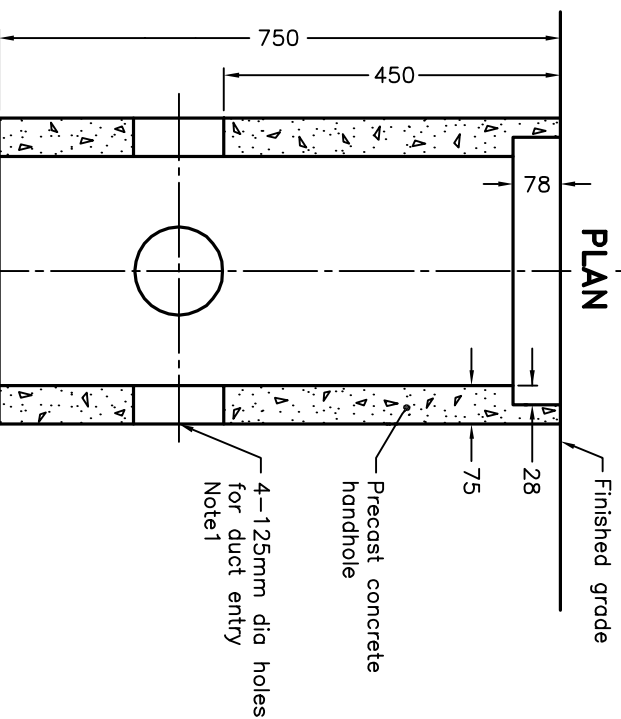
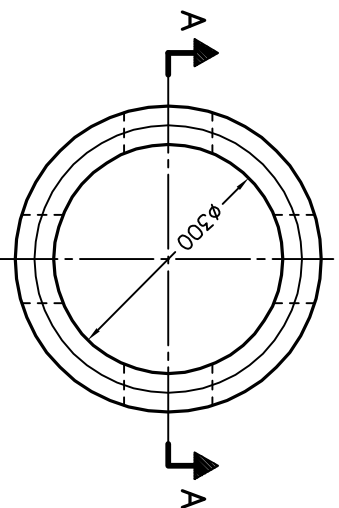
Nov 2015

Rev 1

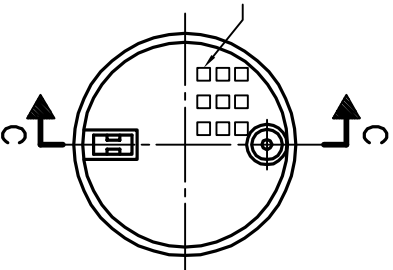
ELECTRICAL MAINTENANCE HOLE
PRECAST CONCRETE
1800 x 2400mm



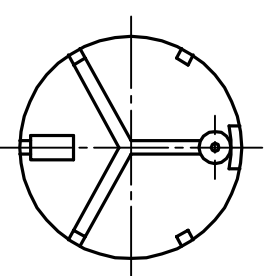
OPSD 2111.050



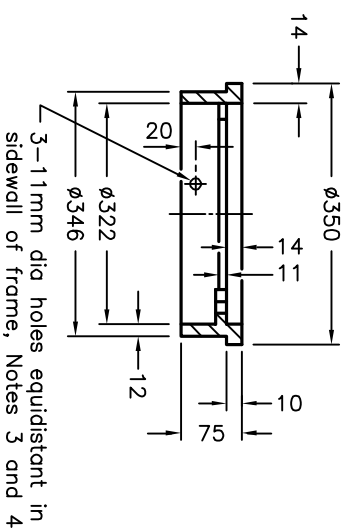
**PLAN
FRAME**



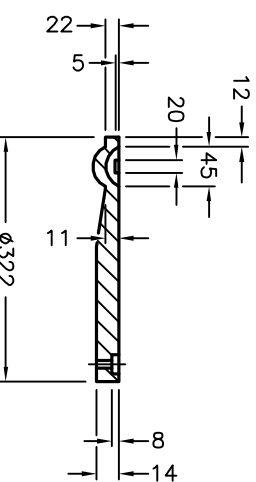
**PLAN
COVER**



UNDERSIDE OF COVER



SECTION B-B



SECTION C-C

NOTES:

- 1 For installation of ducts see OPSD 2123.03.
 - 2 Cover shall be retained with 12mm dia x 20mm long stainless steel hex head machine bolt that shall be flush with top of cover when fastened.
 - 3 Frame shall be attached using 3-10mm dia x 38mm long machine bolts anchored in concrete wall.
 - 4 One ground lug for #6 AWG stranded copper shall be attached to one frame bolt.
- A** For general installation see OPSD 2117.02.
- B** All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

ELECTRICAL HANDHOLE

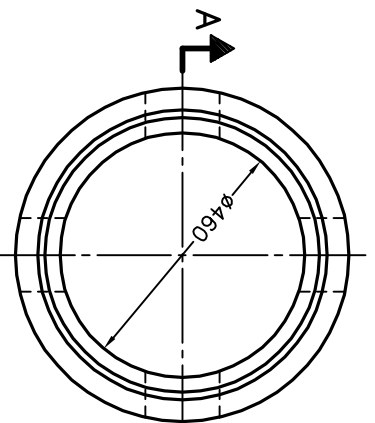
PRECAST CONCRETE WITH COVER

300mm DIA

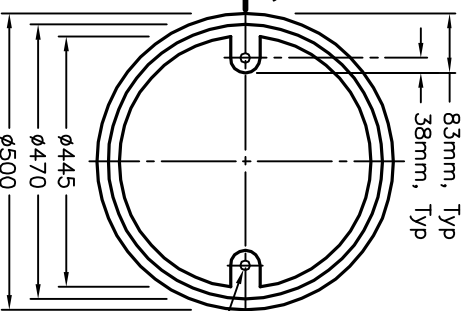
Nov 2009 Rev 2

OPSD 2112.01

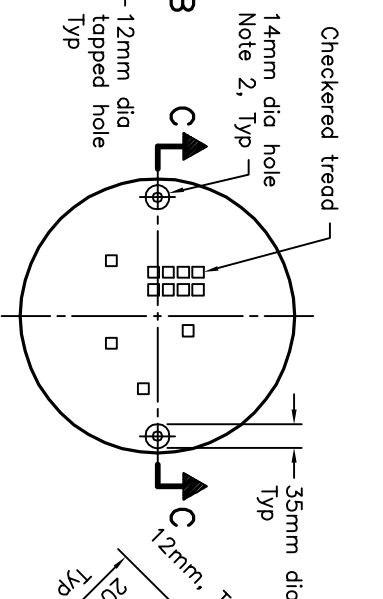




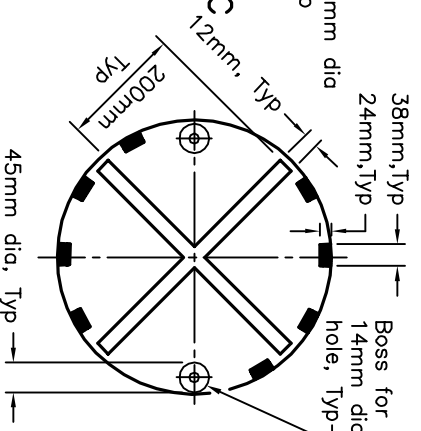
**PLAN
HANDHOLE**



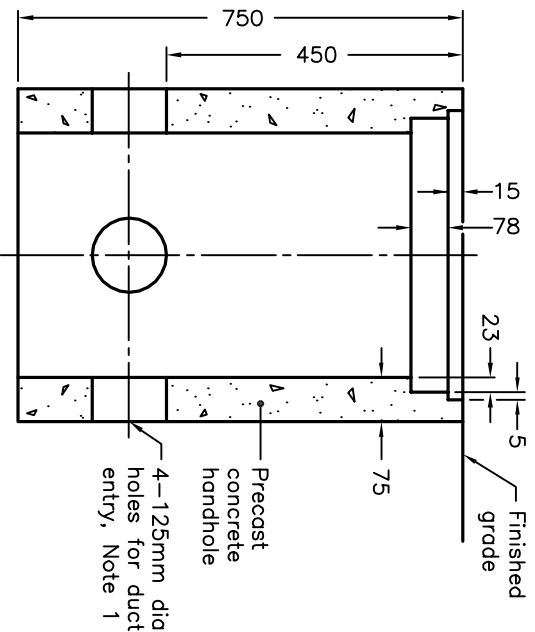
**PLAN
FRAME**



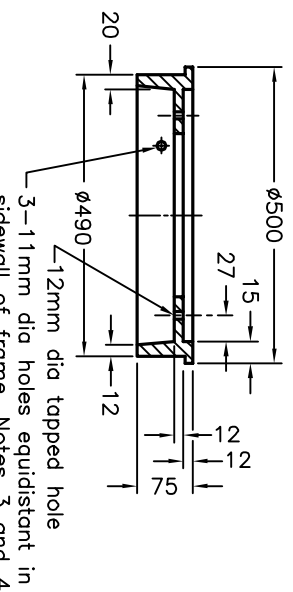
**PLAN
COVER**



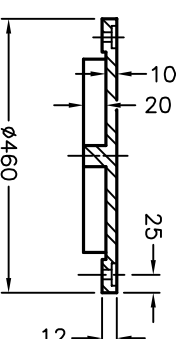
UNDERSIDE OF COVER



SECTION A-A



SECTION B-B



SECTION C-C

NOTES:

- 1 For installation of ducts see OPSPD 2123.03.
 - 2 Cover shall be retained with 2-12mm dia x 20mm long stainless steel hex head machine bolts that shall be flush with top of cover when fastened.
 - 3 Frame shall be attached using 3-10mm dia x 38mm long machine bolts anchored in concrete wall.
 - 4 One ground lug for #6 AWG stranded copper shall be attached to one frame bolt.
- A For general installation see OPSPD 2117.02.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

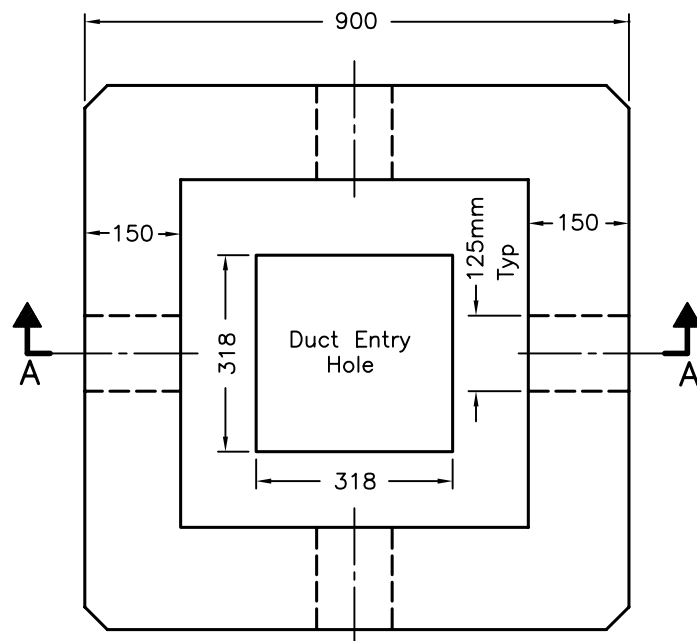
Nov 2009 Rev 2

**ELECTRICAL HANDHOLE
PRECAST CONCRETE WITH COVER**

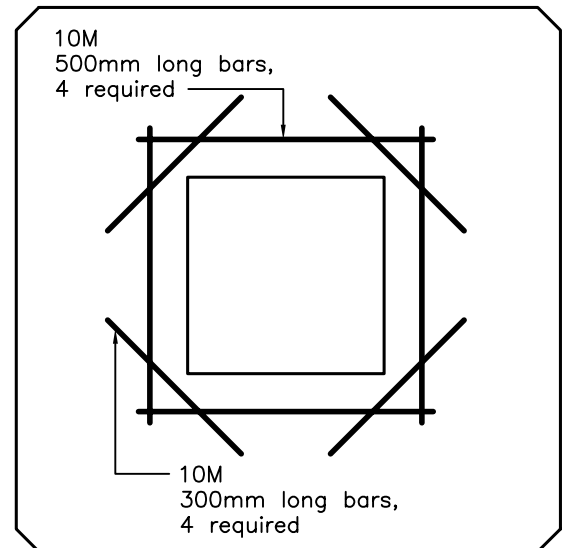
460mm DIA

OPSPD 2112.02

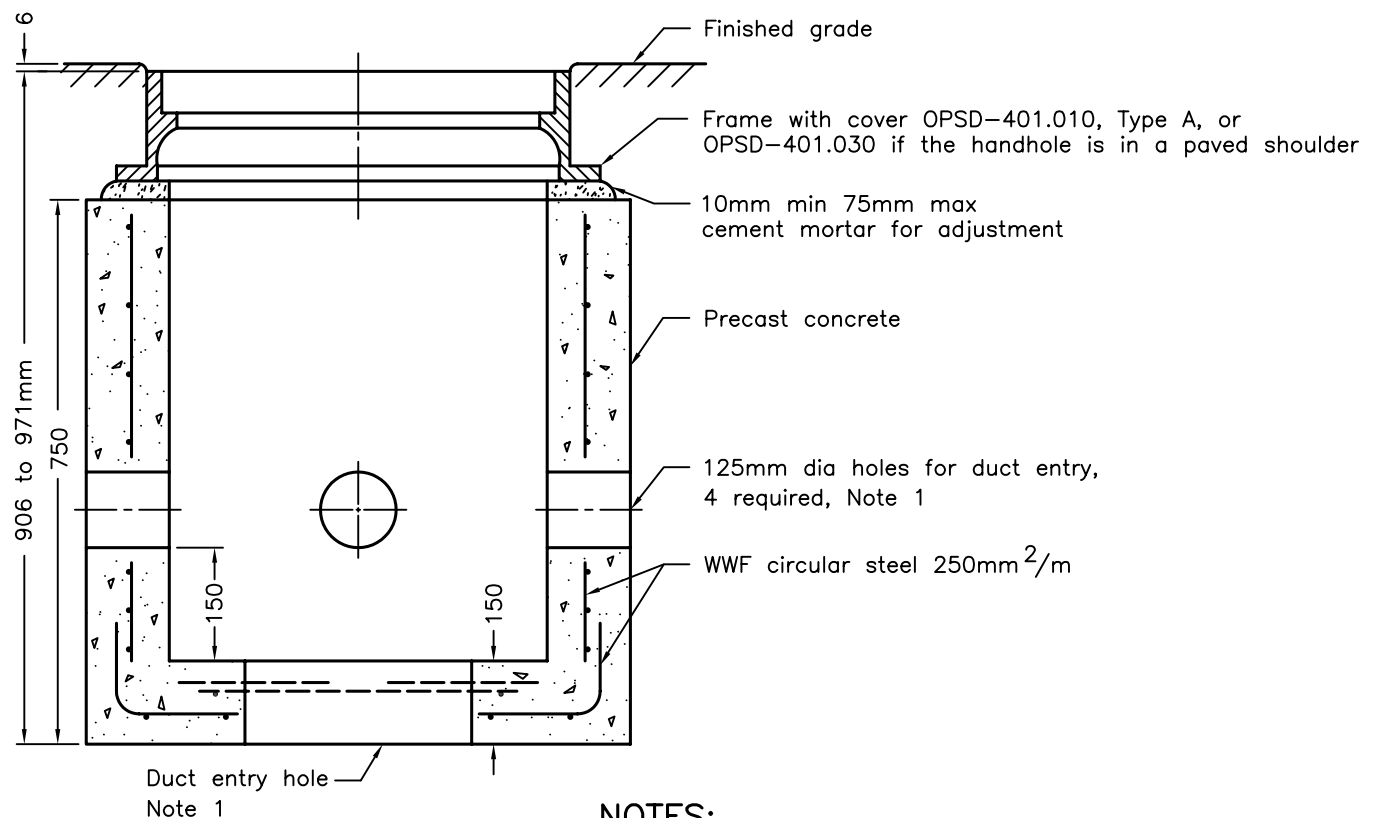




PLAN



BOTTOM-DUCT ENTRY REINFORCING



SECTION A-A

NOTES:

- 1 For duct installation details see OPSD-2123.03.
- A For general installation details see OPSD-2117.02.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2004

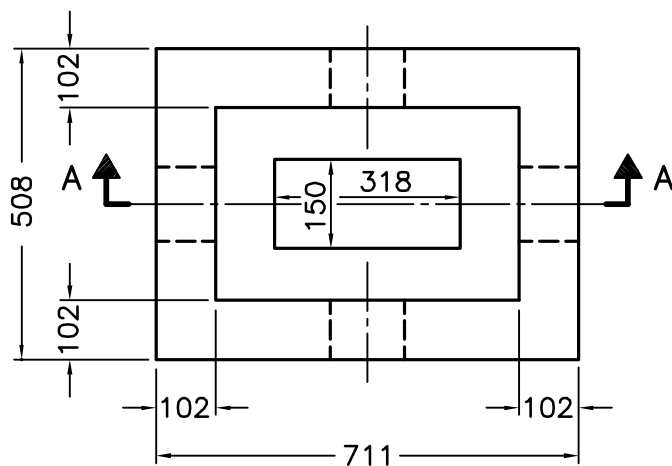
Rev 0

ELECTRICAL HANDHOLE

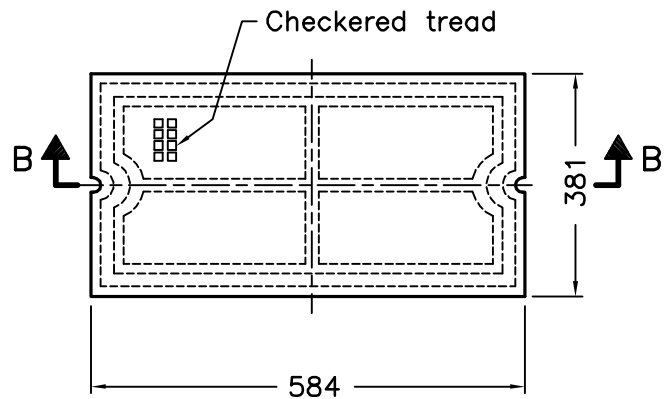
PRECAST CONCRETE - 600 x 600mm



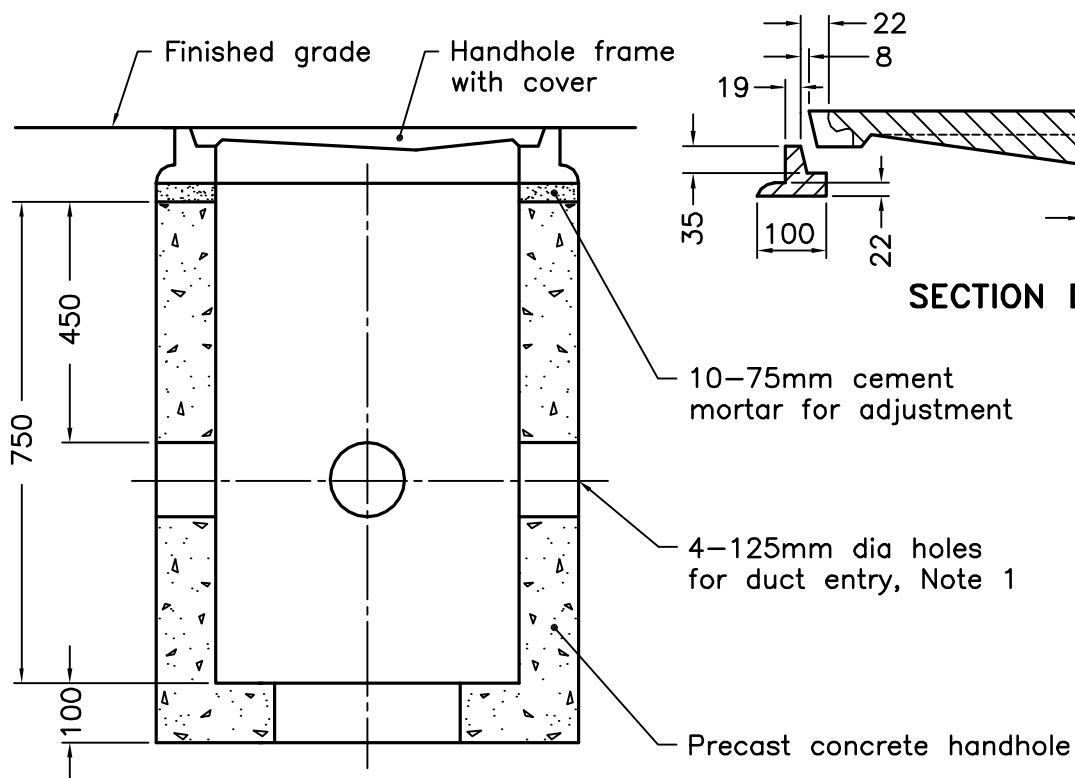
OPSD - 2112.040



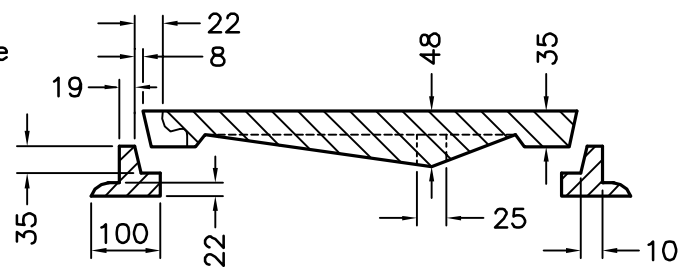
PLAN



PLAN
COVER



SECTION A-A



SECTION B-B

NOTES:

- 1 For installation of ducts see OPSD 2123.03.
- A For general installation details see OPSD 2117.02.
- B All dimensions are in millimetres unless otherwise shown.

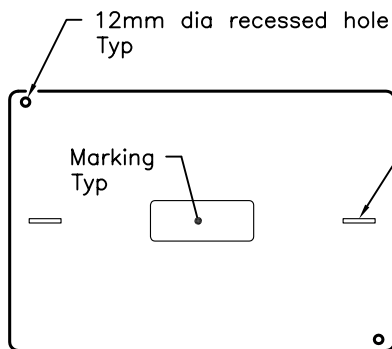
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2009 Rev 1

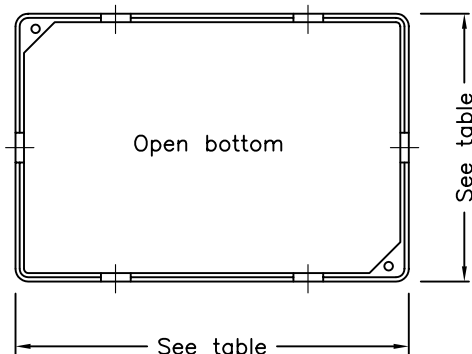
ELECTRICAL HANDHOLE
PRECAST CONCRETE WITH COVER
300 x 500mm



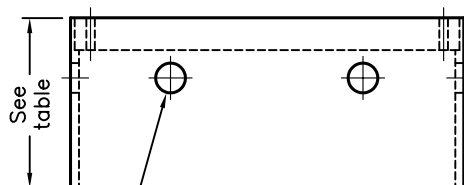
OPSD 2112.05



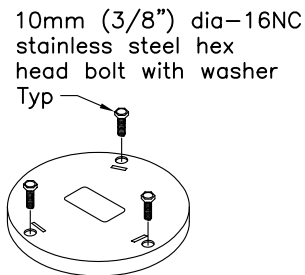
COVER VIEW



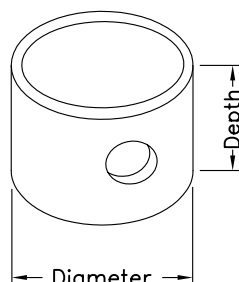
PLAN VIEW



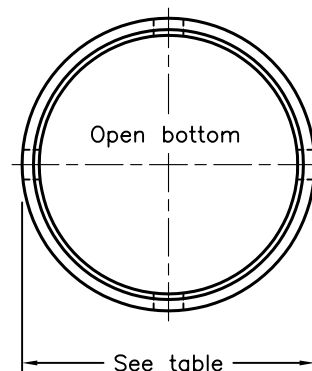
FRONT VIEW



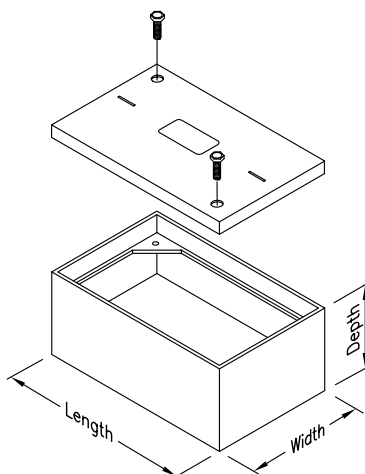
COVER VIEW



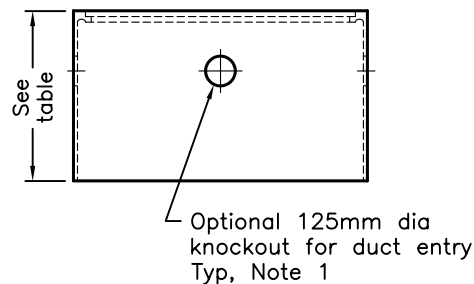
ROUND HANDHOLE



PLAN VIEW



RECTANGULAR HANDHOLE



FRONT VIEW

HANDHOLE	RECTANGULAR HANDHOLE						ROUND HANDHOLE			
	Length		Width		Depth		Diameter		Depth	
	min	max	min	max	min	max	min	max	min	max
TYPE I—small	500	<600	300	<350	300	<350	437	<517	300	<350
TYPE II—medium	600	<850	350	<550	350	<450	517	<771	350	<450
TYPE III—large	850	<1500	550	<1000	450	<660	771	<1382	450	<660

NOTES:

1 For duct installation details see OPSD-2123.03.

A For general installation details see OPSD-2117.02.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

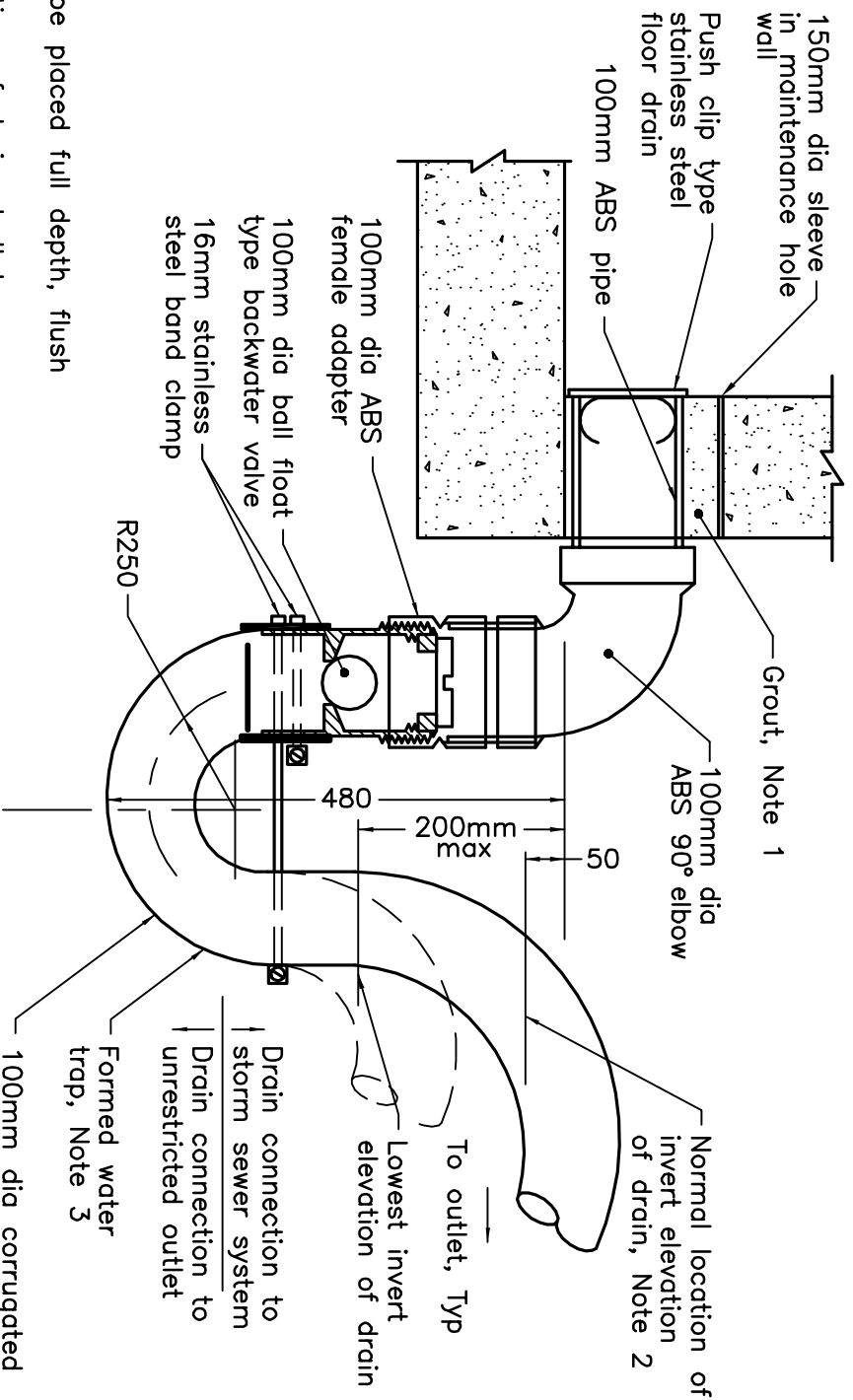
Nov 2004

Rev 0

**ELECTRICAL HANDHOLE
NON AND SEMI-CONCRETE
GENERAL REQUIREMENTS**

OPSD - 2113.010

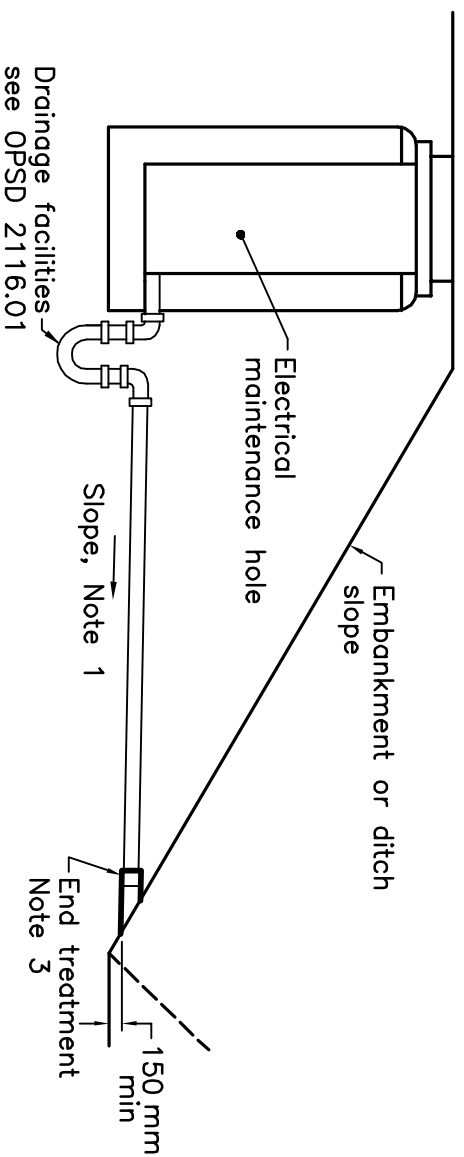




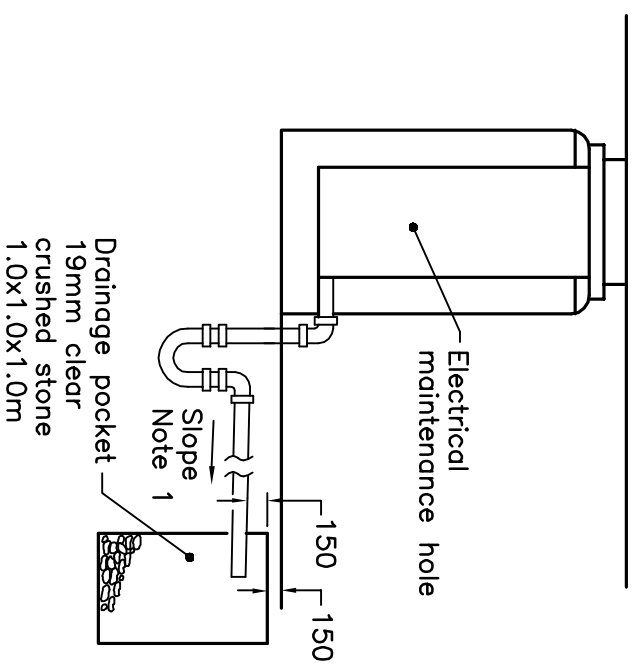
NOTES:

- 1 Grout shall be placed full depth, flush both walls.
 - 2 Vertical location of drain shall be adjusted between the highest and lowest limits shown to obtain a minimum grade on the drain as set by the outlet elevation.
 - 3 Water trap shall be formed in all cases when the outlet is part of the storm sewer system.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev 1
DRAINAGE FACILITIES FOR ELECTRICAL MAINTENANCE HOLES		
OPSD 2116.01		



DRAIN TO EMBANKMENT SLOPE OR DITCH OUTLET



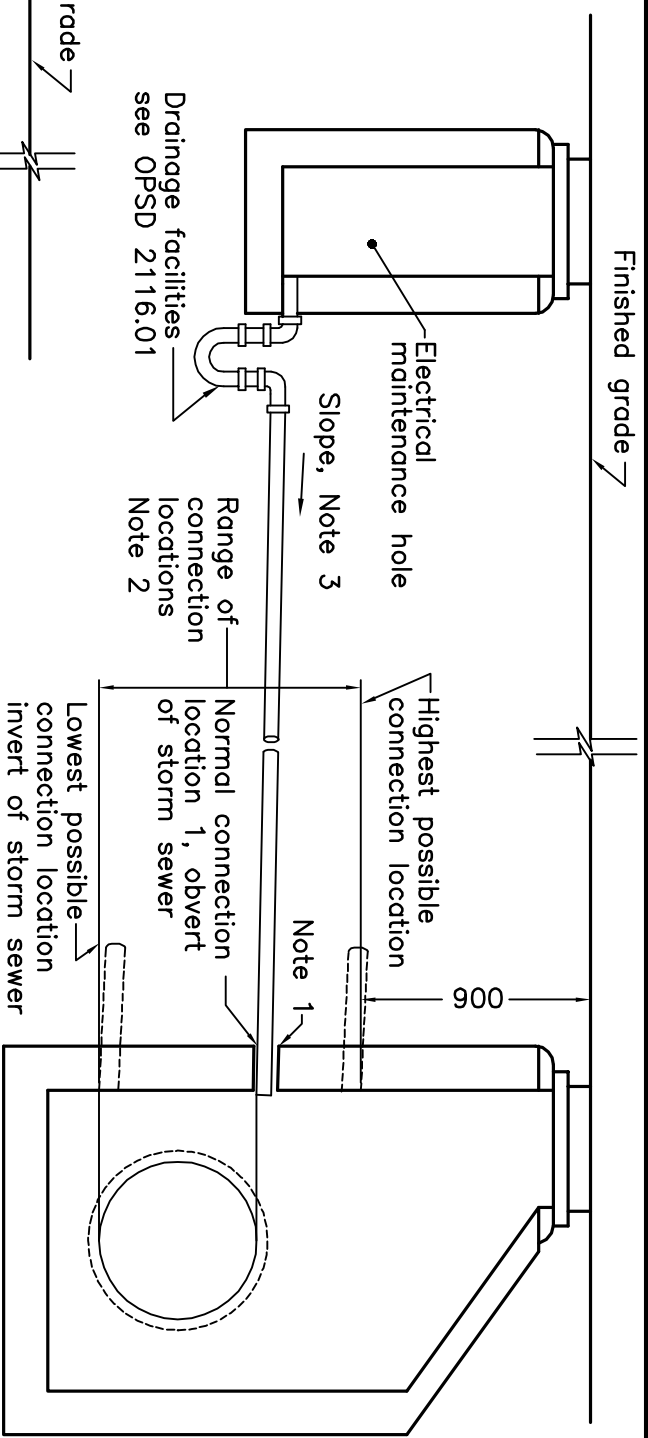
Varies, Note 2

DRAIN TO DRAINAGE POCKET

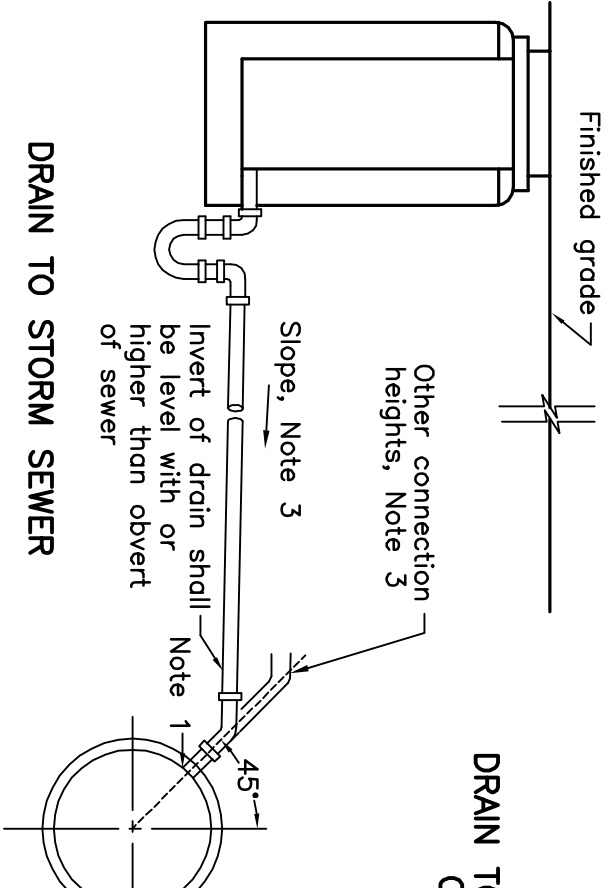
NOTES:

- 1 Drain to slope shall be a minimum of 0.25% (400H:1V) to outlet.
 - 2 Drainage pocket shall be located 1.5m from centreline of maintenance hole in paved or restricted areas and 3.0m from centreline of maintenance hole in grass or unrestricted areas.
 - 3 A 2.5m length of 150mm diameter corrugated steel pipe with galvanized rodent gate shall be installed with drain pipe with 0.3m overlap.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING				
Nov 2013		Rev 1		
ELECTRICAL MAINTENANCE HOLE DRAINS TO DRAINAGE POCKETS, EMBANKMENT OUTLETS, AND DITCHES				
OPSD 2116.02				



DRAIN TO STORM SEWER MAINTENANCE HOLE, CATCHBASIN, OR DITCH INLET



DRAIN TO STORM SEWER

NOTES:

- 1 Break-in shall be performed using 150mm core drill. Grout shall be placed to fill cavity.
 - 2 The normal connection location shall be used when elevations allow, using the range of drain heights at the maintenance hole as shown on OPSD 2116.01 and the minimum slope of drain. Other locations may be used when elevations do not allow the use at the normal connection point.
 - 3 Drain to slope shall be a minimum of 0.25% (400H:1V) to outlet connection point.
- A All dimensions are in millimetres unless otherwise shown.

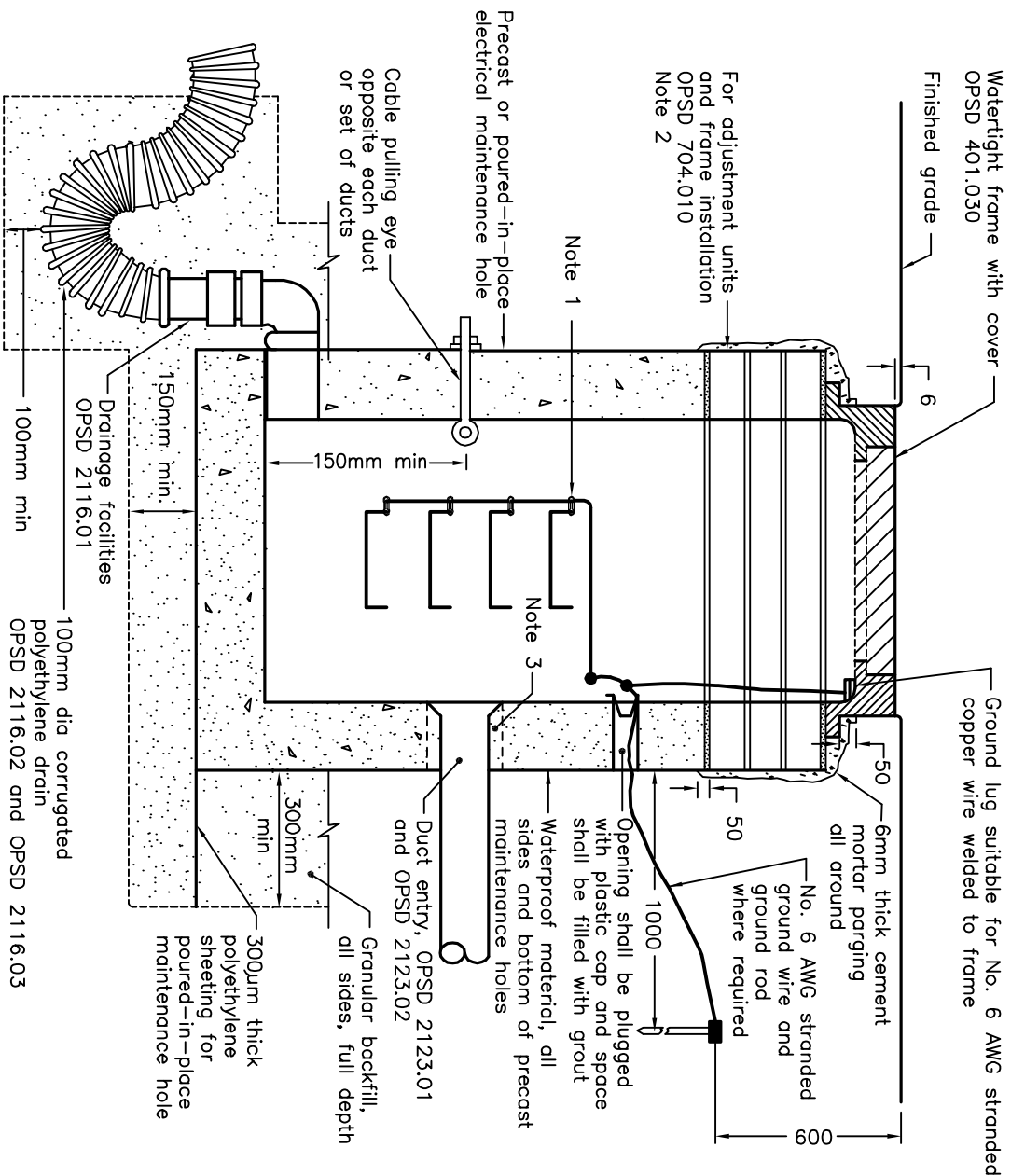
ONTARIO PROVINCIAL STANDARD DRAWING

ELECTRICAL MAINTENANCE HOLE
DRAINS TO
STORM SEWER SYSTEMS

Nov 2013 Rev 1



OPSD 2116.03



NOTES:

- 1 No. 6 AWG stranded copper bare wire shall be fastened to steps using single cable to pipe copper ground connectors. The ground connector shall be a copper or copper-alloy saddle. The connector shall be attached to each step in such a way that the ground wire runs perpendicularly to the steps.
- 2 When specified, a precast concrete cap shall be used to replace the frame with cover and adjustment units.
- 3 Space surrounding ducts in used openings shall be filled with grout.
- A This OPSPD shows general equipment only. Refer to other drawings for particular applications.
- B Orient maintenance hole such that the wall with maintenance hole steps is nearest to the travelled roadway, where practical. Orient maintenance hole to accommodate existing ducts both in line and grade. Maintain a maximum 45° skew to existing ducts in line. Where required, cut back duct encasement to 3.0m maximum beyond the maintenance hole and refit duct to proper location.
- C Unused openings shall be filled with grout.
- D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

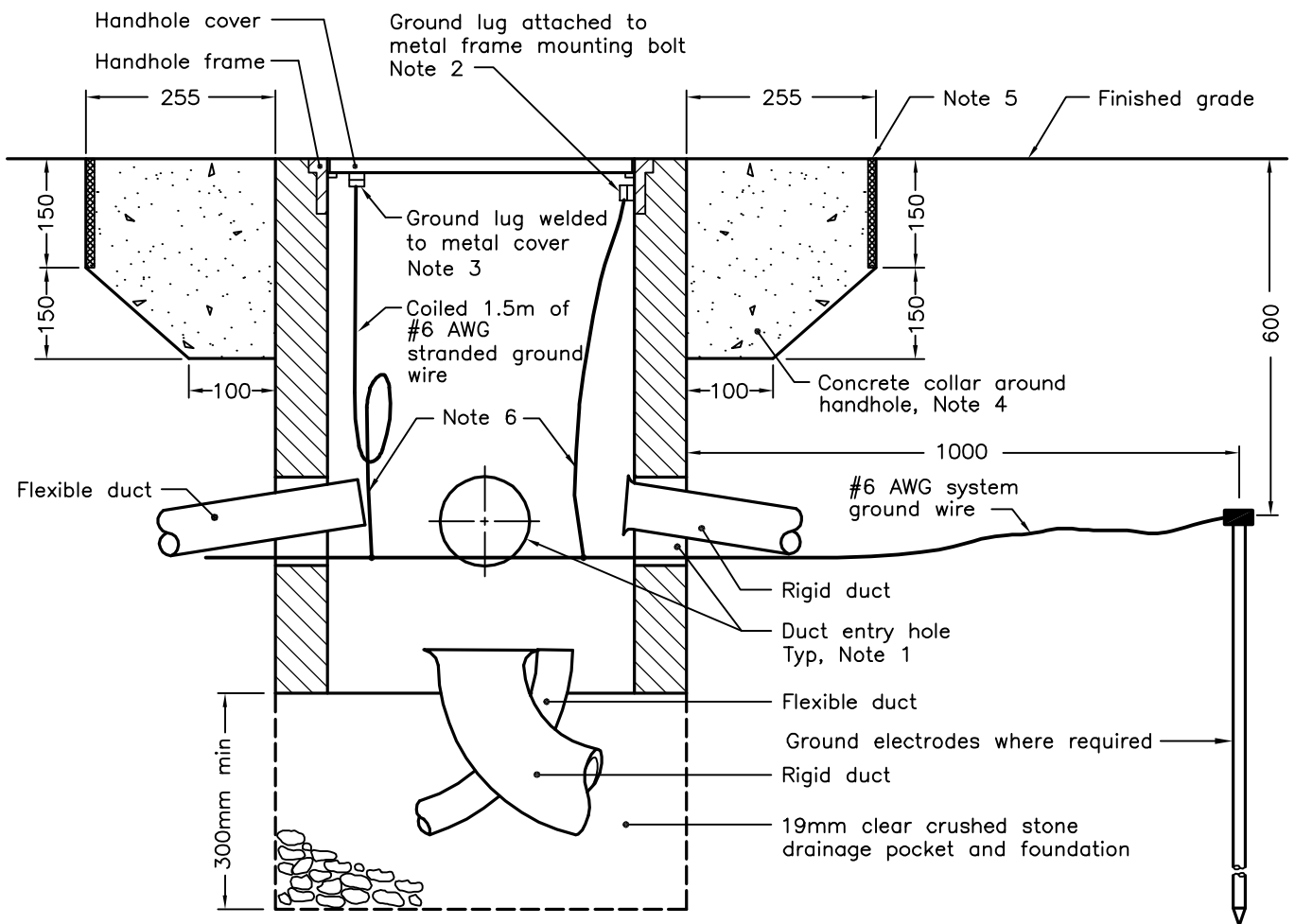
Nov 2013 Rev 2



ELECTRICAL MAINTENANCE HOLES

GENERAL INSTALLATION REQUIREMENTS

OPSPD 2117.01



NOTES:

- 1 For duct entry details see OPSD 2123.03.
 - 2 For handholes with metal frames, ground wire shall be attached to frame using a ground lug suitable for #6 AWG stranded copper wire.
 - 3 For handholes with metal covers and non-metallic frames, the ground wire shall be attached to the handhole cover using a ground lug suitable for #6 AWG copper wire.
 - 4 Concrete collar is required around the complete perimeter of all electrical handholes except:
 - a) concrete electrical handholes, or
 - b) handholes installed in concrete pavement or sidewalk.
 - 5 In raised traffic islands, install 12mm expansion board at back of curb and install concrete collar to suit.
 - 6 For handholes with extra low voltage cables with metal frames and covers, grounding and bonding is not required.
- A For specific handhole details see OPSD 2112.01, 2112.02, 2112.030, 2112.040 2112.05, and 2113.010.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

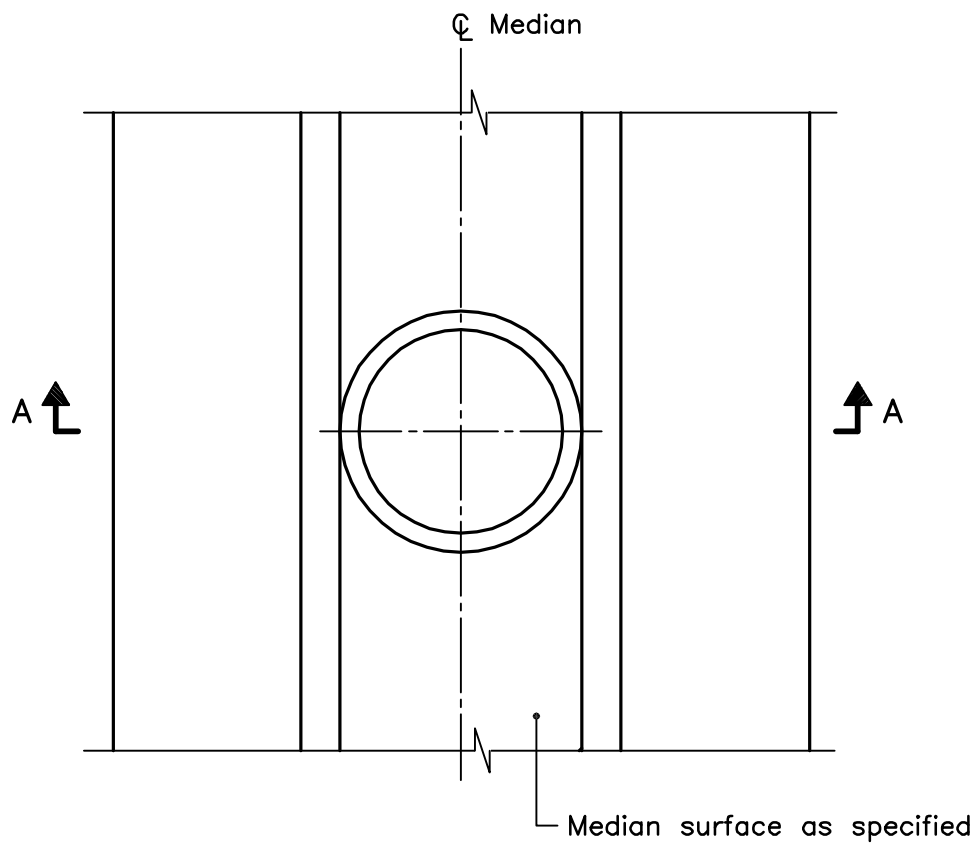
Nov 2013 Rev 3

ELECTRICAL HANDHOLES

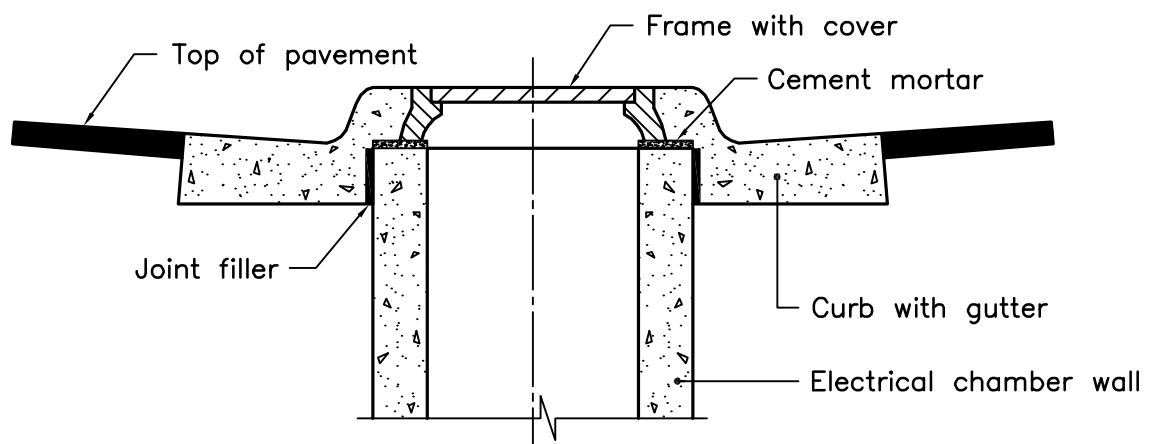
GENERAL INSTALLATION REQUIREMENTS



OPSD 2117.02



PLAN



SECTION A-A

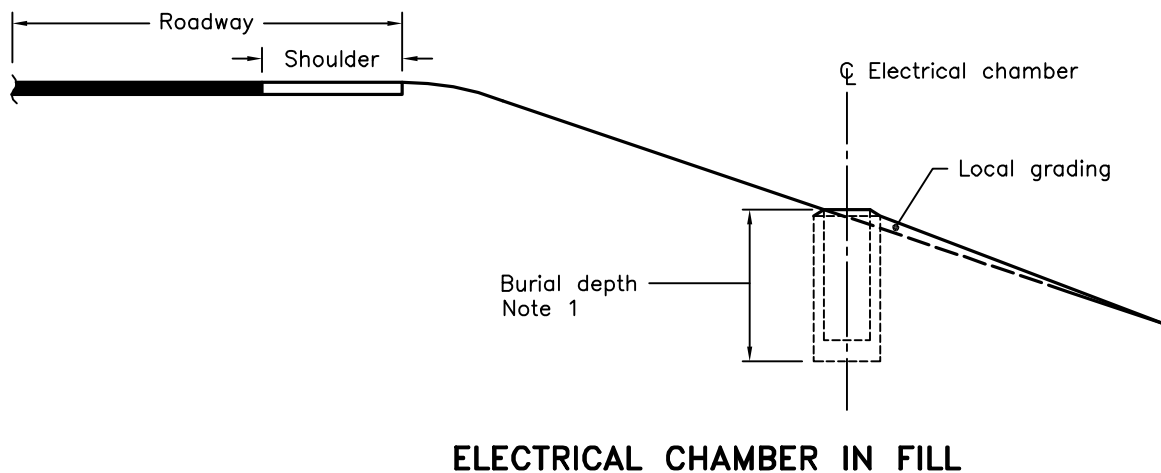
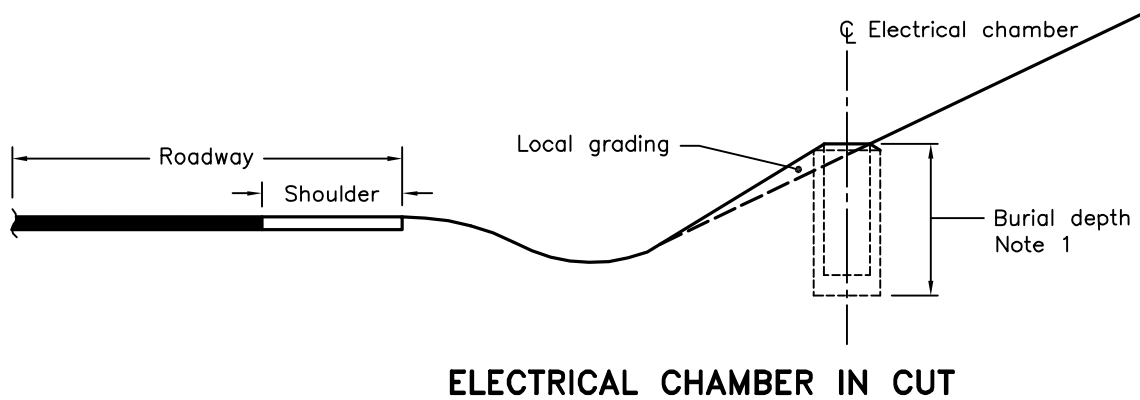
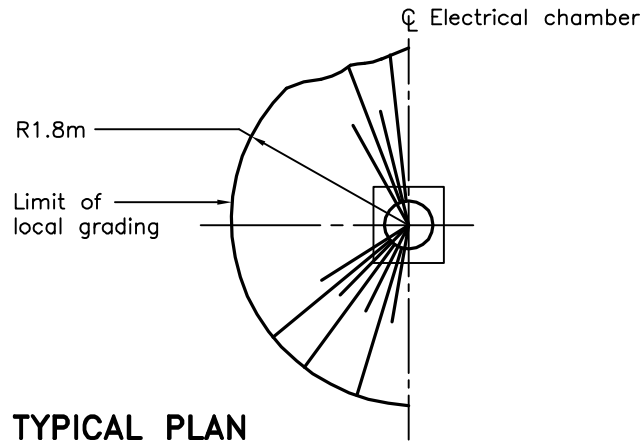
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2009 Rev 0

ELECTRICAL CHAMBER
INSTALLATION IN MEDIAN



OPSD 2118.010



NOTES:

1 Burial depth shall be measured from the highest grade elevation of the chamber frame with cover.

A All dimensions are in millimetres unless otherwise shown.

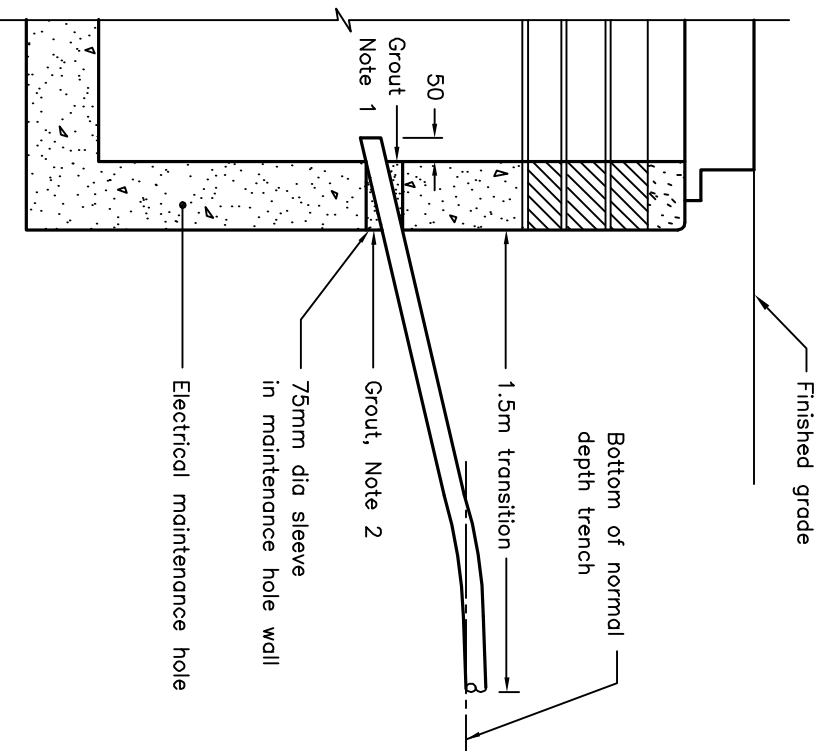
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2009 Rev 0

**ELECTRICAL CHAMBER
INSTALLATION IN SLOPE**



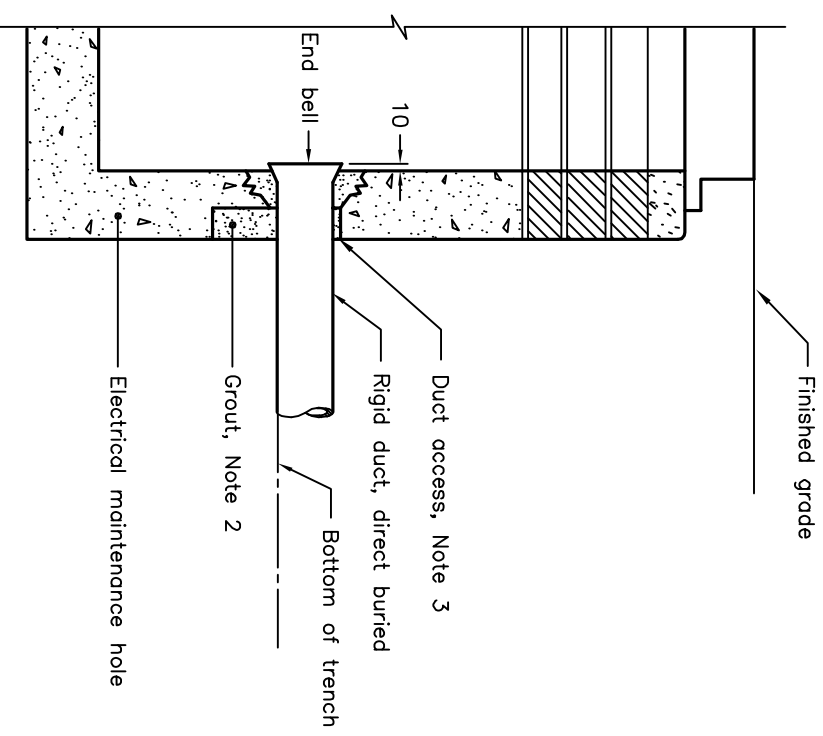
OPSD 2118.020



FLEXIBLE DUCTS, DIRECT BURIED

NOTES:

- 1 Grout shall be placed flush with inside wall to a minimum thickness of 75mm.
 - 2 Grout shall be placed flush with outside wall and full depth, including knock-out cavity in precast maintenance holes.
 - 3 For precast maintenance holes, knock-out holes shall be the minimum size required.
- A All dimensions are in millimetres unless otherwise shown.



RIGID DUCTS, DIRECT BURIED OR BY SUB-SURFACE INSTALLATION

ONTARIO PROVINCIAL STANDARD DRAWING

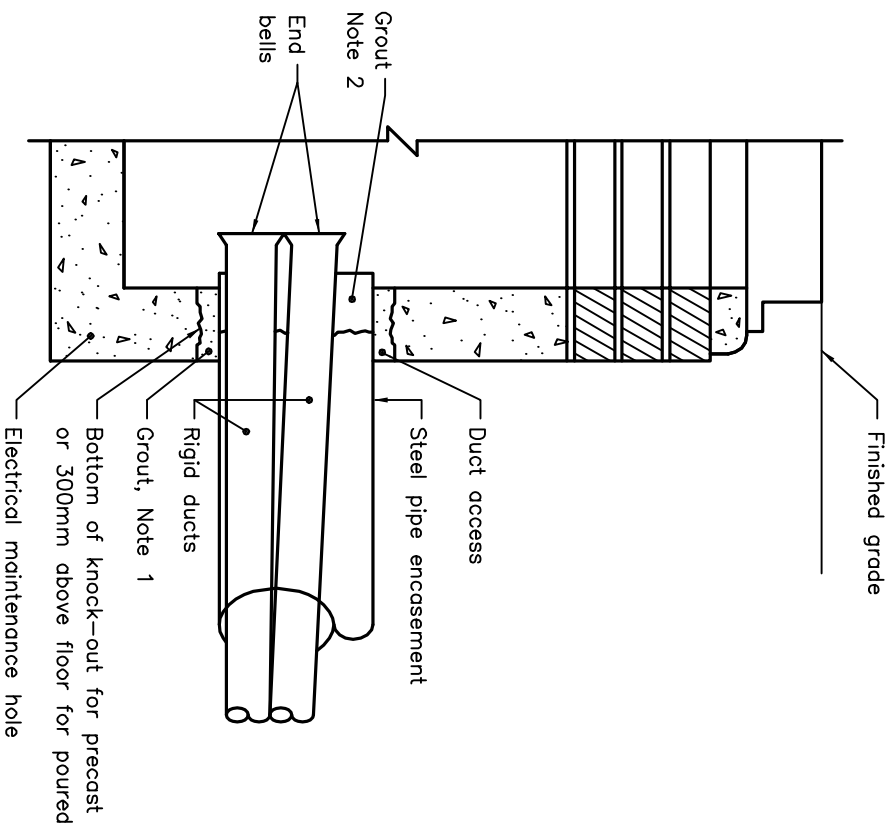
Nov 2013

Rev 1

ELECTRICAL MAINTENANCE HOLES
ENTRY OF DIRECT BURIED DUCTS



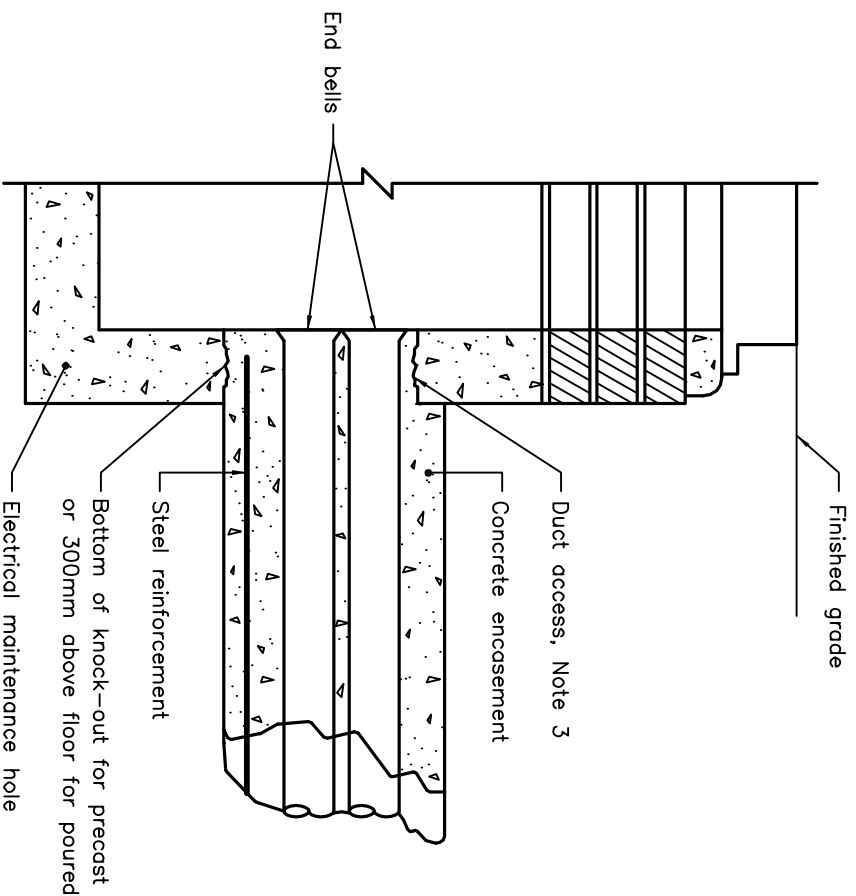
OPSD 2123.01



RIGID DUCTS, STEEL ENCASED

NOTES:

- 1 Grout shall be placed full depth and flush with both walls.
 - 2 Grout shall be placed within steel pipe, around all ducts, to a minimum depth of 75mm.
 - 3 Concrete shall be placed flush with inside wall.
- A All dimensions are in millimetres unless otherwise shown.



RIGID DUCTS, CONCRETE ENCASED

ELECTRICAL MAINTENANCE HOLES ENTRY OF ENCASED DUCTS

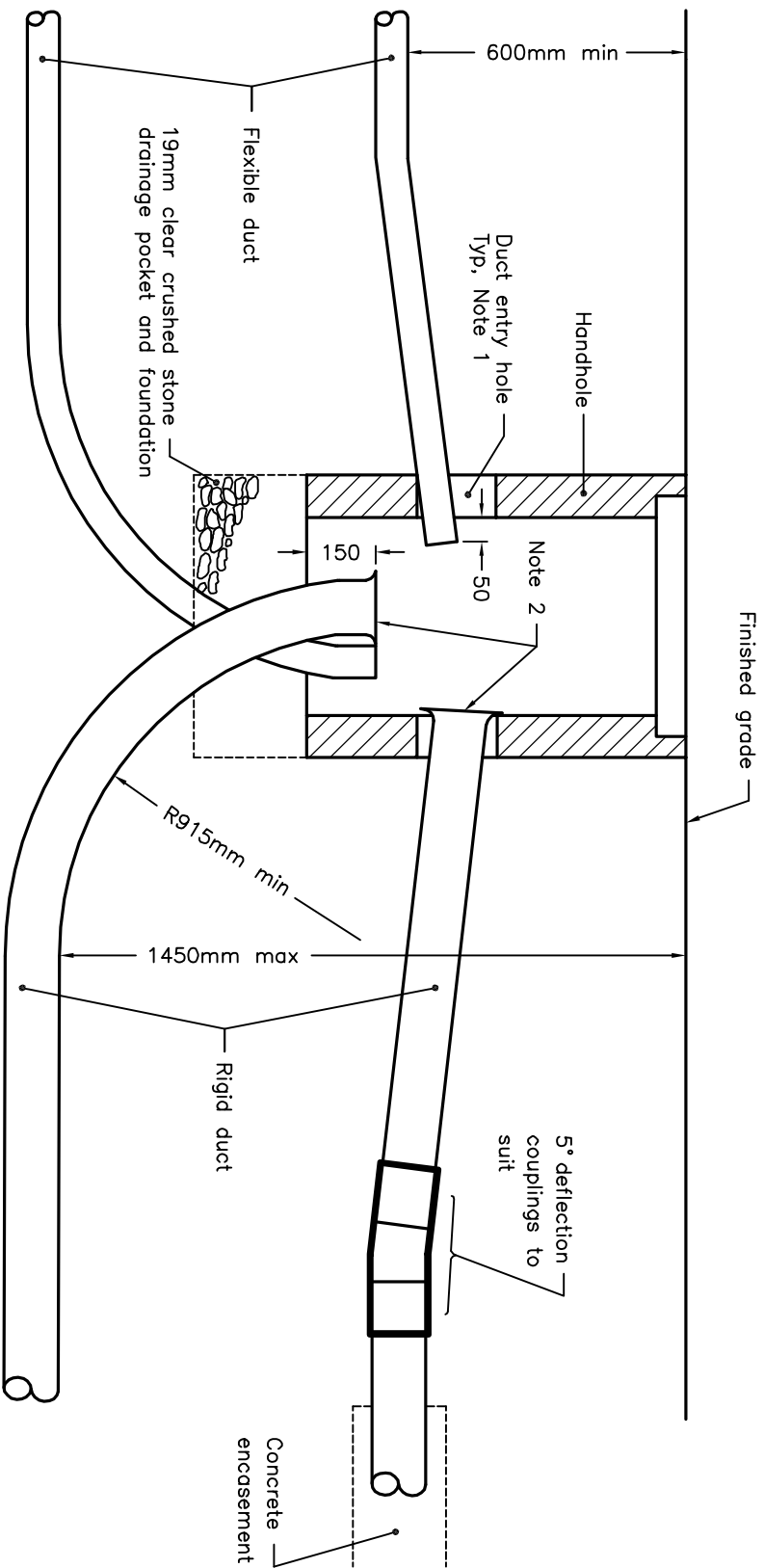
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2013

Rev 1



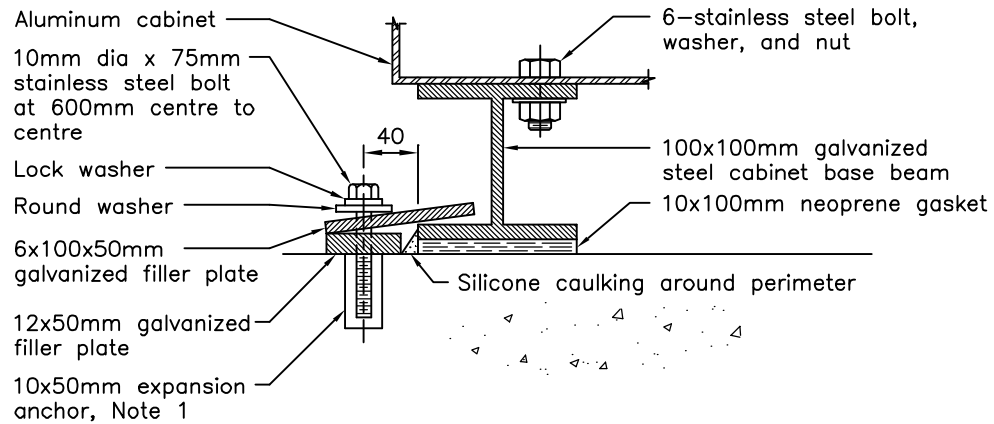
OPSD 2123.02



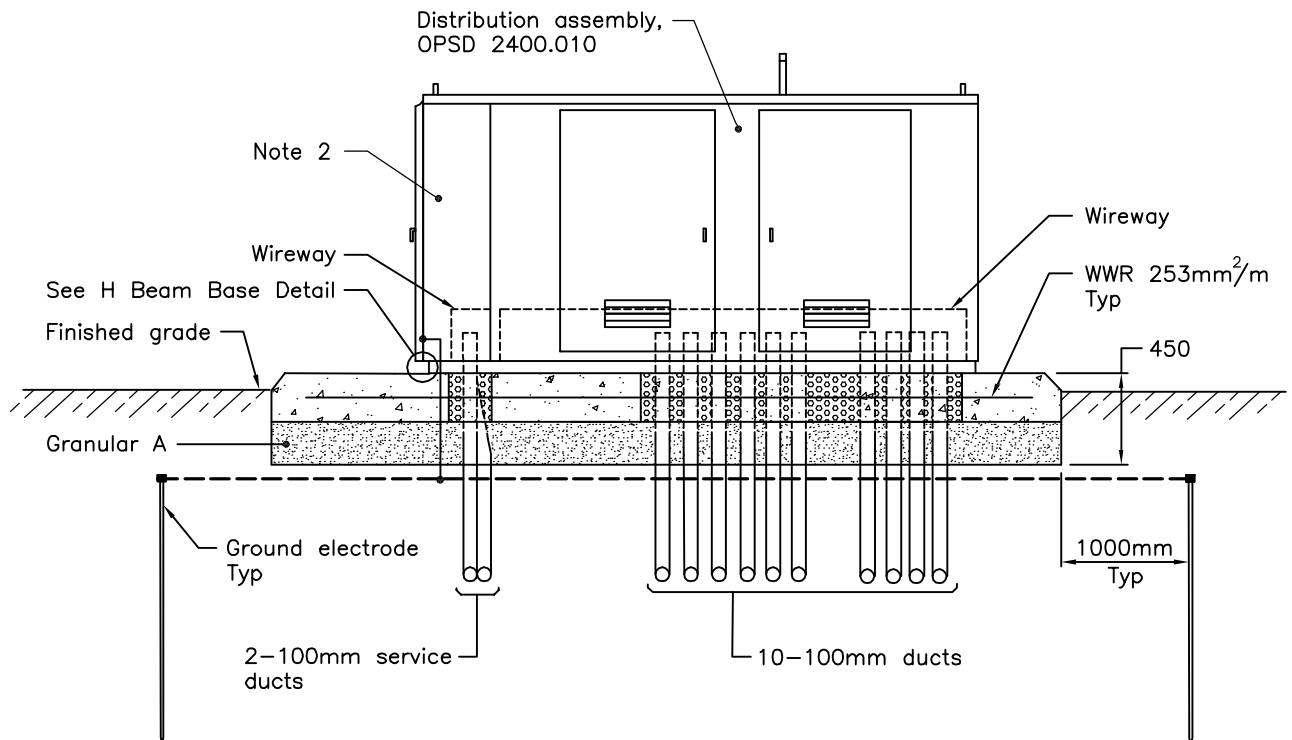
NOTES:

- 1 Duct entry holes shall be filled with expandable foam.
- 2 Rigid ducts terminating in maintenance holes, handholes, or other permanent openings of underground systems shall be provided with an end bell.
- A For installation details see OPSD 2117.02.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2013	Rev 2	
ELECTRICAL HANDHOLES				
ENTRY OF DIRECT BURIED AND ENCASED DUCTS				
OPSD 2123.03				



H BEAM BASE DETAIL



SECTION B-B

NOTES:

- 1 Anchor bolts shall be installed on exterior face of base beam.
- 2 Metering compartment as specified by power supply authority.
Metering compartment may be a separate stand-alone enclosure.
- A For plan view see OPSD 2126.010.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2010

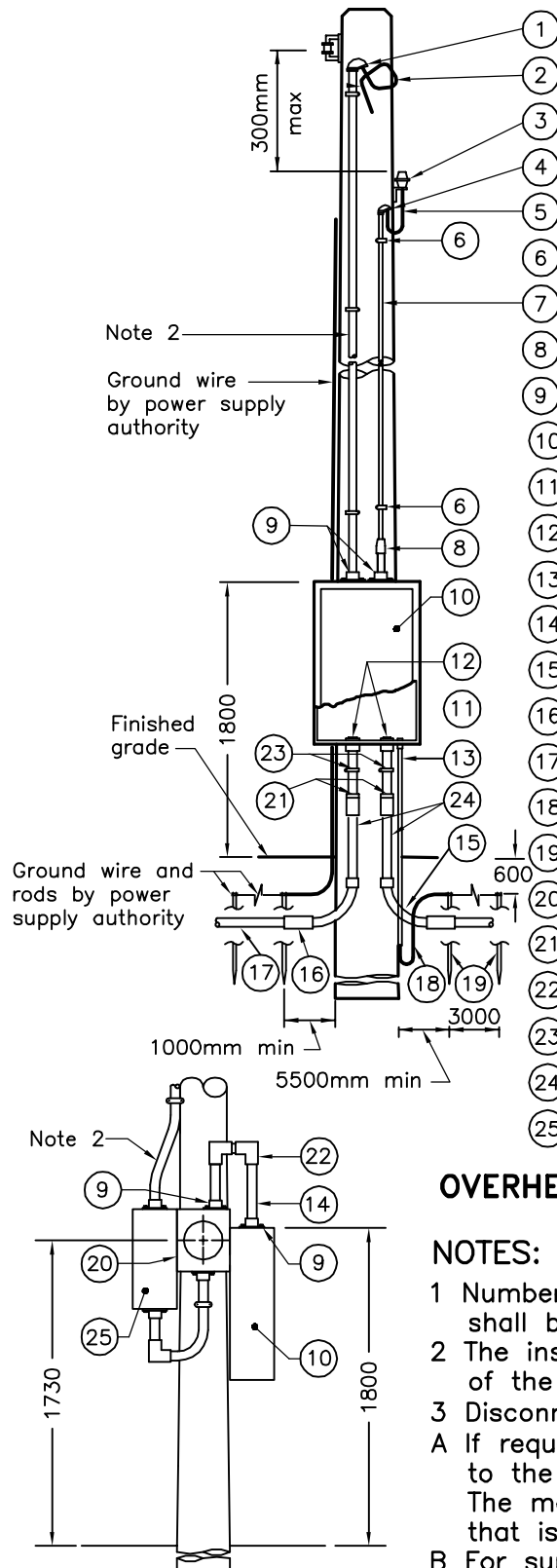
Rev 2

DISTRIBUTION ASSEMBLY

CONCRETE PAD AND DUCTS
SECTION B-B



OPSD 2126.020



DETAIL OF METER BASE

- 1 Service entrance fitting, Note 2
- 2 1.0m coil of cable for connection to incoming supply
- 3 Photoelectric controller with bracket
- 4 Service entrance fitting, 25mm, rigid PVC
- 5 3 No.12 AWG, low voltage cable
- 6 Clamp for 25mm, rigid PVC
- 7 Conduit, 25mm, rigid PVC
- 8 Reducing adapter, 50mm to 25mm, rigid PVC
- 9 Meter hub, 50mm, rigid PVC
- 10 Supply control cabinet
- 11 Terminal adapter and locknut, 20mm, rigid PVC
- 12 Terminal adapter and locknut, rigid PVC, size as required
- 13 Conduit, 20mm, rigid PVC
- 14 Conduit, 50mm, rigid PVC
- 15 Standard 90° elbow, rigid PVC, size as required
- 16 Adapter coupling, size as required
- 17 Conduit, polyethylene or steel, size as required
- 18 Ground wire, Note 1
- 19 Ground rod, Note 1
- 20 Meter base, 100A, 600V
- 21 Expansion coupling, size as required
- 22 Access fitting Type LB, 50mm rigid PVC
- 23 Clamp for rigid PVC, size as required
- 24 Conduit, rigid PVC, size as required
- 25 Disconnect, size as required, Note 3

OVERHEAD SERVICES

NOTES:

- 1 Number of ground rods and size of ground wire shall be as specified in the Contract Documents.
- 2 The installation shall be according to the requirements of the power supply authority.
- 3 Disconnect required only for 347/600V power supply cabinet.
- A If required, the meter base shall be bonded according to the requirements of the Electrical Safety Authority. The meter base shall be placed on the side of the pole that is most accessible to the power supply authority.
- B For supply control cabinet schematics wiring diagram see OPSD 2440.010 and 2440.020.
- C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

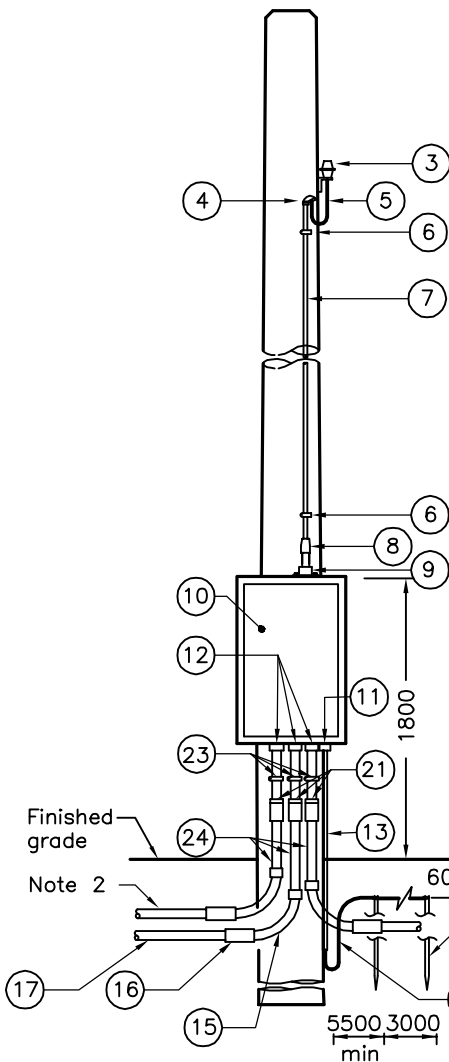
Nov 2013

Rev 0

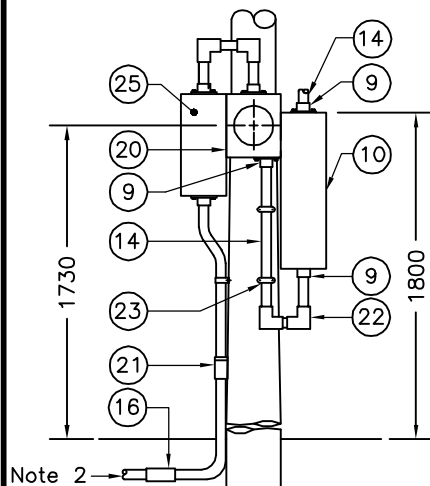
**SUPPLY CONTROL CABINET INSTALLATION
OVERHEAD SERVICES
TOP ENTRY METERING**

OPSD 2130.010





- ① Service entrance fitting, 50mm, rigid PVC (not used)
- ② 1.0m coil of cable for connection to incoming supply (not used)
- ③ Photoelectric controller with bracket
- ④ Service entrance fitting, 25mm, rigid PVC
- ⑤ 3 No.12 AWG, low voltage cable
- ⑥ Clamp for 25mm, rigid PVC
- ⑦ Conduit, 25mm, rigid PVC
- ⑧ Reducing adapter, 50mm to 25mm, rigid PVC
- ⑨ Meter hub, 50mm, rigid PVC
- ⑩ Supply control cabinet
- ⑪ Terminal adapter and locknut, 20mm, rigid PVC
- ⑫ Terminal adapter and locknut, rigid PVC, size as required
- ⑬ Conduit, 20mm, rigid PVC
- ⑭ Conduit, 50mm, rigid PVC
- ⑮ Standard 90° elbow, rigid PVC, size as required
- ⑯ Adapter coupling, size as required
- ⑰ Conduit polyethylene or steel, size as required
- ⑱ Ground wire, Note 1
- ⑲ Ground rod, Note 1
- ⑳ Meter base, 100A, 600V
- ㉑ Expansion coupling, size as required
- ㉒ Access fitting Type LB, 50mm rigid PVC
- ㉓ Clamp for, 50mm, rigid PVC
- ㉔ Conduit, rigid PVC, size as required
- ㉕ Disconnect, size as required, Note 3



DETAIL OF METER BASE

UNDERGROUND SERVICES

NOTES:

- 1 Number of ground rods and size of ground wire shall be as specified in the Contract Documents.
- 2 The installation shall be according to the requirements of the power supply authority.
- 3 Disconnect required only for 347/600V power supply cabinet.
- A If required, the meter base shall be bonded according to the requirements of the Electrical Safety Authority. The meter base shall be placed on the side of the pole that is most accessible to the power supply authority.
- B For supply control cabinet schematics wiring diagram see OPSD 2440.010 and 2440.020.
- C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

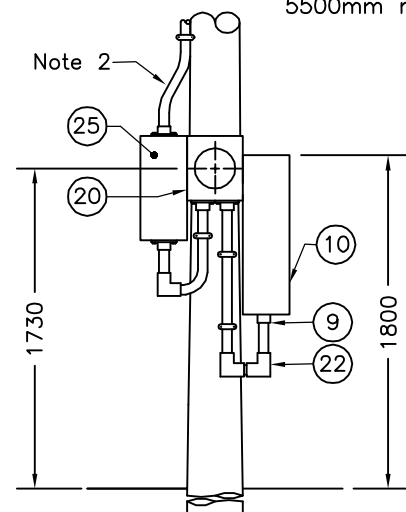
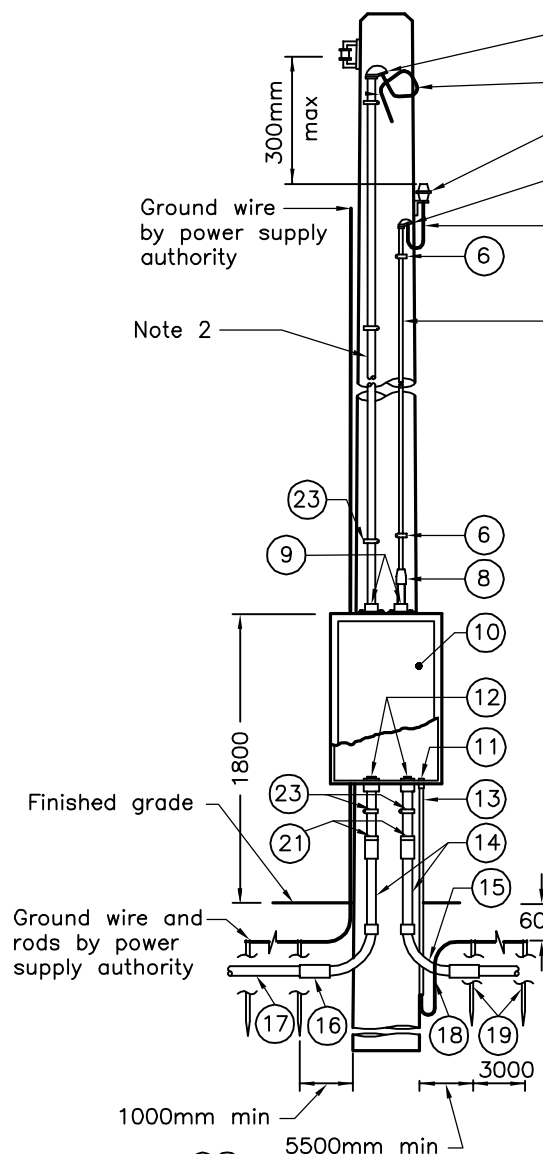
Nov 2013

Rev 0

**SUPPLY CONTROL CABINET INSTALLATION
UNDERGROUND SERVICES
BOTTOM ENTRY METERING**

OPSD 2130.011





DETAIL OF METER BASE

- ① Service entrance fitting, 50mm, Note 2
- ② 1.0m coil of cable for connection to incoming supply
- ③ Photoelectric controller with bracket
- ④ Service entrance fitting, 25mm, rigid PVC
- ⑤ 3 No.12 AWG, low voltage cable
- ⑥ Clamp for 25mm, rigid PVC
- ⑦ Conduit, 25mm, rigid PVC
- ⑧ Reducing adapter, 50mm to 25mm, rigid PVC
- ⑨ Meter hub, 50mm, rigid PVC
- ⑩ Supply control cabinet
- ⑪ Terminal adapter and locknut, 20mm, rigid PVC
- ⑫ Terminal adapter and locknut, rigid PVC, size as required
- ⑬ Conduit, 20mm, rigid PVC
- ⑭ Conduit, 50mm, rigid PVC
- ⑮ Standard 90° elbow, rigid PVC, size as required
- ⑯ Adapter coupling, size as required
- ⑰ Conduit polyethylene or steel, size as required
- ⑱ Ground wire, Note 1
- ⑲ Ground rod, Note 1
- ⑳ Meter base, 100A, 600V
- ㉑ Expansion coupling, size as required
- ㉒ Access fitting Type LB, 50mm rigid PVC
- ㉓ Clamp for, rigid PVC, size as required
- ㉔ Conduit, rigid PVC, size as required
- ㉕ Disconnect, size as required, Note 3

OVERHEAD SERVICES

NOTES:

- 1 Number of ground rods and size of ground wire shall be as specified in the Contract Documents.
- 2 The installation shall be according to the requirements of the power supply authority.
- 3 Disconnect required only for 347/600V power supply cabinet.
- A If required, the meter base shall be bonded according to the requirements of the Electrical Safety Authority. The meter base shall be placed on the side of the pole that is most accessible to the power supply authority.
- B For supply control cabinet schematics wiring diagram see OPSD 2440.010 and 2440.020.
- C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

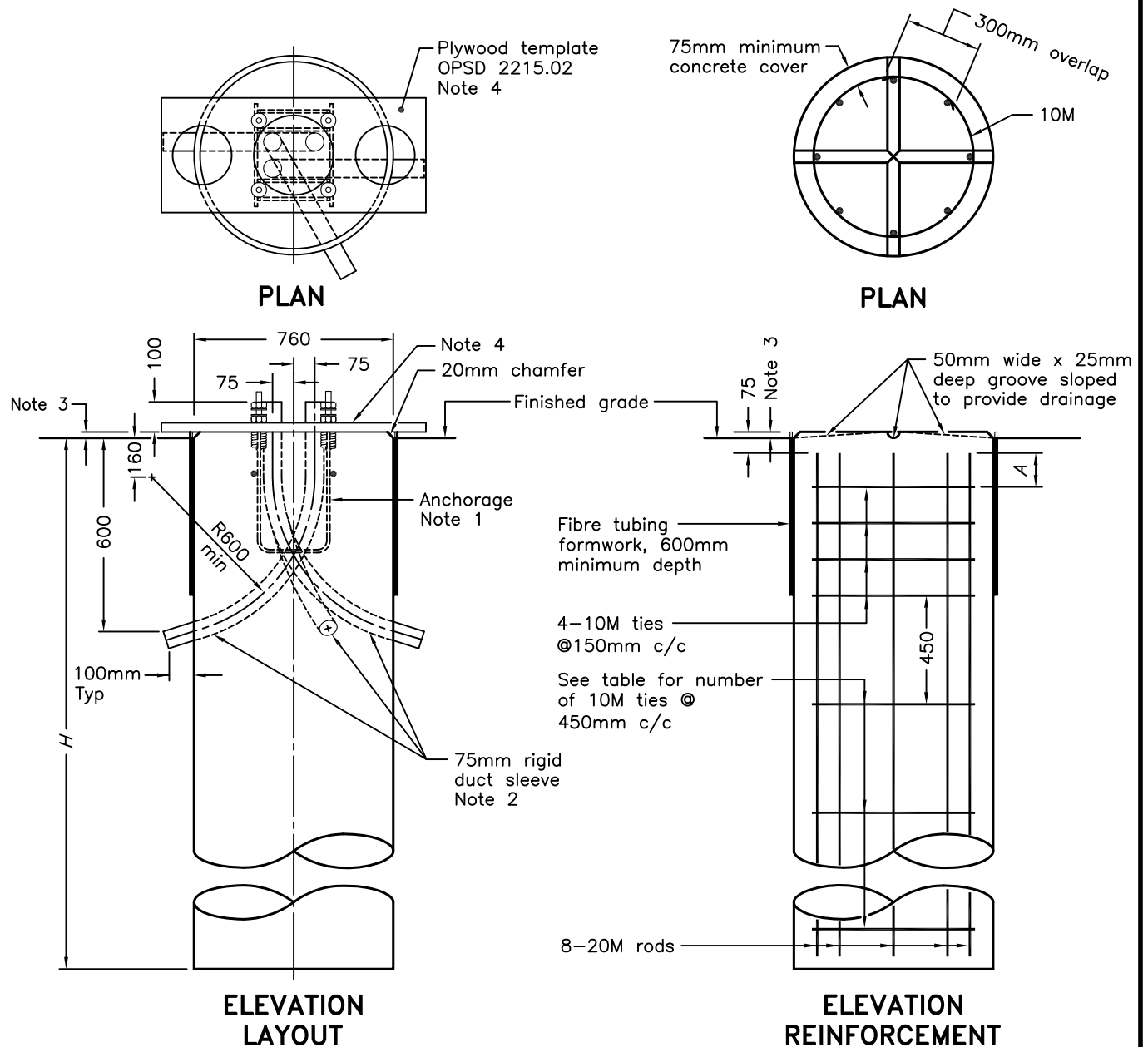
Nov 2013

Rev 0

SUPPLY CONTROL CABINET INSTALLATION
OVERHEAD SERVICES
BOTTOM ENTRY METERING

OPSD 2130.012





NOTES:

- 1 For anchorage assembly see OPSD 2215.02.
 - 2 Minimum of two sleeves required for each concrete footing. Three sleeves as specified.
 - 3 Top of footing shall be installed at 40mm $\pm$ 15mm above finished grade in paved or concrete areas and 75mm $\pm$ 25mm above finished grade in earth or granular areas.
 - 4 Plywood template set level. Remove to finish concrete after initial set.
- A For pole mounting details see OPSD 2215.03.
B All dimensions are in millimetres unless otherwise shown.

POLE LENGTH m	BURIAL DEPTH H m	ROD LENGTH m	A mm	NO. OF 10M TIES @ 450 c/c	BOLT CIRCLE DIA FOR METAL POLES		
					Aluminum	Steel	Sectional Steel
5.6	2.15	2.00	100	3	N/A	N/A	449
7.0	2.15	2.00	100	3	N/A	N/A	449
7.5	2.15	2.00	100	3	406	406	N/A
8.7	2.45	2.30	250	3	N/A	N/A	449
9.0	2.45	2.30	0	4	406	406	N/A
10.5	2.60	2.45	100	4	406	406	449
12.0	2.75	2.60	150	4	406	406	N/A
13.6	2.90	2.75	0	5	406	406	N/A
15.1	3.05	2.90	100	5	406	406	N/A

N/A - Not applicable

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2012

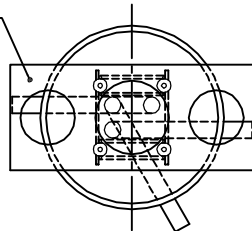
Rev 2

CONCRETE FOOTING
FOR BASE MOUNTED
LIGHTING AND SIGNAL POLES

OPSD 2200.01

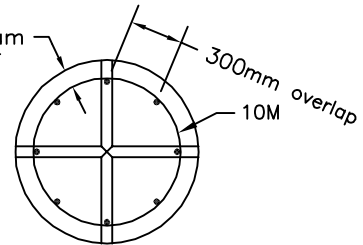


Plywood template
See OPSD 2215.02

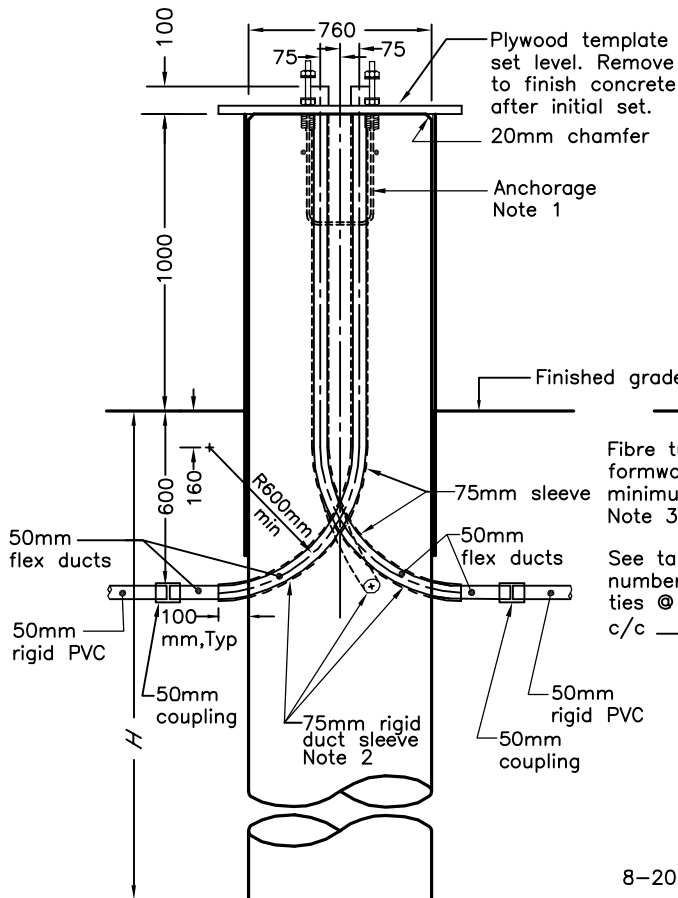


PLAN

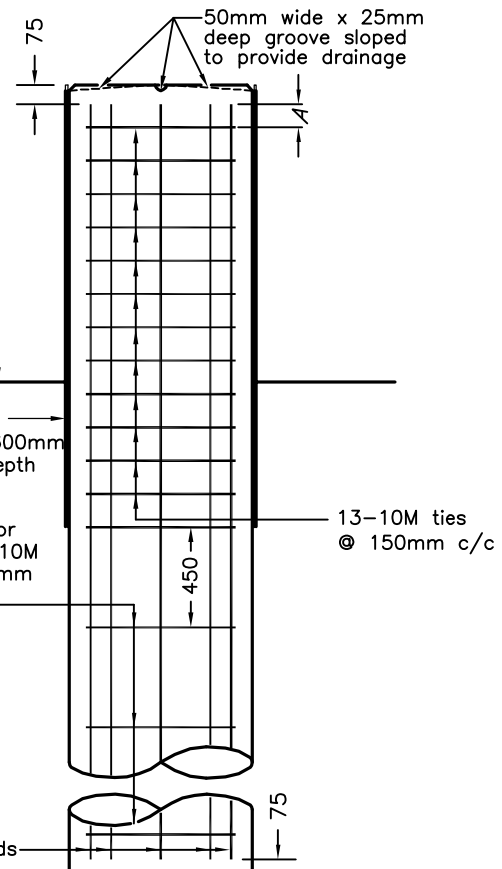
75mm minimum
concrete cover



PLAN



ELEVATION LAYOUT



ELEVATION REINFORCEMENT

NOTES:

- 1 For anchorage assembly see OPSD 2215.02.
 - 2 Minimum of two sleeves required for each concrete footing. Three sleeves as specified.
 - 3 Remove formwork above finished grade after initial set.
- A For pole mounting details see OPSD 2215.03.
- B All dimensions are in millimetres unless otherwise shown.

POLE LENGTH m	BURIAL DEPTH H m	ROD LENGTH m	A mm	NO. OF 10M TIES @ 450 c/c	BOLT CIRCLE DIA FOR METAL POLES		
					Aluminum	Steel	Sectional Steel
5.6	2.15	3.00	100	3	N/A	N/A	449
7.0	2.15	3.00	100	3	N/A	N/A	449
7.5	2.15	3.00	100	3	406	406	N/A
8.7	2.45	3.30	250	3	N/A	N/A	449
9.0	2.45	3.30	0	4	406	406	N/A
10.5	2.60	3.45	100	4	406	406	449
12.0	2.75	3.60	150	4	406	406	N/A
13.6	2.90	3.75	0	5	406	406	N/A
15.1	3.05	3.90	100	5	406	406	N/A

N/A - Not applicable

ONTARIO PROVINCIAL STANDARD DRAWING

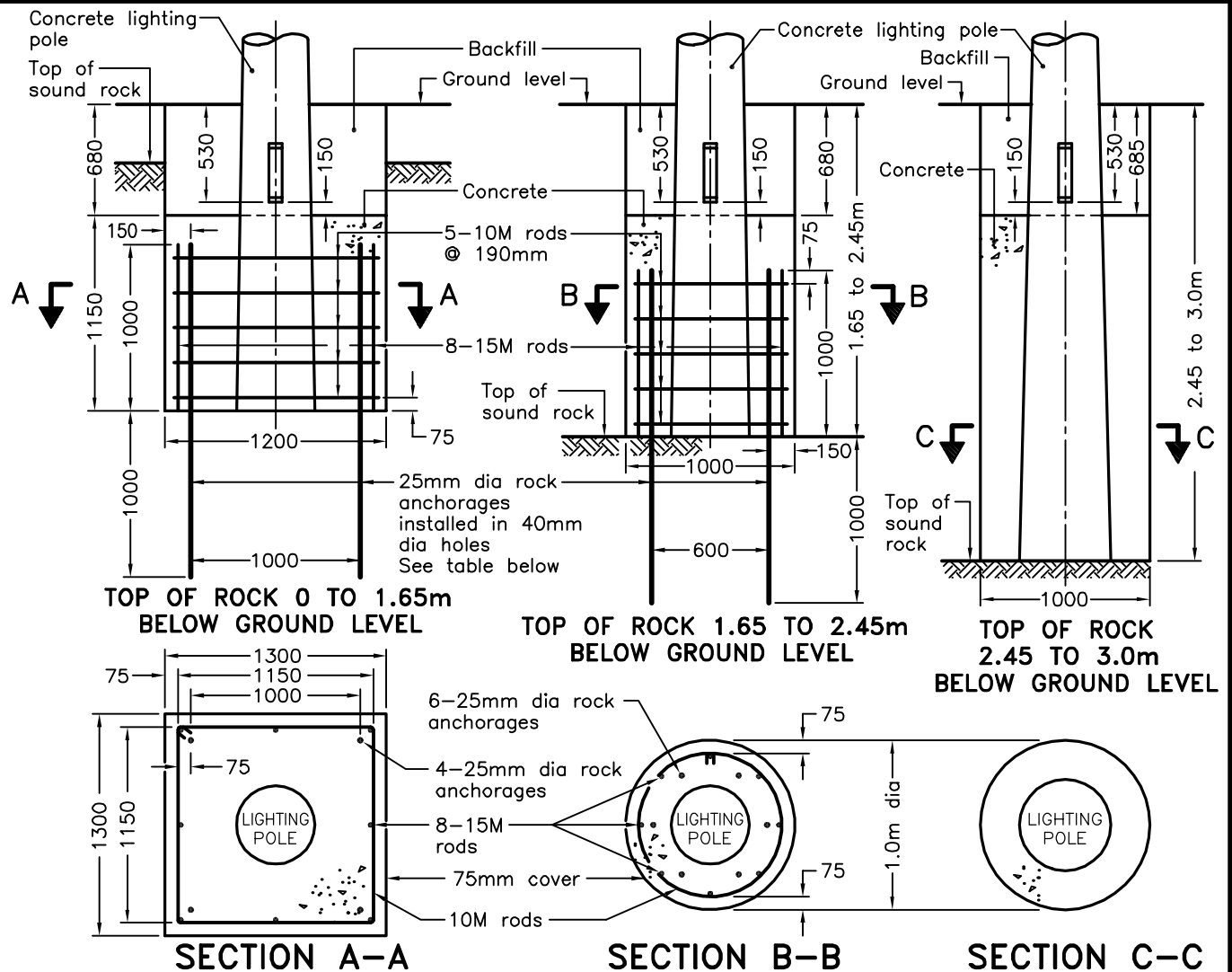
Nov 2010

Rev 0

RAISED CONCRETE FOOTING
FOR BASE MOUNTED LIGHTING POLES



OPSD 2200.011



CONCRETE POLE SETTING WHERE ROCK IS ENCOUNTERED												
POLE LENGTH m	NORMAL BURIAL DEPTH IN EARTH m	BELOW GROUND DEPTH TO TOP OF ROCK, m										
		0	0.30	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70	3.00
		DEPTH OF ROCK EXCAVATION REQUIRED, m										
9.0	1.65	1.65 *	1.35 *	1.05 *	0.75 *	0.45 *	0.15 *					
10.2	1.65	1.65 *	1.35 *	1.05 *	0.75 *	0.45 *	0.15 *					
10.7	1.65	1.65 *	1.35 *	1.05 *	0.75 *	0.45 *	0.15 *					
12.1	1.65	1.65 *	1.35 *	1.05 *	0.75 *	0.45 *	0.15 *					
12.5	2.00	1.65 (0.30) *	1.35 (0.30)	1.05 (0.30)	0.75 (0.30)	0.45 (0.30)	0.15 (0.30) *	0 (0.15) *				
14.0	2.00	1.65 (0.30) *	1.35 (0.30)	1.05 (0.30)	0.75 (0.30)	0.45 (0.30)	0.15 (0.30)	0 (0.15) *				
15.8	2.30	1.65 (0.60)	1.35 (0.60)	1.05 (0.60)	0.75 (0.60)	0.45 (0.60)	0.15 (0.75)	0 (0.45)	0 (0.15) *			
18.3	3.20	1.65 (1.50)	1.35 (1.50)	1.05 (1.50)	0.75 (1.50)	0.45 (1.50)	0.15 (1.50)	0 (1.35)	0 (1.05)	0 (0.75) *	0 (0.45) *	0 (0.15) *
21.3	3.20	1.65 (1.50)	1.35 (1.50)	1.05 (1.50)	0.75 (1.50)	0.45 (1.50)	0.15 (1.50)	0 (1.35)	0 (1.05)	0 (0.75) *	0 (0.45) *	0 (0.15) *

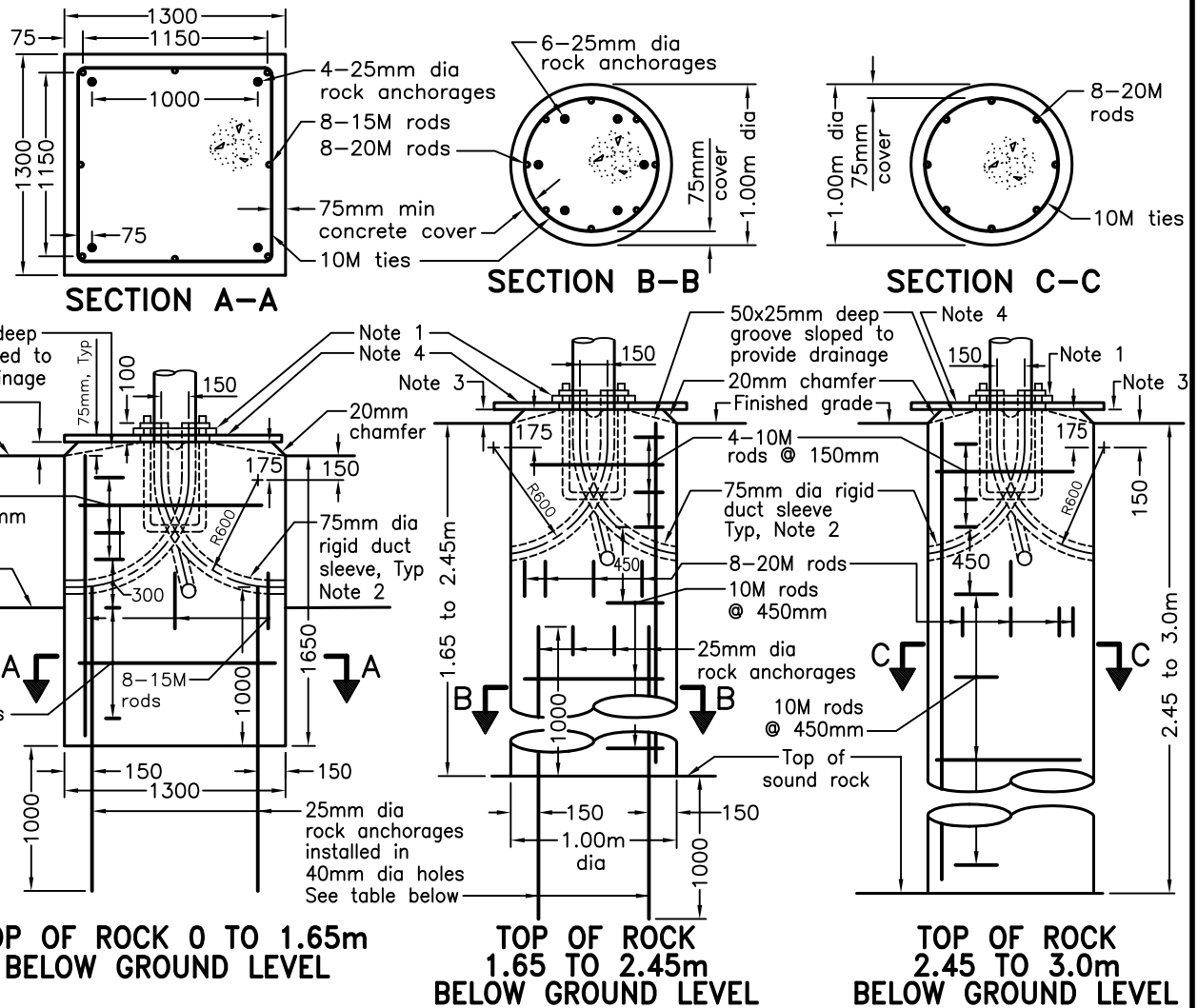
* Rock anchorages and steel reinforcing not required.

() Dimensions shown in brackets indicate the length to be cut off from the bottom of the pole.

NOTE:

All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev	1	
CONCRETE FOUNDATION FOR DIRECT BURIED LIGHTING POLES WHERE ROCK IS ENCOUNTERED				
OPSD 2200.02				



FOOTINGS FOR BASE MOUNTED POLES WHERE ROCK IS ENCOUNTERED											
POLE LENGTH m	NORMAL BURIAL DEPTH IN EARTH m	BELOW GROUND DEPTH TO TOP OF ROCK, m									
		0.0	0.30	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70
		DEPTH OF ROCK EXCAVATION REQUIRED, m									
7.0	2.15	1.65*	1.35*	1.05*	0.75*	0.45*	0.15*	* Rock anchorages not required			
7.5	2.15	1.65*	1.35*	1.05*	0.75*	0.45*	0.15*				
8.7	2.45	1.65*	1.35*	1.05*	0.75*	0.45*	0.15*				
9.0	2.45	1.65*	1.35*	1.05*	0.75*	0.45	0.15*				
10.5	2.60	1.65*	1.35	1.05	0.75	0.45	0.15*	0*			
12.0	2.75	1.65*	1.35	1.05	0.75	0.45	0.15	0*			
13.6	2.90	1.65	1.35	1.05	0.75	0.45	0.15	0	0*		
15.1	3.05	1.65	1.35	1.05	0.75	0.45	0.15	0	0		

NOTES:

- For anchorage assembly see OPSD 2215.02. For pole mounting details see OPSD 2215.03.
- Minimum of two sleeves required for concrete foundation. Three sleeves as specified.
- Top of footing shall be installed at 40mm $\pm$ 15mm above finished grade in paved or concrete areas and 75mm $\pm$ 25mm above finished grade in earth or granular areas.
- Plywood template set level. Remove to finish concrete after initial set.

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

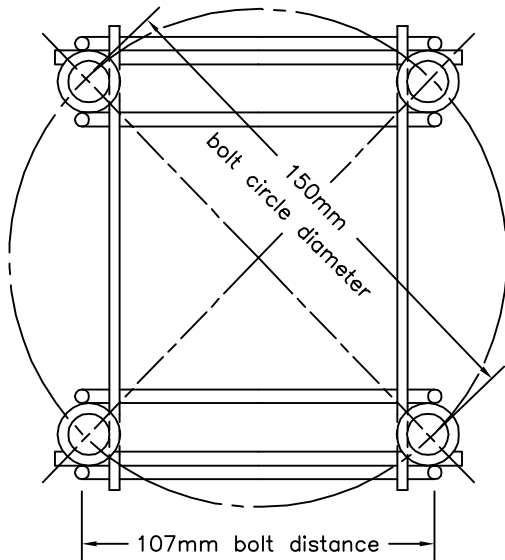
Nov 2012

Rev 2

CONCRETE FOUNDATION
FOR BASE MOUNTED LIGHTING POLES
WHERE ROCK IS ENCOUNTERED

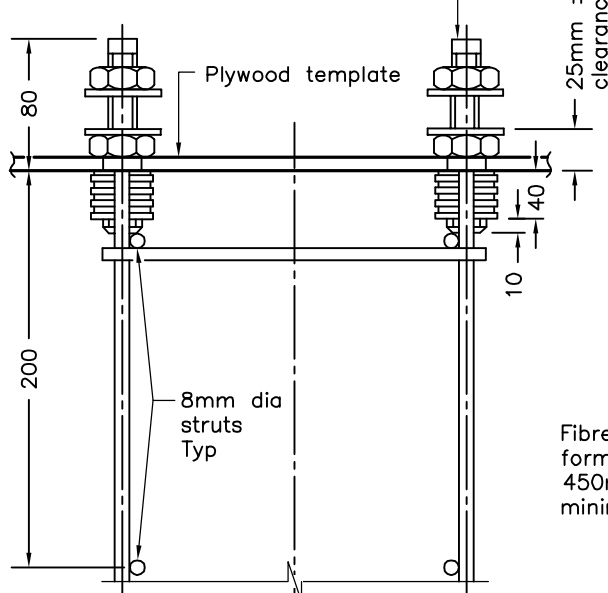
OPSD 2200.03



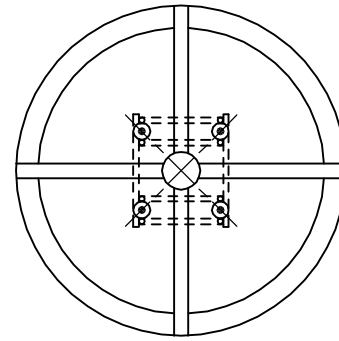


PLAN

16mm dia x 130mm long square head stud C/W circular flat washers and hexagon nuts, Typ, Note 2



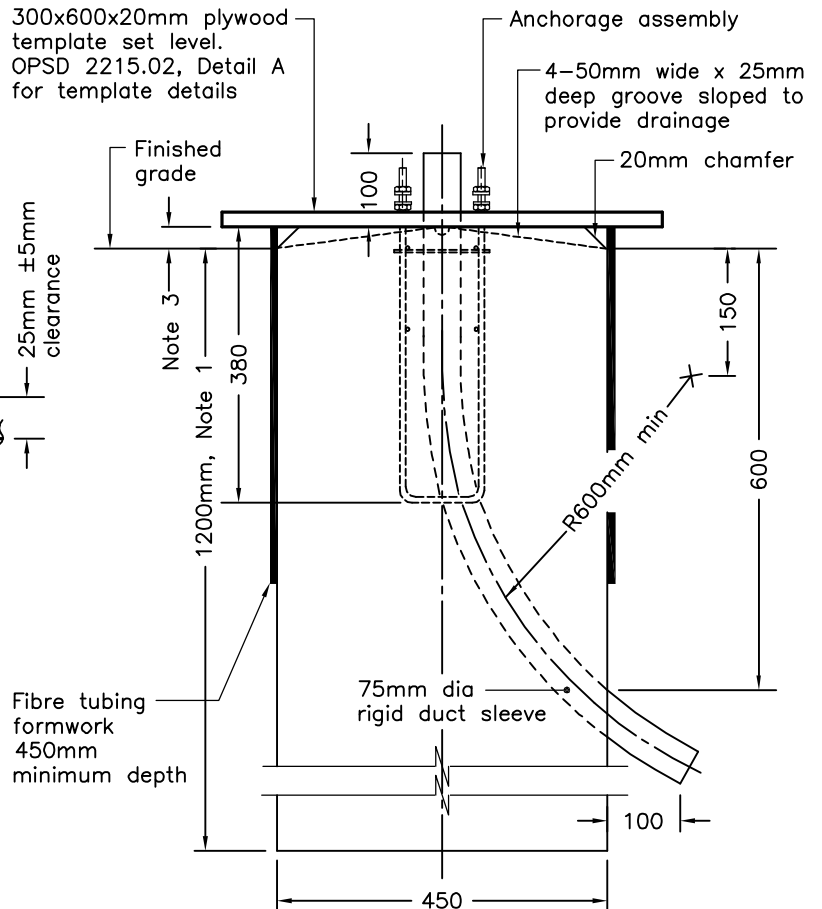
**ELEVATION
ANCHORAGE ASSEMBLY**



PLAN

Plywood template not shown for clarity

300x600x20mm plywood template set level.
OPSD 2215.02, Detail A for template details



**ELEVATION
CONCRETE FOOTING**

NOTES:

- 1 When rock is encountered at 600mm or less below ground level, the depth of the concrete footing shall be a minimum of 900mm.
- 2 Studs shall be factory set with preapplied thread locking compound and shall remain in place during footing and pole installation.
- 3 Top of footing shall be installed at 40mm ±15mm above finished grade in paved or concrete areas and 75mm ±25mm above finished grade in earth or granular areas.

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

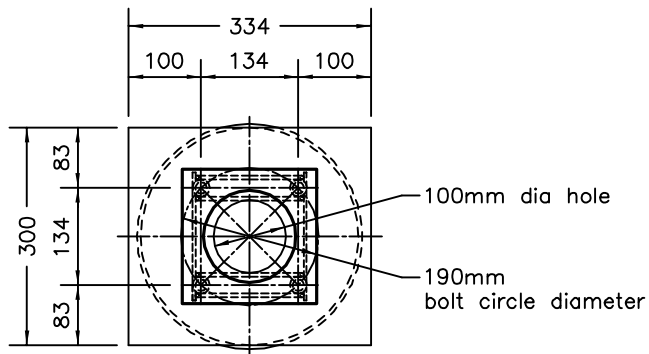
Nov 2014

Rev 2

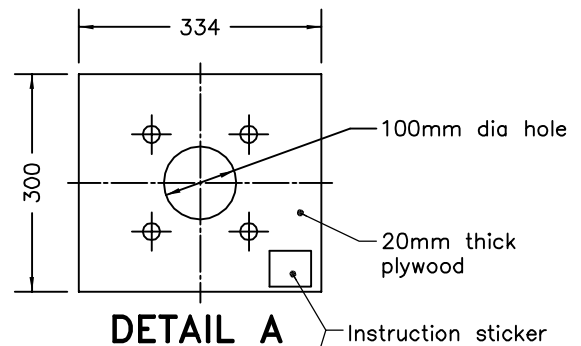
**CONCRETE FOOTING
AND ANCHORAGE ASSEMBLY FOR
3.3m BASE MOUNTED METAL POLE**



OPSD 2200.04



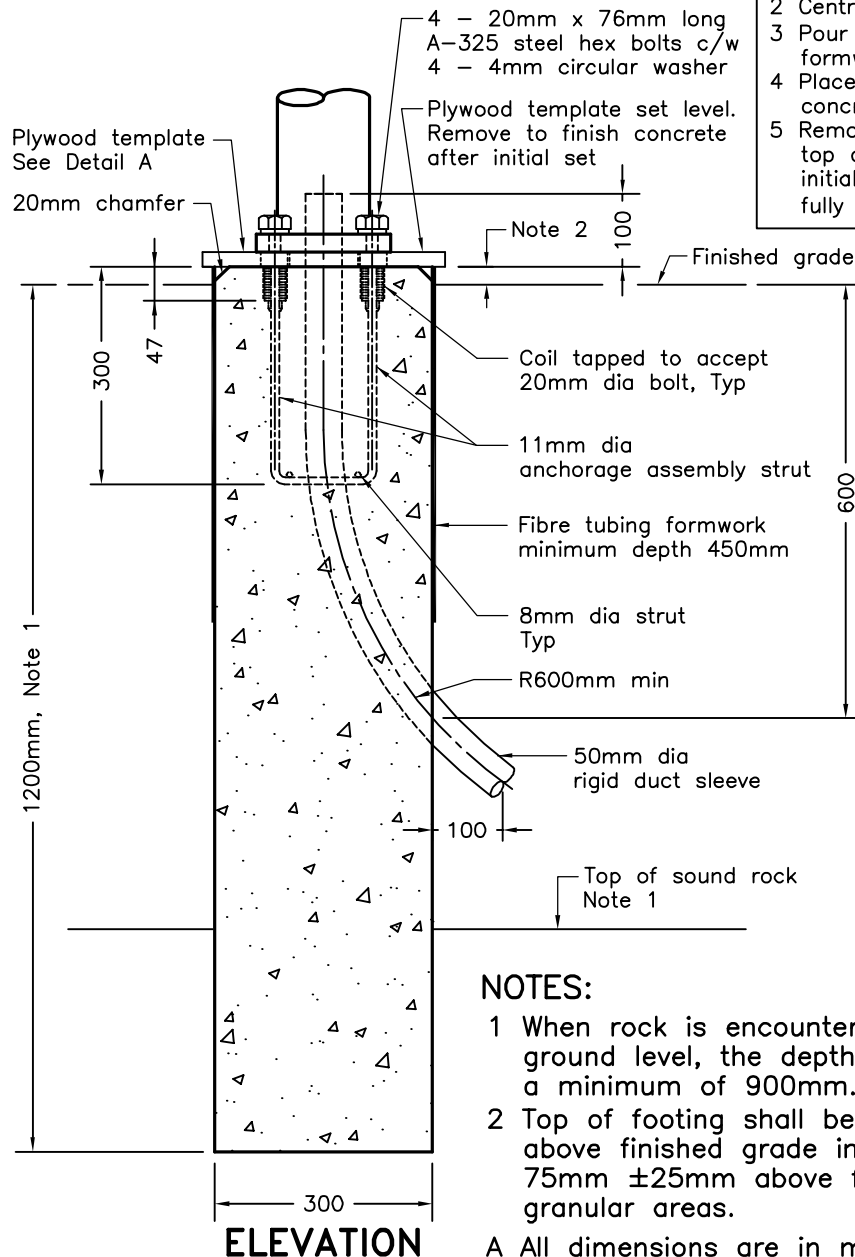
PLAN



DETAIL A

INSTRUCTIONS:

- 1 Position and level fibre tubing formwork.
- 2 Centre duct within fibre tubing formwork.
- 3 Pour concrete to the top of the fibre tubing formwork.
- 4 Place and centre anchorage assembly within concrete footing.
- 5 Remove wood template and finish concrete on top of footing as soon as concrete has an initial set. Replace template and place bolts fully to threaded ferrules, hand tight.



ELEVATION

NOTES:

- 1 When rock is encountered at 600mm or less below ground level, the depth of the concrete footing shall be a minimum of 900mm.
- 2 Top of footing shall be installed at 40mm $\pm$ 15mm above finished grade in paved or concrete areas and 75mm $\pm$ 25mm above finished grade in earth or granular areas.

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

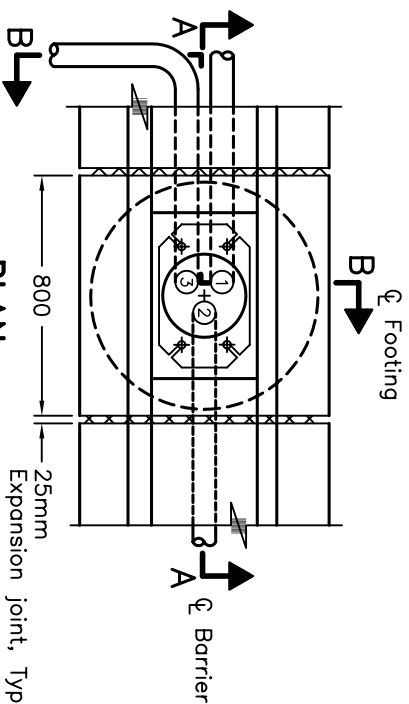
Nov 2014

Rev 0

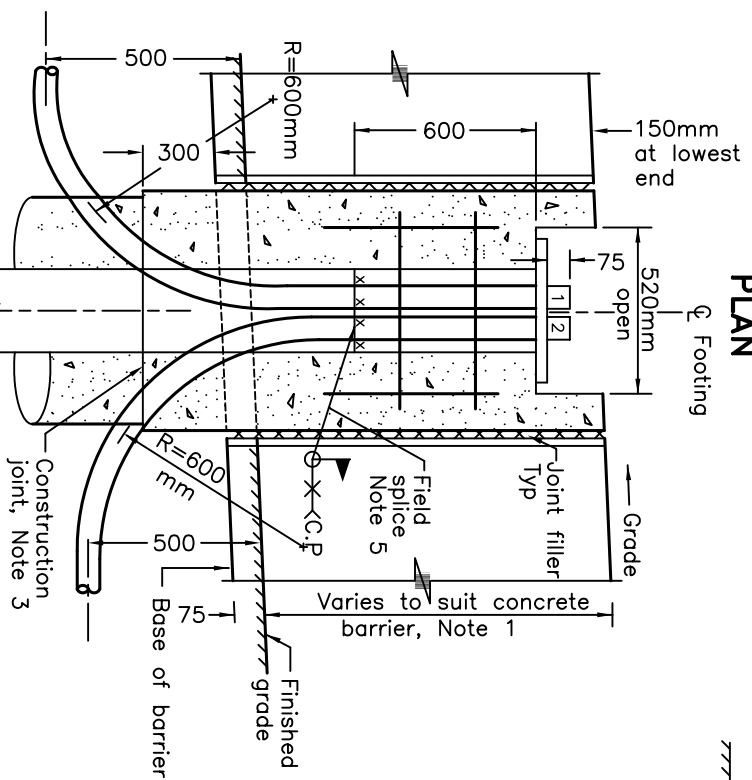
**CONCRETE FOOTING FOR
1.5m BASE MOUNTED
PEDESTRIAN PUSH BUTTON POLE**

OPSD 2200.041

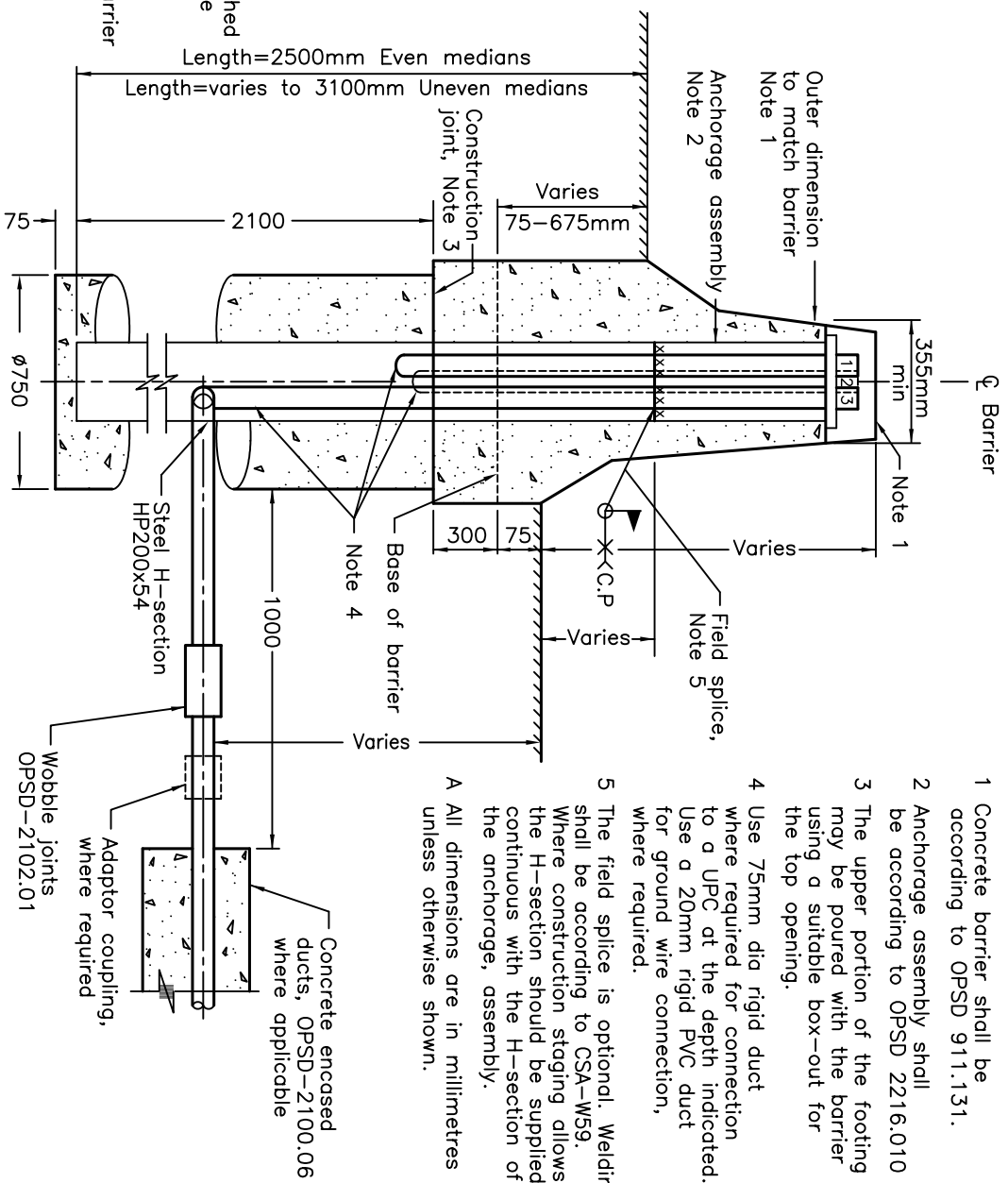




PLAN



SECTION A-A



SECTION B-B

NOTES:

- 1 Concrete barrier shall be according to OPSD 911.131.
- 2 Anchorage assembly shall be according to OPSD 2216.010
- 3 The upper portion of the footing may be poured with the barrier using a suitable box-out for the top opening.
- 4 Use 75mm dia rigid duct where required for connection to a UPC at the depth indicated. Use a 20mm rigid PVC duct for ground wire connection, where required.
- 5 The field splice is optional. Welding shall be according to CSA-W59. Where construction staging allows, the H-section should be supplied continuous with the H-section of the anchorage, assembly.

A All dimensions are in millimetres unless otherwise shown.

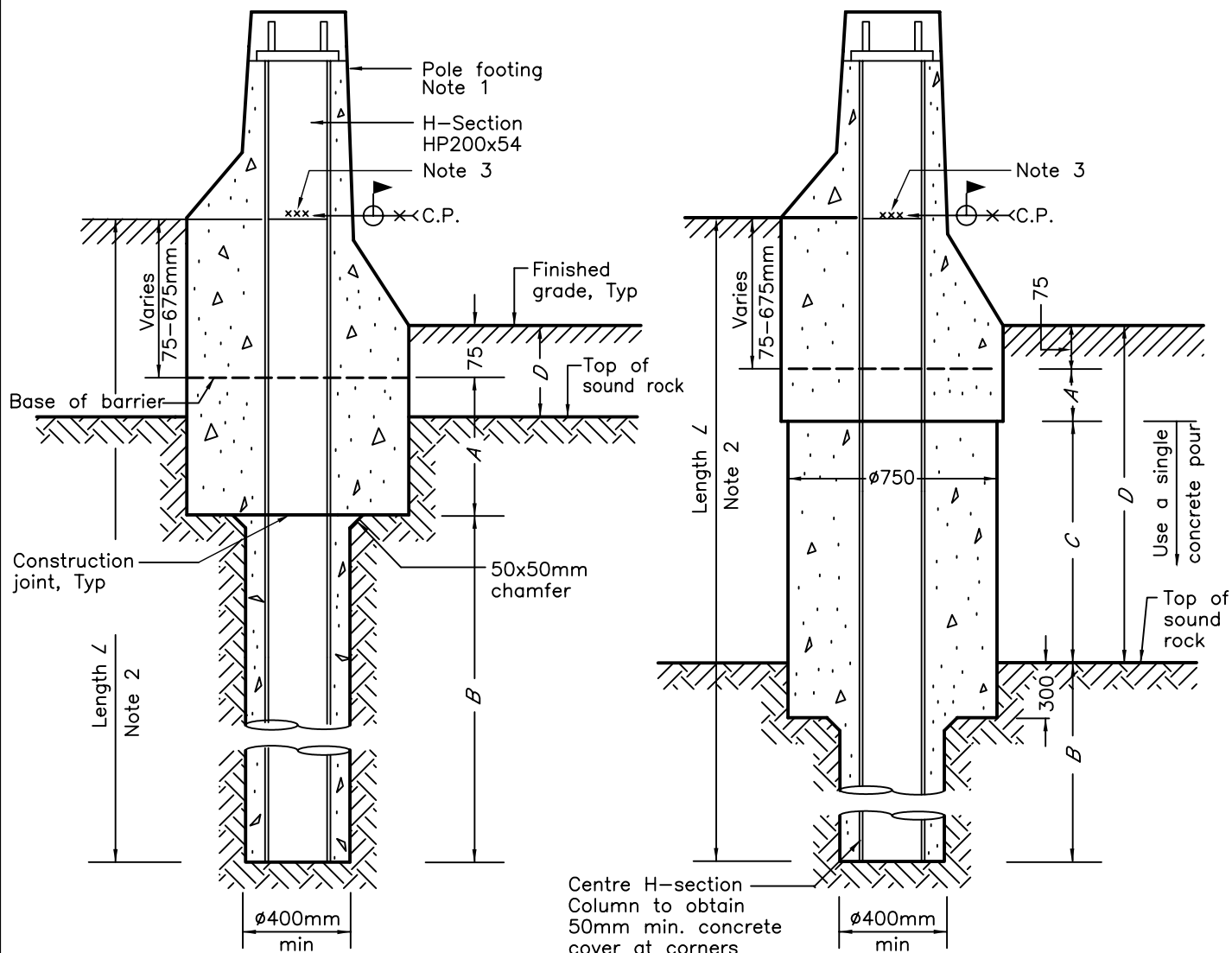
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2001 Rev 0

POLE FOOTING IN EARTH FOR CAST-IN-PLACE CONCRETE BARRIER

OPSD - 2200.070





DEPTH TO SOUND ROCK = 0 TO 1199mm

DEPTH TO SOUND ROCK = 1200 TO 2100mm

DIMENSION		DEPTH TO SOUND ROCK D mm							
		0	300	600	900	1200	1500	1800	2100
Depth A		300	600	900	1100	300	300	200	200
Depth B	C	1400	1100	800	600	600	900	600	300
	C-1	2000	1700	1400	1200	1200	1500	1200	900
Depth C		n/a	n/a	n/a	n/a	800	1100	1500	1800
Length L	C	1875	1875	1875	1875	1875	2475	2475	2475
	C-1	2475	2475	2475	2475	2475	3075	3075	3075

* C and C-1 are barrier types. Refer to OPSD-911.131

NOTES:

- Details shown are for modifications required to the normal footing for installation in rock. For all other details, refer to OPSD-2200.070.
- Lengths L are indicated for C or C-1 barriers. Rock excavation depth B shall correspond to the H-section lengths as shown.
- The field splice is optional. Welding shall be according to CSA-W59. Where construction staging allows, the H-section should be supplied continuous with the H-section of the anchorage assembly.

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

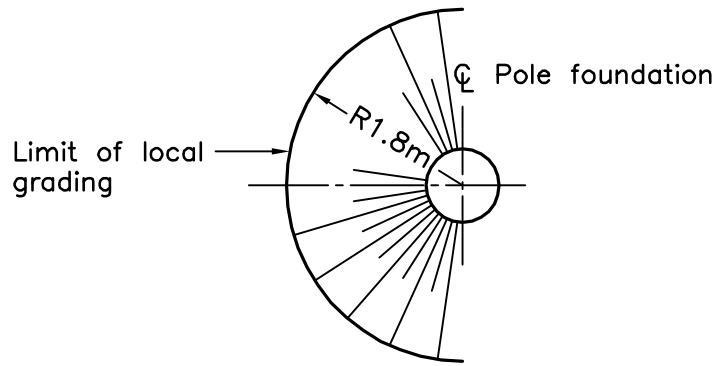
Nov 2001

Rev 0

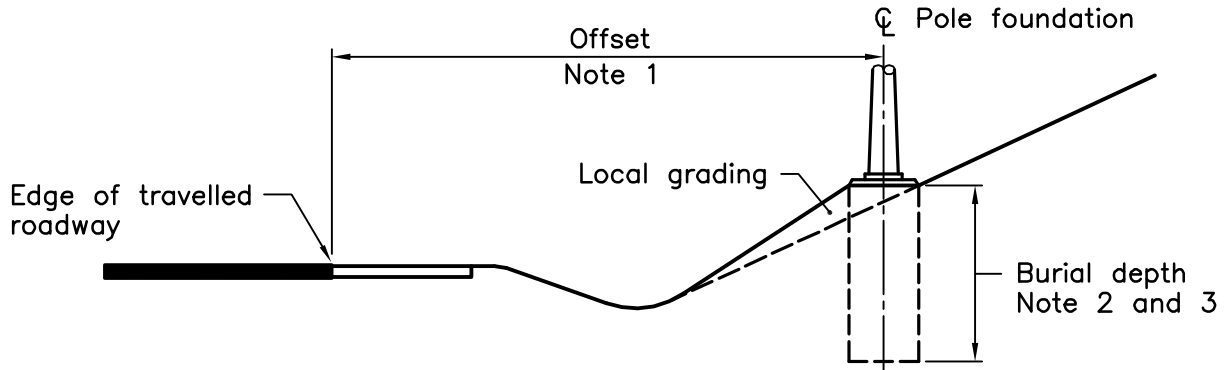
POLE FOOTING IN ROCK
FOR CAST-IN-PLACE CONCRETE BARRIER



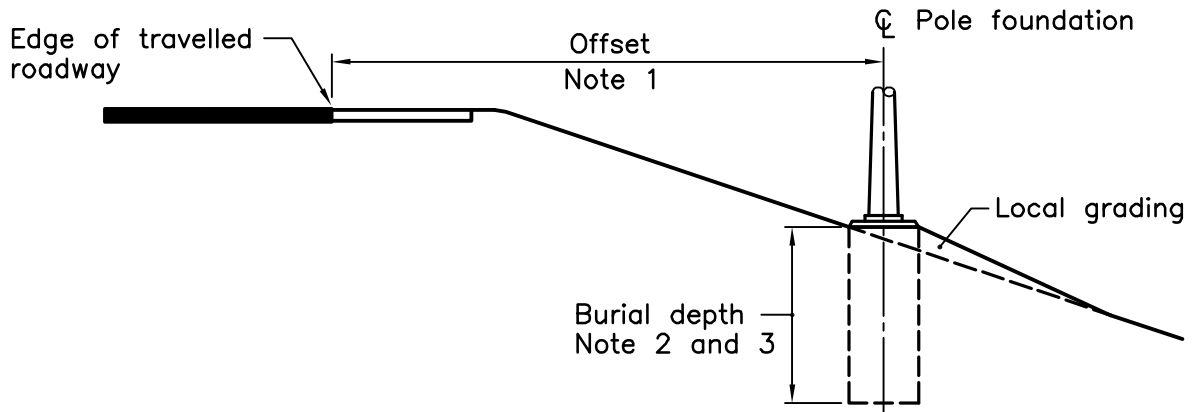
OPSD - 2200.080



TYPICAL PLAN



POLE FOUNDATION IN CUT



POLE FOUNDATION IN FILL

NOTES:

- 1 Offset dimension as specified in the Contract Documents.
- 2 Burial depth shall be measured from the highest grade elevation at pole foundation.
- 3 For burial depths see OPSD 2200.01.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

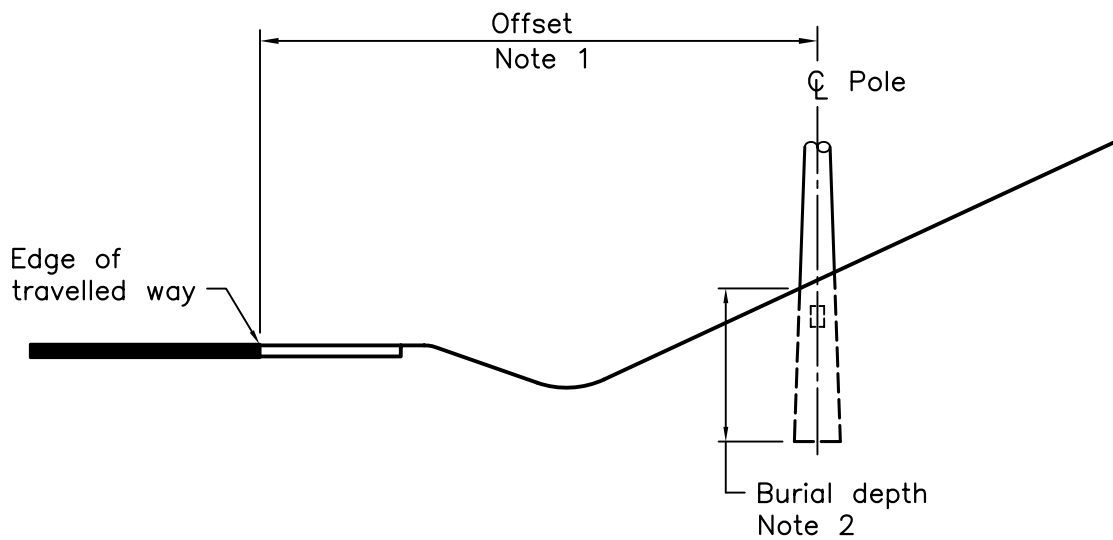
Nov 2013

Rev 0

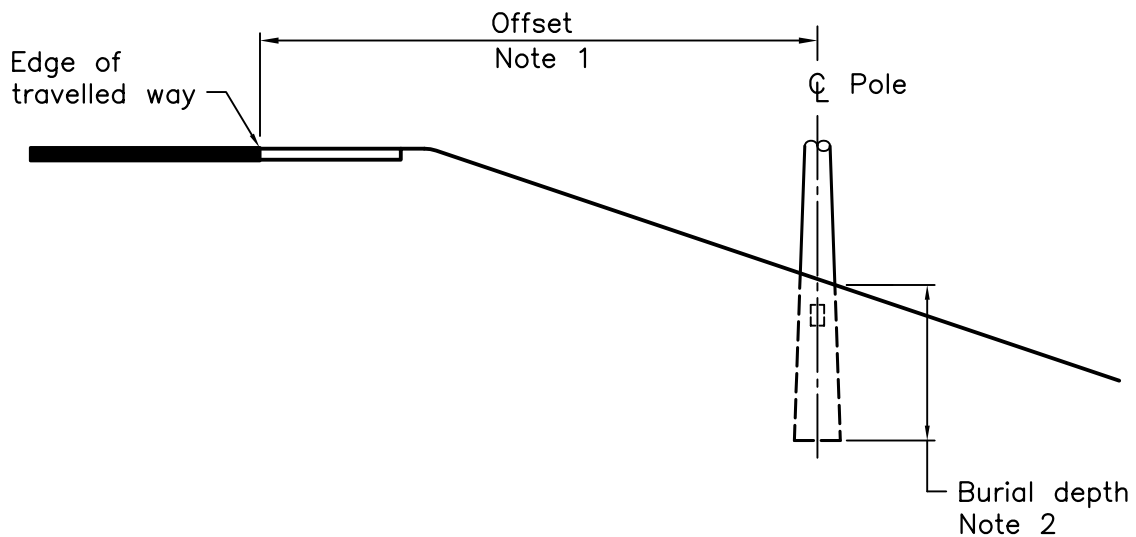
**LOCAL GRADING
AT
POLE FOUNDATIONS**

OPSD 2210.010





DIRECT BURIED POLE IN CUT



DIRECT BURIED POLE IN FILL

NOTES:

- 1 Offset dimension as specified.
- 2 Burial depth shall be measured from the lowest grade elevation at pole.
- 3 This OPSD to be read in conjunction with OPSD 2225.010, 2232.010, and 2238.01.

ONTARIO PROVINCIAL STANDARD DRAWING

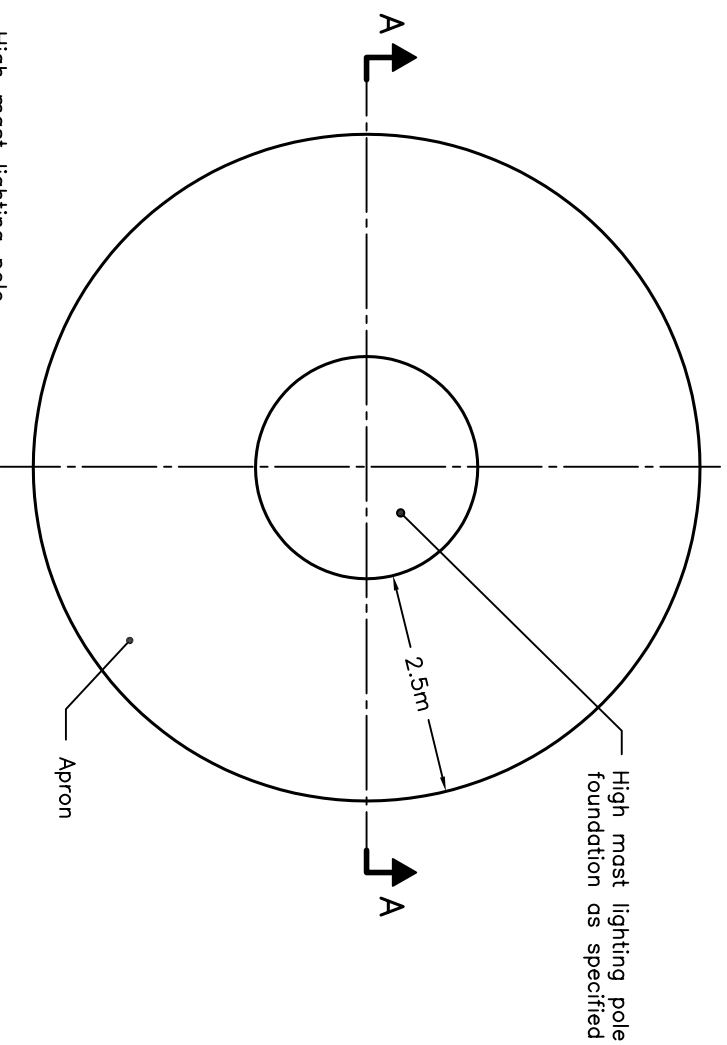
April 2007

Rev 1

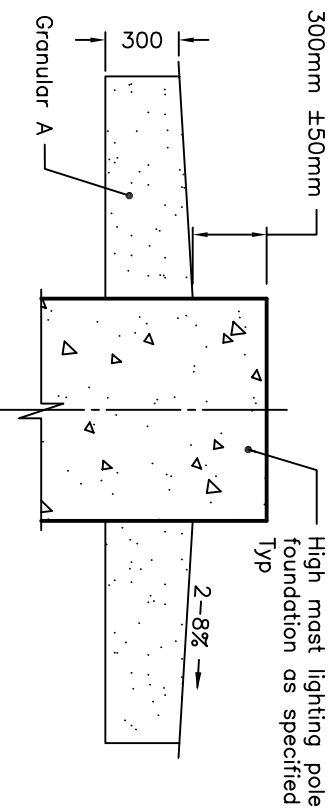
**INSTALLATION OF
DIRECT BURIED POLES IN SLOPES**

OPSD 2210.020

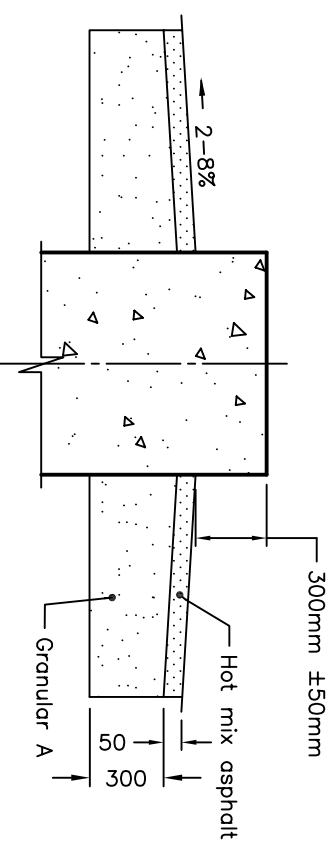




PLAN



**SECTION A-A
GRANULAR APRON**



**SECTION A-A
ASPHALT APRON
WHEN SPECIFIED**

ONTARIO PROVINCIAL STANDARD DRAWING

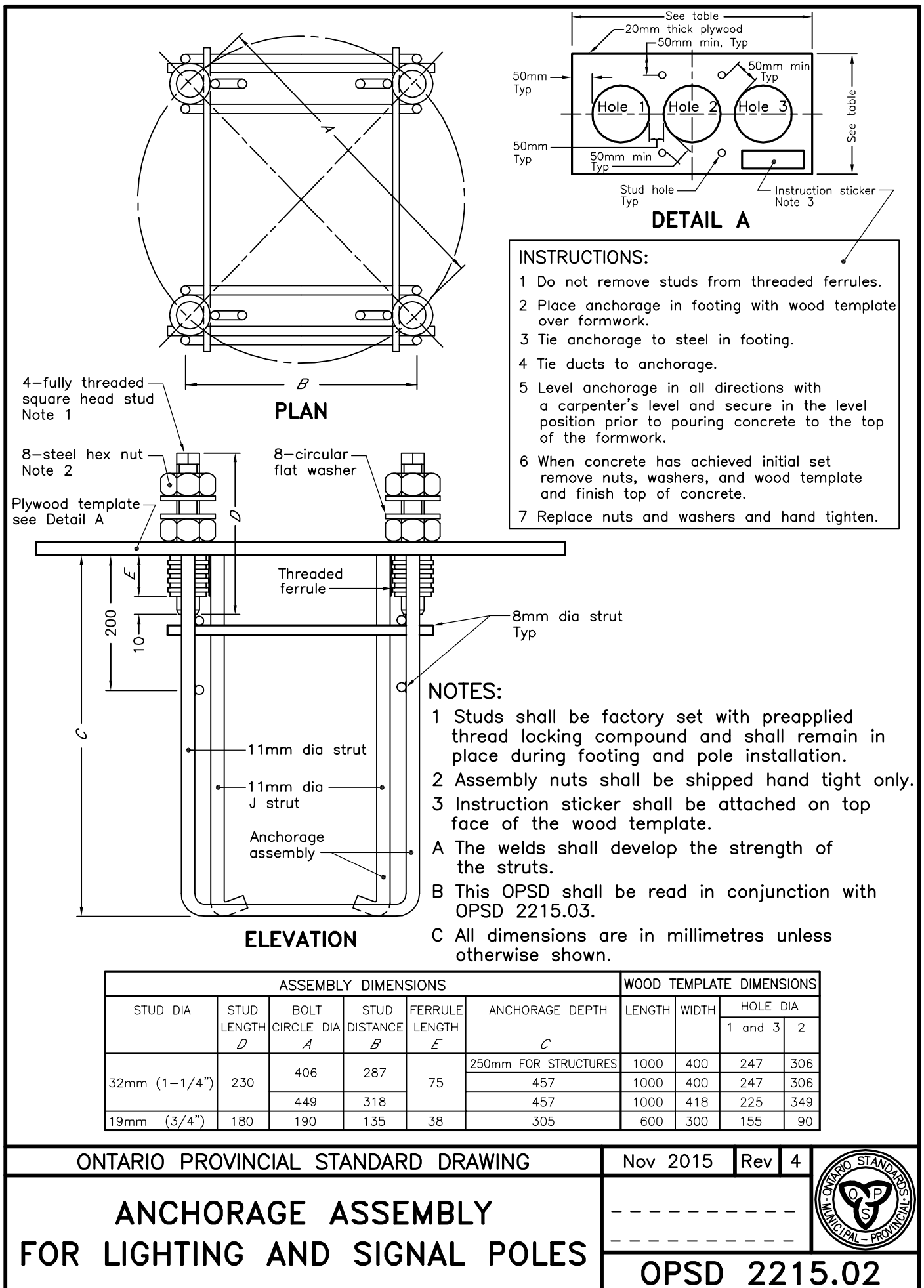
Nov 2005 Rev 0

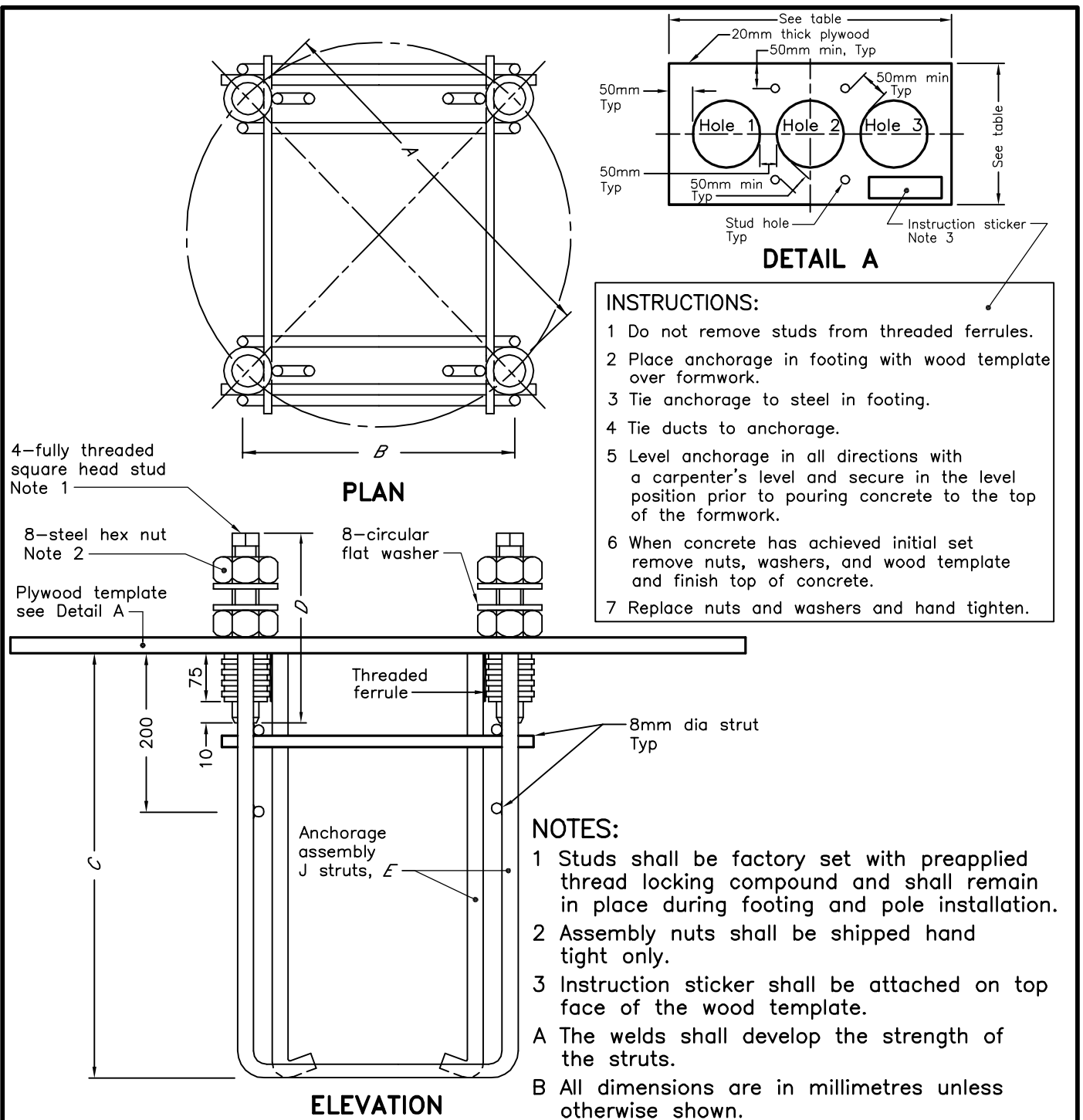
HIGH MAST LIGHTING POLE APRON

OPSD – 2210.030



NOTE:
A All dimensions are in millimetres unless otherwise shown.





POLE		ASSEMBLY DIMENSIONS					WOOD TEMPLATE DIMENSIONS			
LENGTH m	STUD DIA	BOLT CIRCLE DIA A	STUD DISTANCE B	ANCHORAGE DEPTH C	STUD LENGTH D	J STRUT DIA E	LENGTH	WIDTH	HOLE DIA	
10.5	38mm (1-1/2")	449	318	457	285	12.7	1000	418	1 and 3	2
9.0									225	349
7.5	32mm (1-1/4")	449	318	457	265	11	1000	418	225	349
6.0										

ONTARIO PROVINCIAL STANDARD DRAWING

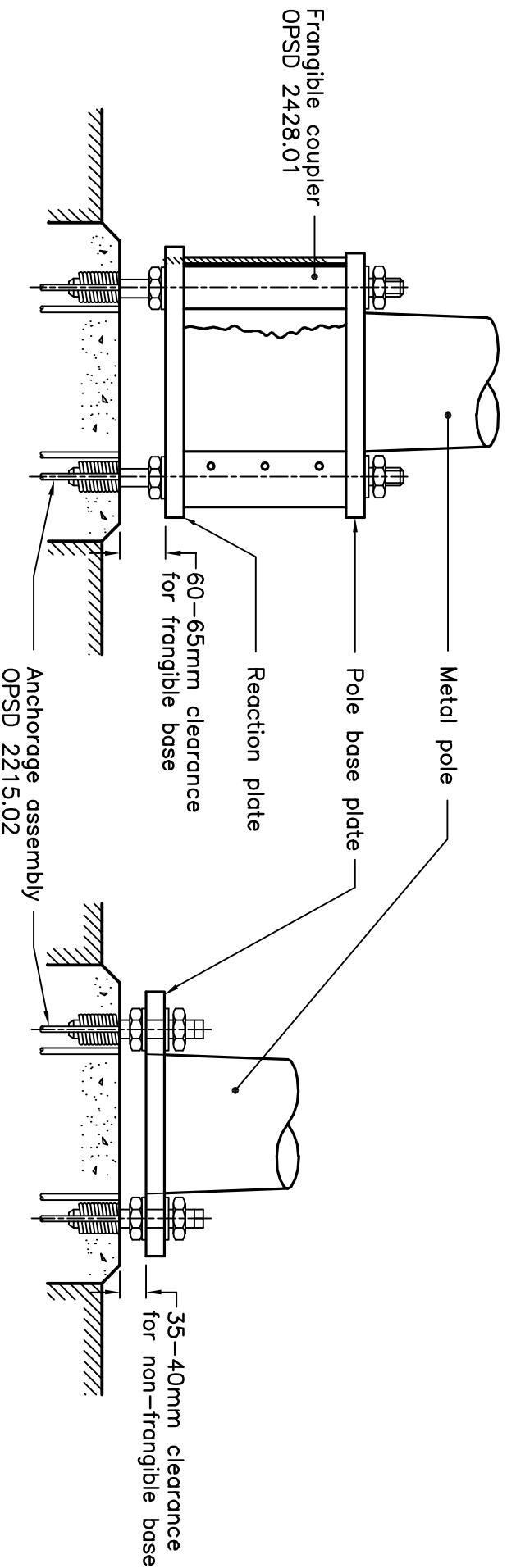
Nov 2015

Rev 0

**ANCHORAGE ASSEMBLY
FOR HEAVY CLASS STEEL POLE AND
SECTIONAL STEEL POLE**



OPSD 2215.025



FRANGIBLE BASE – FRANGIBLE COUPLER

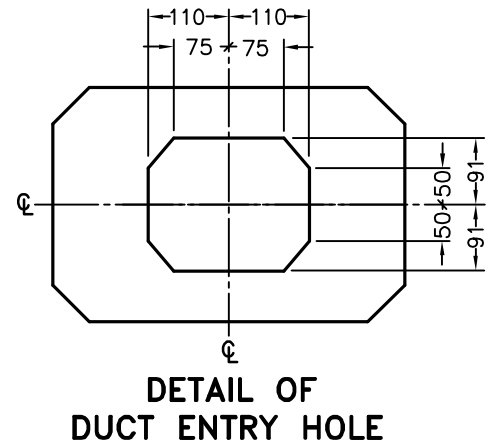
NON-FRANGIBLE BASE

NOTE:

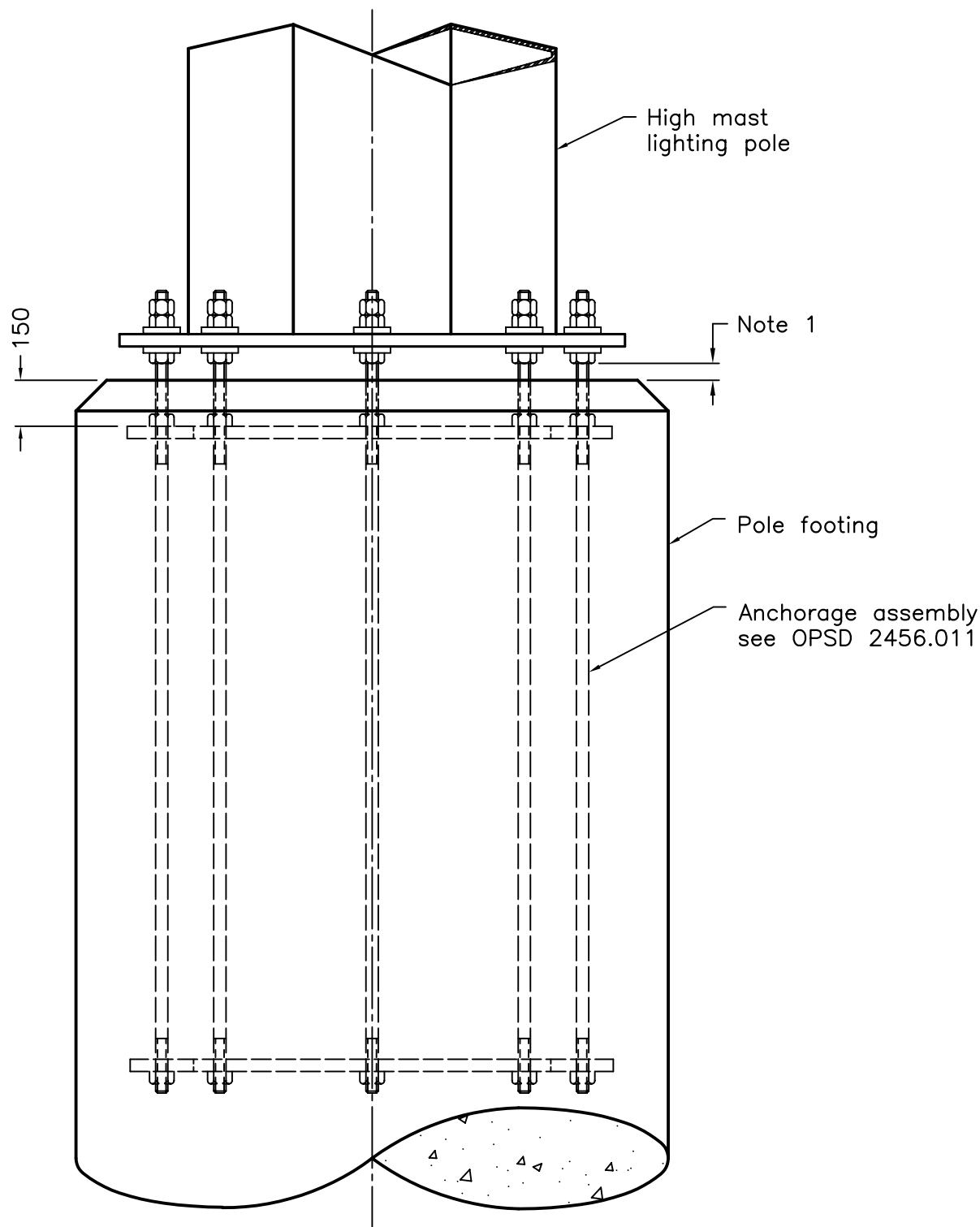
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING			Nov 2014		Rev	4	
POLE MOUNTING DETAILS FOR BASE MOUNTED METAL POLE			-----				

OPSD 2215.03							



- A All dimensions are in millimetres unless otherwise shown.



ELEVATION

NOTES:

- 1 The distance from the underside of the nut to the top of the pole footing shall be 50mm $\pm$ 10mm.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2003

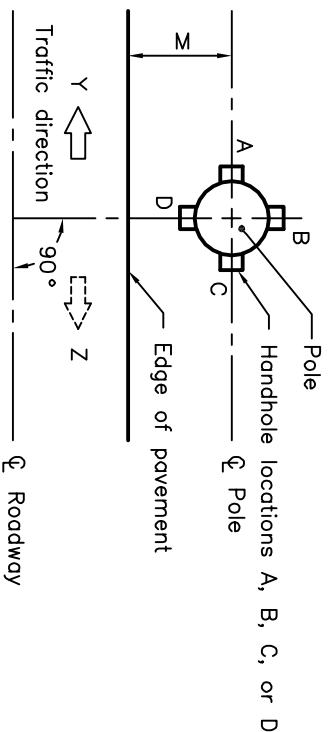
Rev 0

HIGH MAST LIGHTING POLE

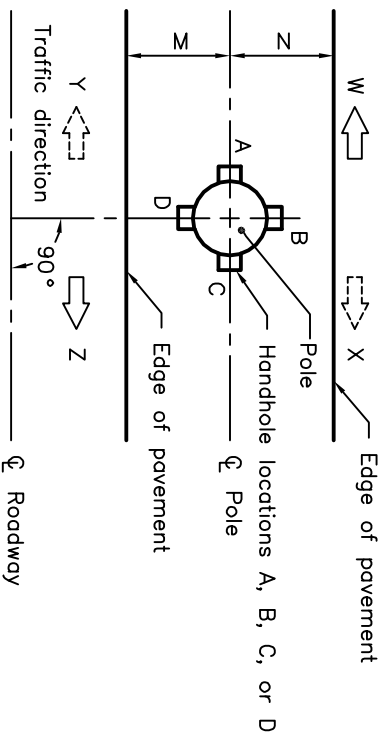
ANCHORAGE ASSEMBLY PLACEMENT

OPSD - 2218.010

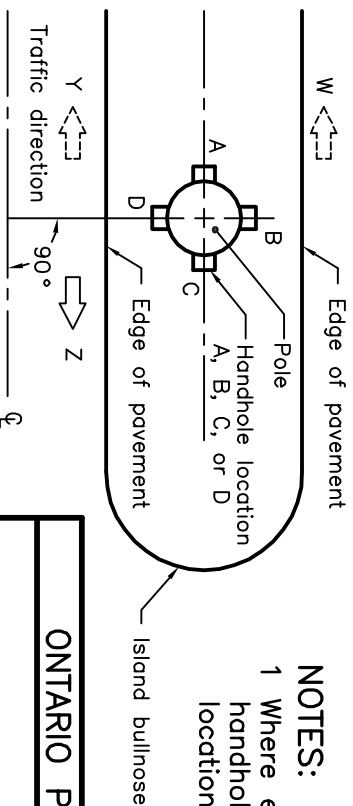




CASE I ALONG ROADWAYS



CASE II CONTINUOUS MEDIANS



CASE III ISLANDS AND BULLNOSES

TYPE OF POLE	POLE USE	CASE	TRAFFIC DIRECTION	HANDHOLE LOCATION
Concrete	Lighting	I	Y	A
		I	Z	C
		II	X and Y or W and Z	A or C
		II	W and Y	A
		II	X and Z	C
		II	Y	B
Steel or aluminum	Lighting (along roadway)	I	Y	B
		I	Z	B
		I	X and Y or W and Z	B or D for M=N
		II	W and Y or X and Z	B for N > M
		II	Y	D for M > N
	Lighting (on structures)	I	Z	D
		I	X and Y or W and Z	B or D for M=N
		II	W and Y or X and Z	B for N > M
		II	Y	D for M > N
		II	Z	A or (B Note 1)
Sectional steel, heavy class sectional steel, or heavy class steel	Lighting, and traffic signals	I	Y	A or (B Note 1)
		I	Z	C or (B Note 1)
		II	W and Z or X and Y	A or C
		II	W and Y	A
		II	X and Z	C
		III	W and Z	A

NOTES:
1 Where externally mounted traffic signal equipment interferes with the preferred handhole location, the pole shall be rotated 90° to give the alternative handhole location as indicated.

ONTARIO PROVINCIAL STANDARD DRAWING

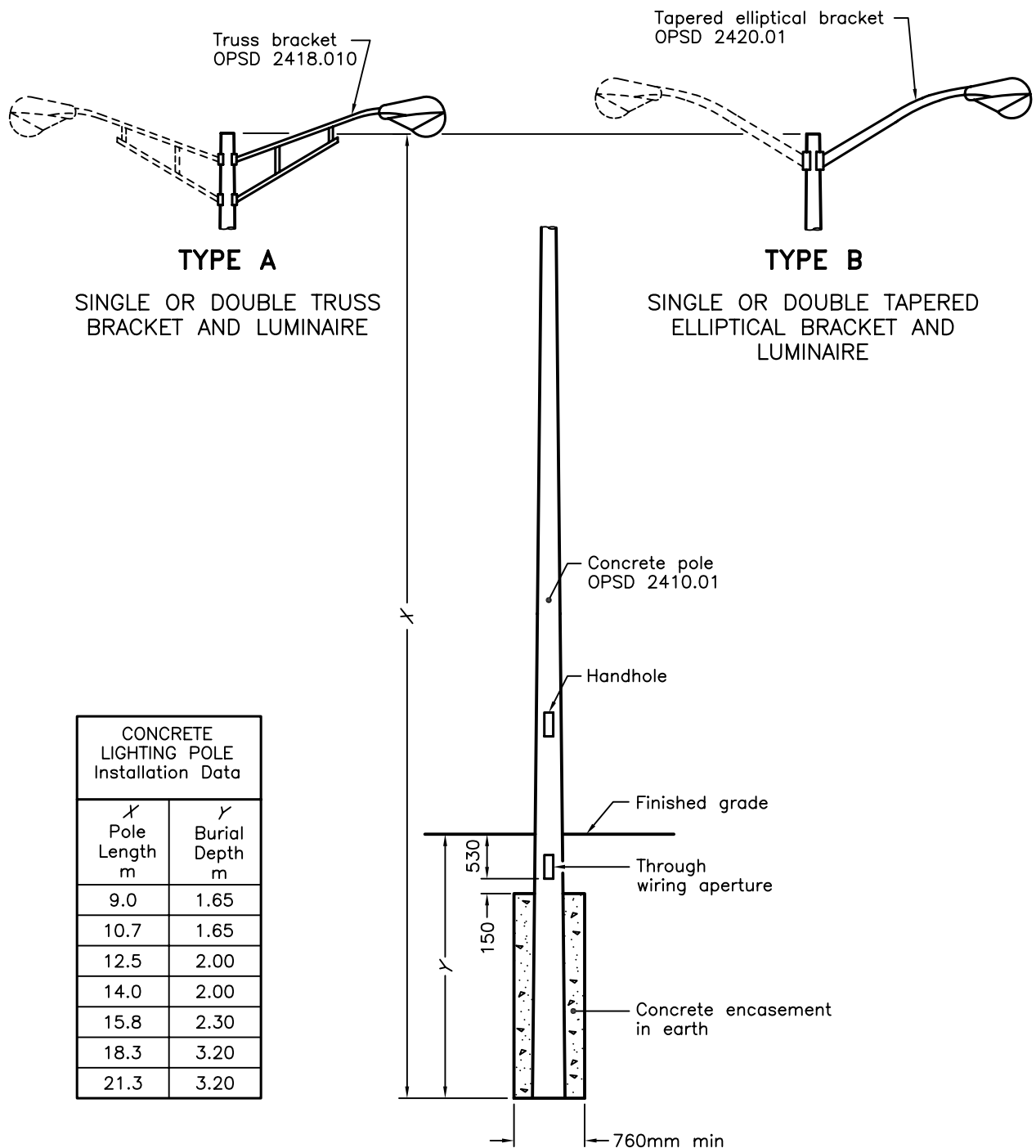
Nov 2010

Rev 1

POLE HANDHOLE LOCATIONS

OPSD 2220.01





NOTES:

- A For installation in rock, this OPSPD to be read in conjunction with OPSPD 2200.02.
 B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

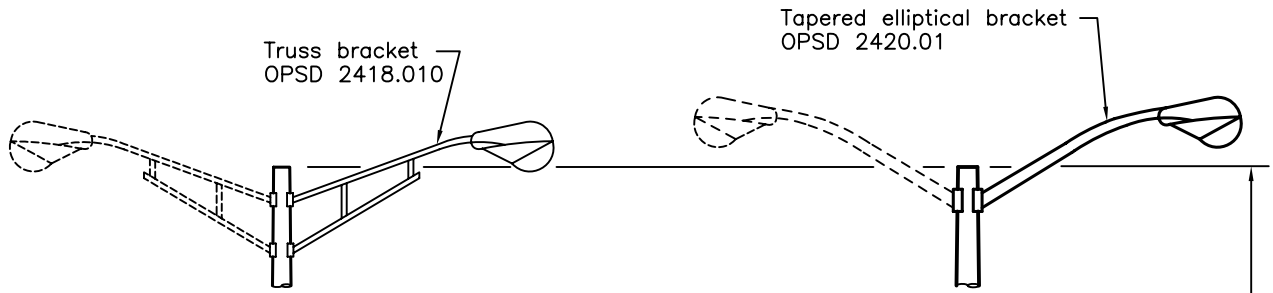
Nov 2006

Rev 0

**CONCRETE LIGHTING POLE
DIRECT BURIED**

OPSPD 2225.010



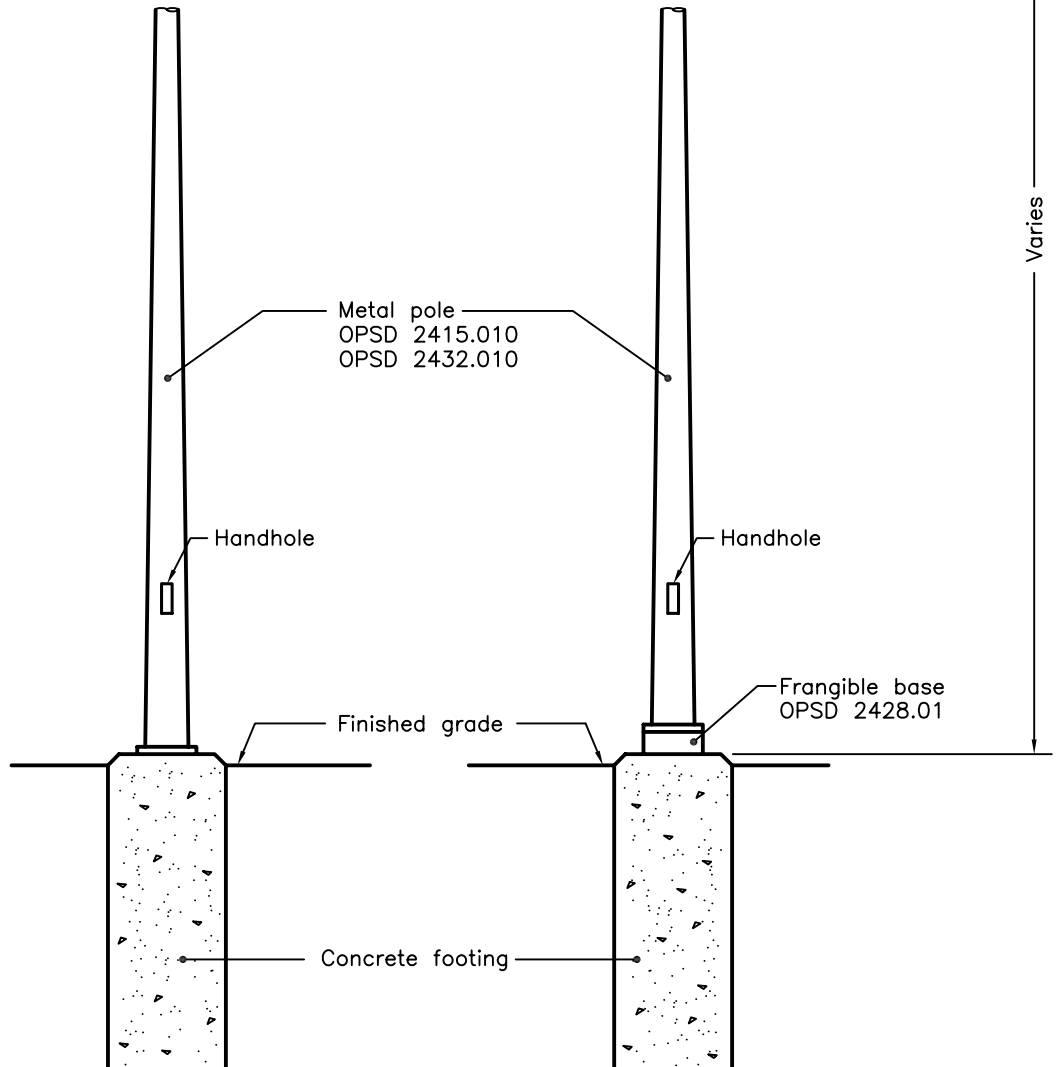


TYPE A

SINGLE OR DOUBLE TRUSS
BRACKET AND LUMINAIRE

TYPE B

SINGLE OR DOUBLE TAPERED ELLIPTICAL
BRACKET AND LUMINAIRE



BASE MOUNTED

**FRANGIBLE BASE
MOUNTED**

ONTARIO PROVINCIAL STANDARD DRAWING

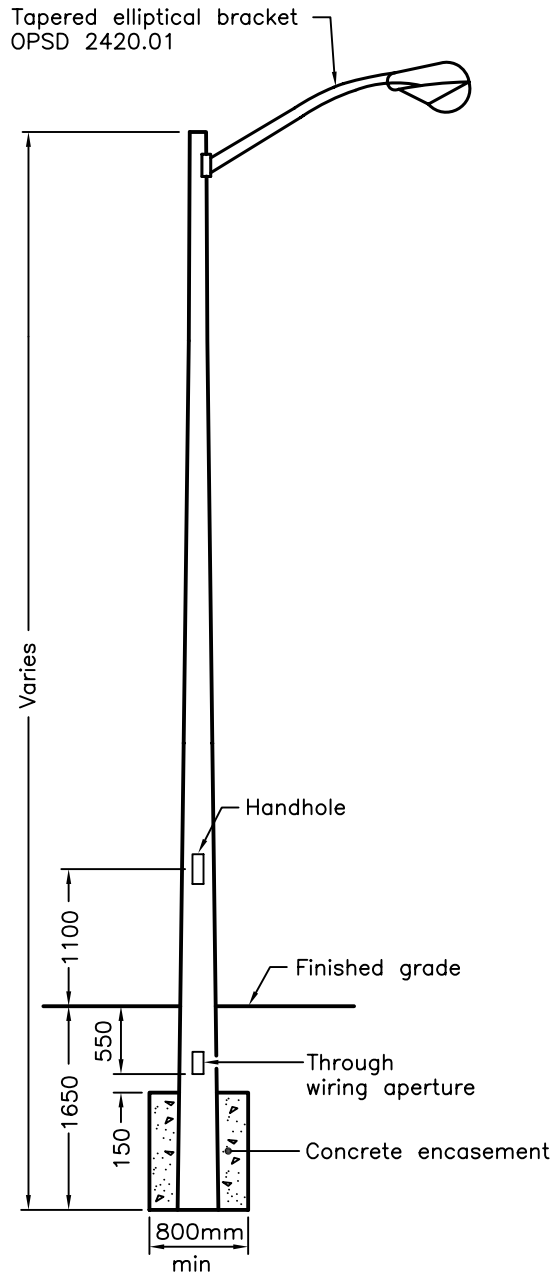
Nov 2006

Rev 0

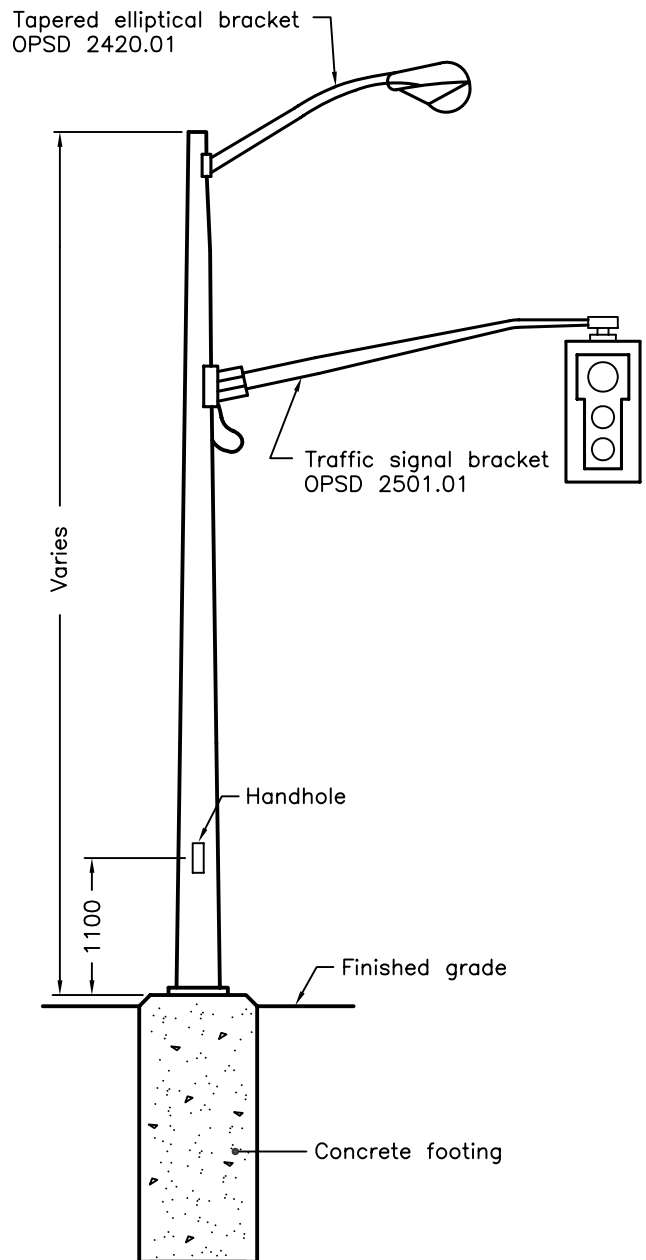
**METAL LIGHTING POLE
BASE MOUNTED**



OPSD 2228.010



DIRECT BURIED



BASE MOUNTED

NOTE:

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

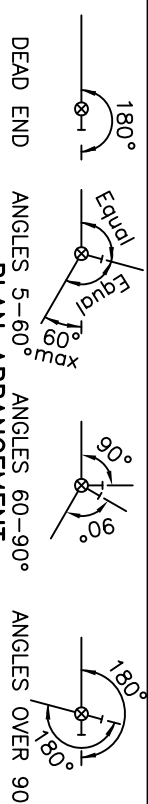
Nov 2006

Rev 0

**SECTIONAL STEEL POLE
WITH BRACKETS, LUMINAIRE,
AND TRAFFIC SIGNAL HEAD**



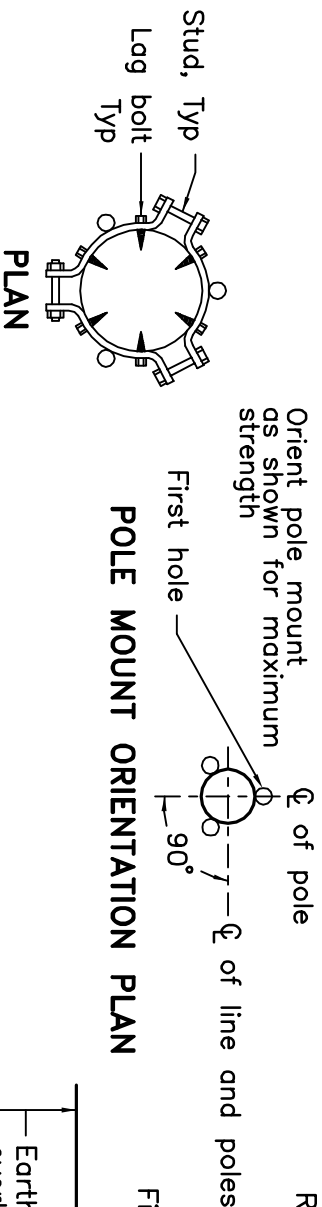
OPSD 2232.010



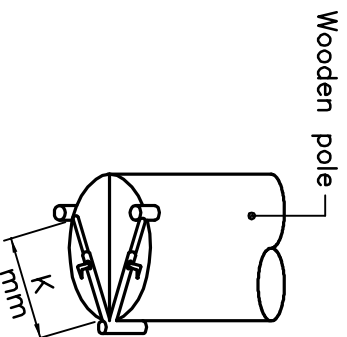
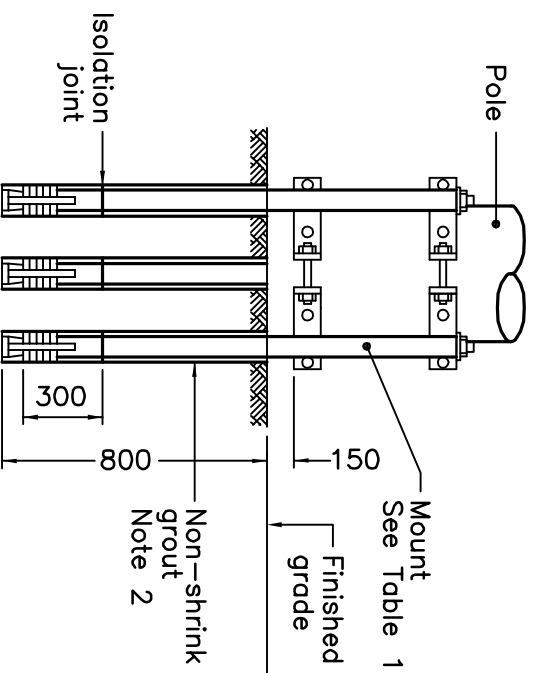
DEAD END PLAN ARRANGEMENT
 ANGLES 5-60° ANGLES 60-90° ANGLES OVER 90°

TABLE 1 MINIMUM LEAD SETTINGS
 SINGLE GUY ANCHORS FOR GUY No. 1

Span m	Pole attachment height, m	10.20	11.20	12.20	13.20	14.20	15.20	16.20	17.20	18.20	19.20	20.20	21.20	22.20	23.20	24.20	25.20	26.20	27.20	28.20	29.20	30.20	31.20	32.20	33.20	34.20	35.20	36.20	37.20	38.20	39.20	40.20	41.20	42.20	43.20	44.20	45.20	46.20	47.20	48.20	49.20	50.20	51.20	52.20	53.20	54.20	55.20	56.20	57.20	58.20	59.20	60.20	61.20	62.20	63.20	64.20	65.20	66.20	67.20	68.20	69.20	70.20	71.20	72.20	73.20	74.20	75.20	76.20	77.20	78.20	79.20	80.20	81.20	82.20	83.20	84.20	85.20	86.20	87.20	88.20	89.20	90.20																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
6.00	6.60	7.20	7.80	8.40	9.00	9.60	10.20	10.80	11.40	12.00	12.60	13.20	13.80	14.40	15.00	15.60	16.20	16.80	17.40	18.00	18.60	19.20	19.80	20.40	21.00	21.60	22.20	22.80	23.40	24.00	24.60	25.20	25.80	26.40	27.00	27.60	28.20	28.80	29.40	30.00	30.60	31.20	31.80	32.40	33.00	33.60	34.20	34.80	35.40	36.00	36.60	37.20	37.80	38.40	39.00	39.60	40.20	40.80	41.40	42.00	42.60	43.20	43.80	44.40	45.00	45.60	46.20	46.80	47.40	48.00	48.60	49.20	49.80	50.40	51.00	51.60	52.20	52.80	53.40	54.00	54.60	55.20	55.80	56.40	57.00	57.60	58.20	58.80	59.40	60.00	60.60	61.20	61.80	62.40	63.00	63.60	64.20	64.80	65.40	66.00	66.60	67.20	67.80	68.40	69.00	69.60	70.20	70.80	71.40	72.00	72.60	73.20	73.80	74.40	75.00	75.60	76.20	76.80	77.40	78.00	78.60	79.20	79.80	80.40	81.00	81.60	82.20	82.80	83.40	84.00	84.60	85.20	85.80	86.40	87.00	87.60	88.20	88.80	89.40	90.00	90.60	91.20	91.80	92.40	93.00	93.60	94.20	94.80	95.40	96.00	96.60	97.20	97.80	98.40	99.00	99.60	100.20	100.80	101.40	102.00	102.60	103.20	103.80	104.40	105.00	105.60	106.20	106.80	107.40	108.00	108.60	109.20	109.80	110.40	111.00	111.60	112.20	112.80	113.40	114.00	114.60	115.20	115.80	116.40	117.00	117.60	118.20	118.80	119.40	120.00	120.60	121.20	121.80	122.40	123.00	123.60	124.20	124.80	125.40	126.00	126.60	127.20	127.80	128.40	129.00	129.60	130.20	130.80	131.40	132.00	132.60	133.20	133.80	134.40	135.00	135.60	136.20	136.80	137.40	138.00	138.60	139.20	139.80	140.40	141.00	141.60	142.20	142.80	143.40	144.00	144.60	145.20	145.80	146.40	147.00	147.60	148.20	148.80	149.40	150.00	150.60	151.20	151.80	152.40	153.00	153.60	154.20	154.80	155.40	156.00	156.60	157.20	157.80	158.40	159.00	159.60	160.20	160.80	161.40	162.00	162.60	163.20	163.80	164.40	165.00	165.60	166.20	166.80	167.40	168.00	168.60	169.20	169.80	170.40	171.00	171.60	172.20	172.80	173.40	174.00	174.60	175.20	175.80	176.40	177.00	177.60	178.20	178.80	179.40	180.00	180.60	181.20	181.80	182.40	183.00	183.60	184.20	184.80	185.40	186.00	186.60	187.20	187.80	188.40	189.00	189.60	190.20	190.80	191.40	192.00	192.60	193.20	193.80	194.40	195.00	195.60	196.20	196.80	197.40	198.00	198.60	199.20	199.80	200.20	200.80	201.40	202.00	202.60	203.20	203.80	204.40	205.00	205.60	206.20	206.80	207.40	208.00	208.60	209.20	209.80	210.40	211.00	211.60	212.20	212.80	213.40	214.00	214.60	215.20	215.80	216.40	217.00	217.60	218.20	218.80	219.40	220.00	220.60	221.20	221.80	222.40	223.00	223.60	224.20	224.80	225.40	226.00	226.60	227.20	227.80	228.40	229.00	229.60	230.20	230.80	231.40	232.00	232.60	233.20	233.80	234.40	235.00	235.60	236.20	236.80	237.40	238.00	238.60	239.20	239.80	240.20	240.80	241.40	242.00	242.60	243.20	243.80	244.40	245.00	245.60	246.20	246.80	247.40	248.00	248.60	249.20	249.80	250.20	250.80	251.40	252.00	252.60	253.20	253.80	254.40	255.00	255.60	256.20	256.80	257.40	258.00	258.60	259.20	259.80	260.20	260.80	261.40	262.00	262.60	263.20	263.80	264.40	265.00	265.60	266.20	266.80	267.40	268.00	268.60	269.20	269.80	270.20	270.80	271.40	272.00	272.60	273.20	273.80	274.40	275.00	275.60	276.20	276.80	277.40	278.00	278.60	279.20	279.80	280.20	280.80	281.40	282.00	282.60	283.20	283.80	284.40	285.00	285.60	286.20	286.80	287.40	288.00	288.60	289.20	289.80	290.20	290.80	291.40	292.00	292.60	293.20	293.80	294.40	295.00	295.60	296.20	296.80	297.40	298.00	298.60	299.20	299.80	300.20	300.80	301.40	302.00	302.60	303.20	303.80	304.40	305.00	305.60	306.20	306.80	307.40	308.00	308.60	309.20	309.80	310.20	310.80	311.40	312.00	312.60	313.20	313.80	314.40	315.00	315.60	316.20	316.80	317.40	318.00	318.60	319.20	319.80	320.20	320.80	321.40	322.00	322.60	323.20	323.80	324.40	325.00	325.60	326.20	326.80	327.40	328.00	328.60	329.20	329.80	330.20	330.80	331.40	332.00	332.60	333.20	333.80	334.40	335.00	335.60	336.20	336.80	337.40	338.00	338.60	339.20	339.80	340.20	340.80	341.40	342.00	342.60	343.20	343.80	344.40	345.00	345.60	346.20	346.80	347.40	348.00	348.60	349.20	349.80	350.20	350.80	351.40	352.00	352.60	353.20	353.80	354.40	355.00	355.60	356.20	356.80	357.40	358.00	358.60	359.20	359.80	360.20	360.80	361.40	362.00	362.60	363.20	363.80	364.40	365.00	365.60	366.20	366.80	367.40	368.00	368.60	369.20	369.80	370.20	370.80	371.40	372.00	372.60	373.20	373.80	374.40	375.00	375.60	376.20	376.80	377.40	378.00	378.60	379.20	379.80	380.20	380.80	381.40	382.00	382.60	383.20	383.80	384.40	385.00	385.60	386.20	386.80	387.40	388.00	388.60	389.20	389.80	390.20	390.80	391.40	392.00	392.60	393.20	393.80	394.40	395.00	395.60	396.20	396.80	397.40	398.00	398.60	399.20	399.80	400.20	400.80	401.40	402.00	402.60	403.20	403.80	404.40	405.00	405.60	406.20	406.80	407.40	408.00	408.60	409.20	409.80	410.20	410.80	411.40	412.00	412.60	413.20	413.80	414.40	415.00	415.60	416.20	416.80	417.40	418.00	418.60	419.20	419.80	420.20	420.80	421.40	422.00	422.60	423.20	423.80	424.40	425.00	425.60	426.20	426.80	427.40	428.00	428.60	429.20	429.80	430.20	430.80	431.40	432.00	432.60	433.20	433.80	434.40	435.00	435.60	436.20	436.80	437.40	438.00	438.60	439.20	439.80	440.20	440.80	441.40	442.00	442.60	443.20	443.80	444.40	445.00	445.60	446.20	446.80	447.40	448.00	448.60	449.20	449.80	450.20	450.80	451.40	452.00	452.60	453.20	453.80	454.40	455.00	455.60	456.20	456.80	457.40	458.00	458.60	459.20	459.80	460.20	460.80	461.40	462.00	462.60	463.20	463.80	464.40	465.00	465.60	466.20	466.80	467.40	468.00	468.60	469.20	469.80	470.20	470.80	471.40	472.00	472.60	473.20	473.80	474.40	475.00	475.60	476.20	476.80	477.40	478.00	478.60	479.20	479.80	480.20	480.80	481.40	482.00	482.60	483.20	483.80	484.40	485.00	485.60	486.20	486.80	487.40	488.00	488.60	489.20	489.80	490.20	490.80	491.40	492.00	492.60	493.20	493.80	494.40	495.00	495.60	496.20	496.80	497.40	498.00	498.60	499.20	499.80	500.20	500.80	501.40	502.00	502.60	503.20	503.80	504.40	505.00	505.60	506.20	506.80	507.40	508.00	508.60	509.20	509.80	510.20	510.80	511.40	512.00	512.60	513.20	513.80	514.40	515.00	515.60	516.20	516.80	517.40	518.00	518.60	519.20	519.80	520.20	520.80	521.40	522.00	522.60	523.20	523.80	524.40	525.00	525.60	526.20	526.80	527.40	528.00	528.60	529.20	529.80	530.20	530.80	531.40	532.00	532.60	533.20	533.80	534.40	535.00	535.60	536.20	536.80	537.40	538.00	538.60	539.20	539.80	540.20	540.80	541.40	542.00	542.60	543.20	543.80	544.40	545.00	545.60	546.20	546.80	547.40	548.00	548.60	549.20	549.80	550.20	550.80	551.40	552.00	552.60	553.20	553.80	554.40	555.00	555.60	556.20	556.80	557.40	558.00	558.60	559.20	559.80	560.20	560.80	561.40	562.00	562.60	563.20	563.80	564.40	565.00	565.60	566.20	566.80	567.40	568.00	568.60	569.20	569.80	570.20	570.80	571.40	572.00	572.60	573.20	573.80	574.40	575.00	575.60	576.20	576.80	577.40	578.00	578.60	579.20	579.80	580.20	580.80	581.40	582.00	582.60	583.20	583.80	584.40	585.00	585.60	586.20	586.80	587.40	588.00	588.60	589.20	589.80	590.20	590.80	591.40	592.00	592.60	593.20	593.80	594.40	595.00	595.60	596.20	596.80	597.40	598.00	598.60	599.20	599.80	600.20	600.80	601.40	602.00	602.60	603.20	603.80	604.40	605.00	605.60	606.20	606.80	607.40	608.00	608.60	609.20	609.80	610.20	610.80	611.40	612.00	612.60	613.20	613.80	614.40	615.00	615.60	616.20	616.80	617.40	618.00	618.60	619.20	619.80	620.20



POLE MOUNT ORIENTATION PLAN



GUY ANCHORAGE SETTING

DRILLING TEMPLATE APPLICATION

TABLE 1

DIMENSION			
ROCK DRILL DIAMETER	54	64	64
DRILLING TEMPLATE, (K min)	280	380	480
MOUNT DIAMETER	32	38	38
POLE BUTT DIAMETER	280 - 380	380 - 480	480 - 580

ELEVATION POLE ANCHORAGE SETTING

NOTES:

- 1 Rock anchor extension is not required if there is no earth overburden on top of rock.
- 2 Hole shall be grouted to prevent water entry.
- A All anchors shall be installed according to manufacturer's specifications.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2013

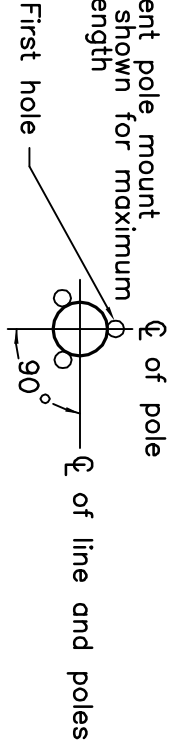
Rev 0

WOODEN POLE AND ANCHORAGE SETTINGS IN SOLID ROCK 1

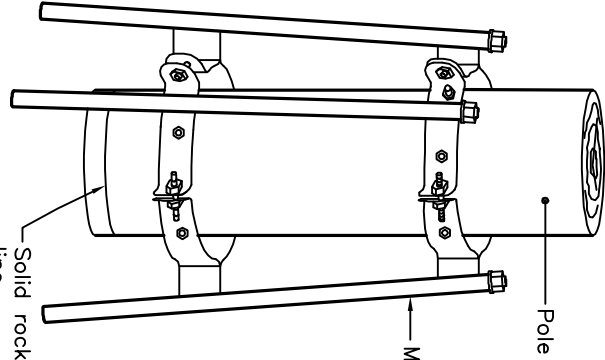
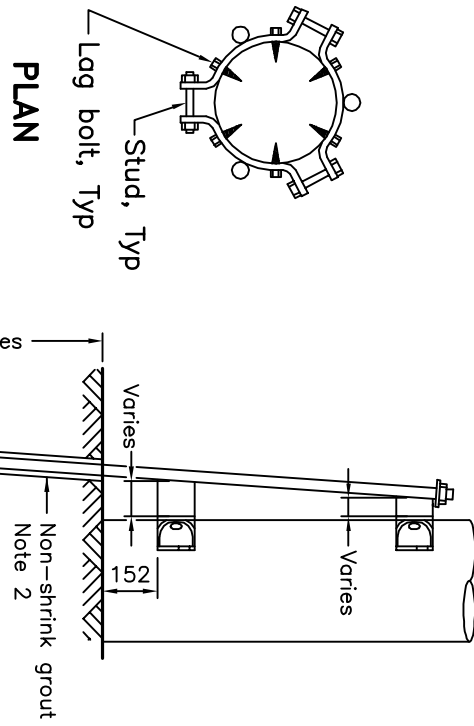


OPSD 2236.010

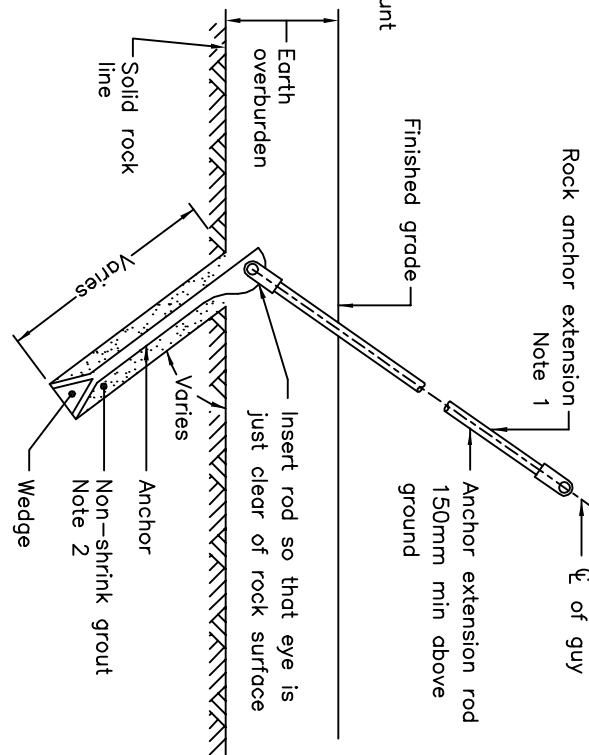
Orient pole mount as shown for maximum strength



POLE MOUNT ORIENTATION PLAN



ISOMETRIC VIEW



GUY ANCHORAGE SETTING

NOTES:

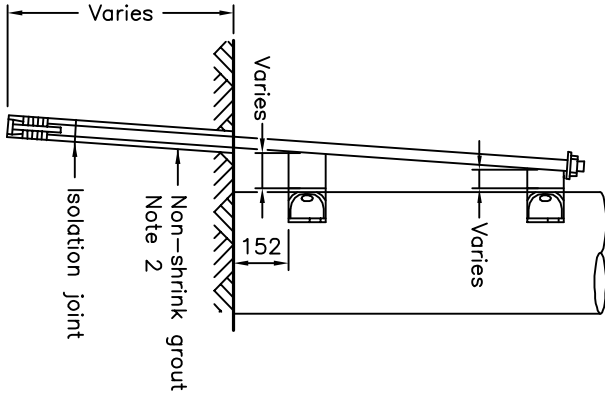
- 1 Rock anchor extension is not required if there is no earth overburden on top of rock.
- 2 Hole shall be grouted to prevent water entry.

A All anchors shall be installed according to manufacturer's specifications.

B Pole anchorage shall be suitable for the class of pole installed.

C All dimensions are in millimetres unless otherwise shown.

ELEVATION POLE ANCHORAGE SETTING



SELECTION CHART

3 Anchor Configuration	4 Anchor Configuration	5 Anchor Configuration

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2013

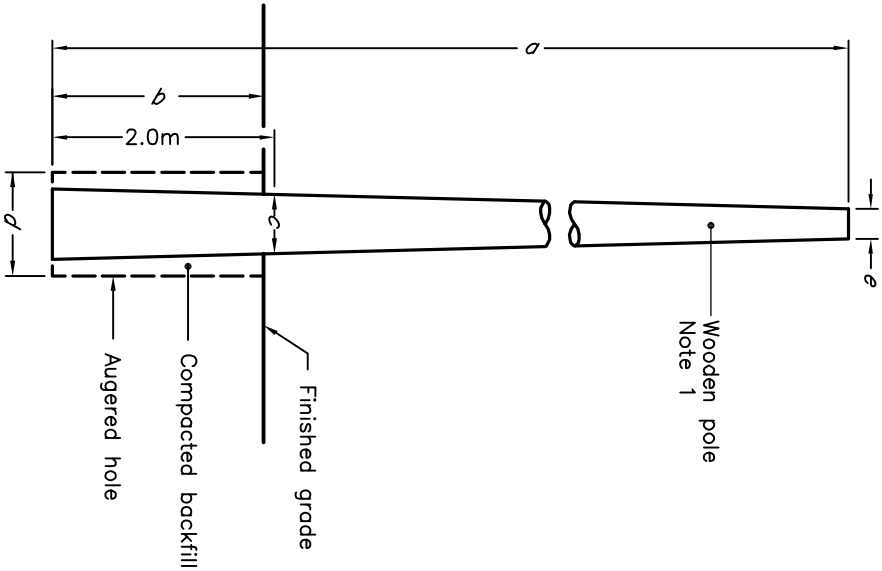
Rev 0

WOODEN POLE AND ANCHORAGE SETTINGS IN SOLID ROCK 2

OPSD 2236.020



Class of pole	Approximate breaking strength N	Pole length m	Pole setting depth m	Minimum diameter at c	Minimum augering diameter d	Minimum pole top diameter e
1	20,200	8.0 9.5 11.0 12.5 14.0 15.5 17.0 18.5	1.50 1.65 1.80 1.95 2.10 2.25 2.40 2.55	310 330 350 370 390 410 430 440	610 685 685 685 760 760 760 760	215
2	16,600	8.0 9.5 11.0 12.5 14.0 15.5 17.0 18.5	1.50 1.65 1.80 1.95 2.10 2.25 2.40 2.55	290 310 330 350 370 390 400 420	610 610 685 685 710 710 710 710	200
3	13,500	8.0 9.5 11.0 12.5 14.0 15.5 17.0 18.5	1.50 1.65 1.80 1.95 2.10 2.25 2.40 2.55	265 290 310 330 350 370 390 400	610 610 610 685 685 685 710 710	185
4	10,700	8.0 9.5 11.0 12.5 14.0 15.5 17.0 18.5	1.50 1.65 1.80 1.95 2.10 2.25 2.40 2.55	245 265 290 310 330 340 350 360	560 610 610 610 685 685 685 685	170
5	8,500	8.0 9.5 11.0 12.5 14.0 15.5 17.0	1.50 1.65 1.80 1.95 2.10 2.25 2.40	230 245 265 290 310 330 350	560 560 610 610 610 685 685	155



NOTES:
 1 Length and class of pole as specified.
 A All dimensions are in millimetres unless otherwise shown.

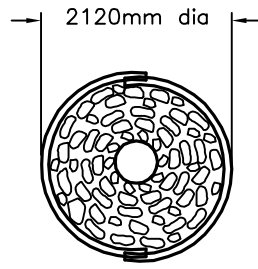
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2010 Rev 1

WOODEN POLE IN EARTH

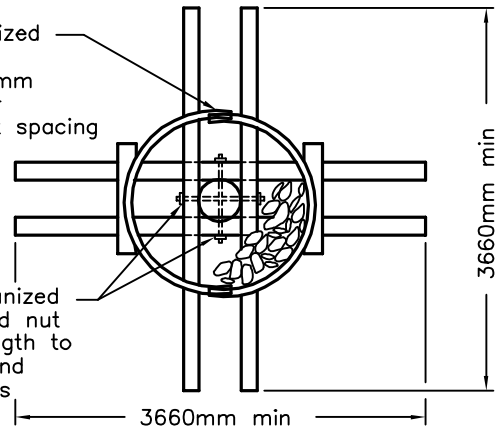
OPSD 2238.01





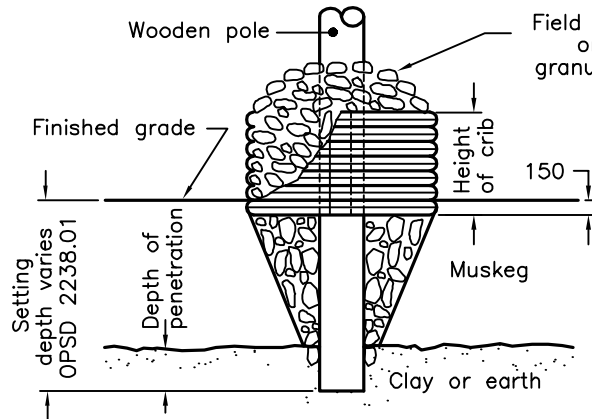
PLAN

Hex head galvanized
bolt with nut
12mm dia x 32mm
long c/w washer
100mm c/c bolt spacing



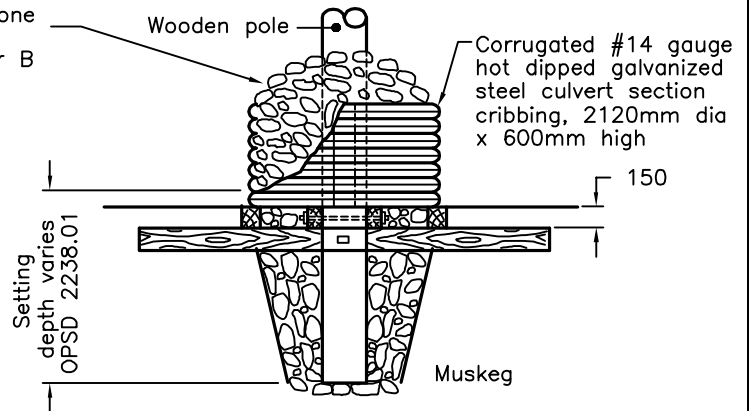
Hex head galvanized
regular bolt and nut
20mm dia. Length to
suit pole dia and
timber thickness

PLAN



SETTING A

SETTING WITH BUTT OF POLE RESTING ON OR
PENETRATING SOLID EARTH AT SETTING DEPTH



SETTING B

SETTING WITH BUTT OF POLE NOT REACHING
SOLID EARTH AT SETTING DEPTH

TABULATION OF CRIB HEIGHTS							
POLE LENGTH	SETTING A						SETTING B
	DEPTH OF PENETRATION						
	300	600	900	1200	1500	1800	
	HEIGHT OF CRIB						
9500	1000	600	600				1000
11000	1150	750	600				1150
12500	1300	1000	600	600			1300
14000	1300	1000	600	600			1300
15500	1500	1150	750	600	600		1500
17000	1500	1300	1000	600	600		1500
18500	1650	1500	1150	750	600		1650

NOTES:

A Timbers shall be cedar or hardwood, treated according to OPSS 1601, and not less than 150mm diameter or 100mm square.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2013

Rev 0

CRIBBING

FOR WOODEN POLES IN MUSKEG



OPSD 2239.010



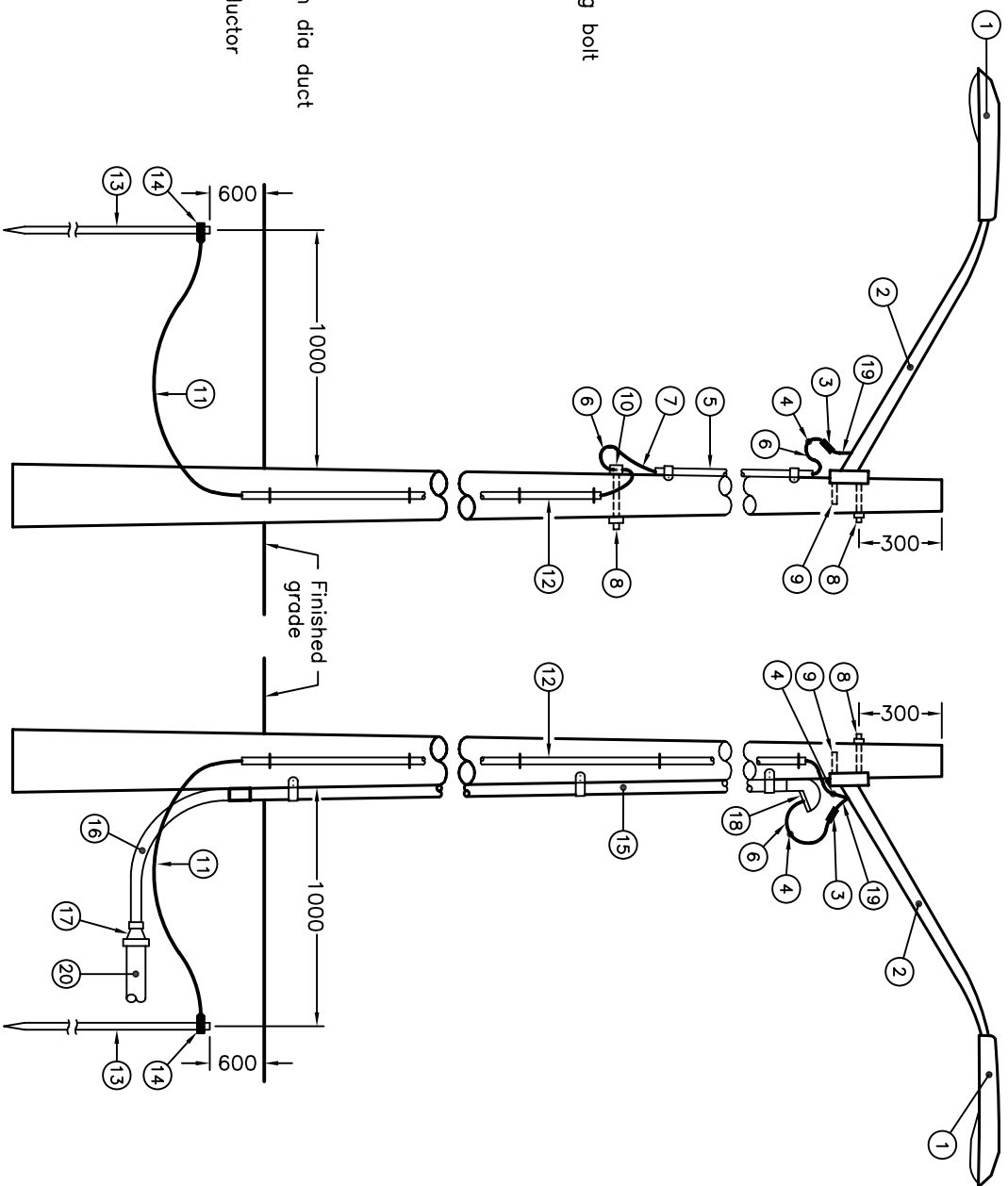
1 Log anchor shall be cedar or hardwood and treated according to OPSS 1601.
A To locate the position of the anchor see OPSD 2235.01.
B All dimensions are in millimetres unless otherwise shown.

MATERIALS:

- ① Luminaire
- ② Single or double elliptical bracket
- ③ 600V, 15A in line type fuse holder, complete with insulating boots
- ④ Compression connectors with insulating covers
- ⑤ 25mm rigid PVC conduit with PVC pipe straps
- ⑥ 150mm drip loop
- ⑦ Secondary aerial bus, 2-#12 AWG low voltage cables and #12 AWG ground conductor
- ⑧ 16mm dia galvanized through bolt, complete with 50x50mm square washer, lock washer, and nut
- ⑨ 12mm dia x 150mm long galvanized square head lag bolt
- ⑩ Spool and clevis with secondary aerial cable
- ⑪ #6 AWG ground conductor
- ⑫ Protective moulding stapled to pole
- ⑬ Ground rod
- ⑭ Ground rod connection
- ⑮ 32mm dia rigid PVC conduit with PVC pipe straps
- ⑯ 32mm dia rigid PVC 90° bend
- ⑰ Coupling from 32mm dia rigid PVC conduit to 50mm dia duct
- ⑱ Entrance fitting
- ⑲ #12 AWG low voltage cables and #12 AWG ground conductor
- ⑳ 50mm dia duct

NOTES:

- A Connect #12 AWG ground conductor to luminaire ground stud and secondary aerial bus.
- B Length of wood pole and pole setting depth as specified.
- C All dimensions are in millimetres unless otherwise shown.



OVERHEAD CIRCUIT

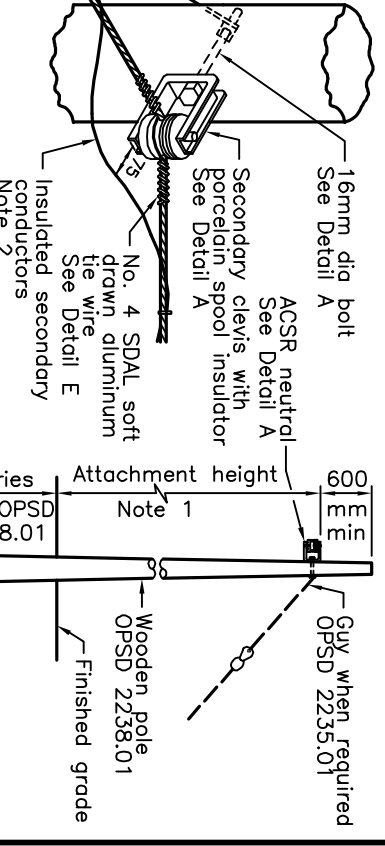
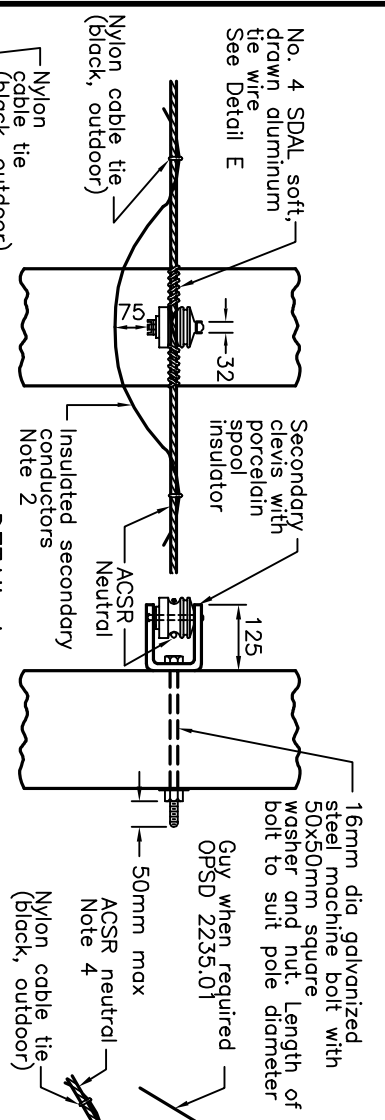
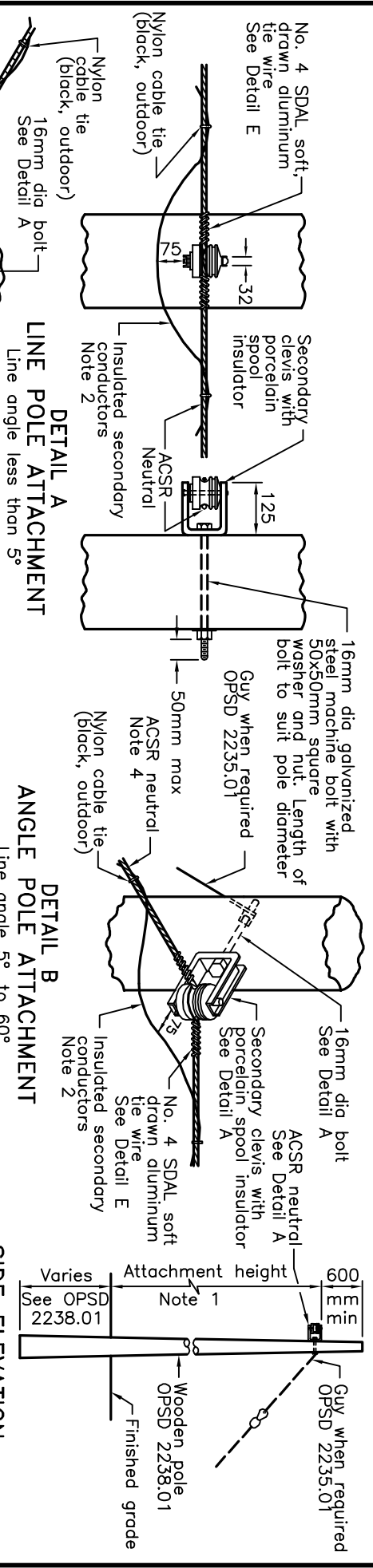
UNDERGROUND CIRCUIT

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2006		Rev 2	

WOOD POLE WITH ELLIPTICAL BRACKET

OVERHEAD AND UNDERGROUND CIRCUITS

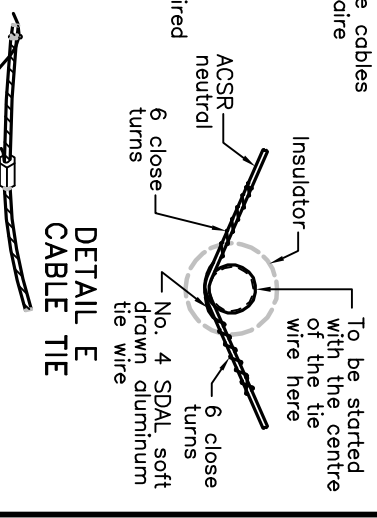
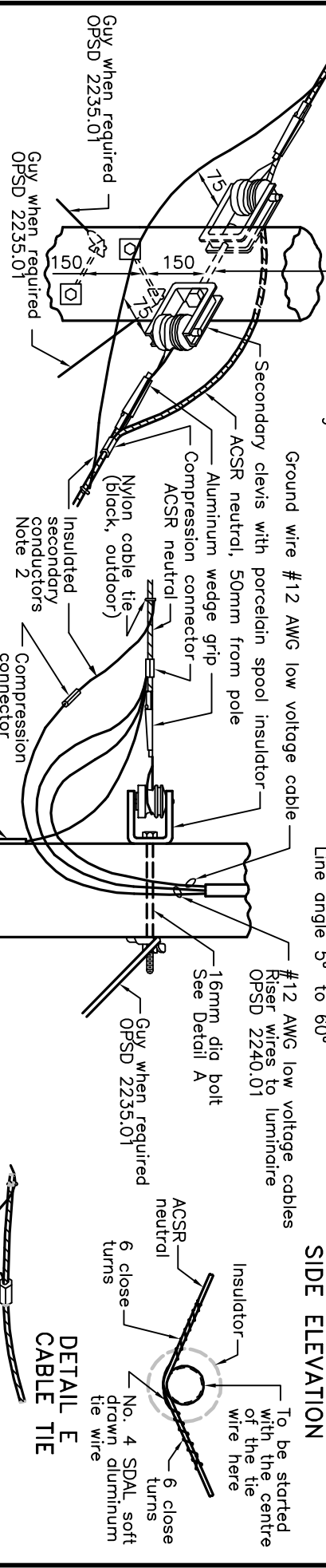
OPSD 2240.01



DETAIL A
LINE POLE ATTACHMENT
Line angle less than 5°

DETAIL B
ANGLE POLE ATTACHMENT
Line angle 5° to 60°

SIDE ELEVATION



DETAIL C
ANGLE POLE ATTACHMENT
Line angle greater than 60°

DETAIL D
DEAD END ATTACHMENT
#6 AWG system ground bare wire in protective moulding. Ground wire shall be terminated to a ground rod where specified in Contract

TYPICAL CONNECTION FOR TAP RUN



NOTES:

- 1 Pole attachment height shall be as high as possible. For minimum attachment heights see OPSPD 2245.01.
- 2 This drawing applies to neutral supported cable types NS75 and NS90 with one, two, or three secondary insulated conductors.
- 3 Compression connectors shall be insulated.
- 4 ACSR neutral shall be installed on the bearing face of the insulator for any line angle.

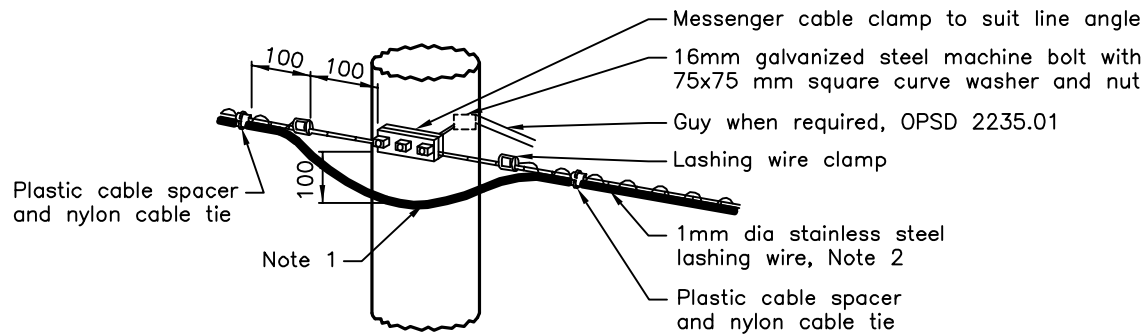
A Maximum span for neutral supported cable shall be 38m.

B Splices in cable shall be done at pole locations only, using aluminum wedge grips to dead end the ACSR neutral and connecting cables similar to Detail C.

ONTARIO PROVINCIAL STANDARD DRAWING			Nov 2013		Rev 1	
WOODEN POLE WITH NEUTRAL SUPPORTED CABLE			-----			

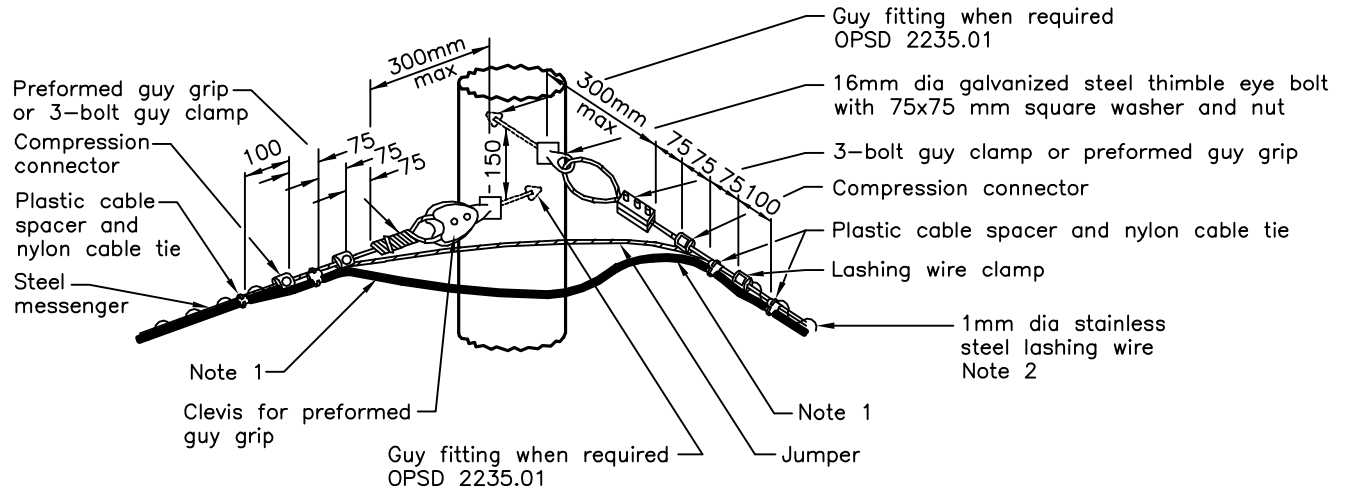
OPSD 2242.01						





LINE POLE ATTACHMENT

Line Angle Less Than 30°

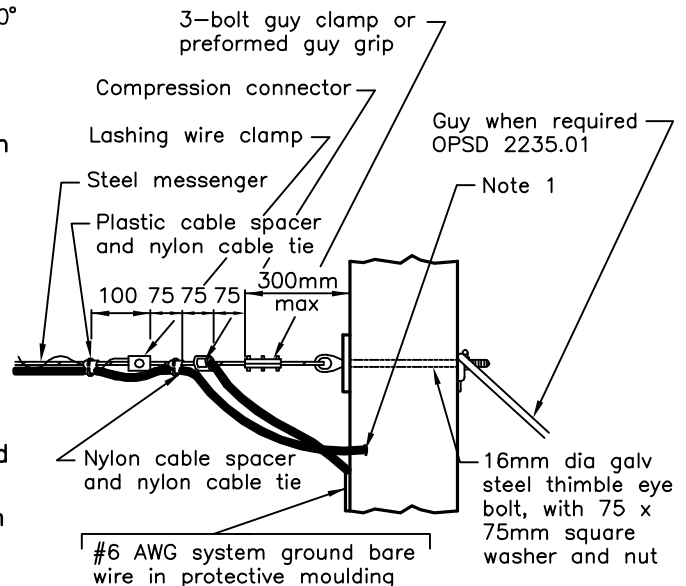


ANGLE POLE ATTACHMENT

Line Angle Greater Than 30°

NOTES:

- 1 For number and type of cable, refer to layout drawings and wiring diagrams. For cable arrangement, riser conduit, and junction box requirements, refer to OPSD 2240.01, 2540.01, 2552.01, layout or detail drawings.
- 2 Lashing wire shall be installed in a one wire spiral lay using a mechanical cable lasher.
- A Pole attachment height shall be at 600mm minimum from pole top and as high as possible. For minimum attachment heights see OPSD 2245.01
- B Steel messenger cable shall be installed to tension as shown on OPSD 2245.01, size and grade as specified in the Contract.
- C For non-permanent installations of 70m span or shorter, nylon cable ties at 450mm c/c may be used in lieu of lashing wire for cable support.
- D All dimensions are in millimetres unless otherwise shown.



DEAD END ATTACHMENT

ONTARIO PROVINCIAL STANDARD DRAWING

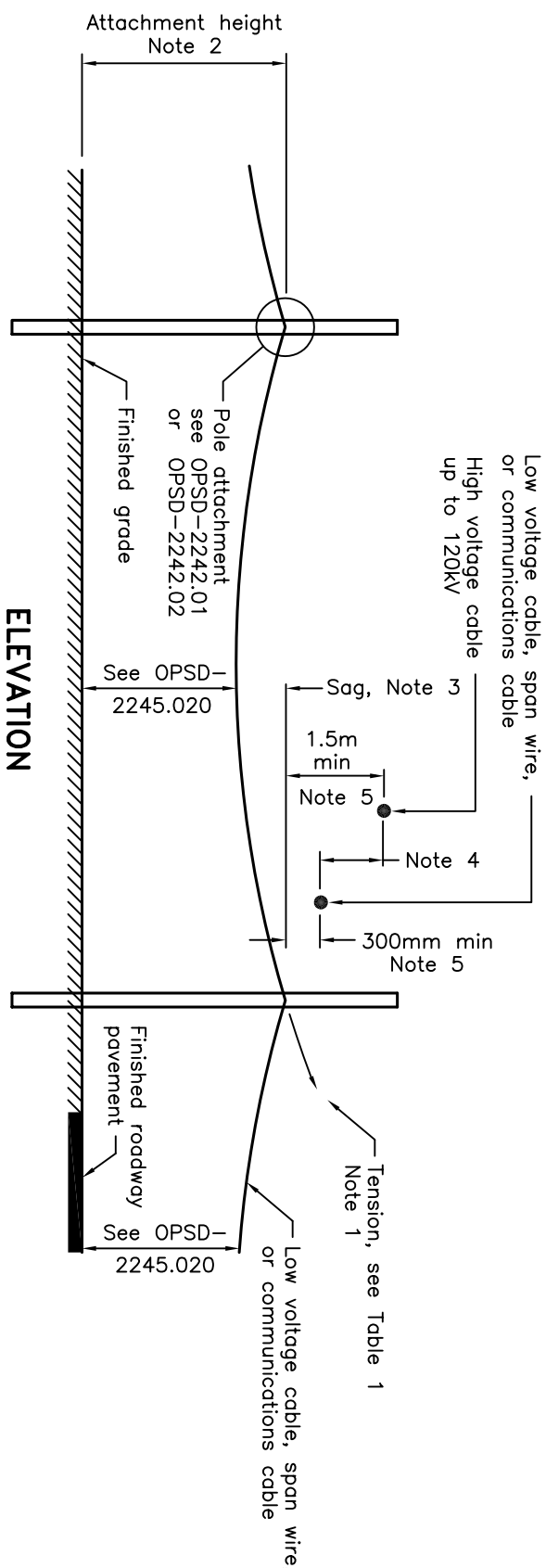
Nov 2013

Rev 2

WOODEN POLES WITH
AERIAL CABLES
LASHED ON MESSENGER

OPSD 2242.02





NOTES:

- 1 Cables shall be installed at the tension shown in Table 1 to the sag specified by the cable manufacturer and the Ontario Electrical Safety Code sag tables. Where cables are parallel to an existing cable line on the same poles, the tension shall be adjusted to maintain a consistent vertical spacing.
 - 2 Minimum attachment height to be determined by addition of the clearance height to the maximum sag.
 - 3 Maximum sag shall be based on the heavy loading or thermal loading conditions specified in CSA C22.3, No.1-01. For maximum sag refer to cable manufacturer and the Ontario Electrical Safety Code sag tables.
 - 4 For minimum vertical clearances between the high voltage cables over 120kV and other cables, refer to CSA C22.3, No.1-01.
 - 5 Vertical clearance between wires to be measured with the upper wire in its maximum sag position and the lower wire is assumed to form a straight line between its points of support.
- A All dimensions are in millimetres unless otherwise shown.

TABLE 1

TENSIONS FOR INSTALLATION OF AERIAL CABLES						
Installation Temp. °C	ACSR Tension For Types NS-1, NSF-2 Cables N			Steel Strand Tension N		
	#2	#1/0	#3/0	7mm Gr.110	9mm Gr.160	
-29	1480	1320	1500	7600	13500	
-18	1300	1280	1460	6950	12300	
0	1120	1210	1410	5900	10500	
16	990	1170	1370	4900	8700	
32	900	1120	1350	3900	6900	
38	860	1070	1330	3700	6600	

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2004

Rev 2

INSTALLATION OF AERIAL CABLE SYSTEMS

OPSD - 2245.01



MINIMUM VERTICAL CLEARANCES

LOCATION OF WIRES OR CABLES		MINIMUM VERTICAL CLEARANCES ABOVE FINISHED GRADE										
		COMMUNICATIONS CABLE AND SPAN WIRE	LOW VOLTAGE CABLE 0-750V	HIGH VOLTAGE CABLE								
				>750V ≤22kV	>22kV ≤50kV	>50kV ≤90kV	>90kV ≤120kV	>120kV ≤150kV	>150kV ≤200kV	220kV (360kV)	318kV (500kV)	442kV (735kV)
1	OVER FREEWAYS, EXPRESSWAYS, AND RAMPS	6.0	6.0	6.0	6.0	6.1	6.4	6.9	10.5	15.7	20.7	
2	OVER KING'S HIGHWAYS AND OTHER ROADWAYS	4.7	4.7	5.1	5.5	5.8	6.1	6.4	6.9	10.5	15.7	20.7
3	OVER AREAS LIKELY TO BE TRAVELLED BY VEHICLES (OTHER THAN RESIDENTIAL DRIVEWAYS)	4.7	4.7	5.1	5.5	5.8	6.1	6.4	6.9	10.5	15.7	20.7
4	ALONGSIDE ROADS IN DENSELY POPULATED AREAS	4.7	4.7	5.1	5.5	5.8	6.1	6.4	6.9	10.5	15.7	20.7
5	ALONGSIDE ROADS OR OVER AREAS UNLIKELY TO BE TRAVELLED BY VEHICLES	3.3	3.7	4.5	4.9	5.2	5.5	5.8	6.3	6.5	7.5	8.7
6	OVER RESIDENTIAL DRIVEWAYS	4.0	4.0	5.1	5.5	5.8	6.1	6.4	6.9	10.5	15.7	20.7
7	OVER AREAS ACCESSIBLE TO PEDESTRIANS ONLY	2.8	3.4	3.7	4.0	4.3	4.6	4.9	5.4	5.6	6.6	7.8
8	ABOVE TOP OF RAIL AT RAILWAY CROSSINGS	7.6	7.6	7.9	8.4	8.7	9.0	9.3	9.8	10.0	11.0	12.2

NOTES:

- A Clearances shown are under maximum sag conditions as defined in CSA C22.3, No.1-10.
 B Voltages are rms line to ground. Voltages in brackets are phase to phase.
 C All dimensions are in metres unless otherwise shown.

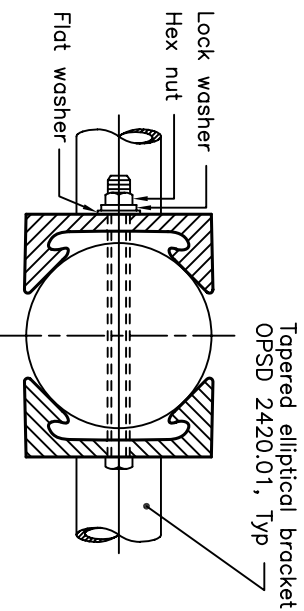
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2011 Rev 1

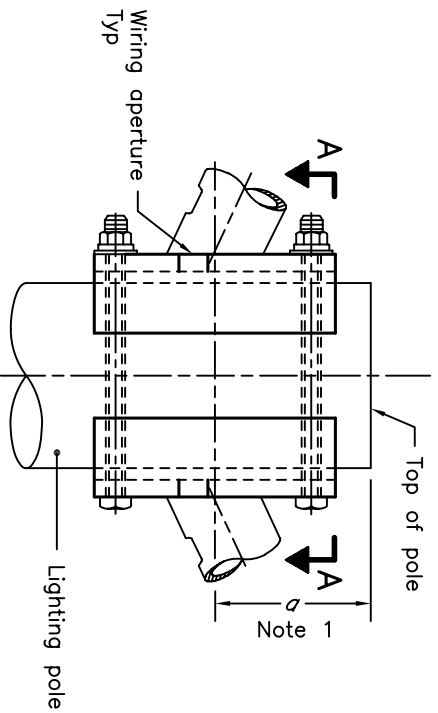
MINIMUM VERTICAL CLEARANCES
FOR AERIAL CABLE SYSTEMS

OPSD 2245.020

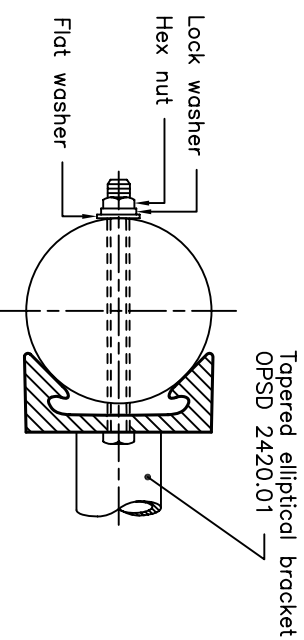




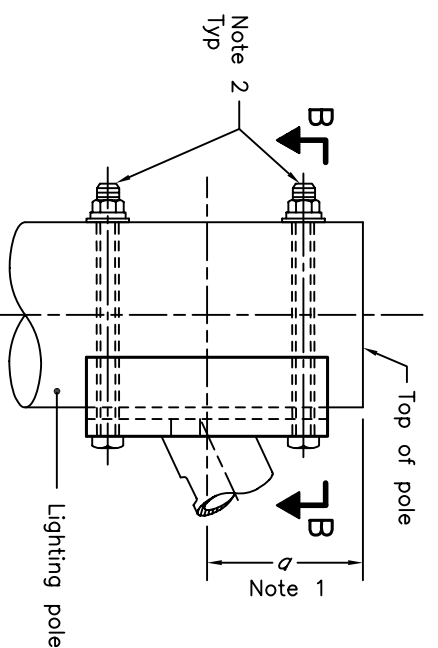
SECTION A-A



DOUBLE BRACKET



SECTION B-B



SINGLE BRACKET

NOTES:

- 1 For sectional steel poles dimension $a=300\text{mm}$.
For all other metal poles and concrete poles, dimension $a=230\text{mm}$.
- 2 16mm dia galvanized steel square head bolt. Bolt length to suit pole.

ONTARIO PROVINCIAL STANDARD DRAWING

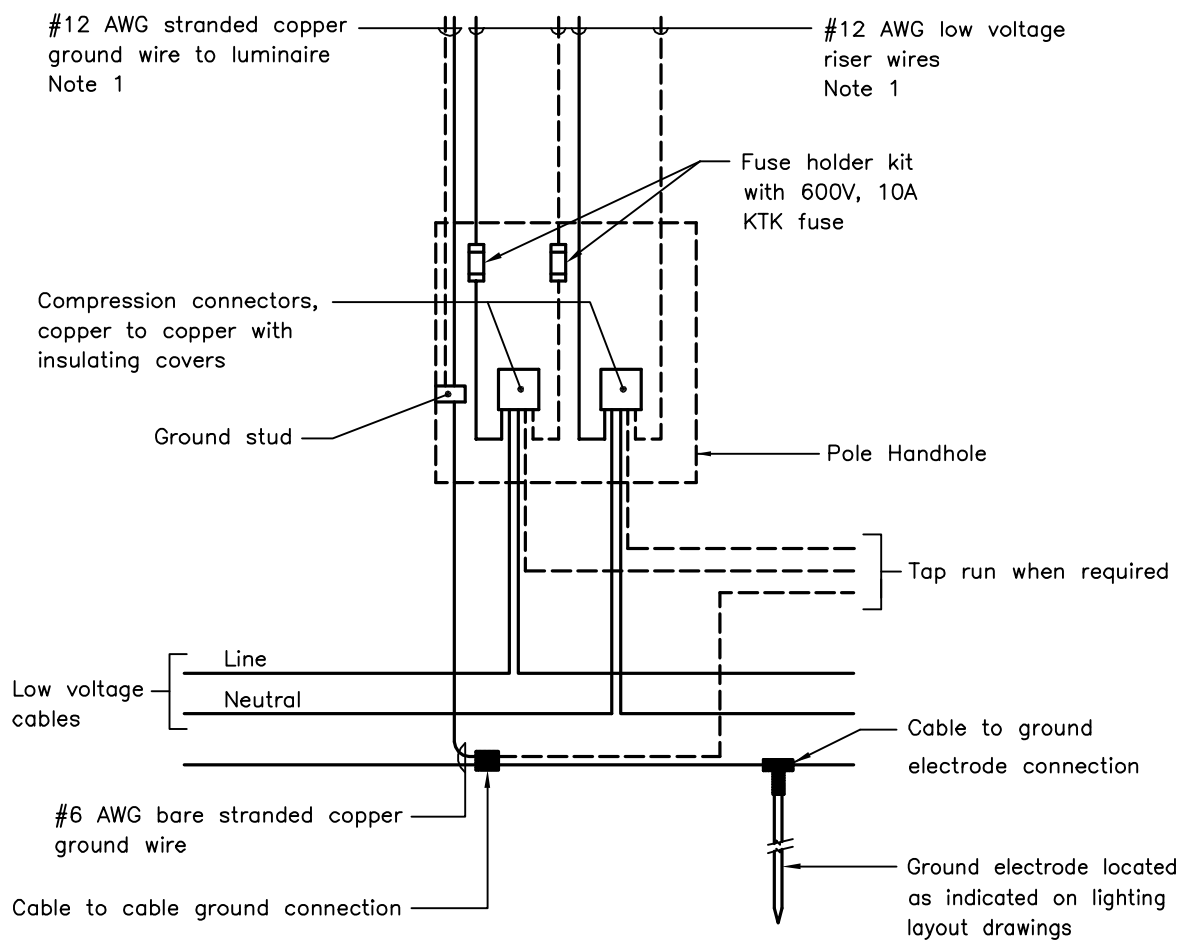
ALUMINUM TAPERED ELLIPTICAL BRACKETS
ON METAL AND CONCRETE POLES

MOUNTING DETAILS

Nov 2006 Rev 5

OPSD 2250.01

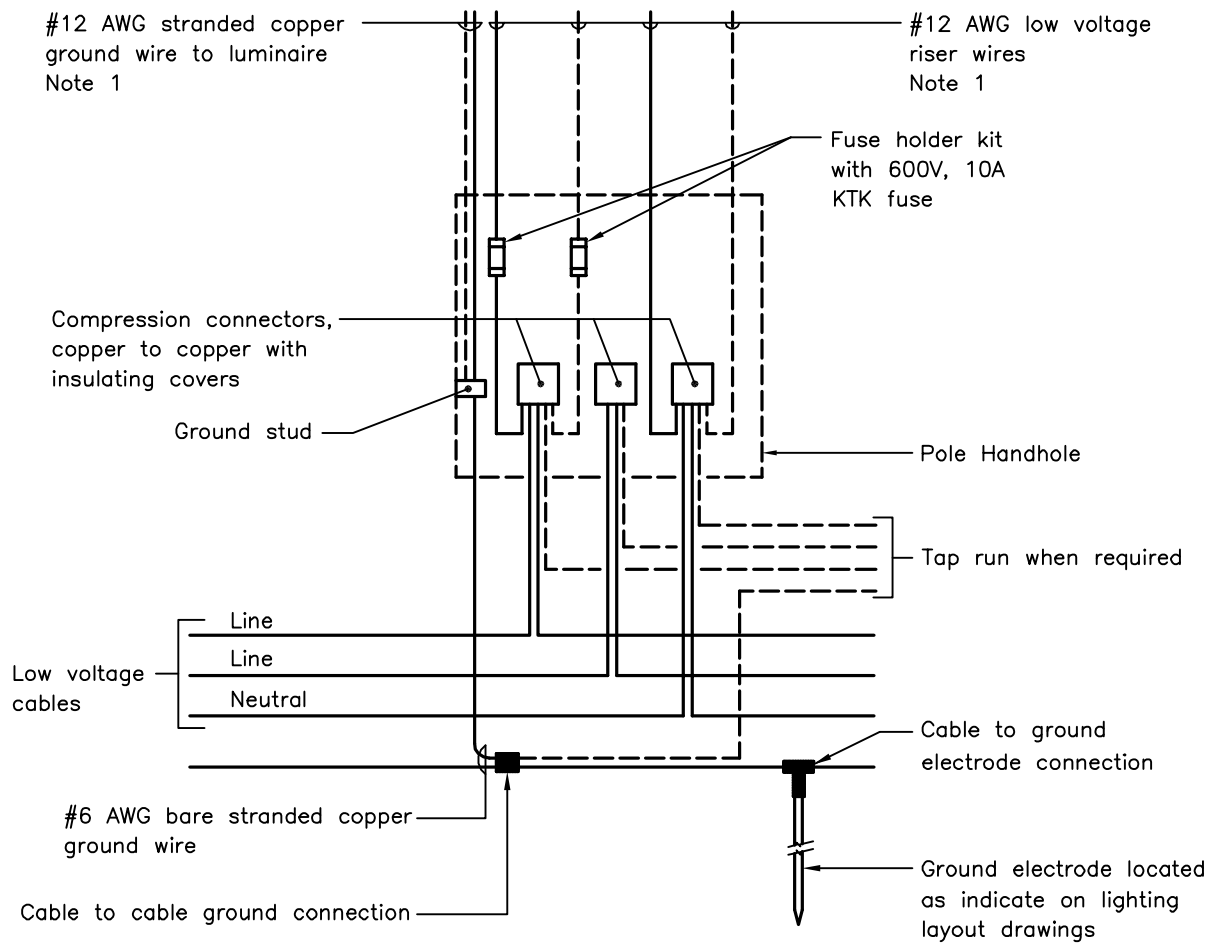




NOTE:

1 Broken lines indicate additional conductors for double luminaire installation.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2013	Rev	1	
POLE WIRING DIAGRAM 120V SYSTEM	----- -----				
	OPSD 2255.010				



NOTE:

1 Broken lines indicate additional conductors for double luminaire installation.

ONTARIO PROVINCIAL STANDARD DRAWING

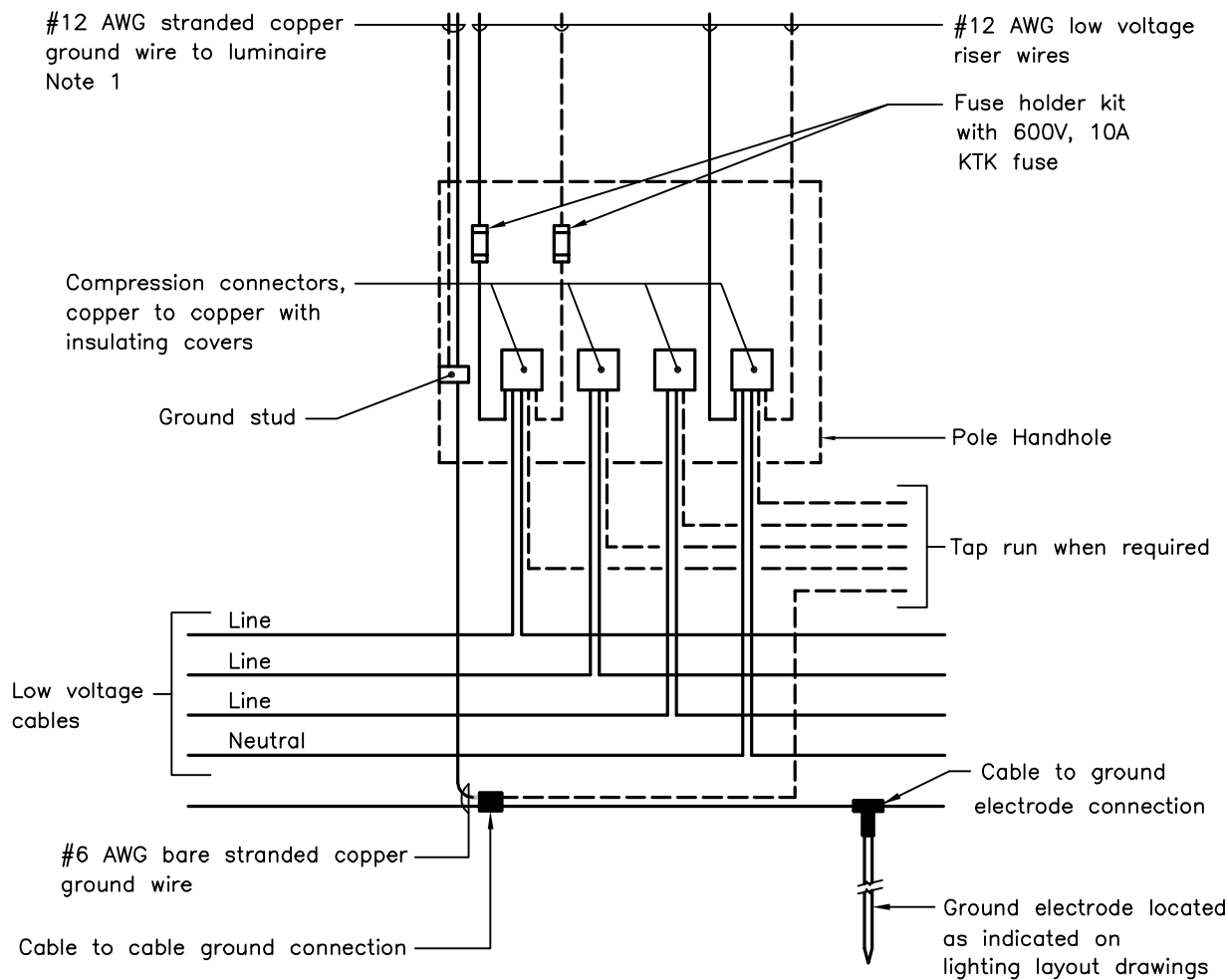
Nov 2013

Rev 1

POLE WIRING DIAGRAM
120/240V SYSTEM



OPSD 2255.020



NOTE:

1 Broken lines indicate additional conductors for double luminaire installation.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2013

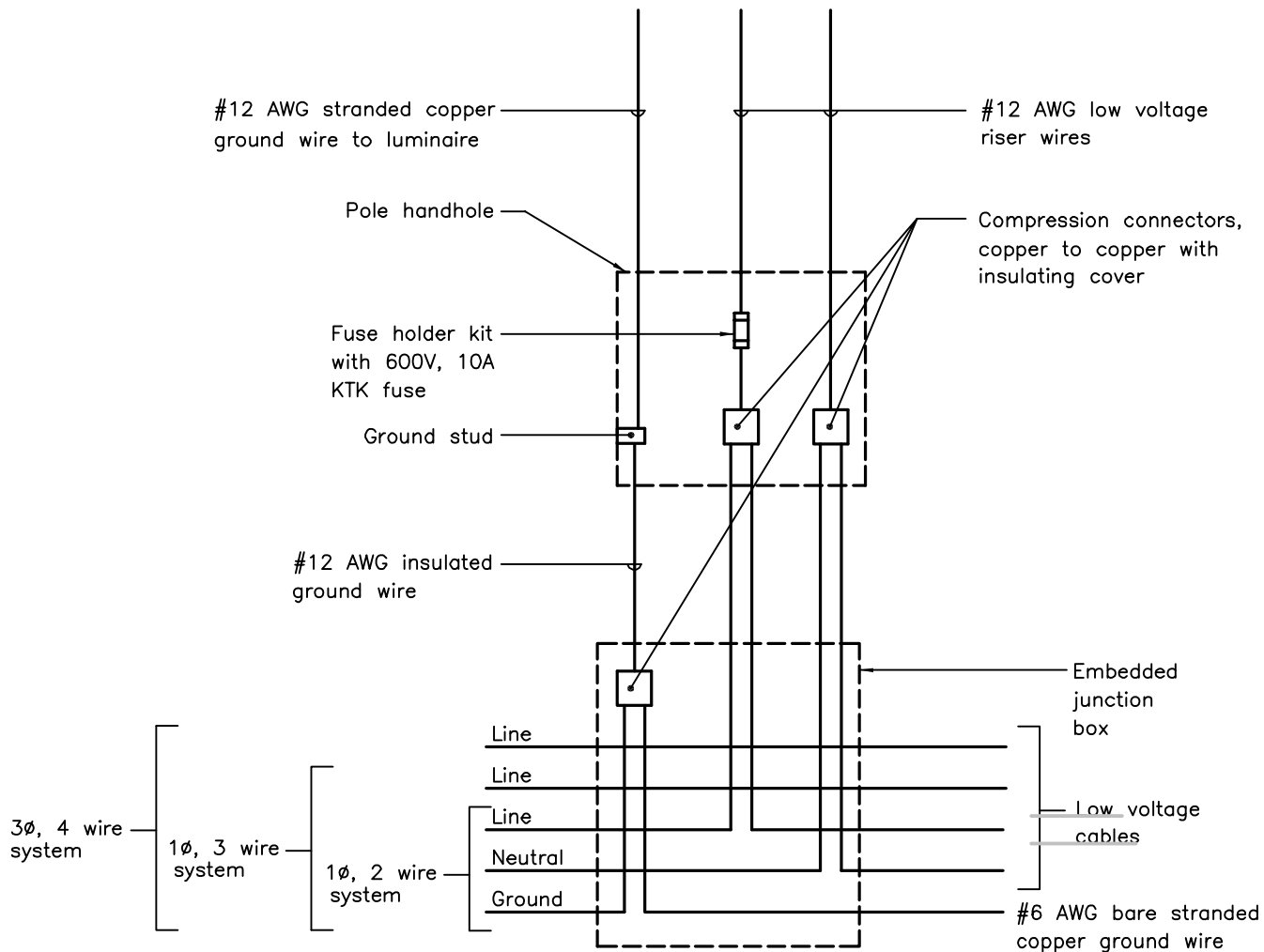
Rev 1

POLE WIRING DIAGRAM

347/600V SYSTEM



OPSD 2255.030



ONTARIO PROVINCIAL STANDARD DRAWING

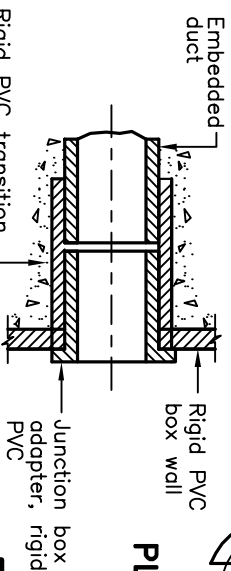
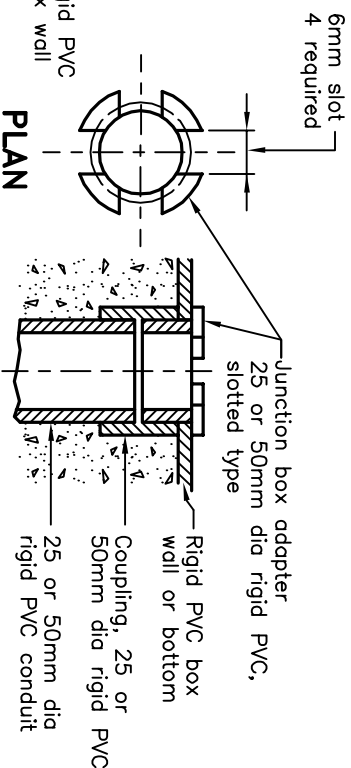
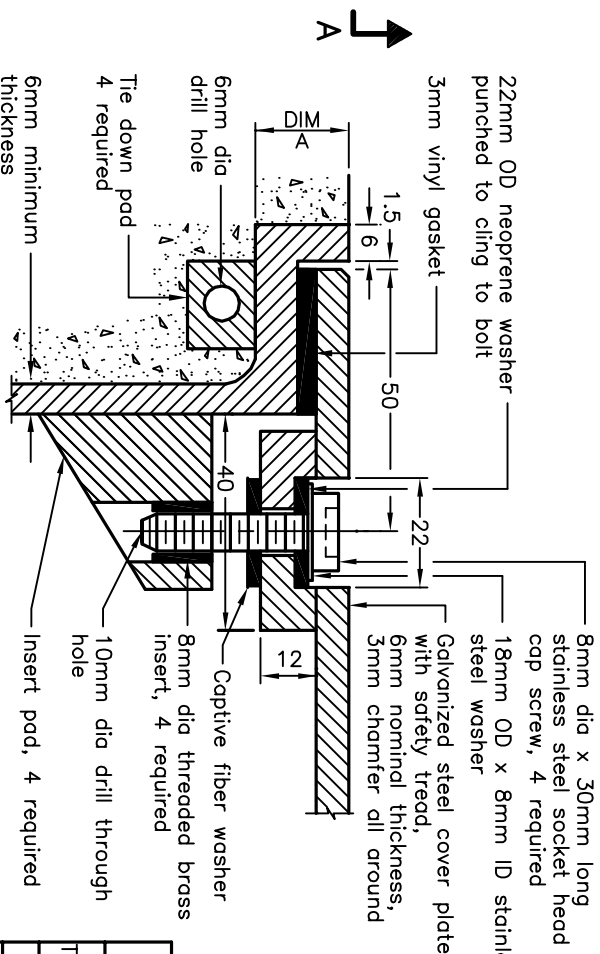
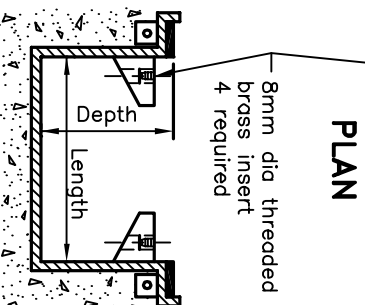
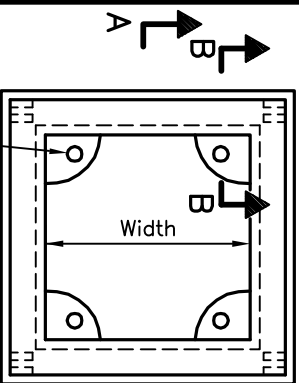
Nov 2013

Rev 1



POLE WIRING DIAGRAM LIGHTING POLE ON BRIDGE STRUCTURE

OPSD 2255.040



**TYPICAL CONNECTION
FOR RIGID CONDUIT**

TYPICAL DETAIL FOR DRAINAGE

NOTES:
1 Rigid PVC transition coupling shall be suitable for use with embedded ducts.
A For junction box conduit entries, refer to the Contract Drawings.
B All dimensions are in millimetres unless otherwise shown.

JUNCTION BOX ADAPTER SIZES

JUNCTION BOX ADAPTER	DRILL HOLE SIZES
25	33
30	42
40	48
50	60
65	73
75	88

**DIMENSIONS OF TYPE P1
RIGID PVC JUNCTION BOXES**

PVC BOX (INSIDE) DIMENSION				COVER THICK- NESS	DIM A
TYPE NO.	LENGTH	WIDTH	DEPTH		
P1-1	150	150	110	6	15
P1-2	150	150	160	6	15
P1-3	200	200	110	9	20
P1-4	200	200	160	9	20
P1-5	200	200	185	9	20
P1-6	250	200	185	9	20
P1-7	300	300	185	9	20
P1-8	400	200	185	9	20
P1-9	400	400	185	9	20

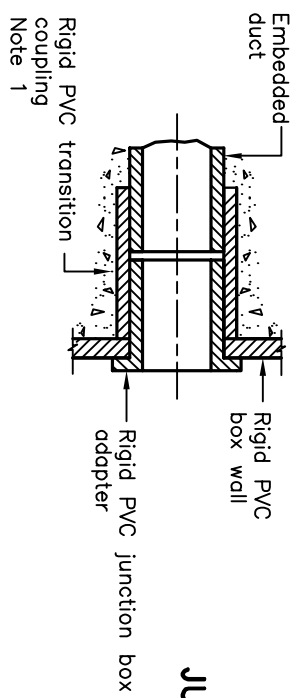
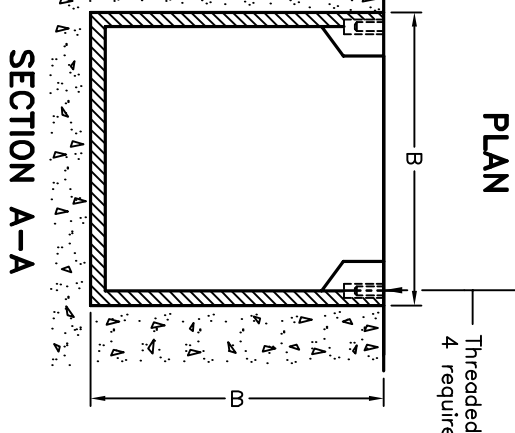
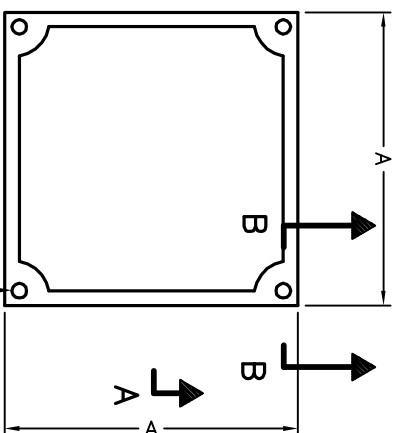
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2013 Rev 1



**RIGID PVC JUNCTION BOX
TYPE P1**

OPSD 2300.010



TYPICAL CONNECTION FOR RIGID CONDUIT

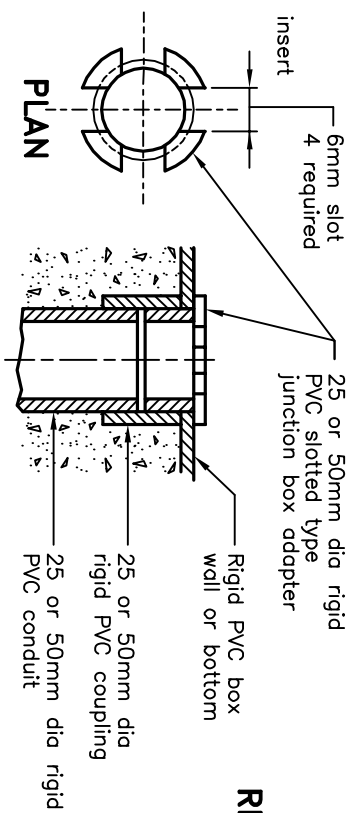
JUNCTION BOX ADAPTER SIZES

JUNCTION BOX ADAPTER	DRILL HOLE SIZES
25	33
32	42
38	48
50	60
65	73
75	88

DIMENSIONS OF TYPE P2 RIGID PVC JUNCTION BOXES

PVC BOX (INSIDE) DIMENSION WITH COVER		
TYPE No.	A	B
P2-1	102	70
P2-2	102	106
P2-3	102	158
P2-4	127	151
P2-5	162	124
P2-6	162	157
P2-7	219	107
P2-8	219	184
P2-9	320	108
P2-10	320	158
P2-11	320	210

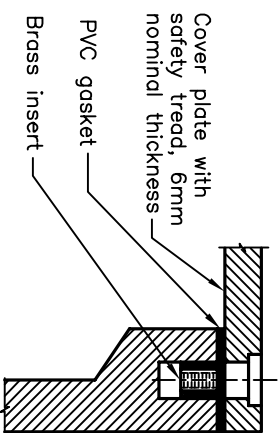
TYPICAL DETAIL FOR DRAINAGE



NOTES:
1 Rigid PVC transition coupling shall be suitable for use with embedded ducts.

A For junction box conduit entries, refer to the Contract Drawings.

B All dimensions are in millimetres unless otherwise shown.



SECTION A-A

SECTION B-B WITH COVER

ONTARIO PROVINCIAL STANDARD DRAWING

RIGID PVC JUNCTION BOX

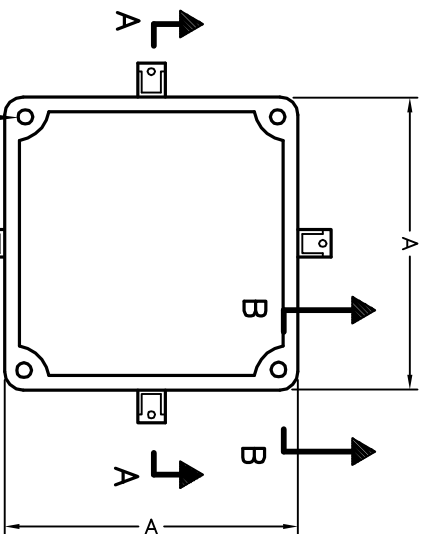
TYPE P2

Nov 2013

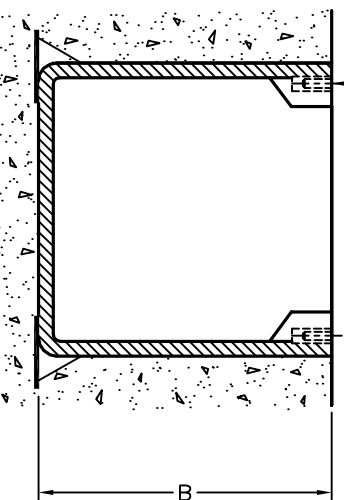
Rev 1

OPSD 2300.020

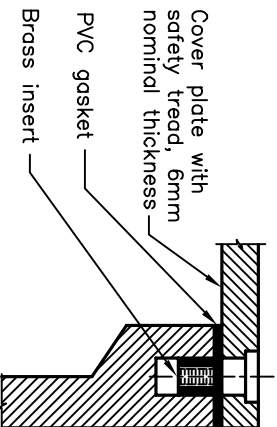




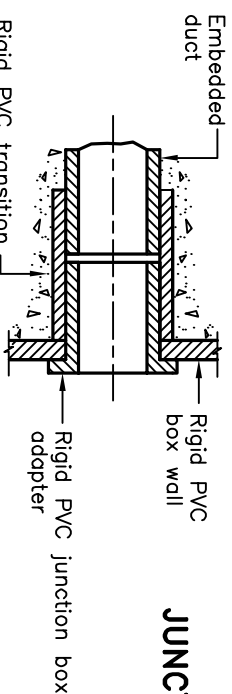
PLAN
Threaded brass insert
4 required



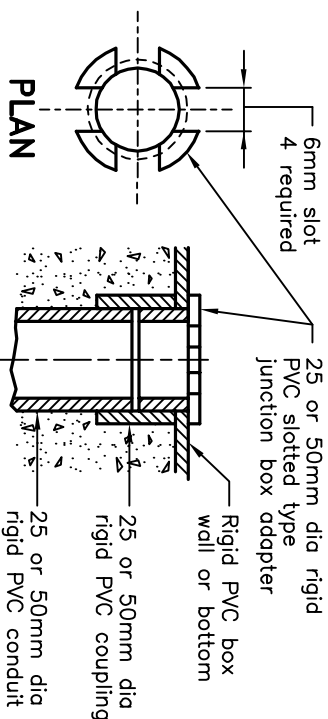
SECTION A-A



SECTION B-B WITH COVER



**TYPICAL CONNECTION FOR
RIGID CONDUIT**



TYPICAL DETAIL FOR DRAINAGE

- NOTES:**
- 1 Rigid PVC transition coupling shall be suitable for use with embedded ducts.
 - A Mounting feet shall be installed to secure the box during installation.
 - B For junction box conduit entries, refer to the Contract Drawings.
 - C All dimensions are in millimetres unless otherwise shown.

JUNCTION BOX ADAPTER SIZES

JUNCTION BOX ADAPTER	DRILL HOLE SIZES
25	33
32	42
38	48
50	60
65	73
75	88

**DIMENSIONS OF TYPE P4
RIGID PVC JUNCTION BOXES**

PVC BOX DIMENSIONS WITH COVER		
TYPE No.	A	B
P4-1	102	70
P4-2	102	106
P4-3	102	158
P4-4	127	51
P4-5	162	124
P4-6	162	157
P4-7	219	107
P4-8	219	184
P4-9	320	108
P4-10	320	158
P4-11	320	210

ONTARIO PROVINCIAL STANDARD DRAWING

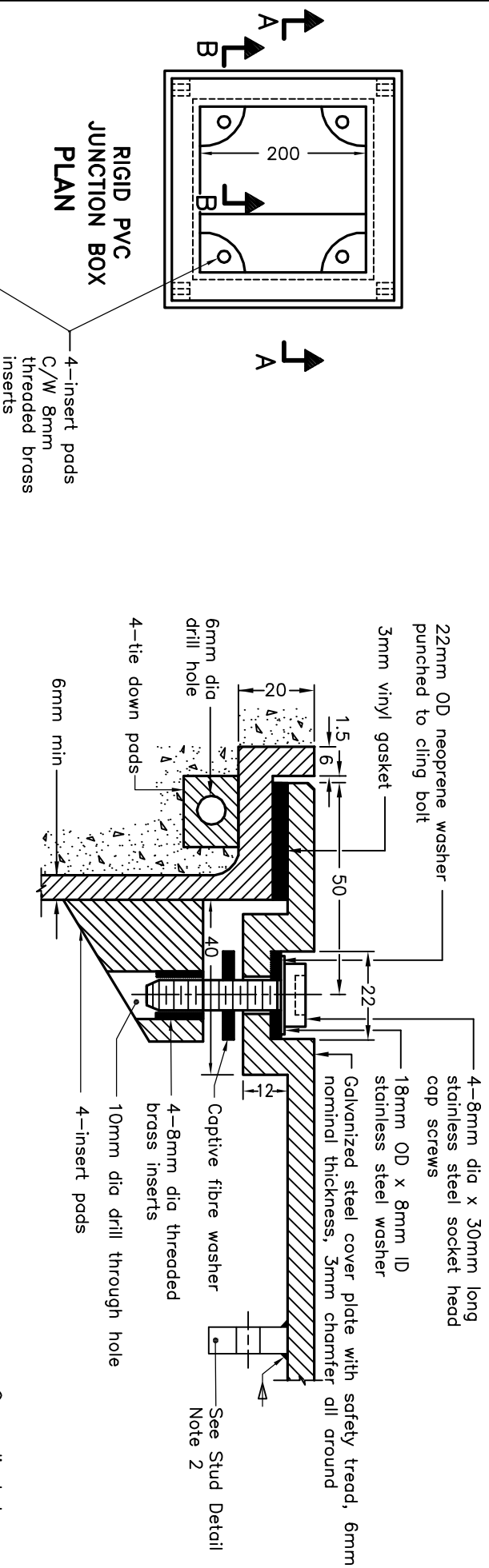
Nov 2013 Rev 1

RIGID PVC JUNCTION BOX

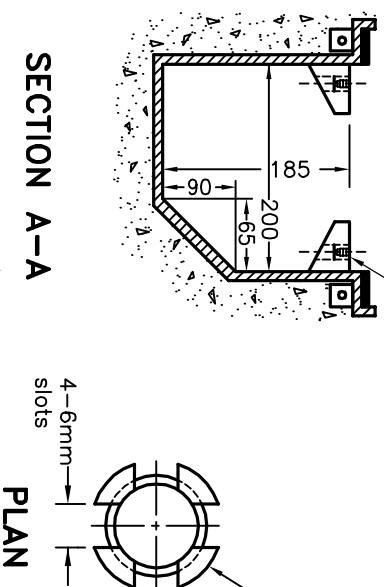
TYPE P4

OPSD 2300.030

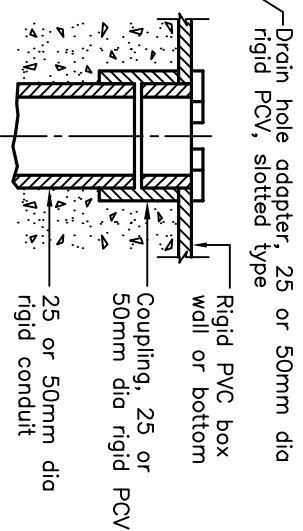




SECTION B-B WITH COVER



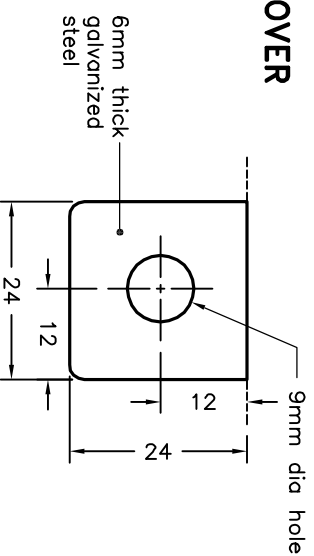
TYPICAL DETAIL FOR DRAINAGE



NOTES:

- 1 Rigid PVC transition coupling shall be suitable for use with embedded ducts.
- 2 Stud for ground connection shall be located at the centre of the cover.
- A All dimensions are in millimetres unless otherwise shown.

STUD DETAIL



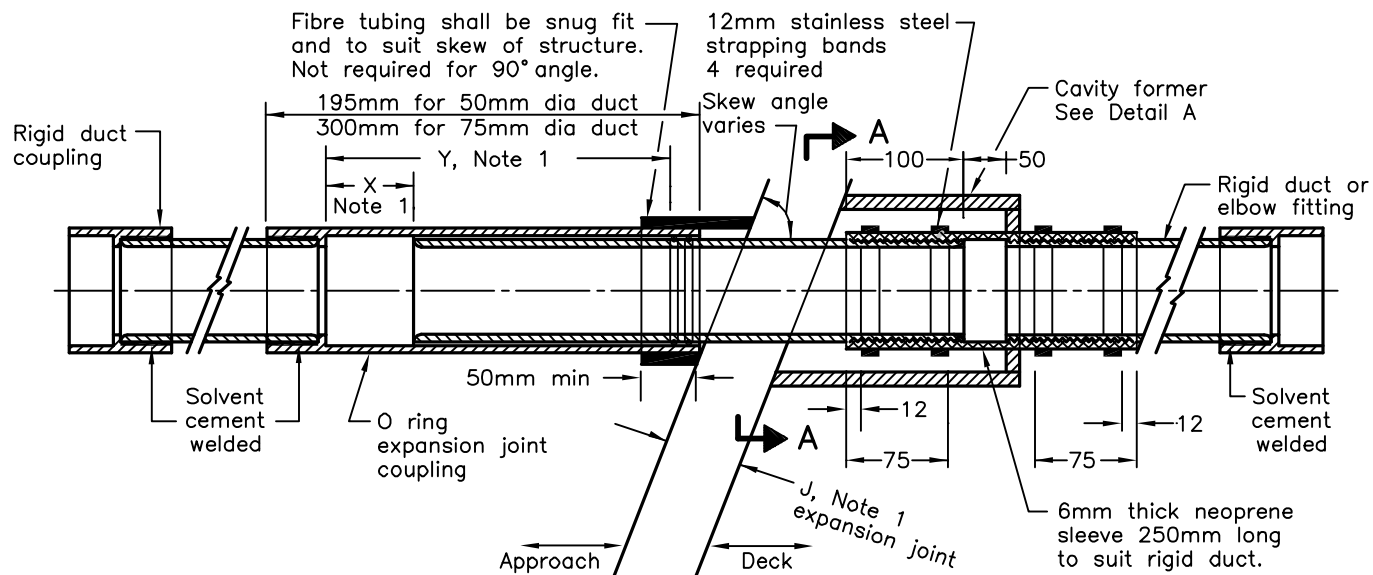
EMBEDDED WORK DETAIL

FOR RIGID PVC JUNCTION BOX, TYPE P3-1,
FOR USE IN CONCRETE BARRIER WALL

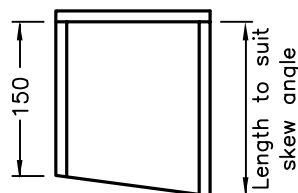
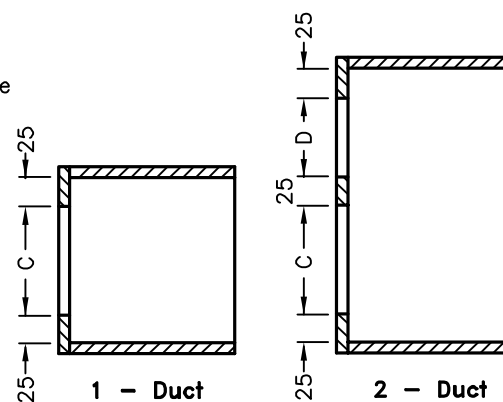
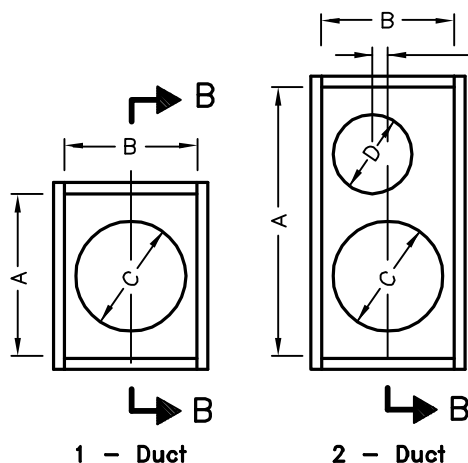
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2010	Rev	1





PLAN - FITTING ASSEMBLY



Number of Duct	Size of Duct	A	B	C	D
1	50	120	90	70	—
1	75	150	120	100	—
2	50	215	90	70	70
1 1	50 75	245	120	100	70

DETAIL A - CAVITY FORMER

NOTES:

- 1 Refer to structural expansion joint drawings for J dimensions.
 $X=J$ at installation temperature - Min $J + 25$, mm minimum.
 $Y=\text{Max } J - \text{Min } J + 50$, mm minimum.

A The cavity former shall be made of 10 mm plywood.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

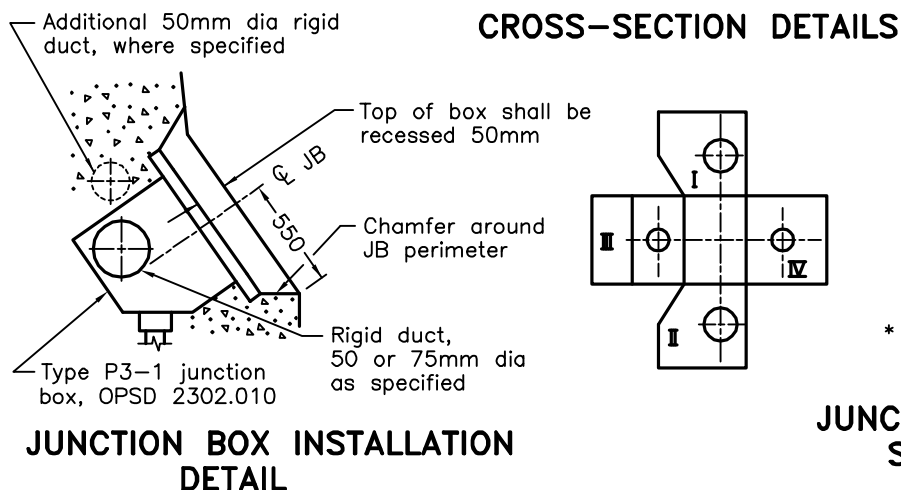
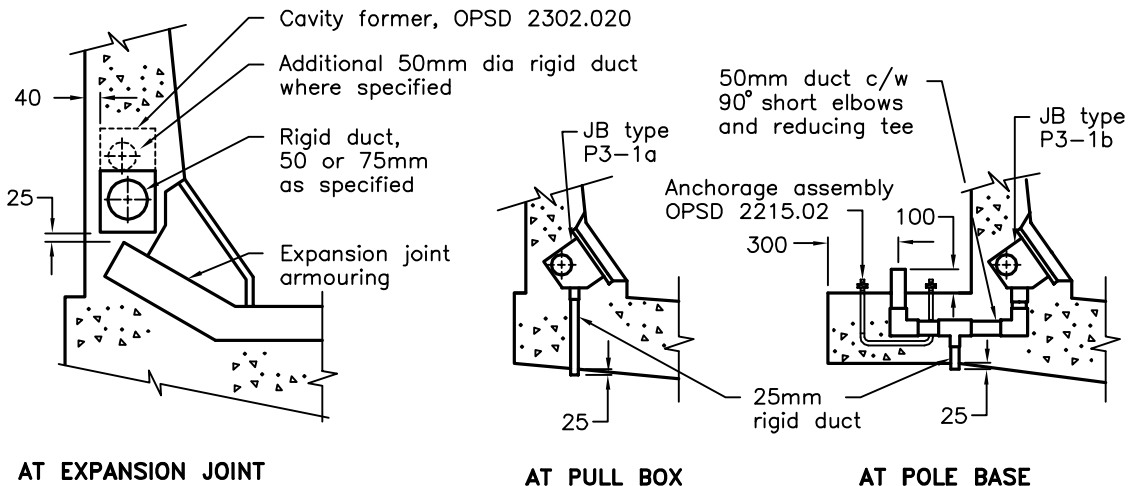
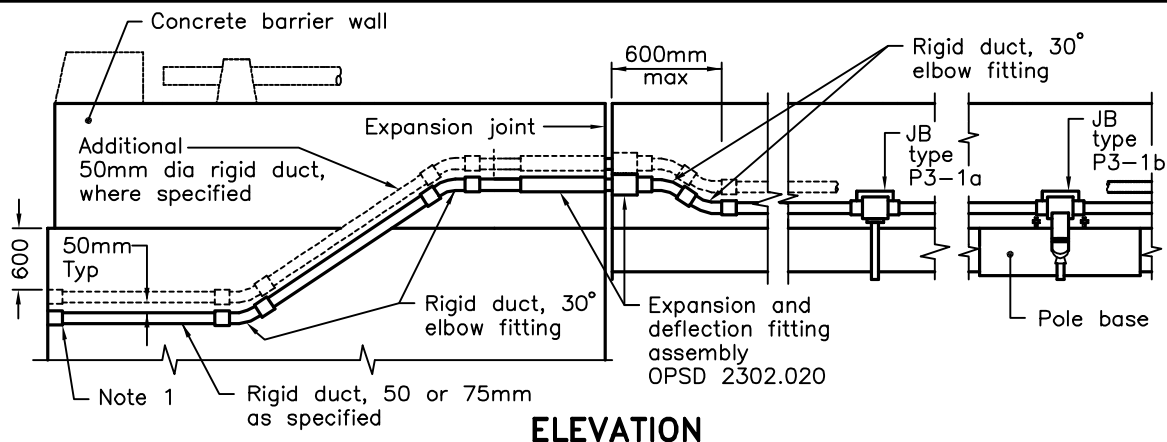
Nov 2013

Rev 0

EXPANSION AND DEFLECTION
 FITTING ASSEMBLY
 FOR 50 AND 75mm RIGID DUCTS



OPSD 2302.020



CROSS-SECTION DETAILS

DRILL-HOLE SIZE AND LOCATION

JUNCTION BOX TYPE	DRILL-HOLE DIA			
	I	II	III	IV
P3-1a	*	*	33	—
P3-1b	*	*	60	—

* For 50mm duct drill-hole dia = 60mm
For 75mm duct drill-hole dia = 88mm

JUNCTION BOX – DUCT ENTRY SIZES AND LOCATIONS

NOTES:

- 1 Embedded rigid duct shall be terminated at wing wall with O ring expansion joint coupling, 195mm long, for 50mm dia duct and with regular coupling for 75mm dia duct.
- 2 When the 50mm dia duct is installed in addition to the 75 or 50mm dia duct, junction boxes shall not be installed in the additional 50mm duct.

- A For embedded duct and junction box requirements, refer to Contract Drawings.
- B All dimensions are in millimetres unless otherwise shown.

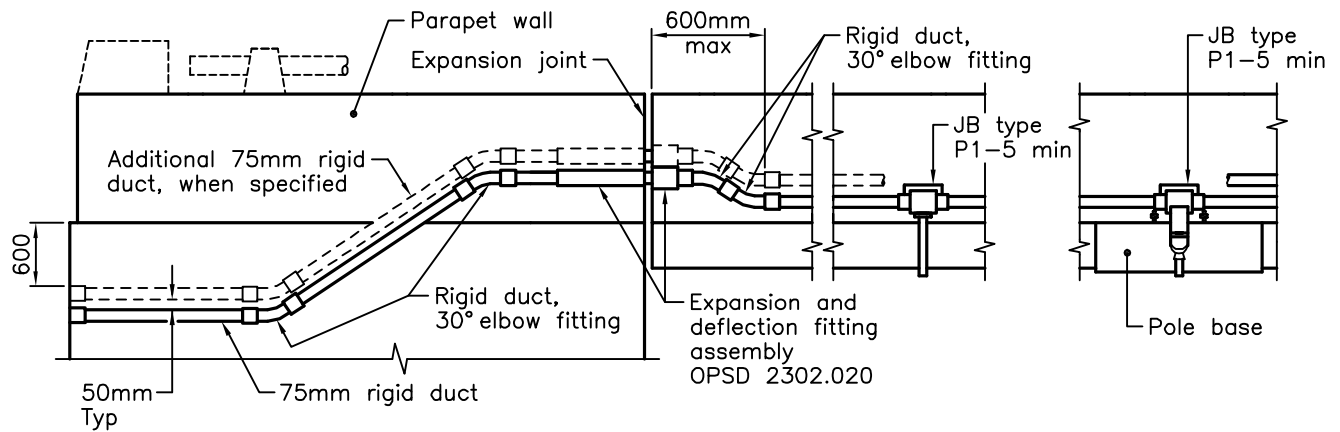
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2013 Rev 1

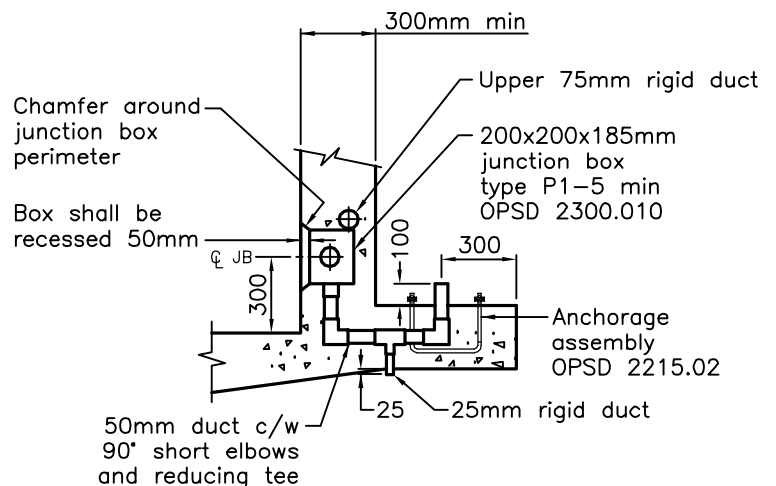
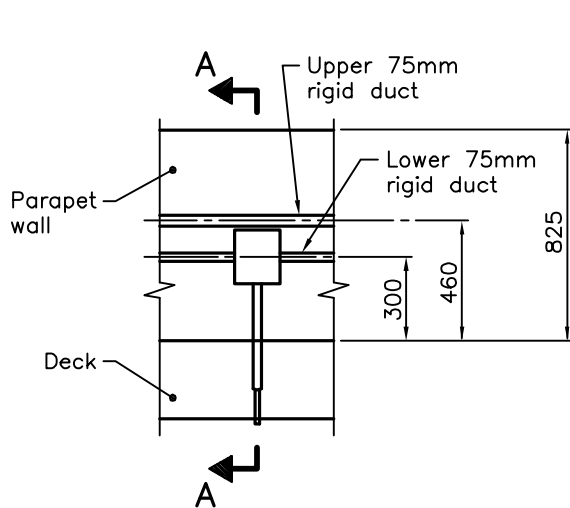
**EMBEDDED WORK
IN STRUCTURE**
NEW JERSEY TYPE CONCRETE BARRIER WALL

OPSD 2302.040

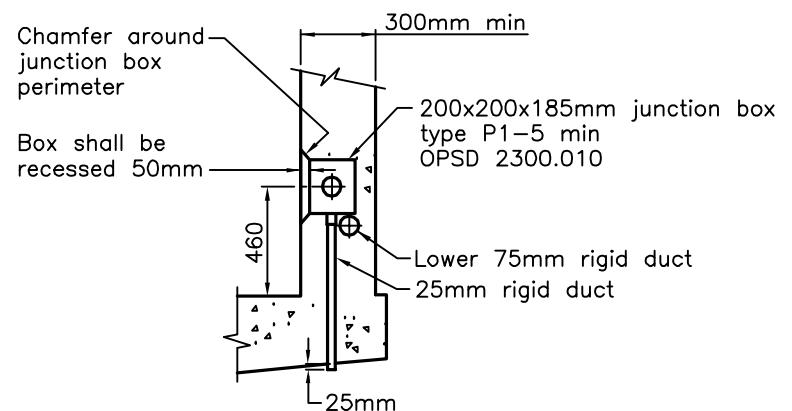
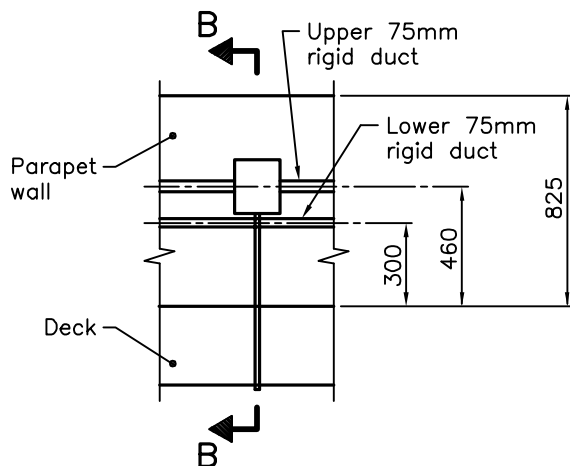




ELEVATION



SECTION A-A AT LIGHTING POLE BASE



SECTION B-B

NOTES:

A Embedded duct and junction box requirements shall be according to the Contract Documents.

B All dimensions are in millimetres unless otherwise shown.

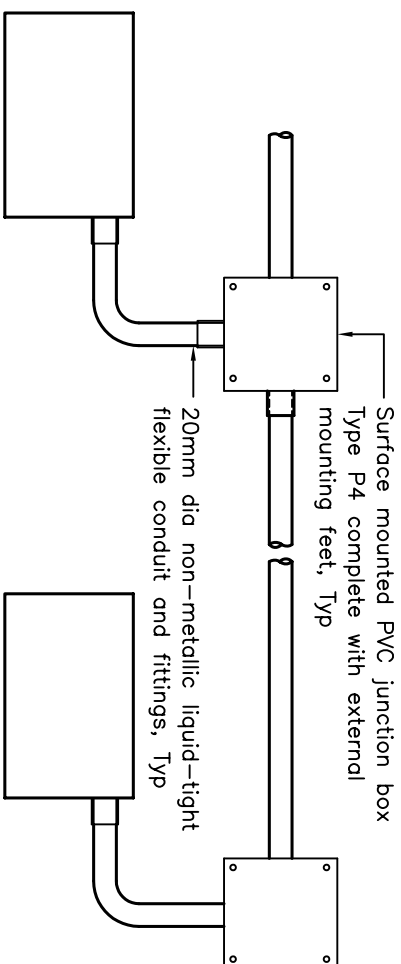
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2014 Rev 0

**EMBEDDED WORK IN STRUCTURE
PARAPET WALL**

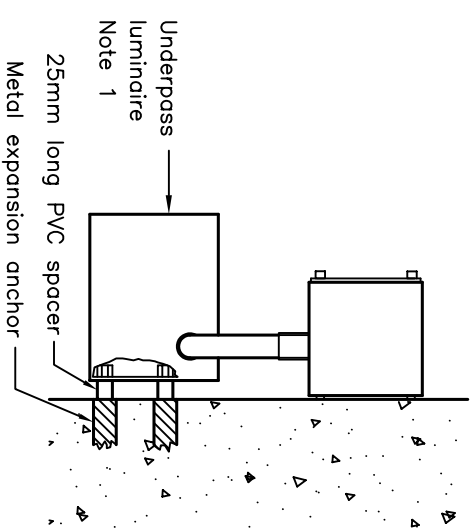


OPSD 2302.045

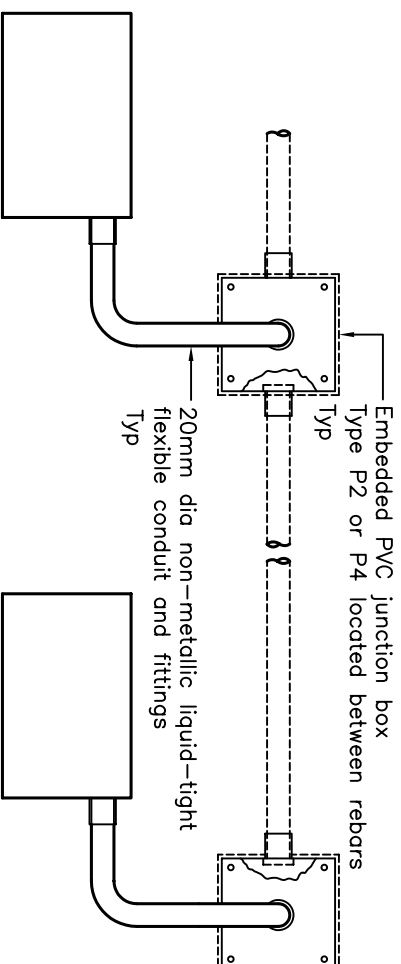


FRONT VIEW

SURFACE MOUNTED DUCTS AND JUNCTION BOXES

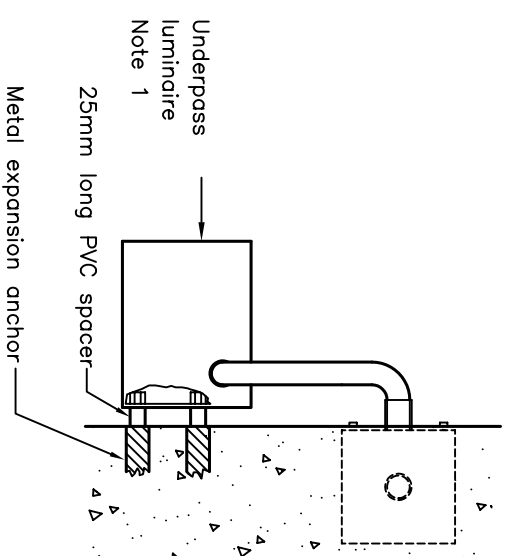


SIDE VIEW



FRONT VIEW

EMBEDDED DUCTS AND JUNCTION BOXES



SIDE VIEW

NOTES:

- 1 Luminaires shall be mounted on concrete surface by drilling and inserting metal expansion anchors and securing the luminaires with 10mm dia x 65mm long stainless steel machine bolts.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2001

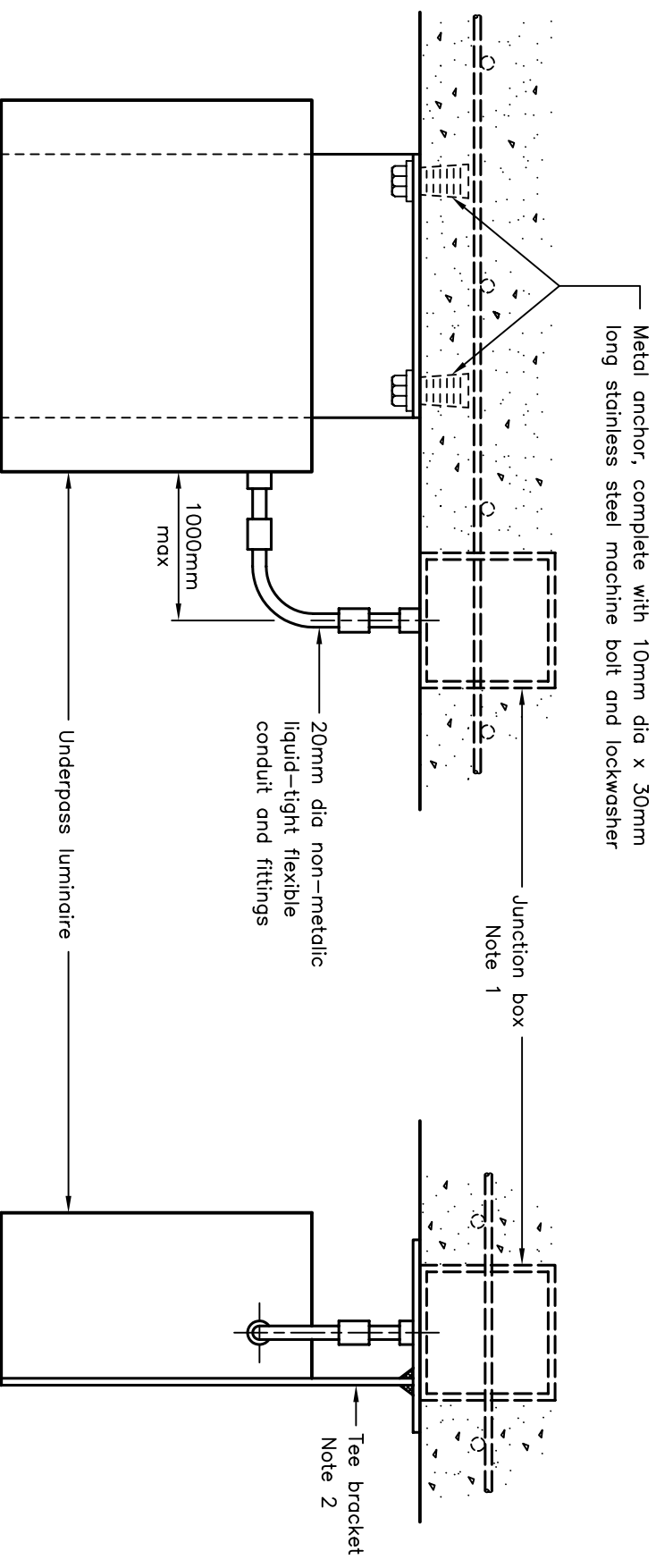
Rev 1

UNDERPASS LUMINAIRES

WALL MOUNTED INSTALLATION

OPSD - 2305.020





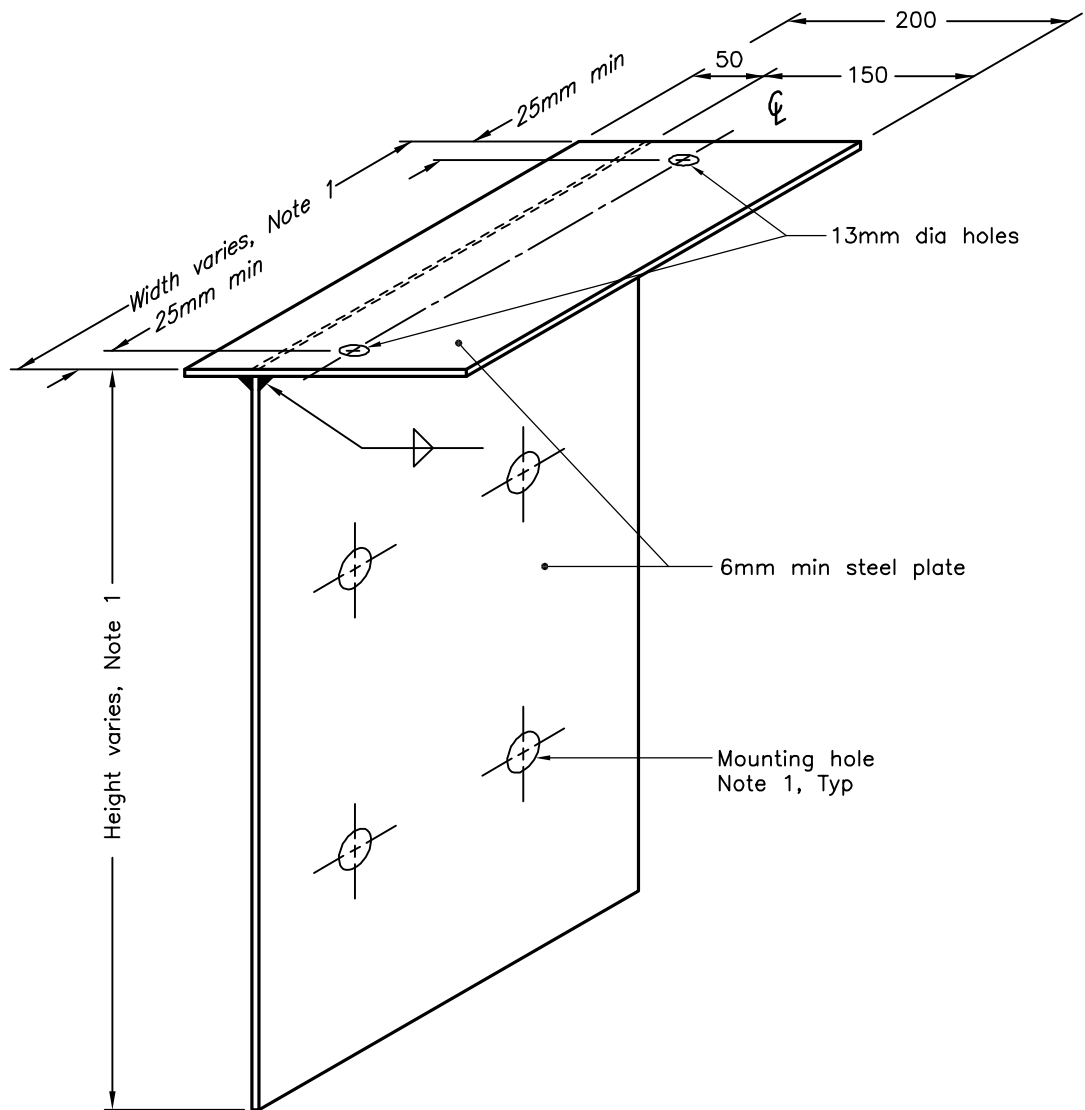
FRONT VIEW

SIDE VIEW

NOTES:

- 1 Junction box may be Type P4, surface mounted, or Type P2 or P4, embedded.
- 2 If ceiling of structure is not flat, tee bracket is to be attached to the ceiling using a wedge mounting bracket as shown in OPSD-2310.030.
- A This OPSD is to be read in conjunction with OPSD-2310.020.
- B Stainless steel machine bolts of a size to suit luminaire mounting holes, nuts, and lockwashers shall be used to mount luminaire to bracket.
- C Conduit entry into the luminaire may vary.
- D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2001	Rev 0	
UNDERPASS LUMINAIRE CEILING MOUNTED INSTALLATION WITH TEE BRACKET				



NOTES:

- 1 The width, height, mounting holes, and wiring aperture of the bracket shall suit the luminaire and fittings for conduit entry and shall be suitable to accommodate the opening of the luminaire door.
- A Bracket shall be stainless steel when attached to atmospheric corrosion resistant structural steel components. For all other applications, brackets shall be stainless steel or hot dip galvanized steel.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2009

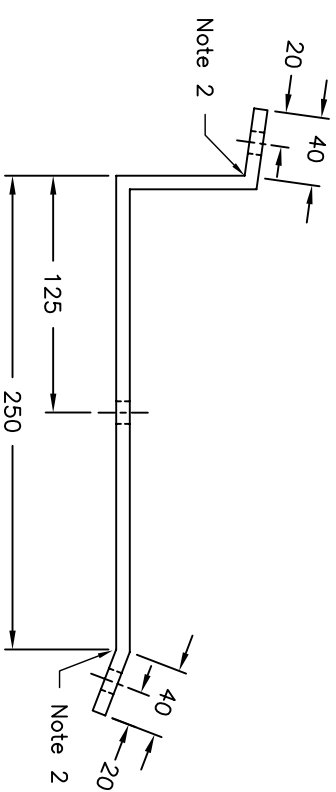
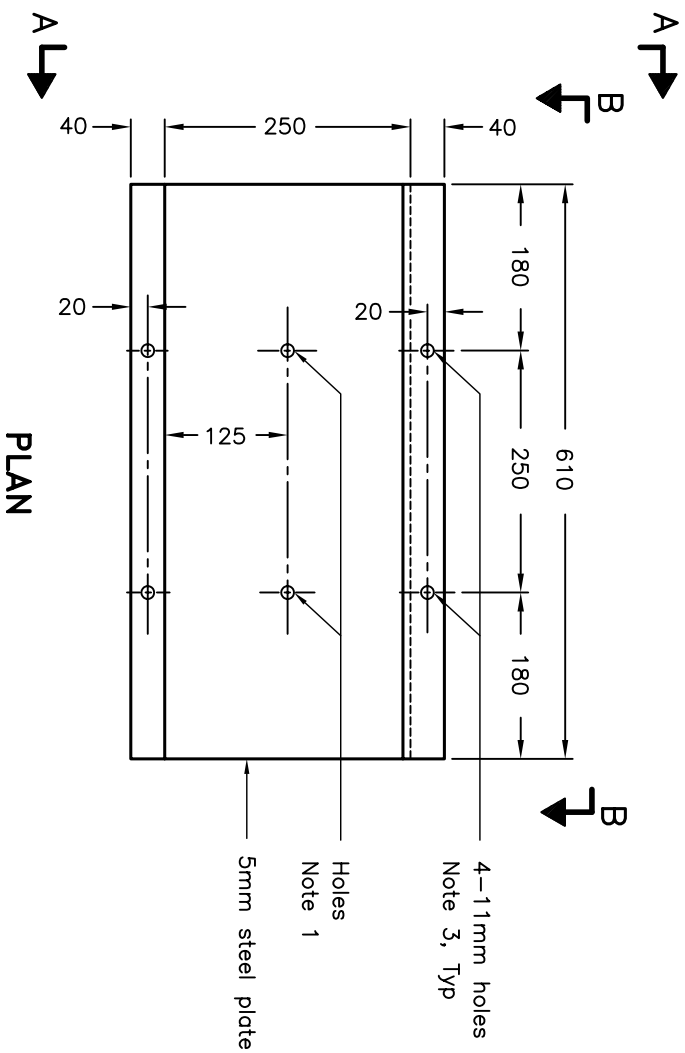
Rev

1

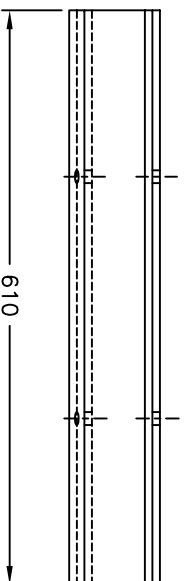
TEE BRACKET FOR
CEILING MOUNTED UNDERPASS LUMINAIRE



OPSD 2310.020



SECTION B-B



NOTES:

- 1 Holes to suit mounting holes of the tee bracket.
- 2 Angle of attachment for wedge mounting bracket to be formed to suit structure.
- 3 Holes for mounting wedge bracket to structure.
- A Bracket shall be galvanized according to CAN/CSA-G164-M92(R1998) after fabrication.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

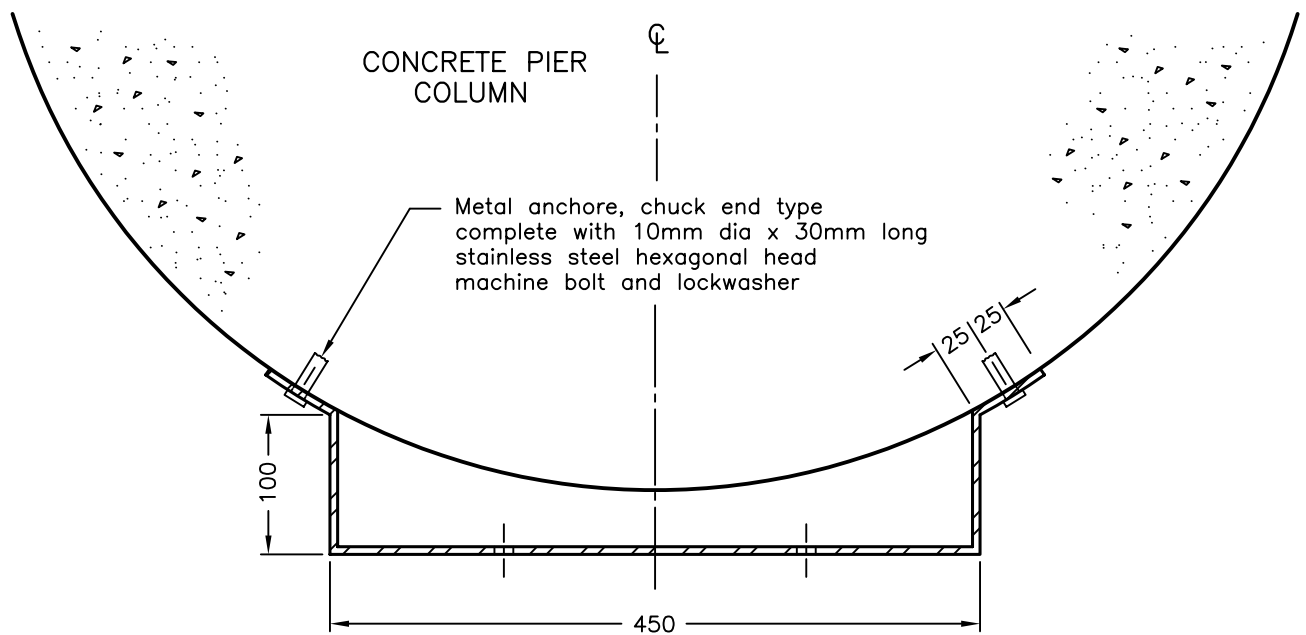
Nov 2001 Rev 0

WEDGE MOUNTING BRACKET

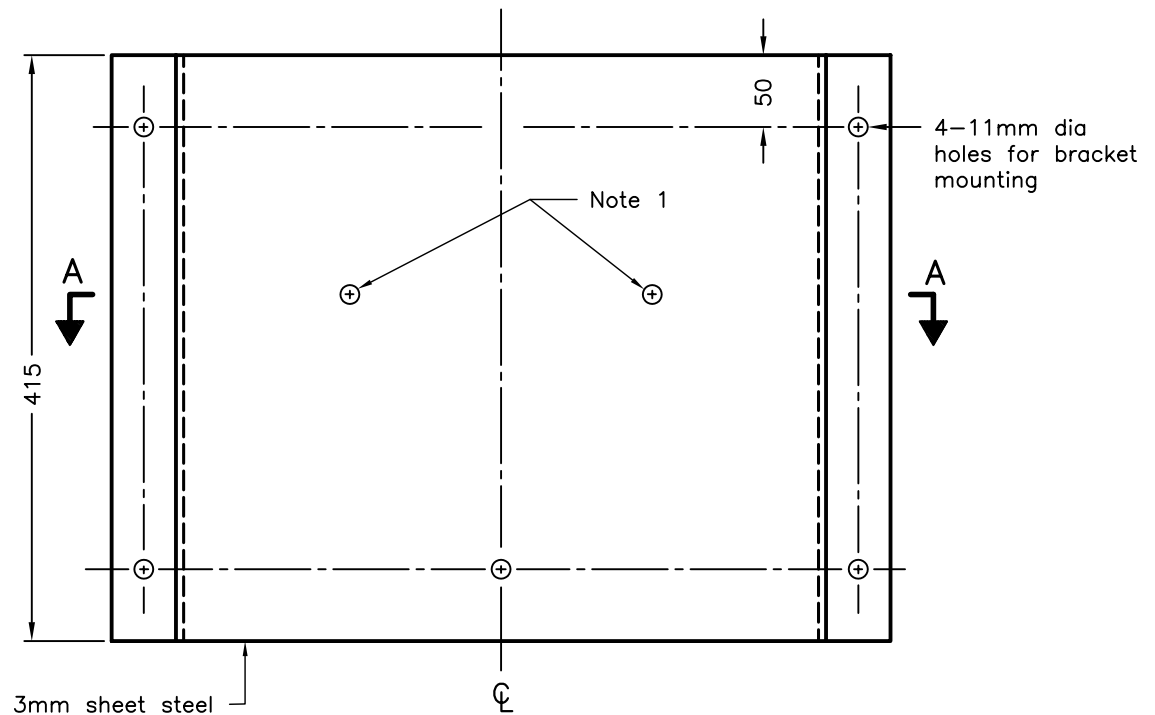
FOR UNDERPASS LUMINAIRE

OPSD - 2310.030





SECTION A-A



FRONT

NOTES:

1 Holes in bracket to suit luminaires mounting holes.

A Bracket shall be galvanized according to CAN/CSA-G164-M92(R1998) after fabrication.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

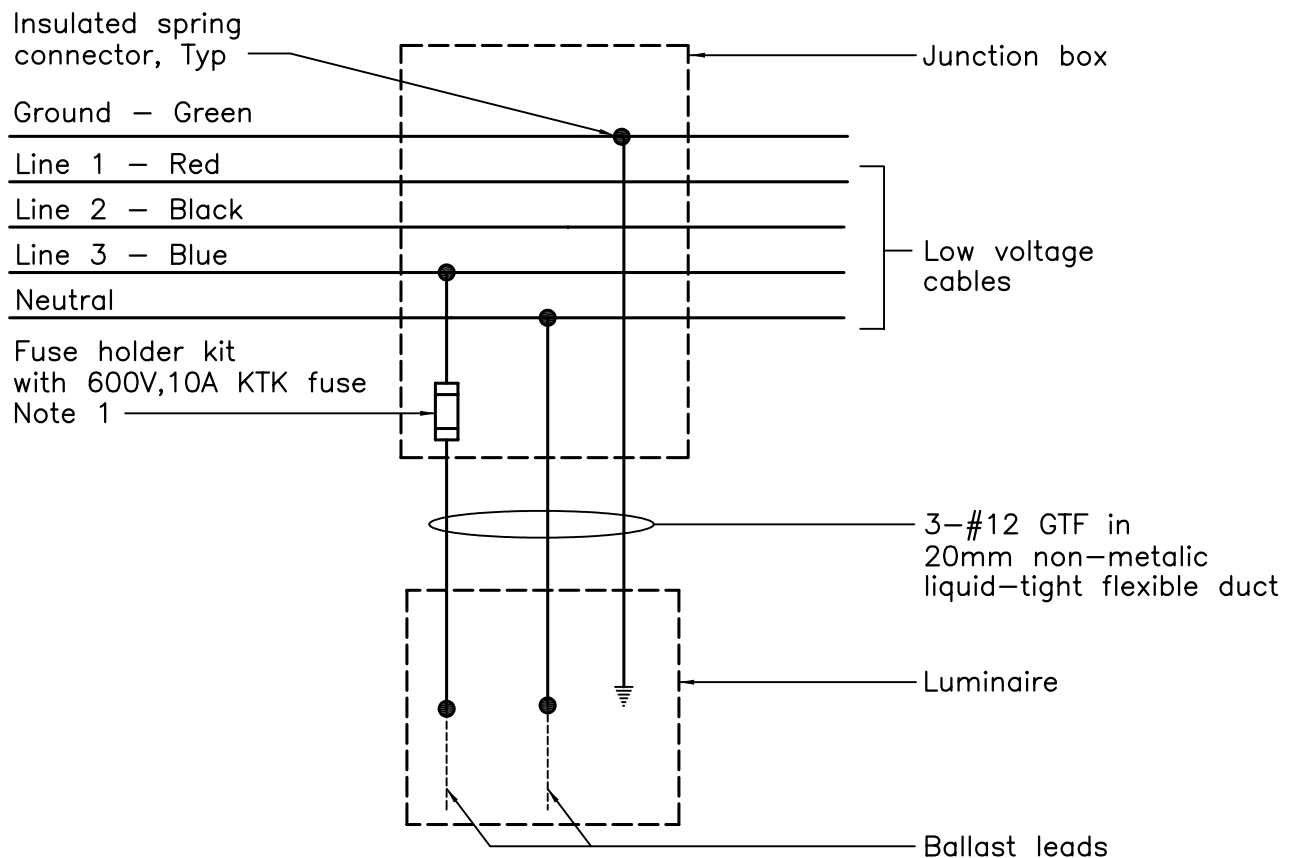
Nov 2001

Rev 0

SUPPORT BRACKET
FOR COLUMN MOUNTED
UNDERPASS LUMINAIRE

OPSD - 2310.040





NOTE:

1 Fuse holder kit may be located inside the luminaire.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2002

Rev 0

**UNDERPASS LUMINAIRE
WIRING DETAIL**

OPSD - 2315.010



- ① Service entrance disconnect with nameplate: SERVICE ENTRANCE DISCONNECT
- ② Metering socket as specified by power supply authority
- ③ Main feed switch, 400A, with nameplate: MAIN FEED SWITCH
- ④ Main splitter, 400A
- ⑤ Combination panelboard, 347/600V, 225A, for Advanced Traffic Management Systems, with nameplate: 347/600V ATMS PANEL
- ⑥ Relamp switch with nameplate: RELAMP SWITCH
- ⑦ Lighting system disconnect with nameplate: 347/600V LIGHTING DISCONNECT
- ⑧ Lighting contactor with nameplate: LIGHTING CONTACTOR
- ⑨ Secondary lightning arrestor, thyrite type, 650V, 3-pole
- ⑩ Panelboard, 347/600V, 225A, lighting system, with nameplate: 347/600V LIGHTING PANEL
- ⑪ Utility panel, 120/240V service, with nameplate: 120/240V UTILITY PANEL
- ⑫ Utility disconnect, 600V, with nameplate: 600V UTILITY DISCONNECT
- ⑬ Dry-type transformer, single phase
- ⑭ Light switch with nameplate: CABINET LIGHT SWITCH
- ⑮ Photoelectric controller
- ⑯ Junction box, 150x150x150mm, complete with terminals for photoelectric controller connection. Terminals shall be identified as Neutral, Line, and Load
- ⑰ Enclosed and gasketed luminaire with incandescent lamp and clear glass globe
- ⑱ GFCI receptacle, 125V, 15A
- ⑲ #2/0 AWG ground wire
- ⑳ Copper ground bus
- ㉑ Field control circuit wiring, min #12AWG
- ㉒ ATMS 225A system feed cable
- ㉓ Lighting system feed cable
- ㉔ Service cable
- ㉕ Service transformer primary feeder, #8AWG
- ㉖ Circuit wireway
- ㉗ Control circuit wiring, min #12AWG

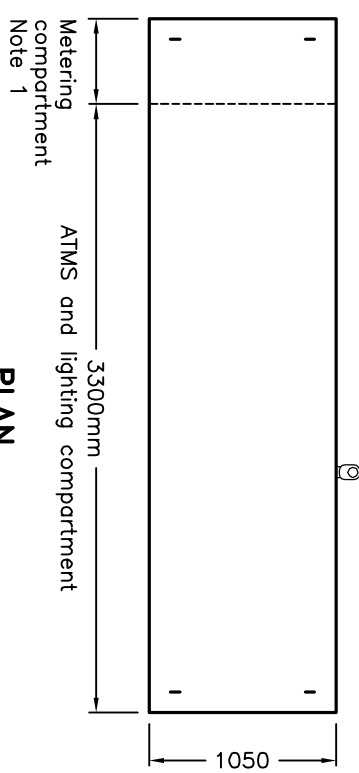
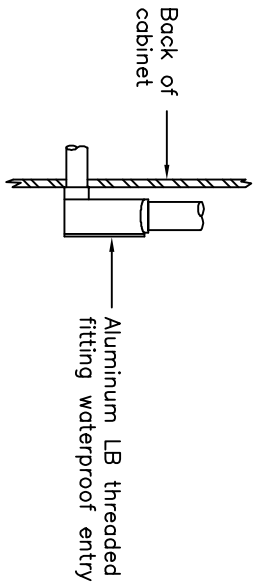
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2013 | Rev | 2

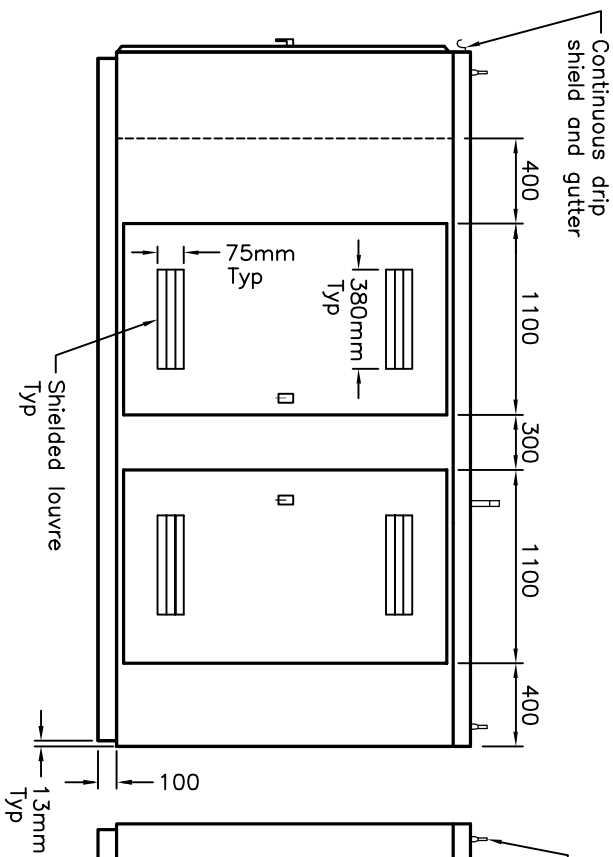
DISTRIBUTION ASSEMBLY LEGEND

OPSD 2400.000





PLAN

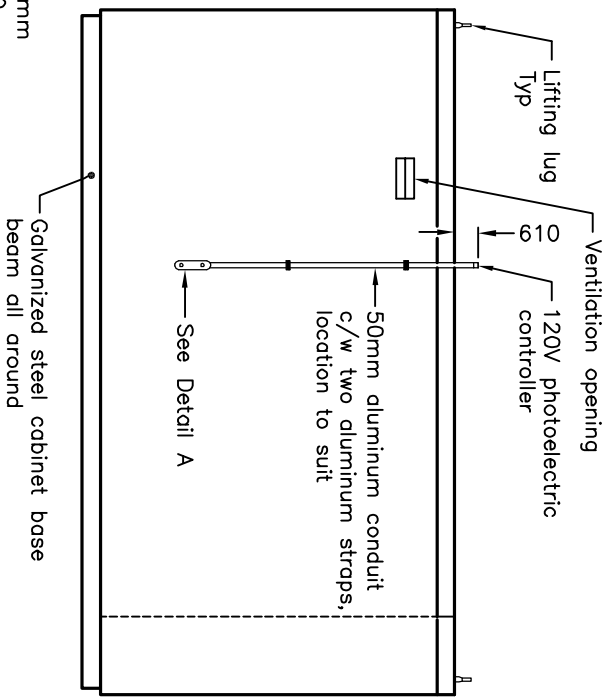


NOTES:

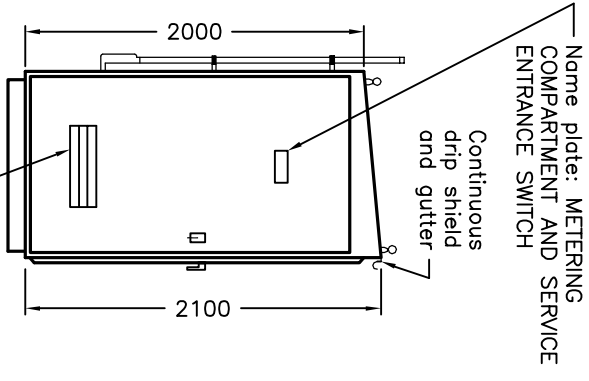
FRONT ELEVATION

- 1 Metering compartment as specified by power supply authority. Metering compartment may be a separate stand-alone enclosure.
- A This OPSD to be read in conjunction with OPSD 2400.000 and 2400.020.
- B All wiring shall be run in conduit or metal wireway between items of equipment.
- C All dimensions are in millimetres unless otherwise shown.

DETAIL A



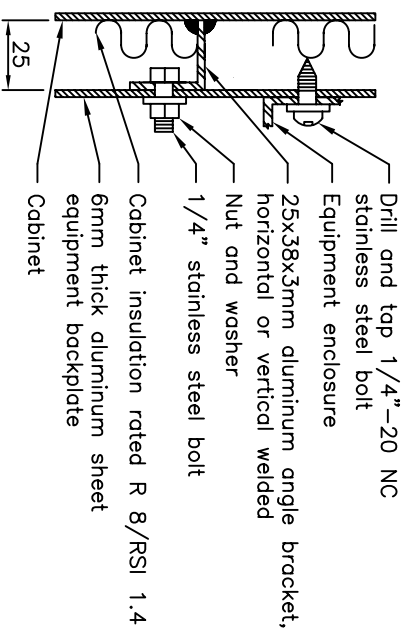
REAR ELEVATION



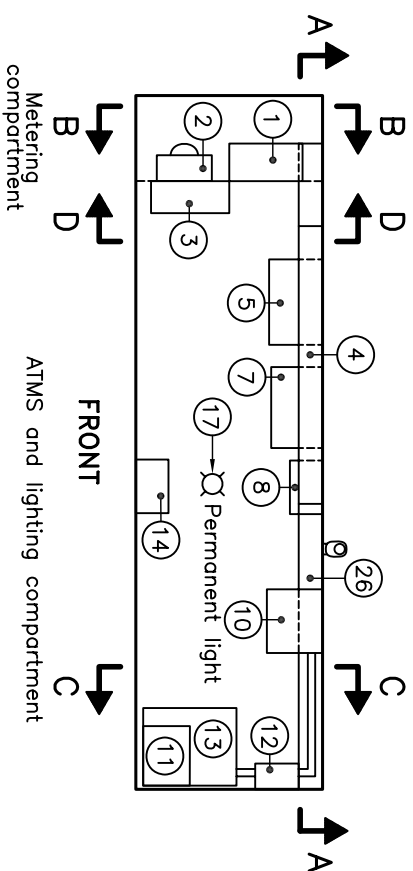
SIDE ELEVATION

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2010	Rev 2
DISTRIBUTION ASSEMBLY		OPSD 2400.010	
		CABINET	

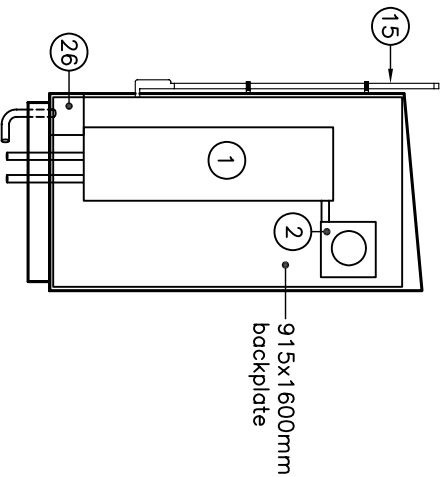




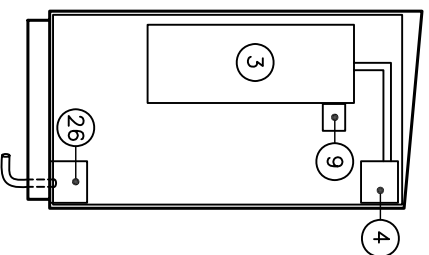
EQUIPMENT MOUNTING DETAIL



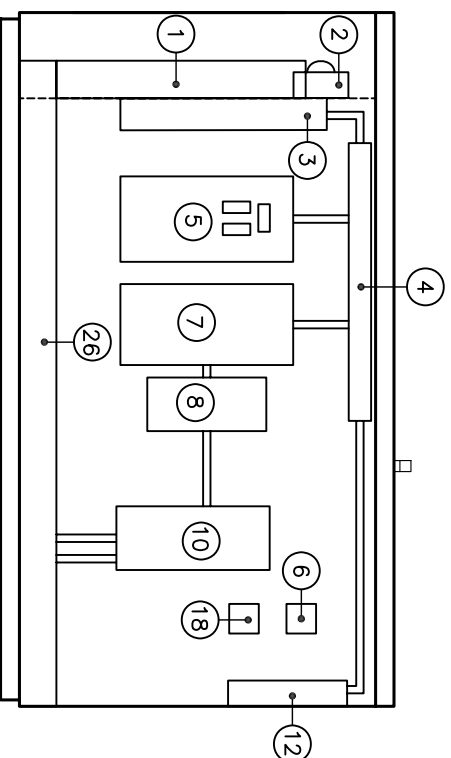
PLAN



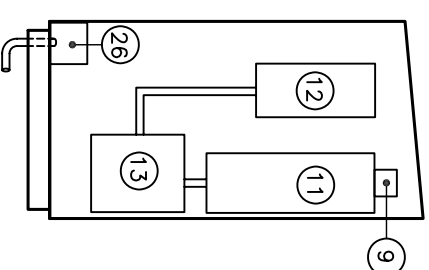
SECTION B-B



SECTION D-D



SECTION A-A



SECTION C-C

NOTES:

A This OPSD to be read in conjunction with OPSD 2400.000 and 2400.010.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

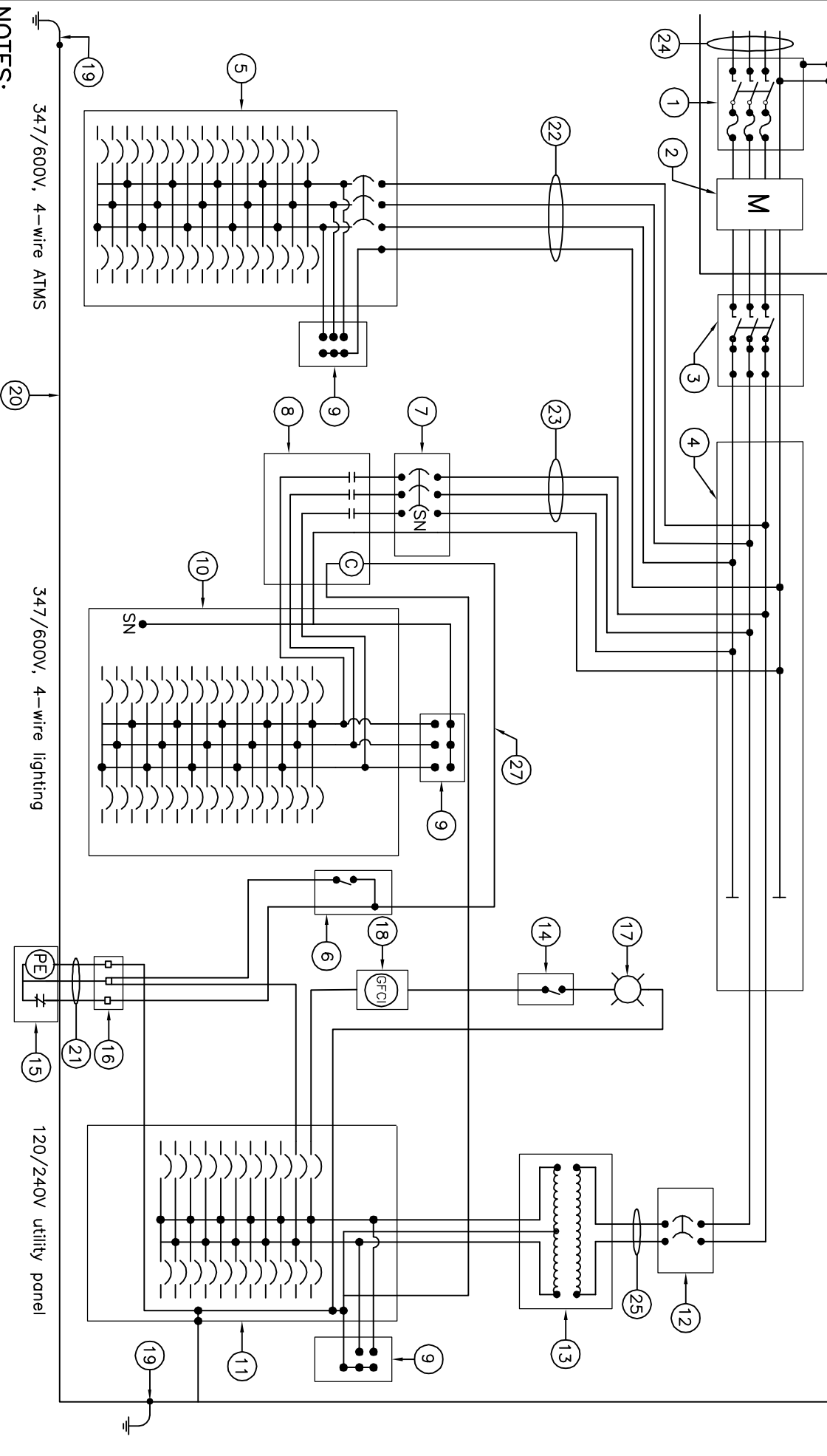
DISTRIBUTION ASSEMBLY

EQUIPMENT LAYOUT

Nov 2008 Rev 1



OPSD 2400.020



NOTES:

- 1 Power supply authority shall provide current taps and voltage transformers for metering during construction.
- A Size dependent equipment rating as specified.
- B This OPSP shall be read in conjunction with OPSP 2400.000.
- C All dimensions are in millimetres unless otherwise shown.

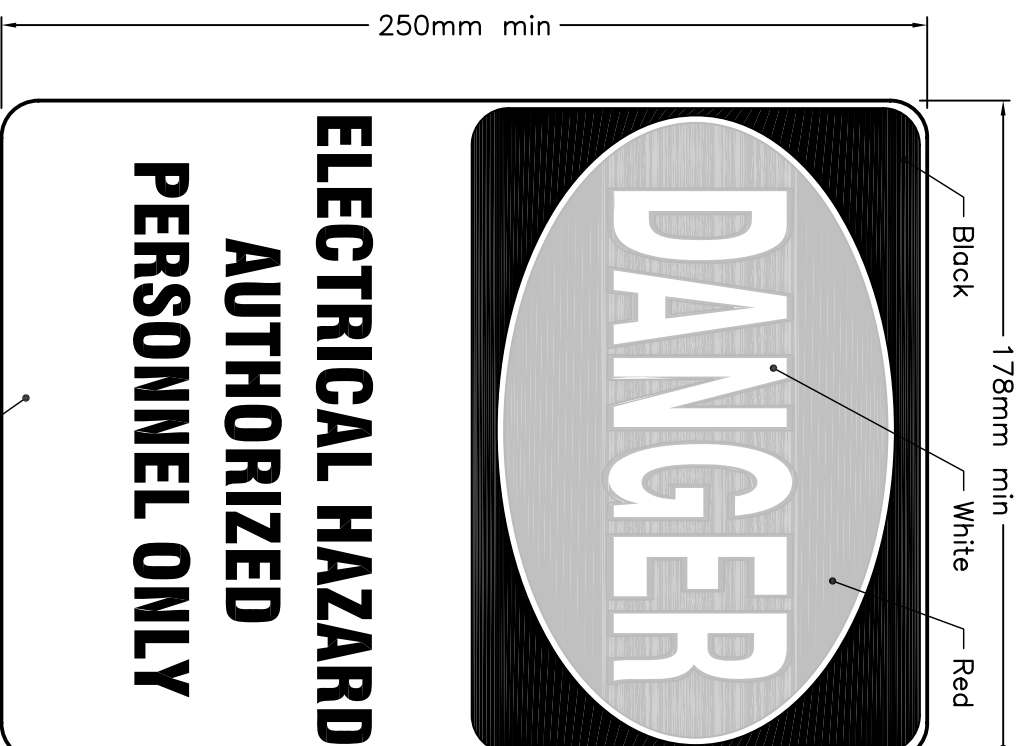
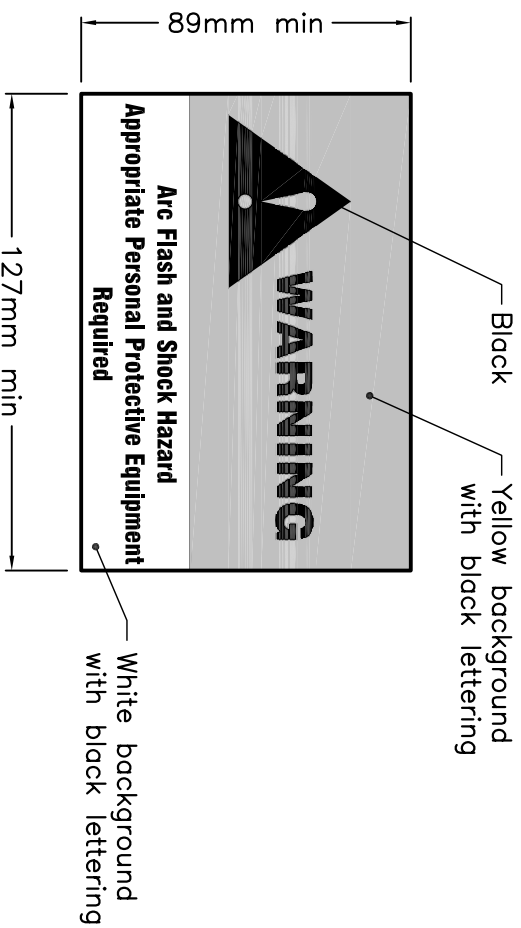
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2013 Rev 2

**DISTRIBUTION ASSEMBLY
WIRING SCHEMATIC**

OPSP 2400.030

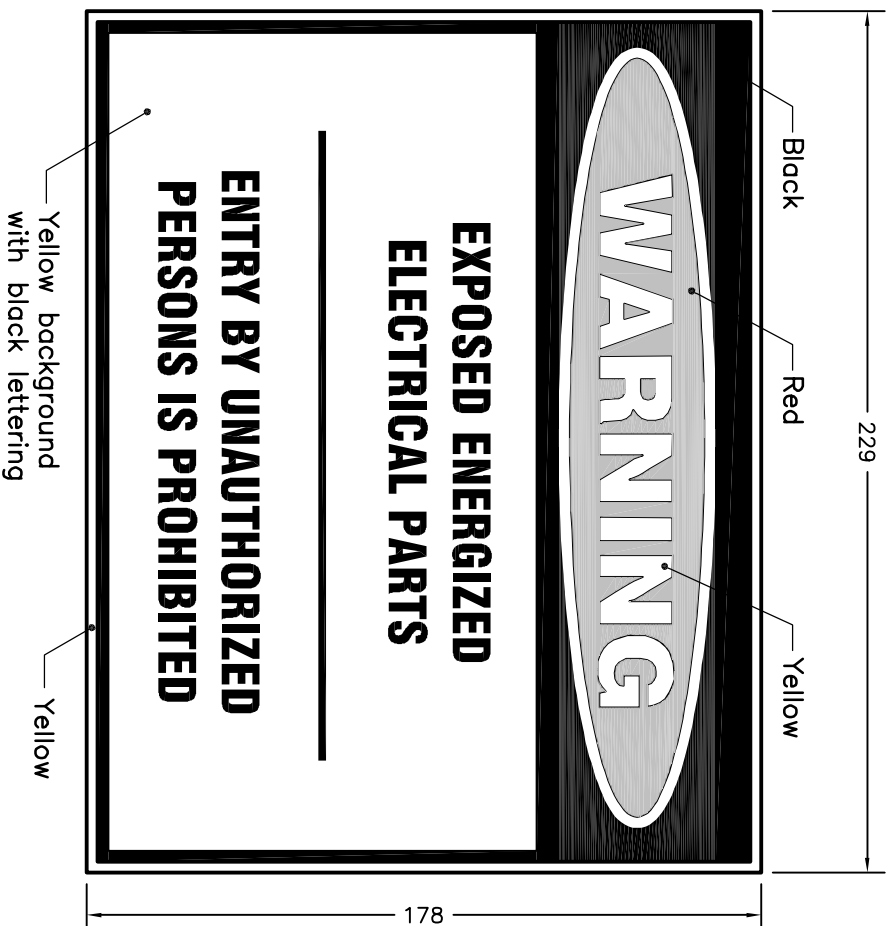
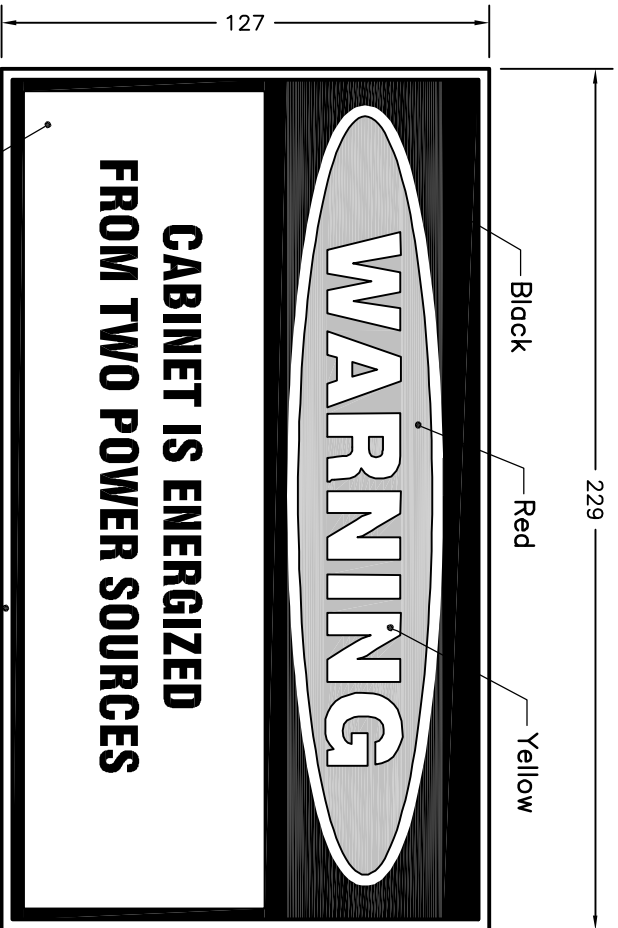




NOTES:

- A Signs shall be fabricated with permanent and weatherproof material.
- B All dimensions are in millimetres unless otherwise shown.

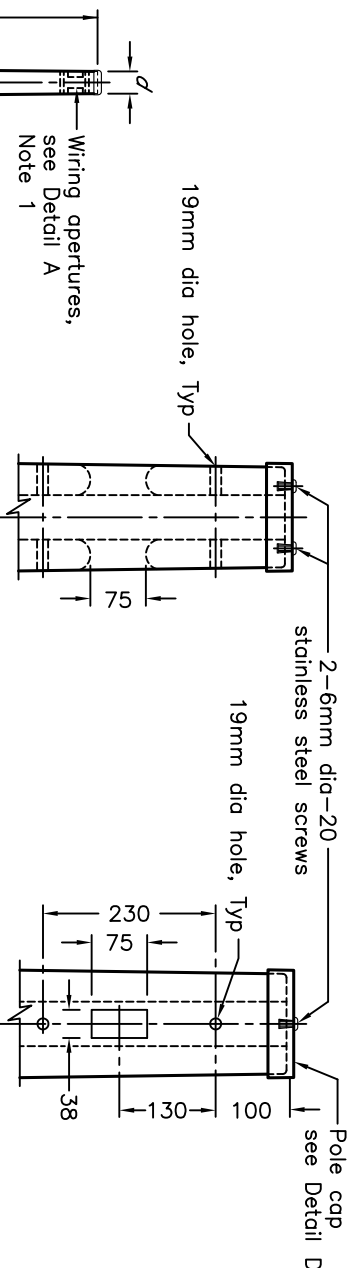
ONTARIO PROVINCIAL STANDARD DRAWING			Nov 2008		Rev	0	
WARNING SIGNS FOR ELECTRICAL EQUIPMENT			-----		-----	-----	
OPSD 2400.100							



NOTES:

- A Signs shall be fabricated with permanent and weatherproof material.
- B All dimensions are in millimetres unless otherwise shown.

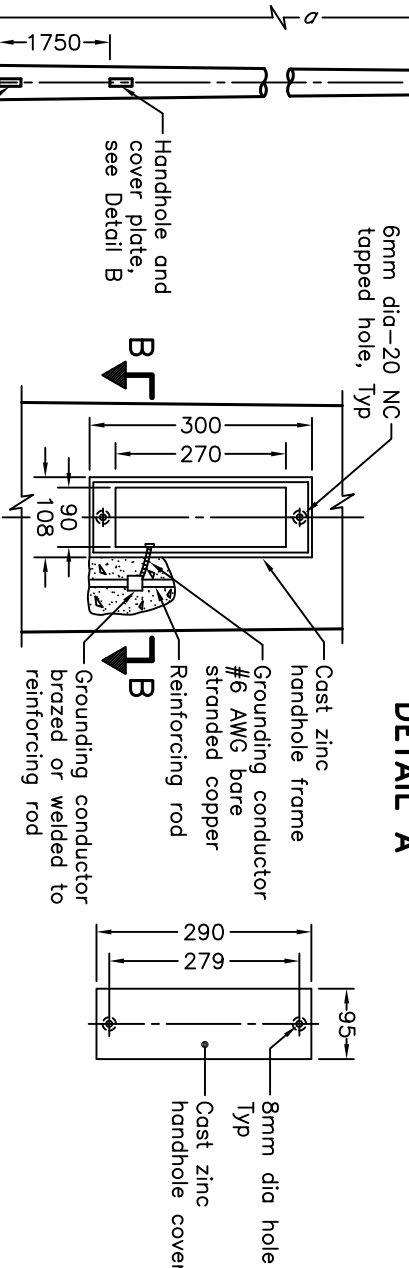
ONTARIO PROVINCIAL STANDARD DRAWING			Nov 2010	Rev	0	
WARNING SIGNS OUTSIDE ELECTRICAL EQUIPMENT			----- ----- -----			
						OPSD 2400.101



FRONT VIEW

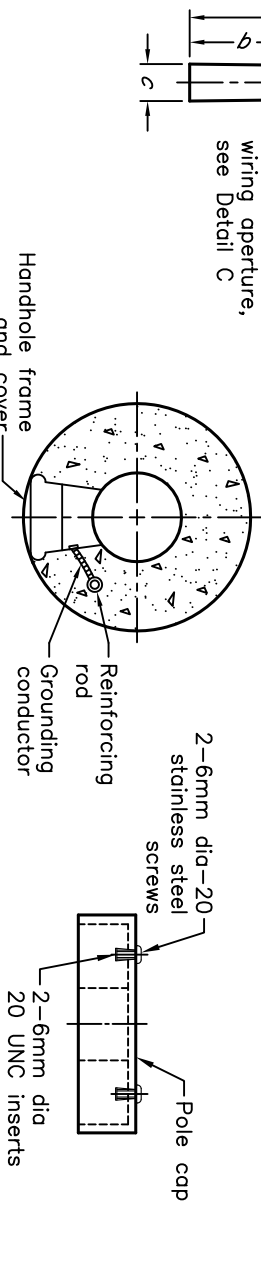
SIDE VIEW

POLE FABRICATION DATA				
Pole Length d' m	Aperture Location b mm	Bottom Diameter c mm	Top Diameter d' mm	
9.0	1150	290	165	
10.7	1150	312	165	
12.5	1500	338	165	
14.0	1500	373	165	
15.8	1750	401	165	
18.3	2670	439	165	
21.3	2670	485	165	



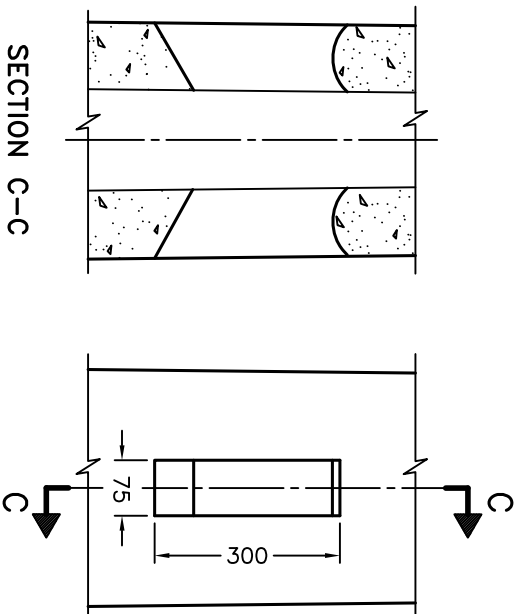
DETAIL A

DETAIL B



SECTION B-B

DETAIL D



SECTION C-C

DETAIL C

NOTES:

- 1 Wiring apertures not used shall be covered with a stainless steel or aluminum plate.
- A All dimensions are in millimetres unless otherwise shown.

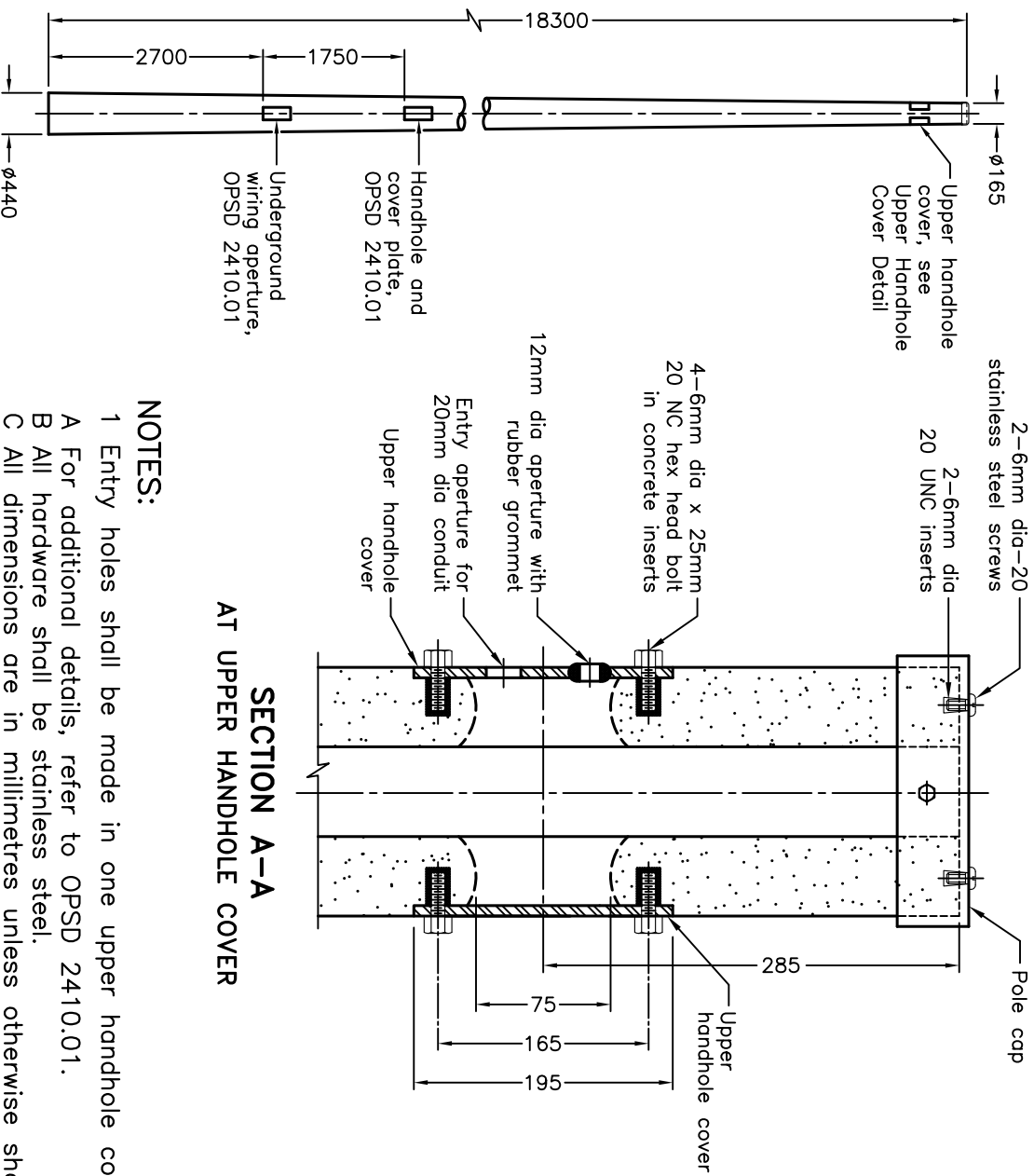
ONTARIO PROVINCIAL STANDARD DRAWING

SPUN CONCRETE POLE

Nov 2012 Rev 3

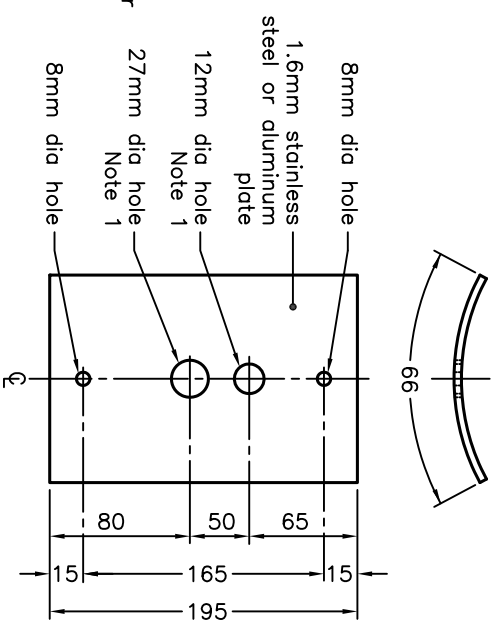
OPSD 2410.01



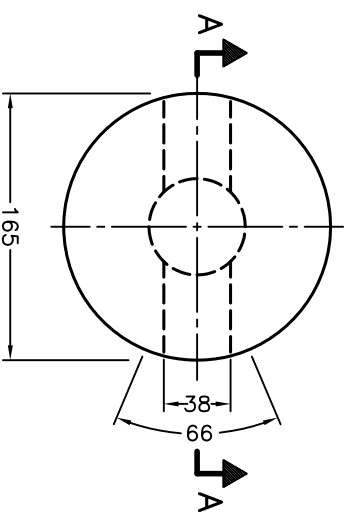


ELEVATION

SECTION A-A AT UPPER HANDHOLE COVER



UPPER HANDHOLE COVER DETAIL



POLE TOP DETAIL

- NOTES:**
- 1 Entry holes shall be made in one upper handhole cover only.
 - A For additional details, refer to OPSD 2410.01.
 - B All hardware shall be stainless steel.
 - C All dimensions are in millimetres unless otherwise shown.

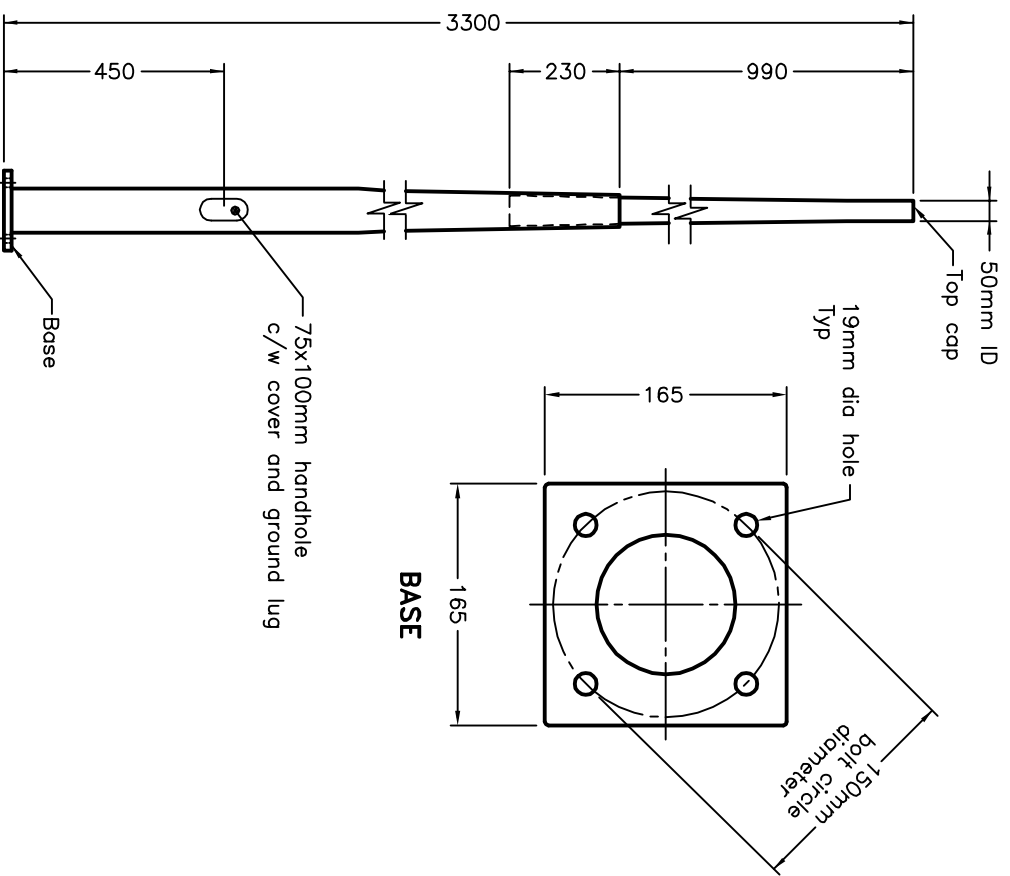
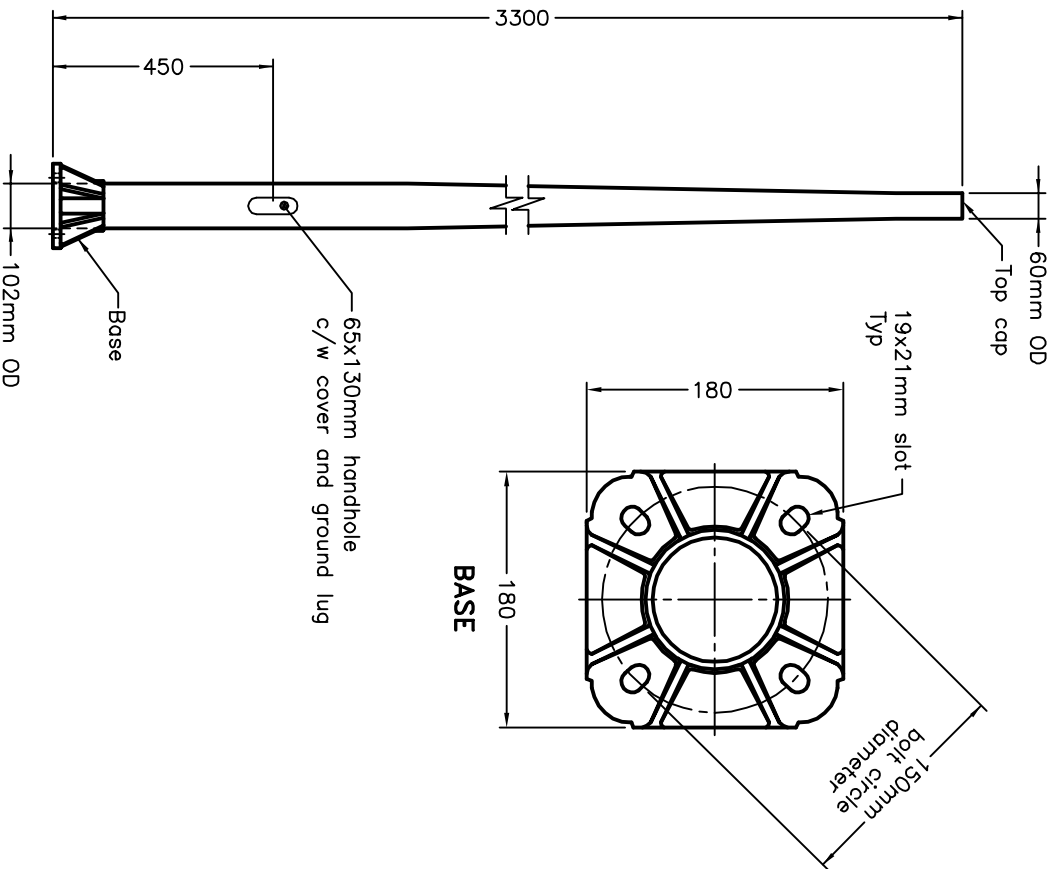
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2012 Rev 0

18.3m SPUN CONCRETE POLE FOR TV CAMERA MOUNTING

OPSD 2410.020





ALUMINUM POLE

SECTIONAL STEEL POLE

NOTES:

- A This OPSP shall be read in conjunction with OPSP 2200.04.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

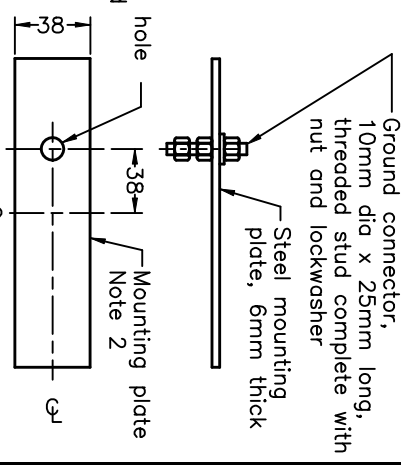
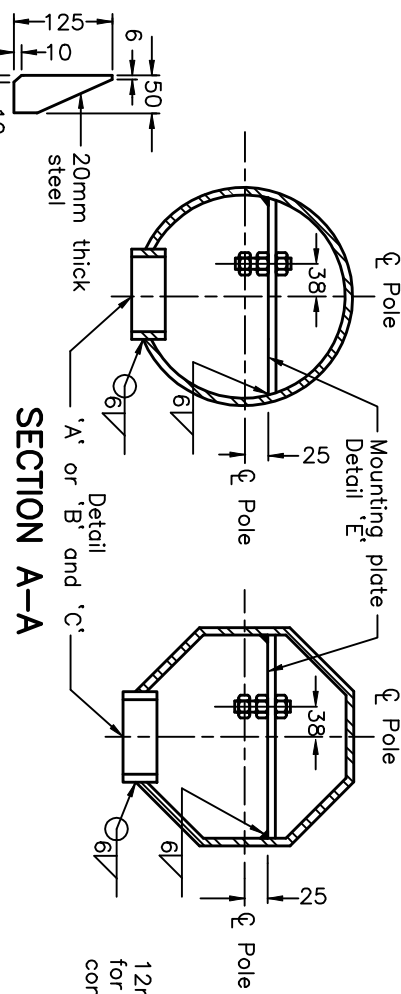
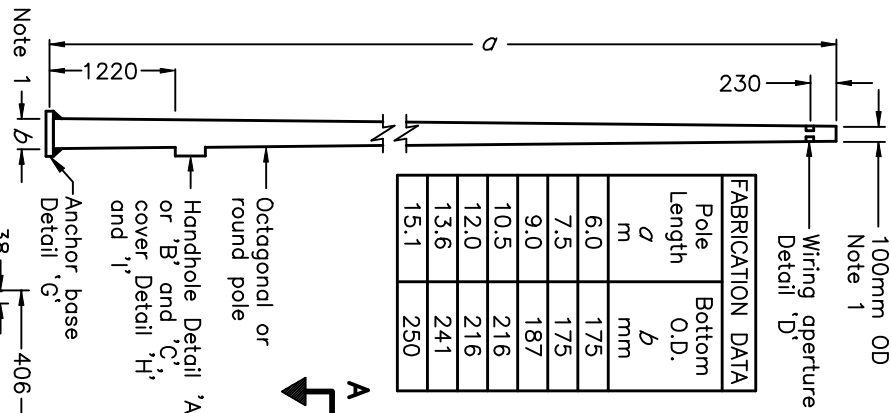
Nov 2015 Rev 0

3.3m ALUMINUM AND SECTIONAL
STEEL POLES, BASE MOUNTED

OPSP 2414.010

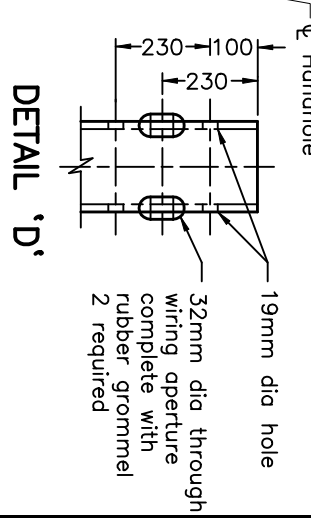
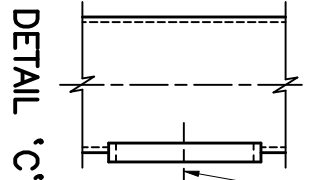
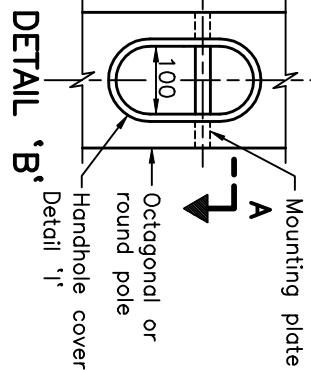
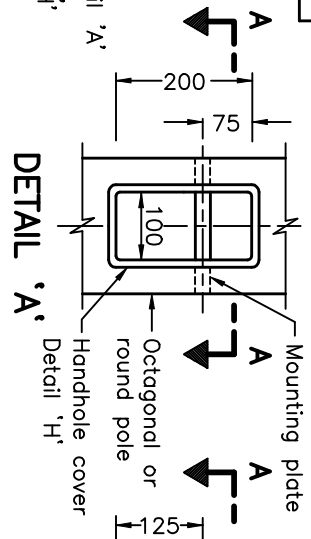


FABRICATION DATA	
Pole Length <i>a</i> m	Bottom O.D. <i>b</i> mm
6.0	175
7.5	175
9.0	187
10.5	216
12.0	216
13.6	241
15.1	250



DETAIL 'F'

DETAIL 'E'

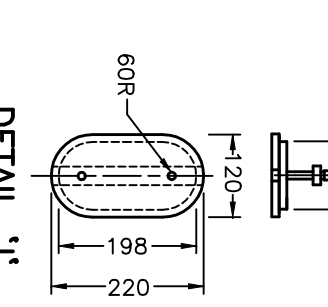
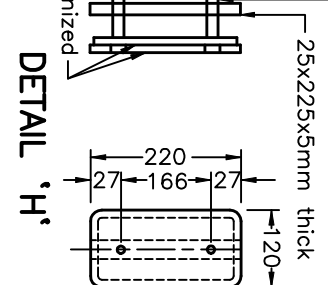
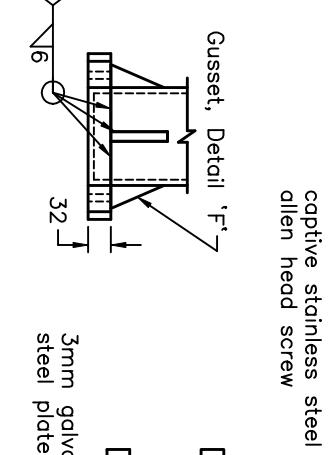
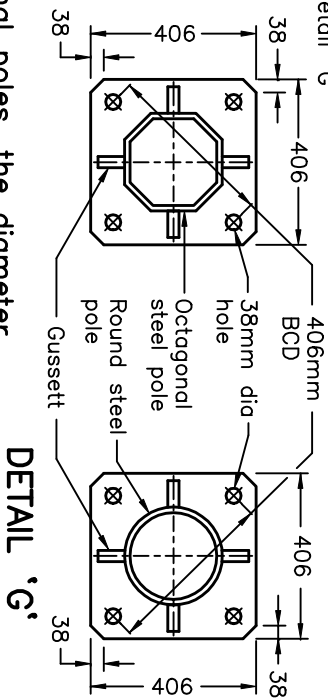


DETAIL 'A'

DETAIL 'B'

DETAIL 'C'

DETAIL 'D'



DETAIL 'G'

DETAIL 'H'

DETAIL 'I'

NOTES:

- 1 For octagonal poles, the diameter shall be measured across the flats
- 2 Centre line of mounting plate, and ground connector to be 25mm above centre of handhole.
- A All shafts shall be 4.5mm steel.
- B All dimensions are in millimetres or metres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

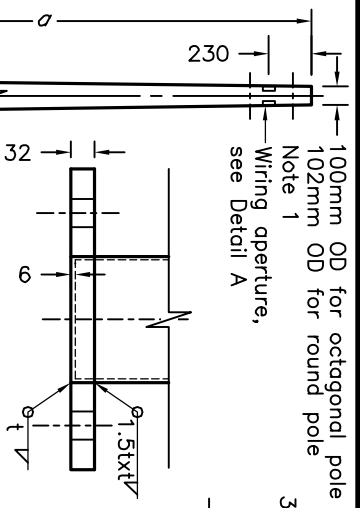
1993 12 15 Rev

STEEL POLE
BASE MOUNTING

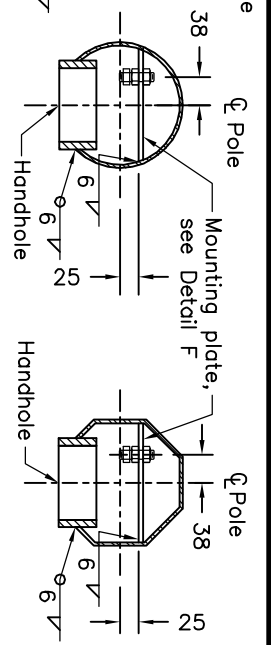
Date

OPSD - 2415.010

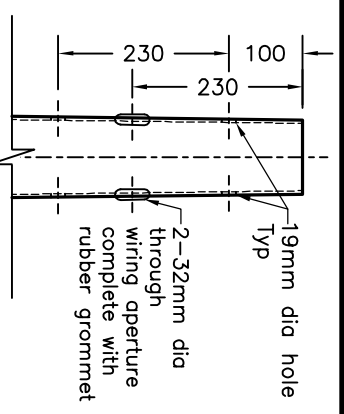




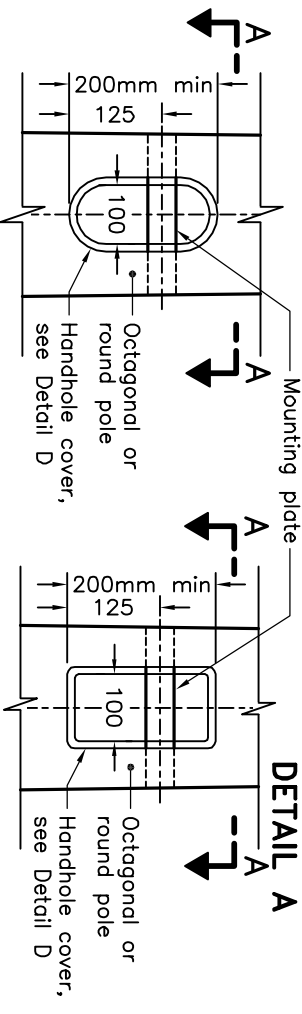
SECTION B-B



SECTION A-A

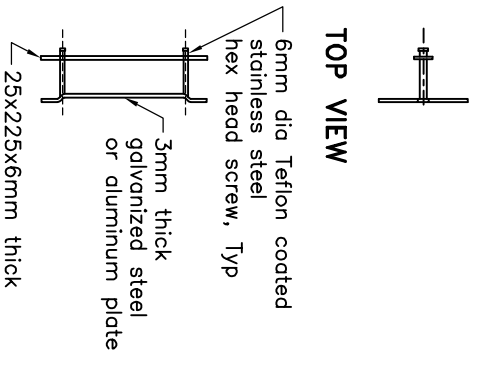


DETAIL A



DETAIL B

DETAIL C



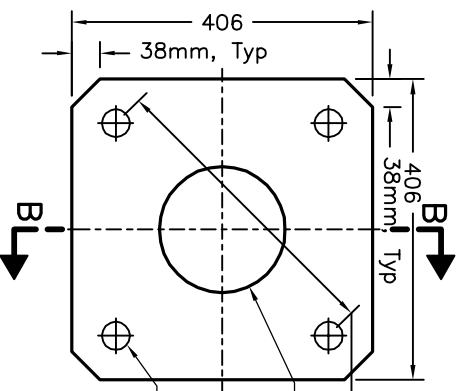
TOP VIEW

**SIDE VIEW
DETAIL D**

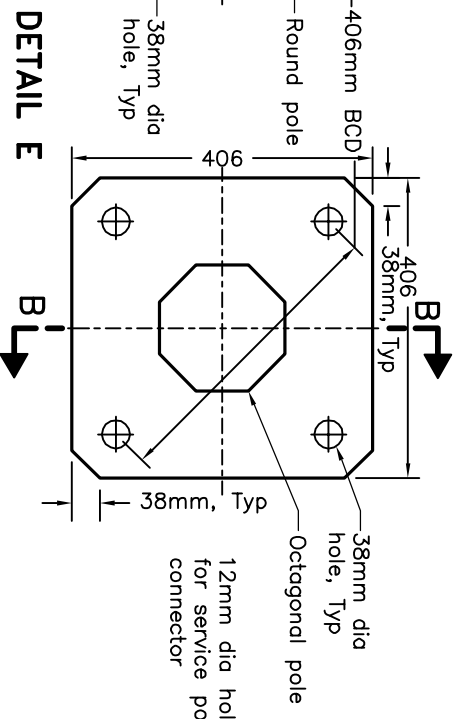
FABRICATION DATA			
Pole Length σ m	Octagonal Bottom OD ϕ	Round Bottom OD ϕ	
6.0	170	170	
7.5	187	187	
9.0	205	205	
10.5	222	222	
12.0	239	242	
13.6	258	260	
15.1	275	278	

NOTES:

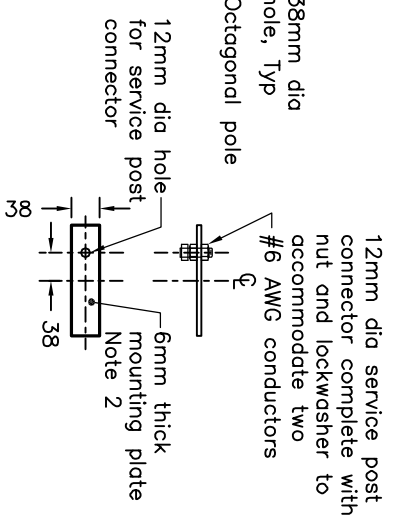
- 1 For octagonal poles, the diameter shall be measured across the flats.
 - 2 Centreline of mounting plate and ground connector shall be 25mm above centreline of handhole.
- A All shafts shall be 4.5mm thick steel.
B All dimensions are in millimetres unless otherwise shown.



DETAIL B



DETAIL E



DETAIL F

ONTARIO PROVINCIAL STANDARD DRAWING

STEEL POLE

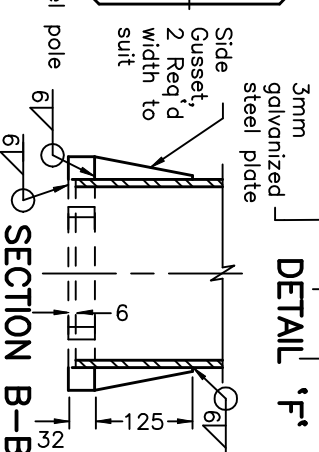
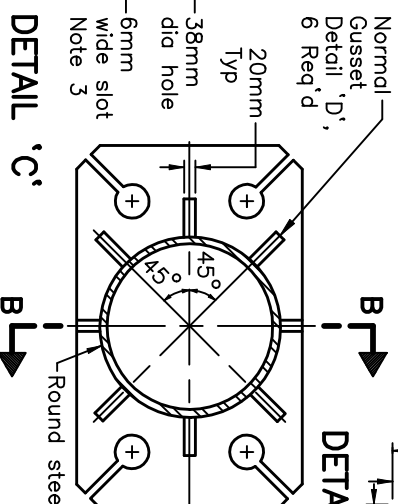
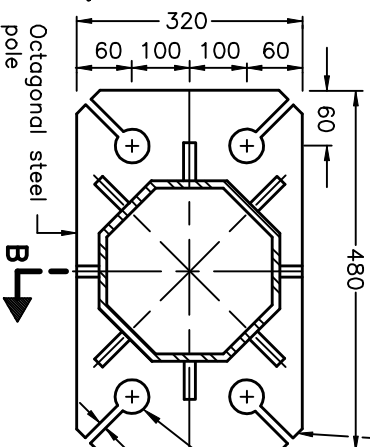
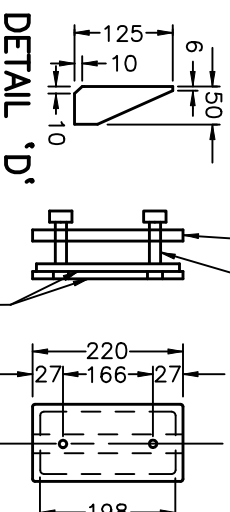
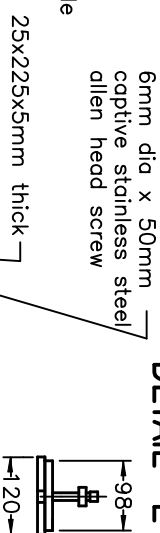
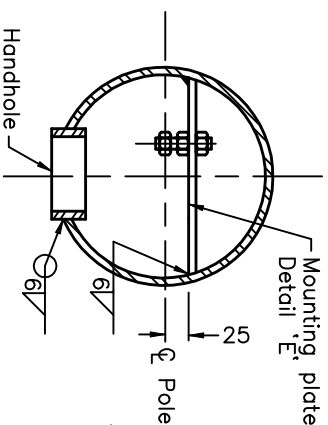
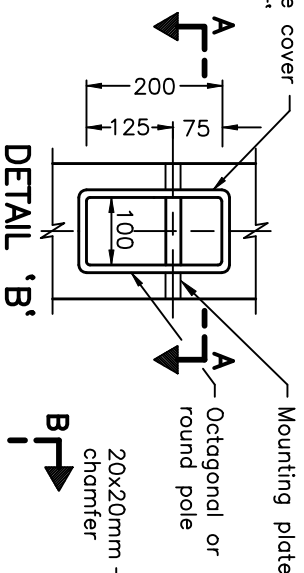
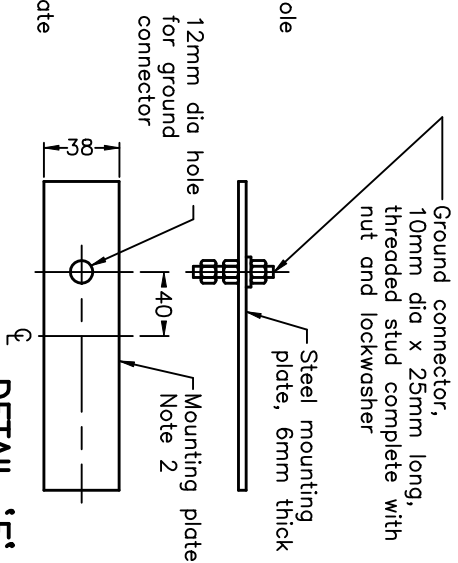
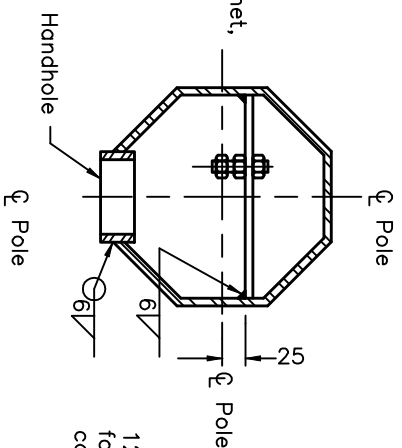
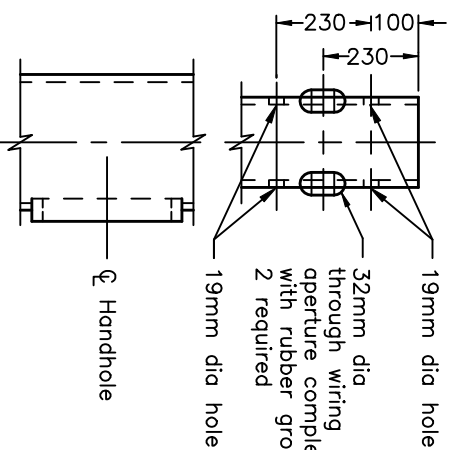
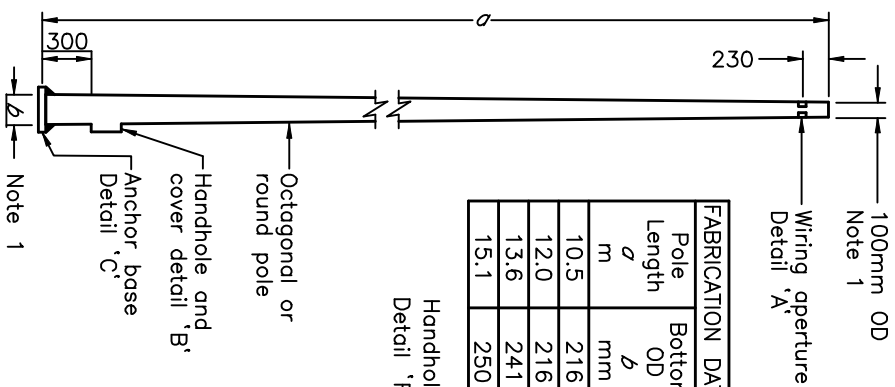
BASE MOUNTED WITHOUT GUSSETS

Nov 2010 Rev 0



OPSD 2415.011

FABRICATION DATA	
Pole Length a m	Bottom OD b mm
10.5	216
12.0	216
13.6	241
15.1	250



NOTES:

- 1 For octagonal poles, the diameter shall be measured across the flats.
- 2 Centre line of mounting plate, and ground connector to be 25mm above centre of handhole.
- 3 6mm slots to bolt holes where required for steel cutting purposes only.
- A All shafts shall be 4.5mm steel.
- B All dimensions are in millimetres or metres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAW

STEEL POLE

CONCRETE BARRIER MOUNTING

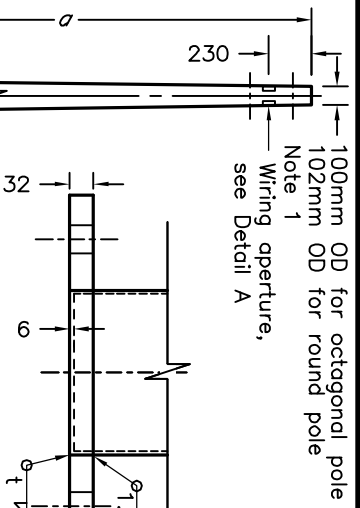
ONTARIO PROVINCIAL STANDARD DRAWING

1993 12 15 Rev

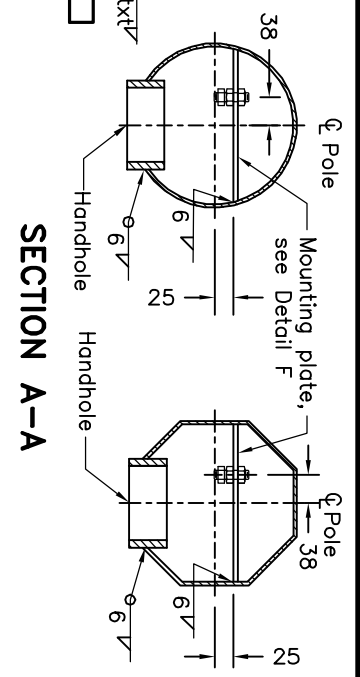
Rev

OPSD – 2416.010

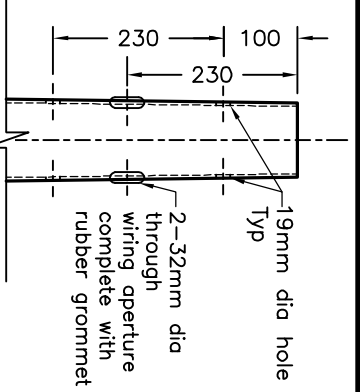




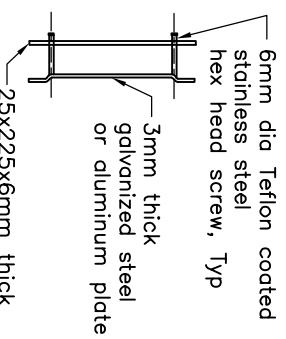
SECTION B-B



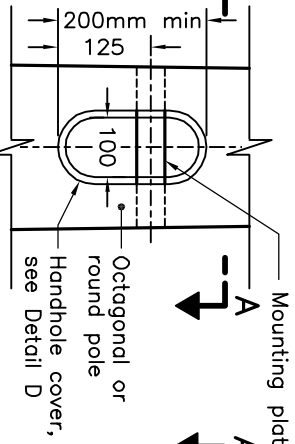
SECTION A-A



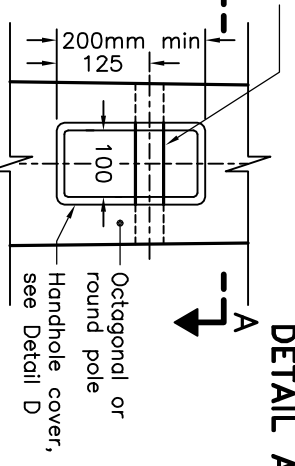
TOP VIEW



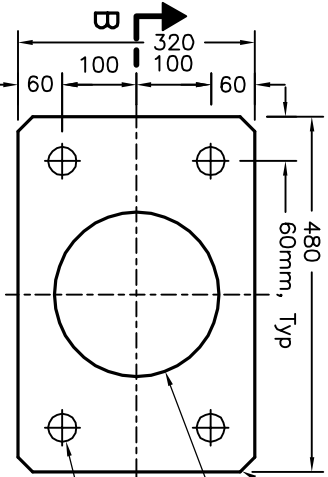
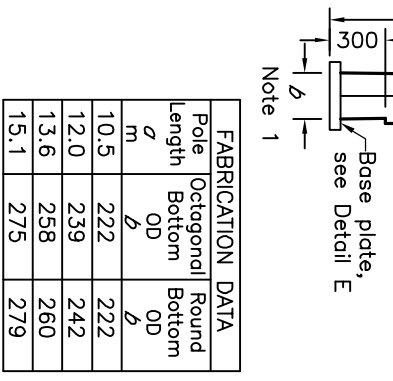
**SIDE VIEW
DETAIL D**



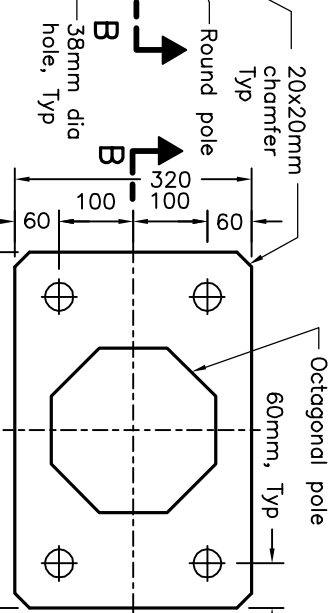
DETAIL B



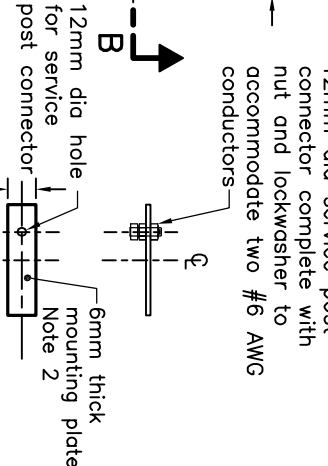
DETAIL C



DETAIL E



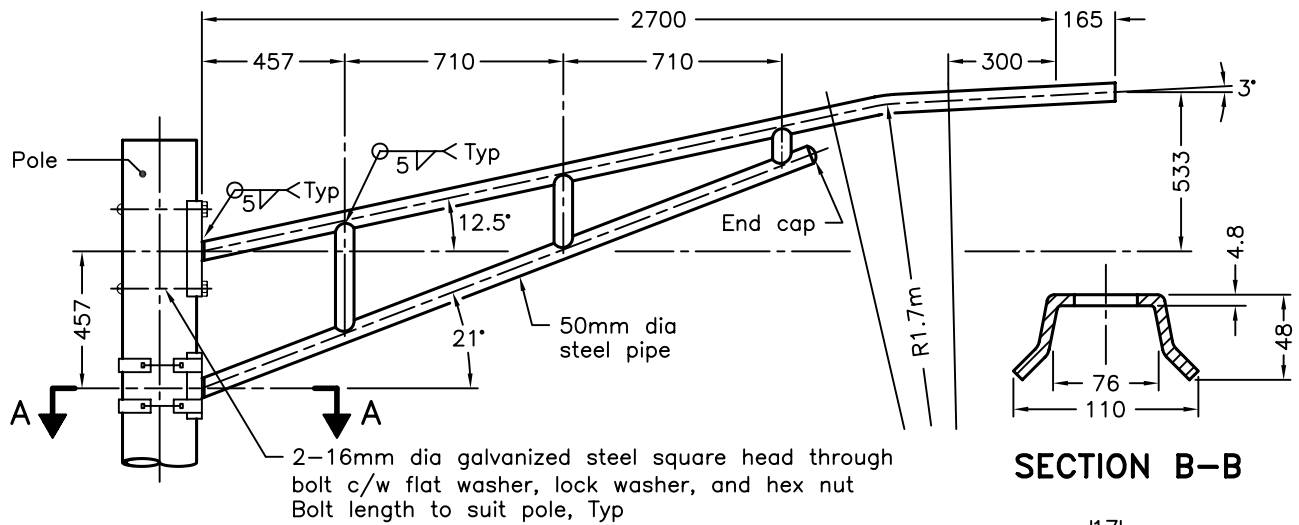
DETAIL F



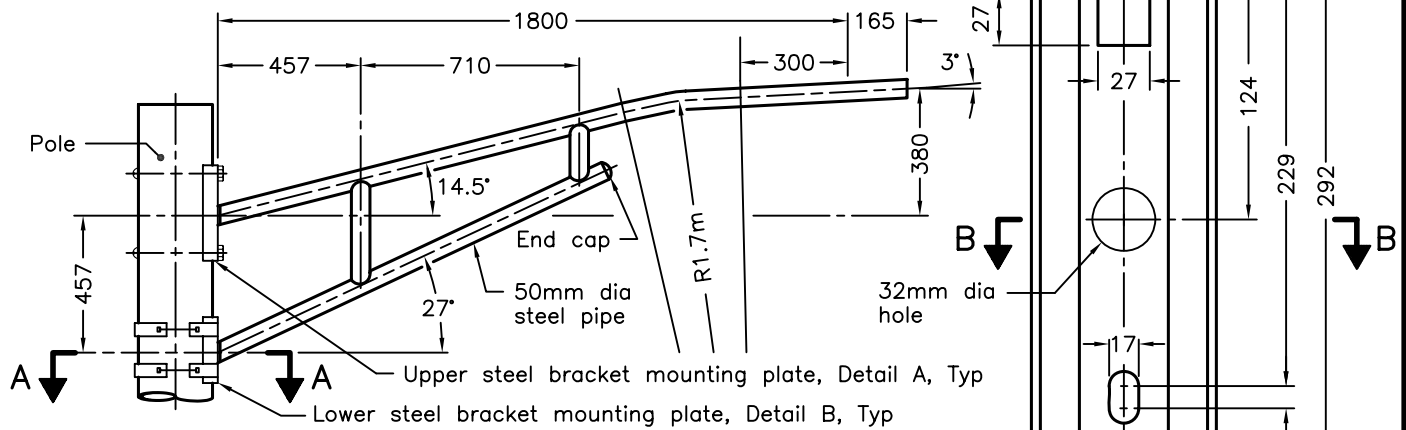
FABRICATION DATA			
Pole length	Octagonal Bottom OD	Round Bottom OD	
m	ϕ	ϕ	
10.5	222	222	
12.0	239	242	
13.6	258	260	
15.1	275	279	

NOTES:

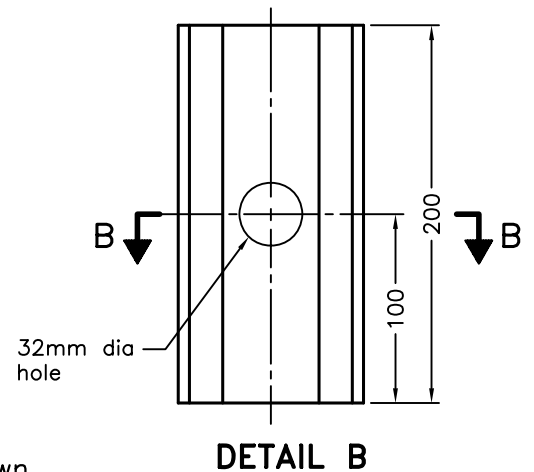
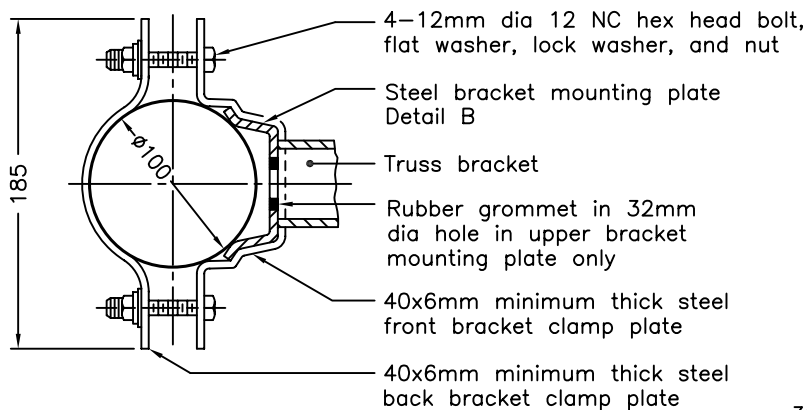
- For octagonal poles, the diameter shall be measured across the flats.
- Centreline of mounting plate and ground connector shall be 25mm above centreline of handhole.
- All shafts shall be 4.5mm thick steel.
- All dimensions are in millimetres unless otherwise shown.



2.7m STEEL TRUSS BRACKET



1.8m STEEL TRUSS BRACKET



NOTE:

A All dimensions are in millimetres unless otherwise shown.

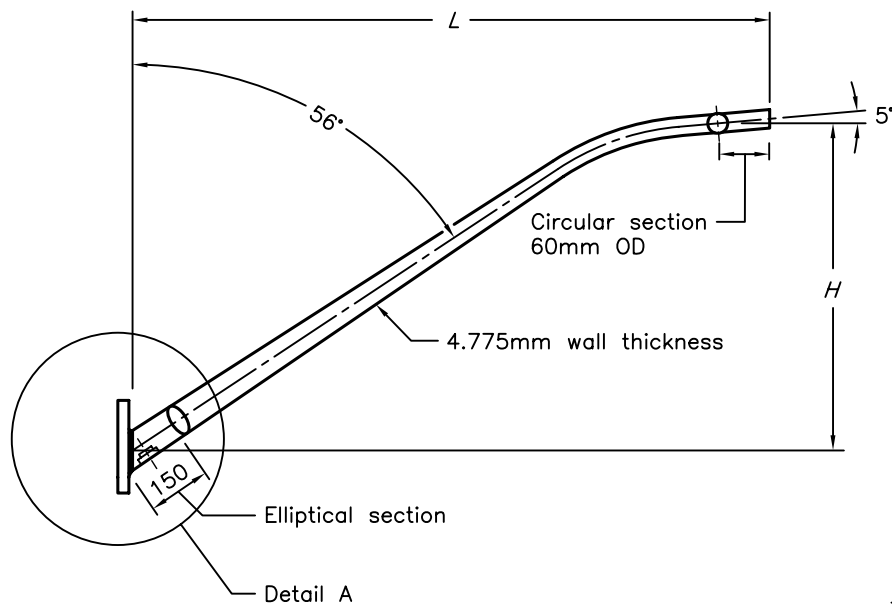
ONTARIO PROVINCIAL STANDARD DRAWING

April 2007 Rev 1

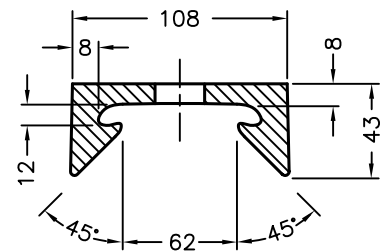
**1.8m AND 2.7m
STEEL TRUSS BRACKET
FOR STEEL POLES**

OPSD 2418.010

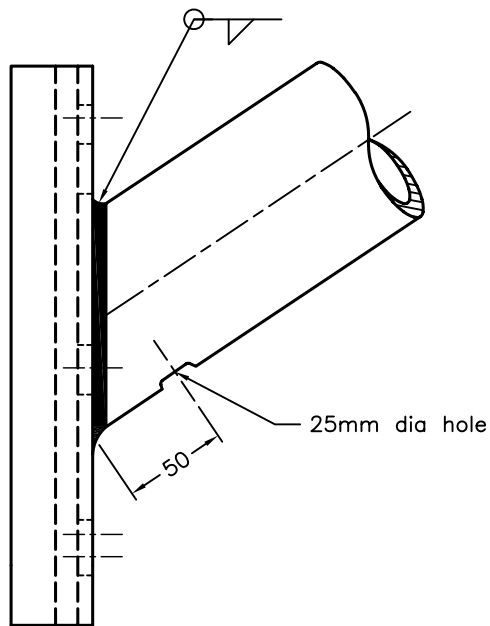




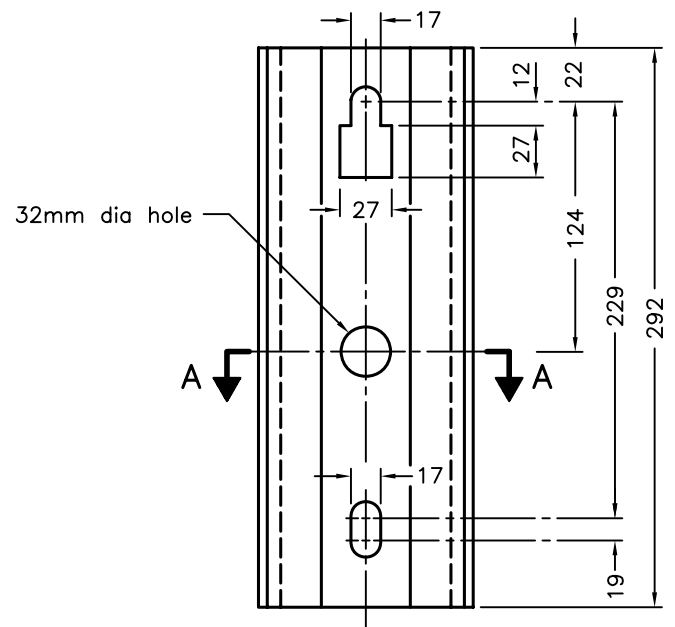
DIMENSION	BRACKET	
	1.8m	2.4m
L	1.8m	2.4m
H	0.9m	1.2m
Elliptical Section	64x108 mm OD	70x125 mm OD



SECTION A-A



DETAIL A



BRACKET BASE PLATE

NOTES:

A For mounting details, see OPSD 2250.01.

B All dimensions are in millimetres unless otherwise shown.

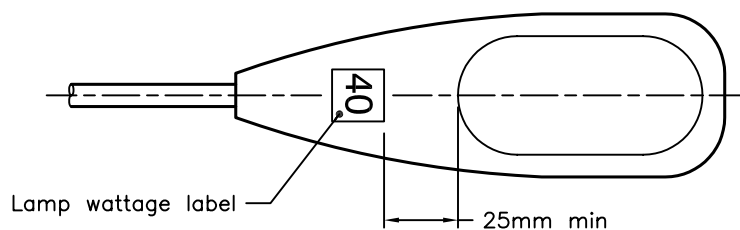
ONTARIO PROVINCIAL STANDARD DRAWING

April 2007 Rev 4

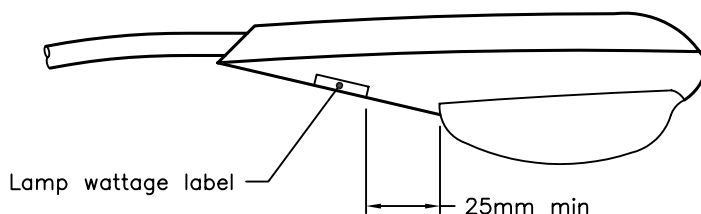
1.8m AND 2.4m ALUMINUM
TAPERED ELLIPTICAL BRACKET



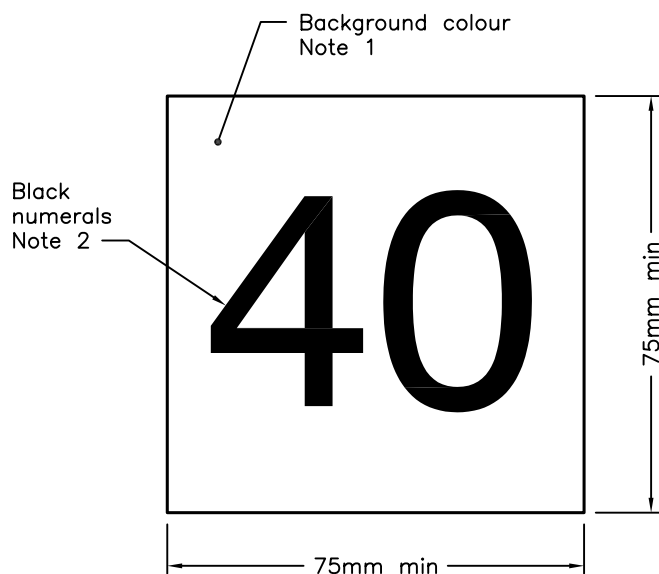
OPSD 2420.01



BOTTOM VIEW



SIDE VIEW



LABEL DIMENSIONS

TYPICAL LAMP WATTAGE CODES	
IDENTIFYING NUMERAL	LAMP WATTAGE
7	70 W
10	100 W
15	150 W
25	250 W
35	350 W
40	400 W

NOTES:

- 1 A gold background shall be used for high pressure sodium and fluorescent red background for the metal halide labels. Labels shall be made using high visibility reflective sheeting.
- 2 All numerals on the labels shall be black and made from 9mm wide line and numerals shall be minimum of 50mm high.
- A Do not cover manufacturer's label.
- B Labels shall be the peel and stick type.
- C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

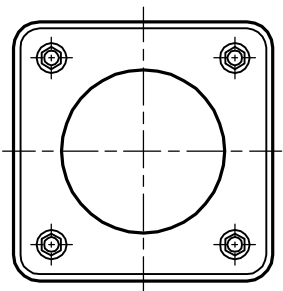
Nov 2005

Rev 0

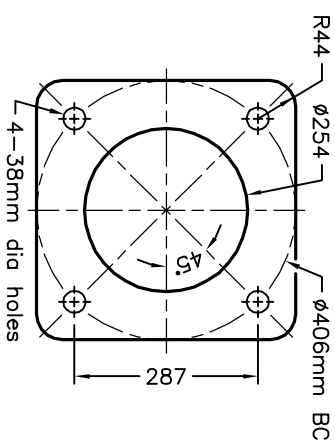
**LAMP WATTAGE LABEL
FOR LUMINAIRE**

OPSD – 2421.010

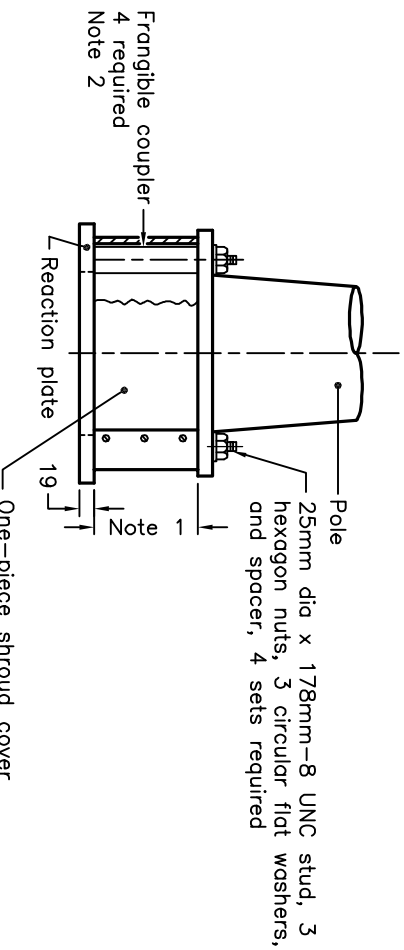




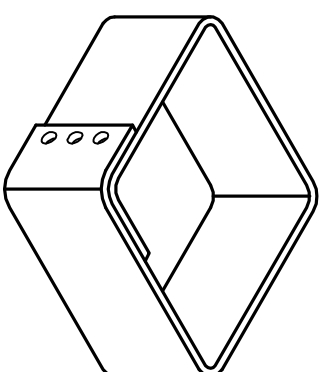
TOP VIEW



REACTION PLATE DETAIL



FRONT VIEW



ONE-PIECE SHROUD COVER

LEGEND:

BC – Bolt Circle

NOTES:

- 1 Height to suit coupler assembly.
- 2 Frangible couplers as specified.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

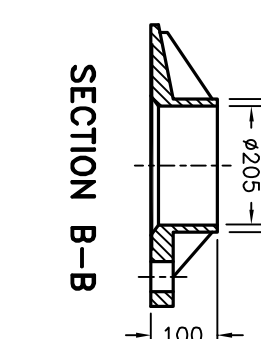
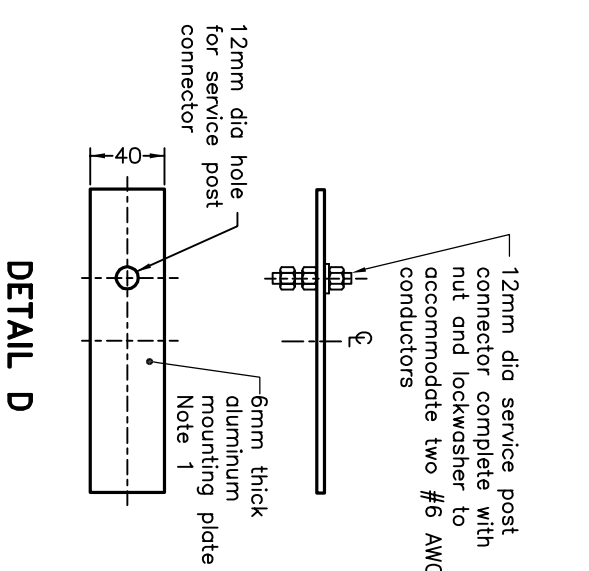
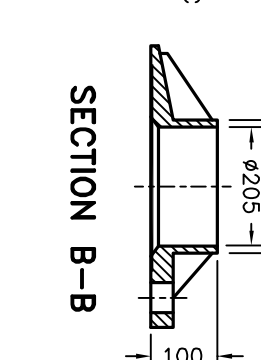
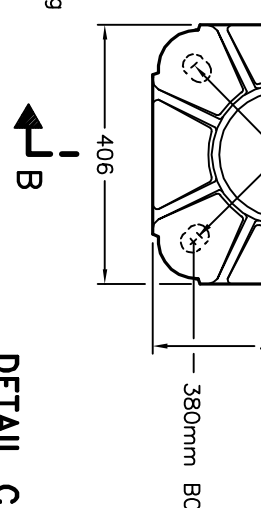
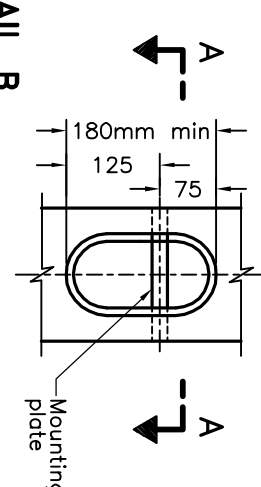
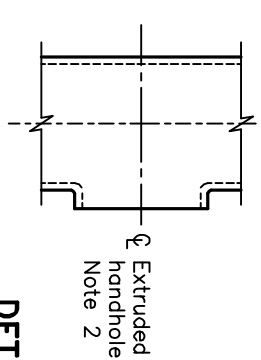
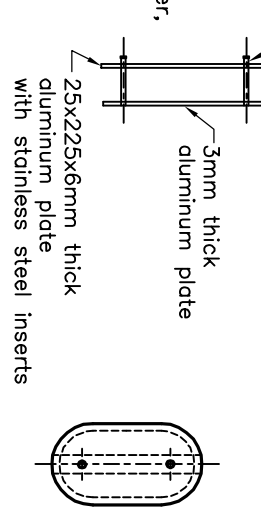
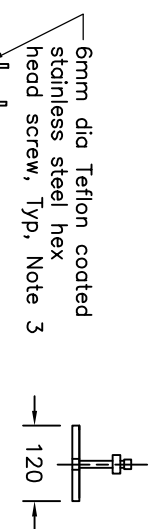
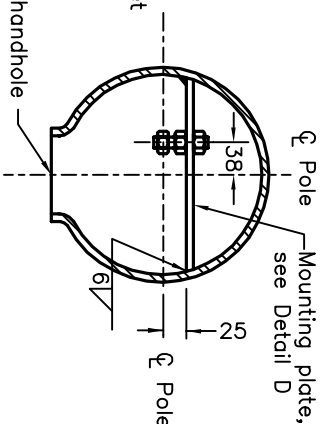
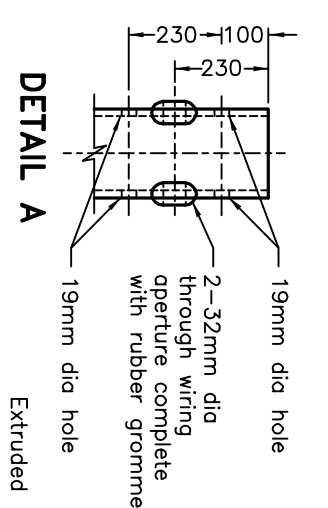
Nov 2010 Rev 3

FRANGIBLE BASES

OPSD 2428.01



125mm OD																	
Wiring aperture, see Detail A																	
230																	
1200																	
Handhole and cover, see Detail B																	
Shoe base, see Detail C																	
FABRICATION DATA <table> <tr> <th>Pole Length <i>a</i></th><th>Bottom OD <i>b</i></th></tr> <tr><td>6.0</td><td>175</td></tr> <tr><td>7.5</td><td>175</td></tr> <tr><td>9.0</td><td>200</td></tr> <tr><td>10.5</td><td>200</td></tr> <tr><td>12.0</td><td>250</td></tr> <tr><td>13.6</td><td>300</td></tr> <tr><td>15.1</td><td>300</td></tr> </table>		Pole Length <i>a</i>	Bottom OD <i>b</i>	6.0	175	7.5	175	9.0	200	10.5	200	12.0	250	13.6	300	15.1	300
Pole Length <i>a</i>	Bottom OD <i>b</i>																
6.0	175																
7.5	175																
9.0	200																
10.5	200																
12.0	250																
13.6	300																
15.1	300																



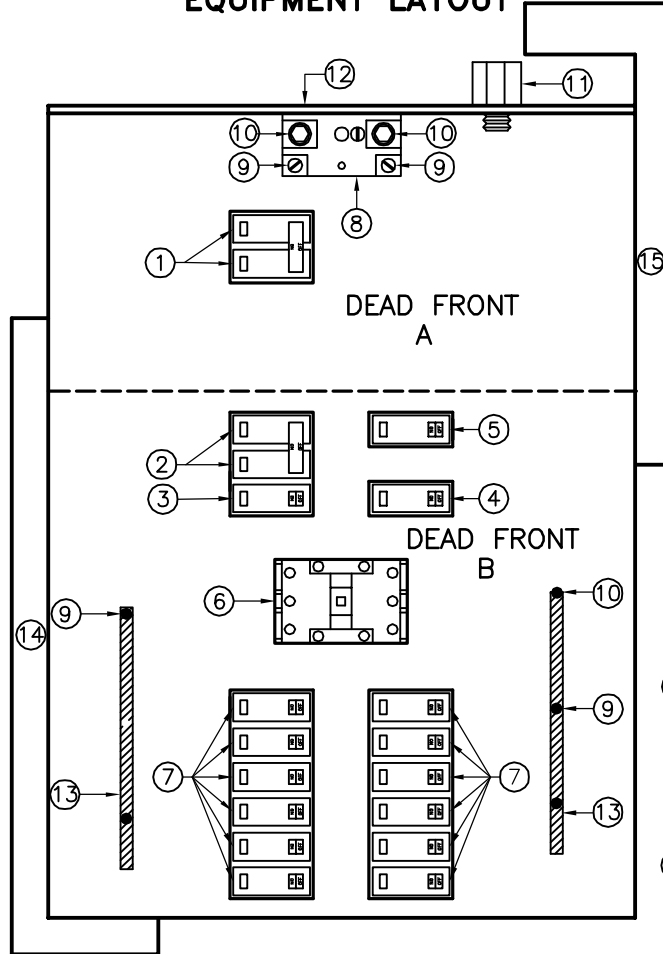
NOTES:

- 1 Centreline of mounting plate and service post connector shall be 25mm above centreline of handhole.
 - 2 Extruded handhole is shown. Welded cast frame is acceptable.
 - 3 Two screws shown. One screw in the middle of the cover is acceptable.
- A All dimensions are in millimetres unless otherwise shown.

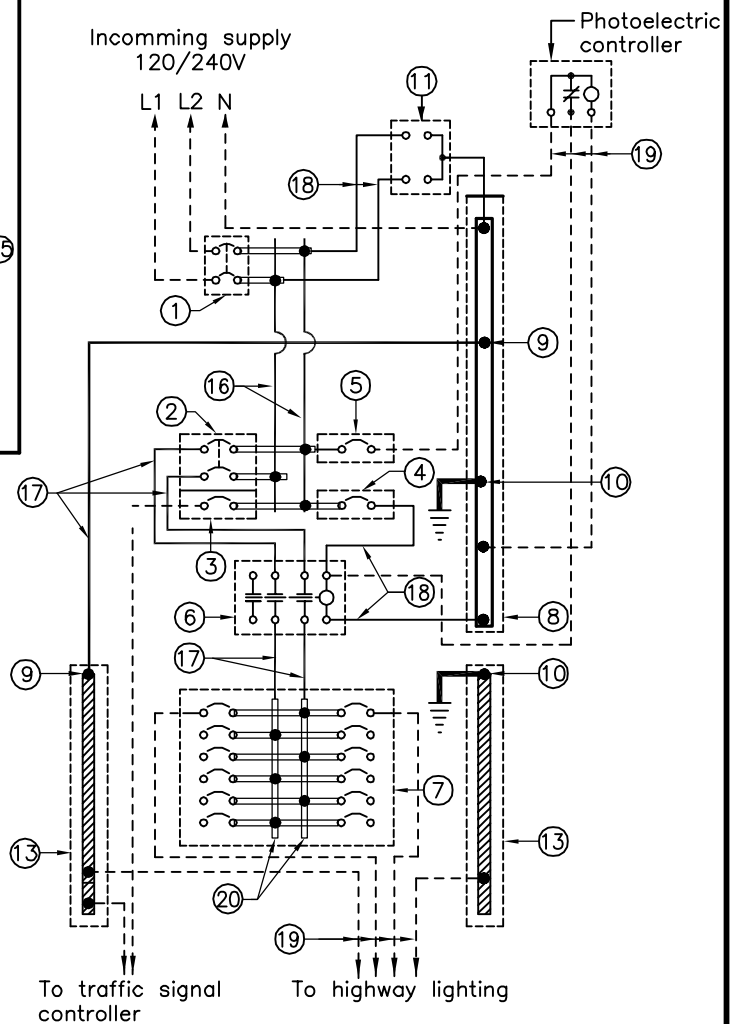
ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2010	Rev 1
ALUMINUM POLE			
BASE MOUNTED			
OPSD 2432.010			



EQUIPMENT LAYOUT



SCHEMATIC WIRING DIAGRAM



ELECTRICAL EQUIPMENT LIST

(1) Main circuit breaker – 100A, 2-pole	(10) Ground lug for No. 2/0 AWG stranded copper ground wire
(2) Lighting circuit breaker – 60A, 2-pole	(11) Secondary lightning arrester, 650V, 2-pole
(3) Traffic signal circuit breaker – 1-pole, ampacity as specified	(12) Drip shield
(4) Circuit breaker used for relamping – 15A, 1-pole	(13) Secondary neutral and ground bus according to CSA and as specified
(5) Circuit breaker for photoelectric controller – 15A, 1-pole	(14) Primary barrier
(6) Lighting contactor – 60A, 2-pole, 120V coil	(15) Secondary barrier
(7) Branch circuit breakers – 30A, 1-pole, number of breakers as specified	(16) No. 3 AWG RWU90 wire or copper bus bar
(8) Solid neutral assembly – 100A minimum, copper	(17) No. 6 AWG RWU90 wire
(9) Ground lug for No. 6 AWG stranded copper ground wire	(18) No. 12 AWG RWU90 wire
	(19) Field wiring
	(20) Copper bus bar

NOTE:

A This OPSD shall be read in conjunction with OPSD 2440.030, 2440.050, and 2440.060.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2014

Rev 1

SUPPLY CONTROL CABINET

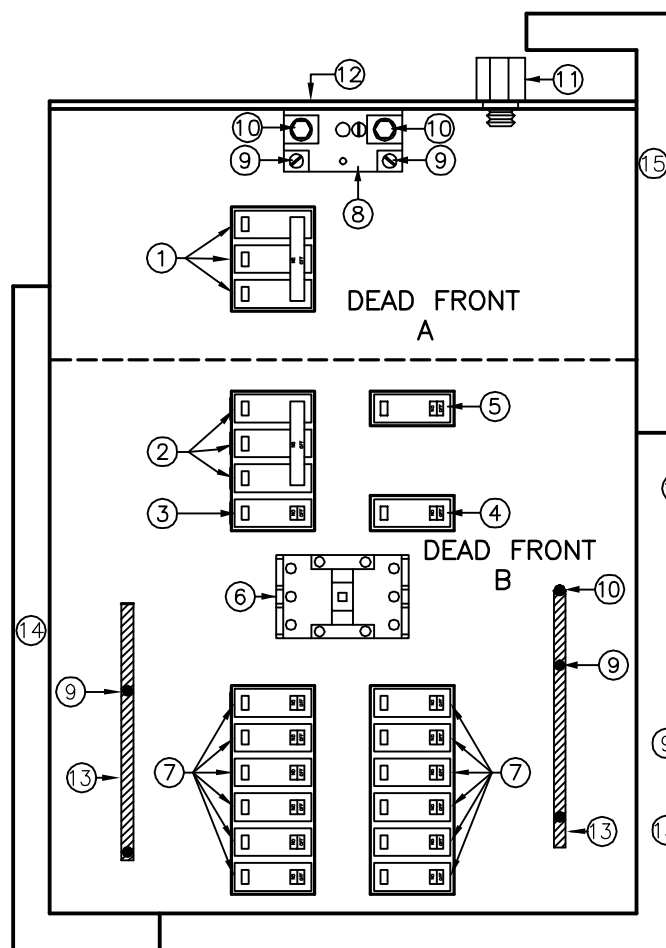
ASSEMBLY TYPE 1

120/240V, 100A, 1-PHASE, 3-WIRE

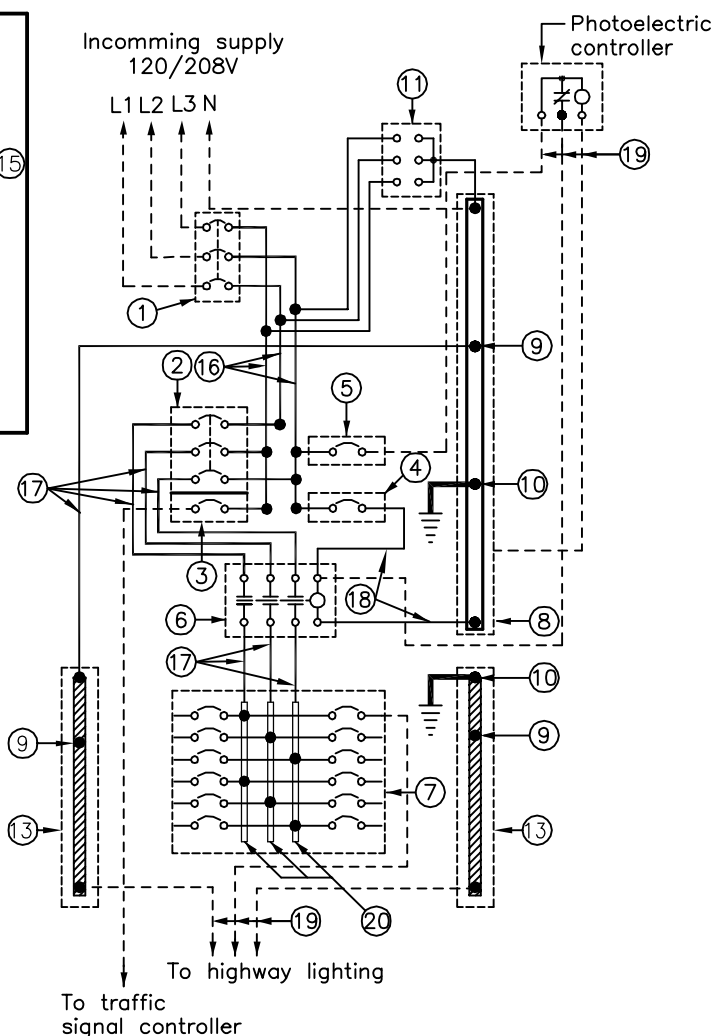


OPSD 2440.010

EQUIPMENT LAYOUT



SCHEMATIC WIRING DIAGRAM



ELECTRICAL EQUIPMENT LIST

- ① Main circuit breaker – 100A, 3–pole
- ② Lighting circuit breaker – 60A, 3–pole
- ③ Traffic signal circuit breaker – 1–pole, ampacity as specified
- ④ Circuit breaker used for relamping – 15A, 1–pole
- ⑤ Circuit breaker for photoelectric controller – 15A, 1–pole
- ⑥ Lighting contactor – 60A, 3–pole, 120V coil
- ⑦ Branch circuit breakers – 30A, 1–pole, number of breakers as specified
- ⑧ Solid neutral assembly – 150A minimum, copper
- ⑨ Ground lug for No. 6 AWG stranded copper ground wire
- ⑩ Ground lug for No. 2/0 AWG stranded copper ground wire
- ⑪ Secondary lightning arrester, 650V, 3–pole
- ⑫ Drip shield
- ⑬ Secondary neutral and ground bus according to CSA and as specified

- ⑭ Primary barrier
- ⑮ Secondary barrier
- ⑯ No. 3 AWG RWU90 wire or copper bus bar
- ⑰ No. 6 AWG RWU90 wire
- ⑱ No. 12 AWG RWU90 wire
- ⑲ Field wiring
- ⑳ Copper bus bar

NOTE:

A This OPSD shall be read in conjunction with OPSD 2440.030, 2440.050, and 2440.060.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2014

Rev 1

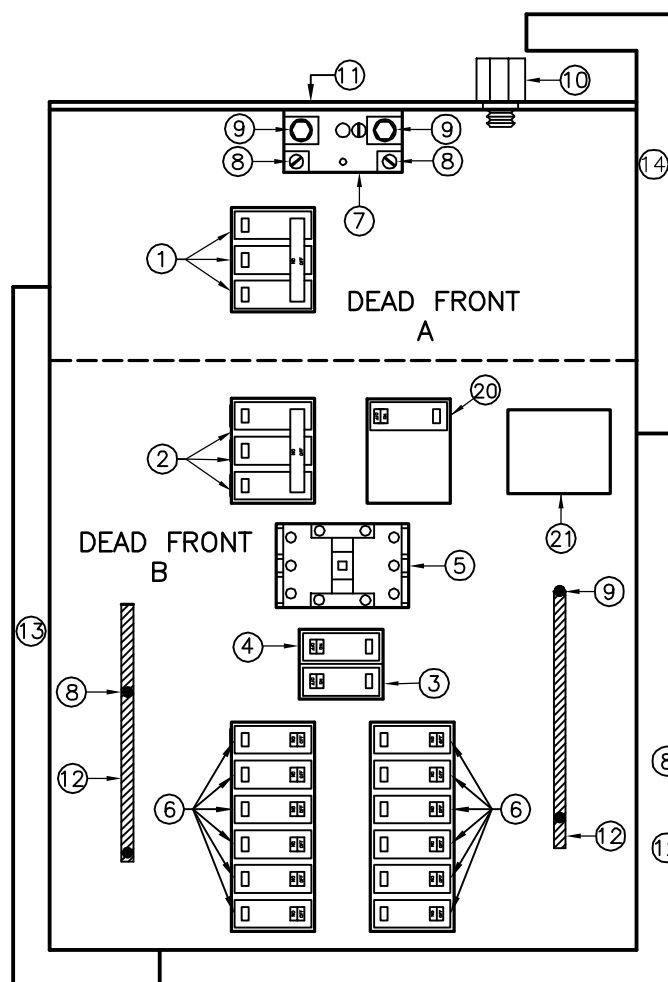
**SUPPLY CONTROL CABINET
ASSEMBLY TYPE 2**

120/208V, 100A, 3–PHASE, 4–WIRE

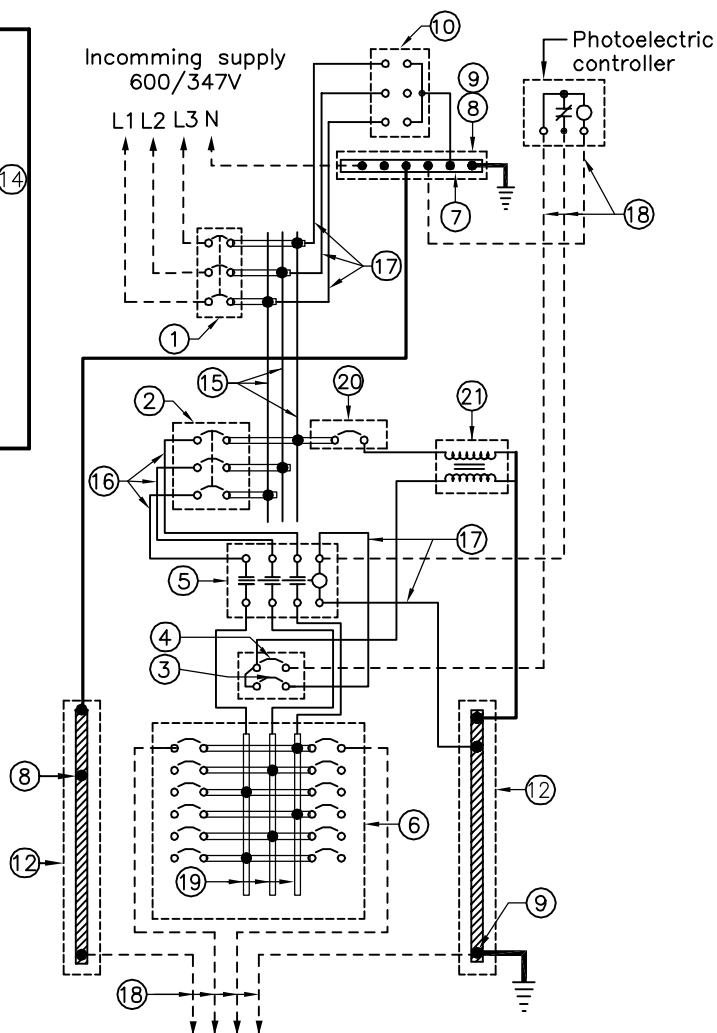


OPSD 2440.020

EQUIPMENT LAYOUT



SCHEMATIC WIRING DIAGRAM



ELECTRICAL EQUIPMENT LIST

- ① Main circuit breaker – 600V, 100A, 3–pole
- ② Lighting circuit breaker – 600V, 60A, 3–pole
- ③ Circuit breaker used for relamping – 120/240V, 10A, 1–pole
- ④ Circuit breaker for photoelectric controller – 120/240V, 10A, 1–pole
- ⑤ Lighting contactor – 600V, 100A, 3–pole, 120V coil
- ⑥ Branch circuit breakers – 600/347V, 30A, 1–pole, number of breakers as specified
- ⑦ Solid neutral assembly – 100A minimum, copper
- ⑧ Ground lug for No. 6 AWG stranded copper ground wire
- ⑨ Ground lug for No. 2/0 AWG stranded copper ground wire

To highway lighting

- ⑩ Secondary lightning arrester, 650V, 3–pole
- ⑪ Drip shield
- ⑫ Secondary neutral and ground bus according to CSA and as specified
- ⑬ Primary barrier
- ⑭ Secondary barrier
- ⑮ No. 3 AWG RWU90 wire or copper bus bar
- ⑯ No. 6 AWG RWU90 wire
- ⑰ No. 12 AWG RWU90 wire
- ⑱ Field wiring
- ⑲ Copper bus bar
- ⑳ Circuit breaker for transformer, 600V, 15A
- ㉑ 347/120V 75VA control transformer

NOTE:

A This OPSD shall be read in conjunction with OPSD 2440.030, 2440.050, and 2440.060.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2014

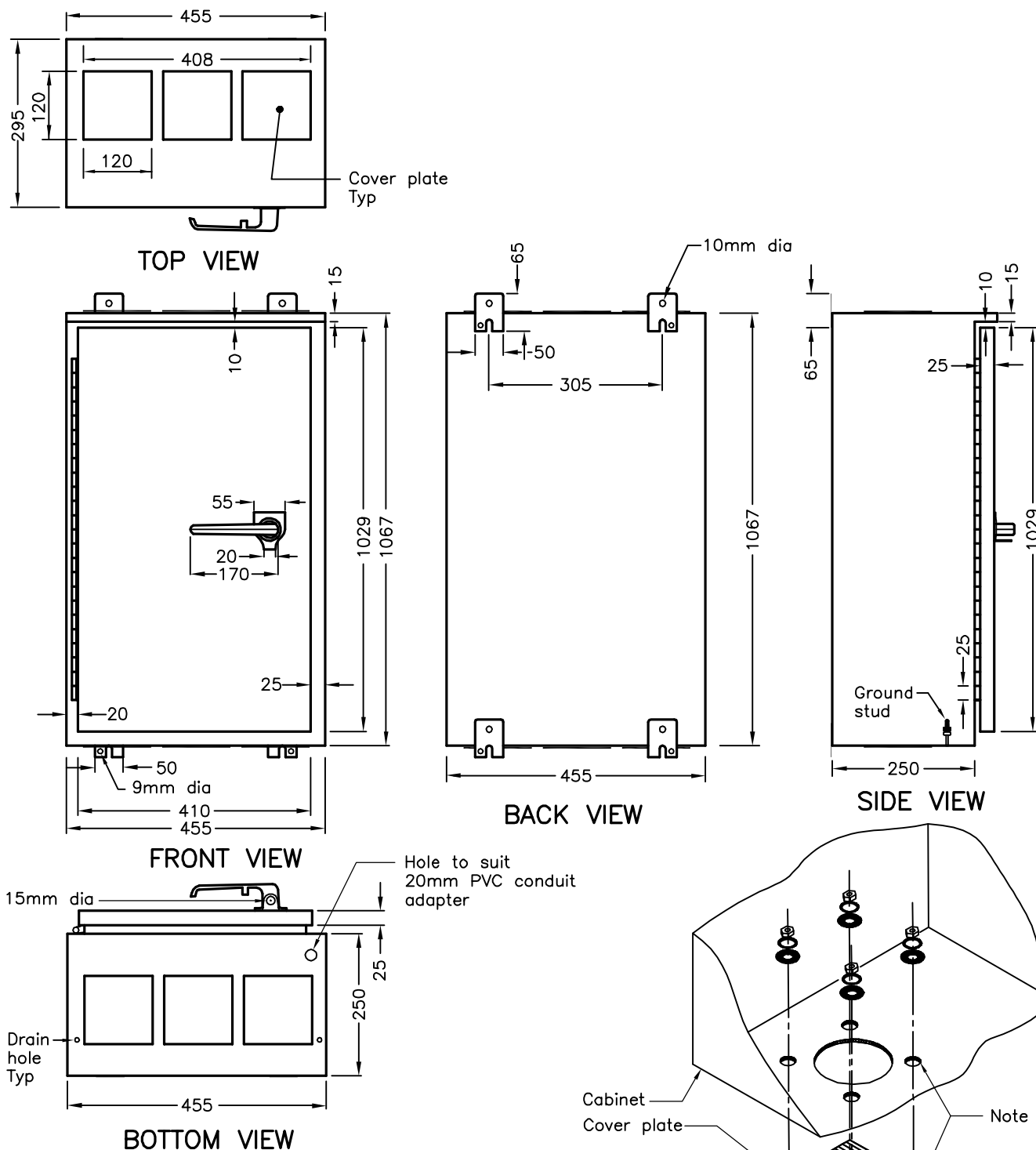
Rev 0

**SUPPLY CONTROL CABINET
ASSEMBLY TYPE 2**

600/347V, 100A, 3–PHASE, 4–WIRE



OPSD 2440.021



NOTES:

1 Bolt and hole pattern shall suit meter hub.

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

**SUPPLY CONTROL CABINET
ASSEMBLY TYPE 1 AND 2
ENCLOSURE**

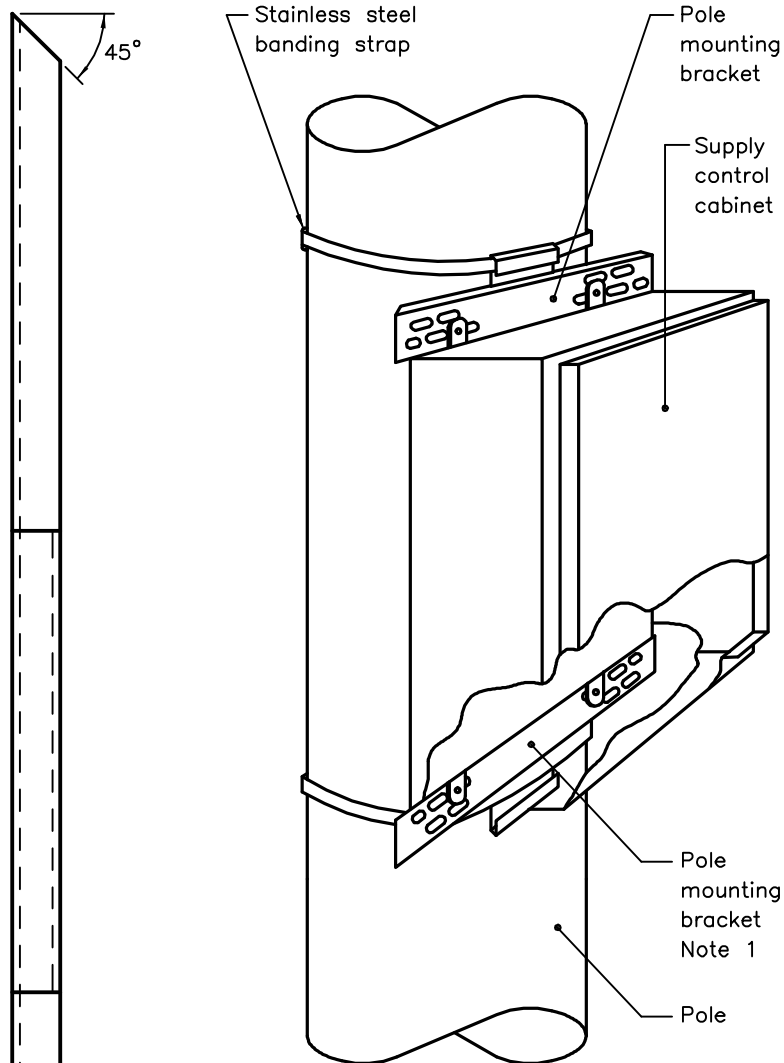
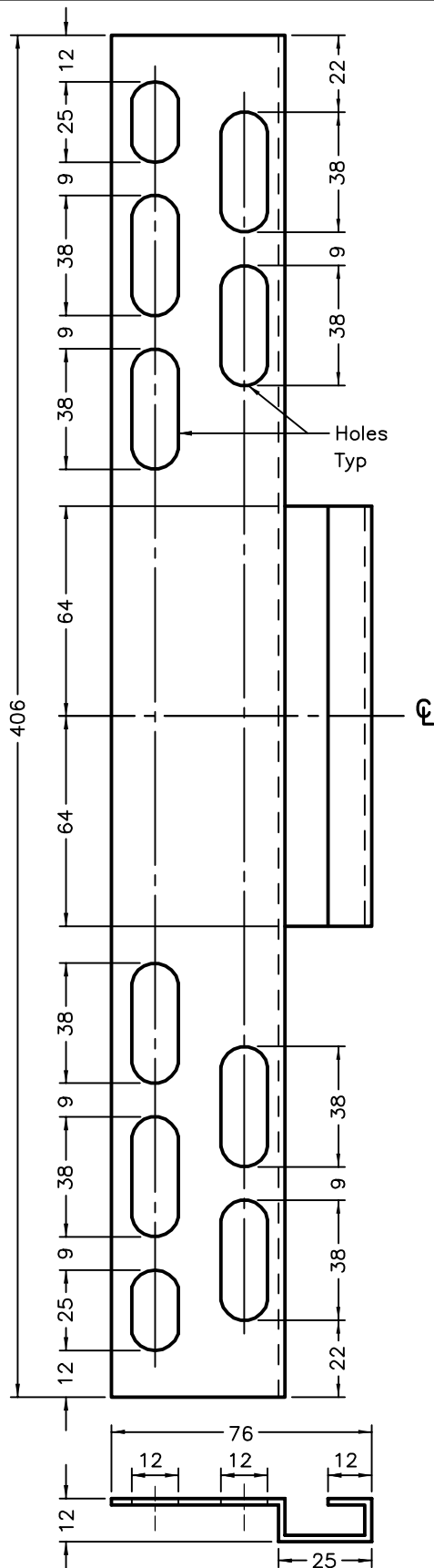
Nov 2014

Rev 1

COVER PLATE DETAIL

OPSD 2440.030





NOTES:

- 1 The pole mounting bracket for supply control cabinet assembly shall be #11 gauge stainless steel.
- A All burrs and sharp corners shall be removed.
- B Pole mounting bracket is required only when the supply cabinet does not have built-in pole mounting provision.
- C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2014

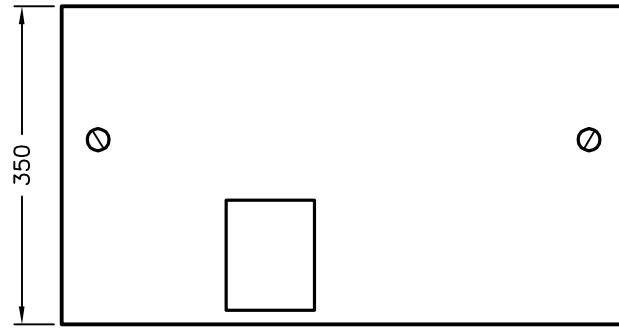
Rev 1

POLE MOUNTING BRACKET

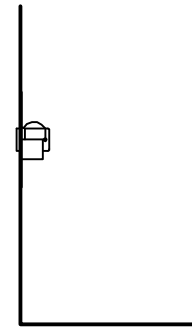
FOR SUPPLY CONTROL CABINET ASSEMBLY



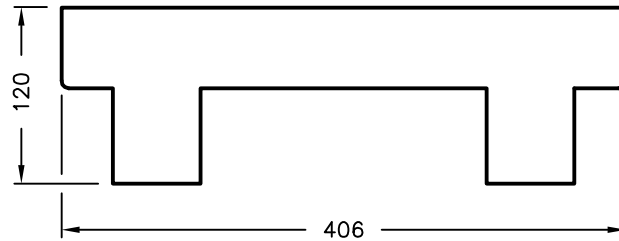
OPSD 2440.04



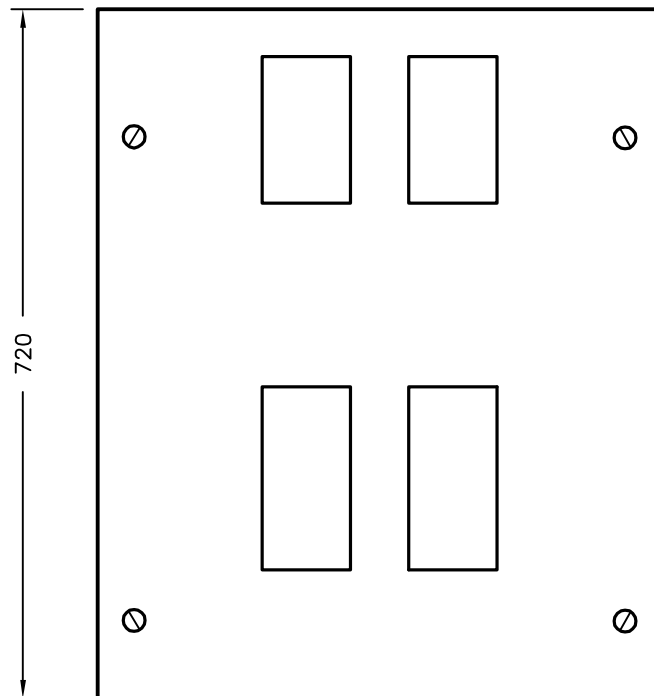
FRONT VIEW



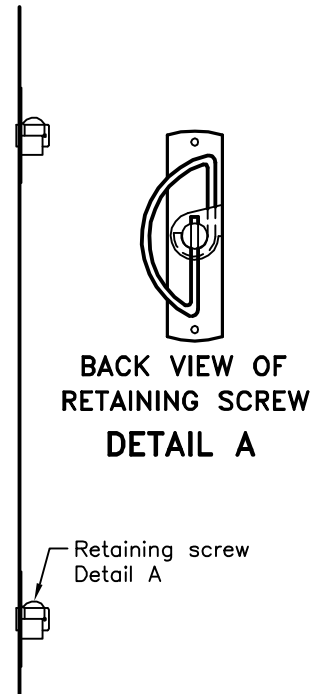
SIDE VIEW



BOTTOM VIEW, Note 1
DEAD FRONT A



FRONT VIEW



BACK VIEW OF
RETAINING SCREW
DETAIL A

SIDE VIEW



BOTTOM VIEW
DEAD FRONT B

NOTES:

1 Size and position of openings to suit main and branch circuit breakers.

A Tolerances shall be within $\pm 3\text{mm}$ unless otherwise shown.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

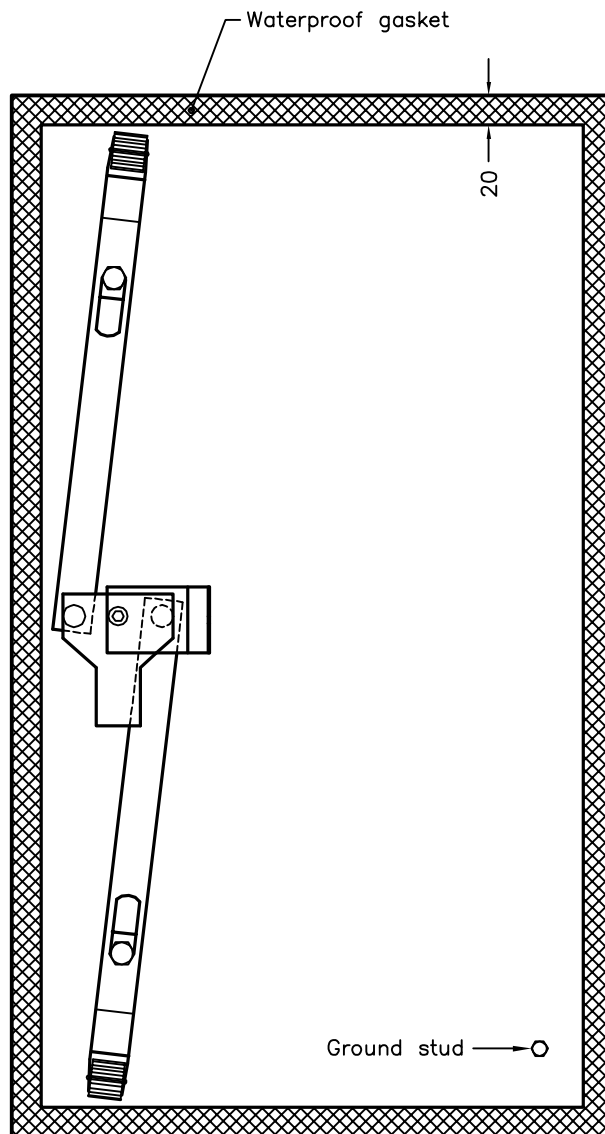
Nov 2014

Rev 1

SUPPLY CONTROL CABINET
ASSEMBLY TYPE 1 AND 2
DEAD FRONT PANELS

OPSD 2440.050



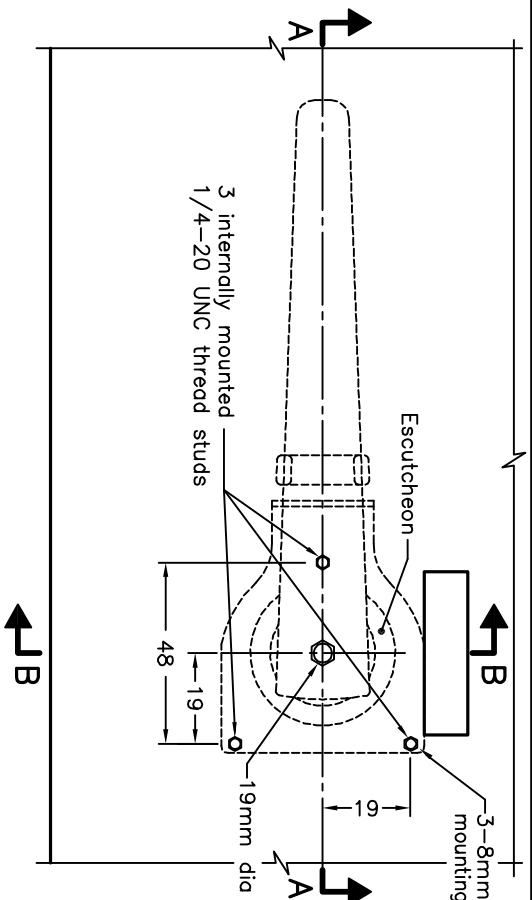


INSIDE DOOR VIEW

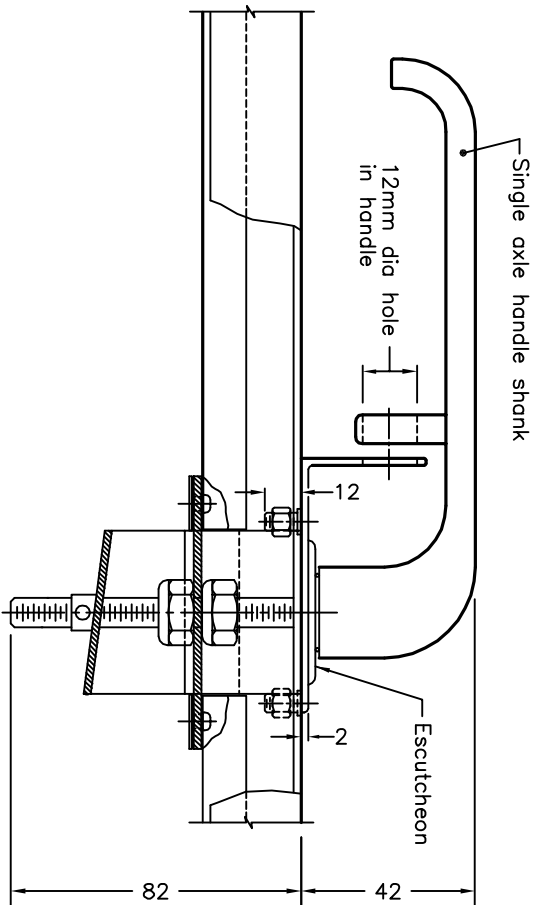
NOTES:

- A Tolerances shall be within $\pm 3\text{mm}$ unless otherwise shown.
 B All dimensions are in millimetres unless otherwise shown.

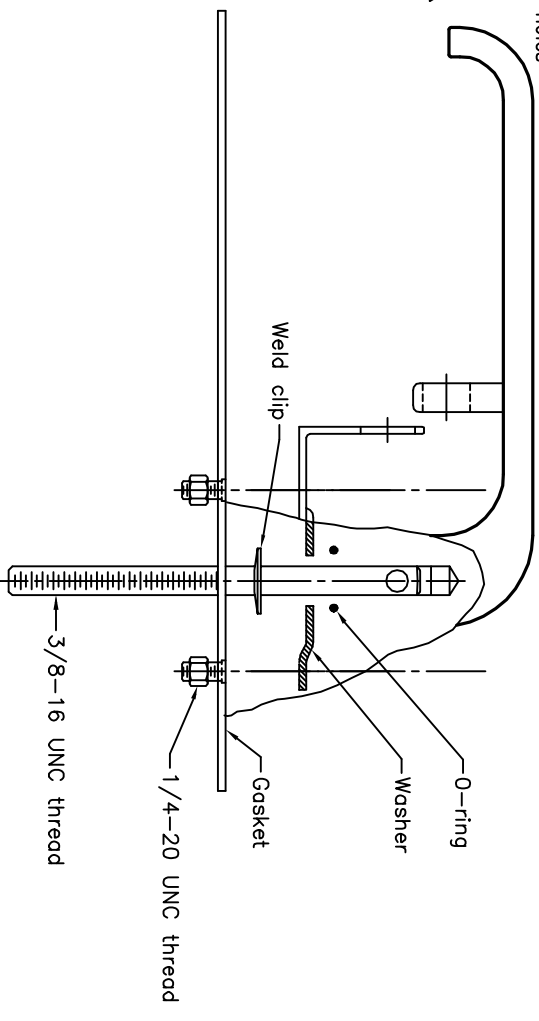
ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2014	Rev	1	
SUPPLY CONTROL CABINET ASSEMBLY TYPE 1 AND 2 3-POINT DOOR LATCH		----- -----			
		OPSD 2440.060			



PLAN



SECTION A-A



SECTION B-B

NOTES:

- A Door handle shall be stainless steel with threaded shank, blind mount escutcheon, and o-ring and gasket.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

SUPPLY CONTROL CABINET

ASSEMBLY TYPE 1, 2, AND 3

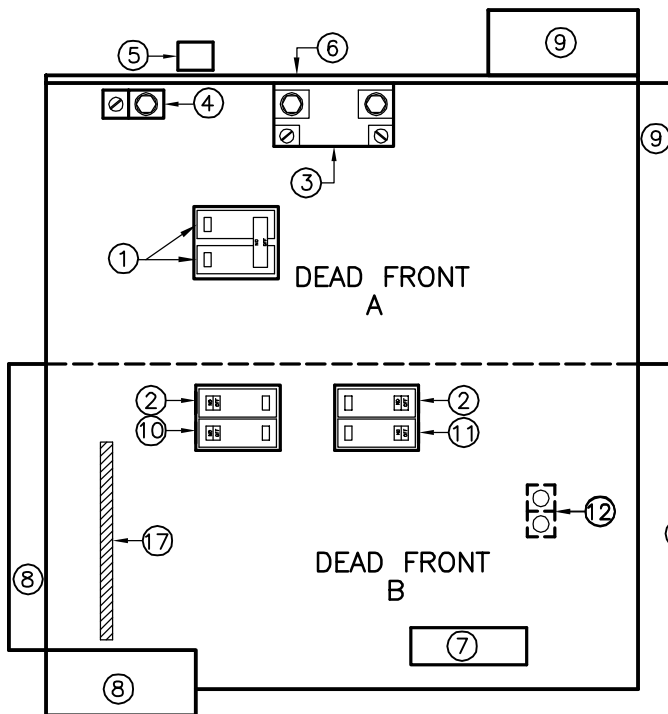
3-POINT STAINLESS STEEL DOOR HANDLE

Nov 2014 Rev 0

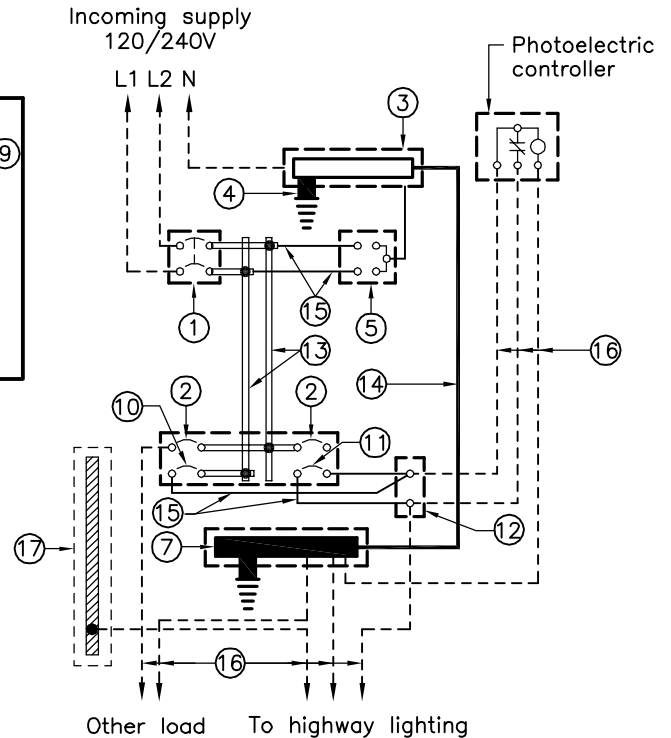


OPSD 2440.061

EQUIPMENT LAYOUT



SCHEMATIC WIRING DIAGRAM



ELECTRICAL EQUIPMENT LIST

- ① Main circuit breaker – 100A, 2–pole
- ② Branch circuit breakers – 1–pole
- ③ Solid neutral assembly – 100A minimum
- ④ Ground lug for No. 2/0 AWG stranded copper ground wire
- ⑤ Secondary lightning arrester – 650V, 2–pole
- ⑥ Drip shield
- ⑦ Secondary neutral
- ⑧ Primary barrier
- ⑨ Secondary barrier
- ⑩ Circuit breaker for photoelectric controller and lighting – 15A, 1–pole
- ⑪ Circuit breaker for relamping – 15A, 1–pole
- ⑫ Terminal block
- ⑬ Copper bus bar
- ⑭ No. 6 AWG RWU 90 wire
- ⑮ No. 12 AWG RWU 90 wire
- ⑯ Field wiring
- ⑰ Bond bus

NOTE:

A This OPSD shall be read in conjunction with OPSD 2441.010, 2441.020, and 2441.030.

ONTARIO PROVINCIAL STANDARD DRAWING

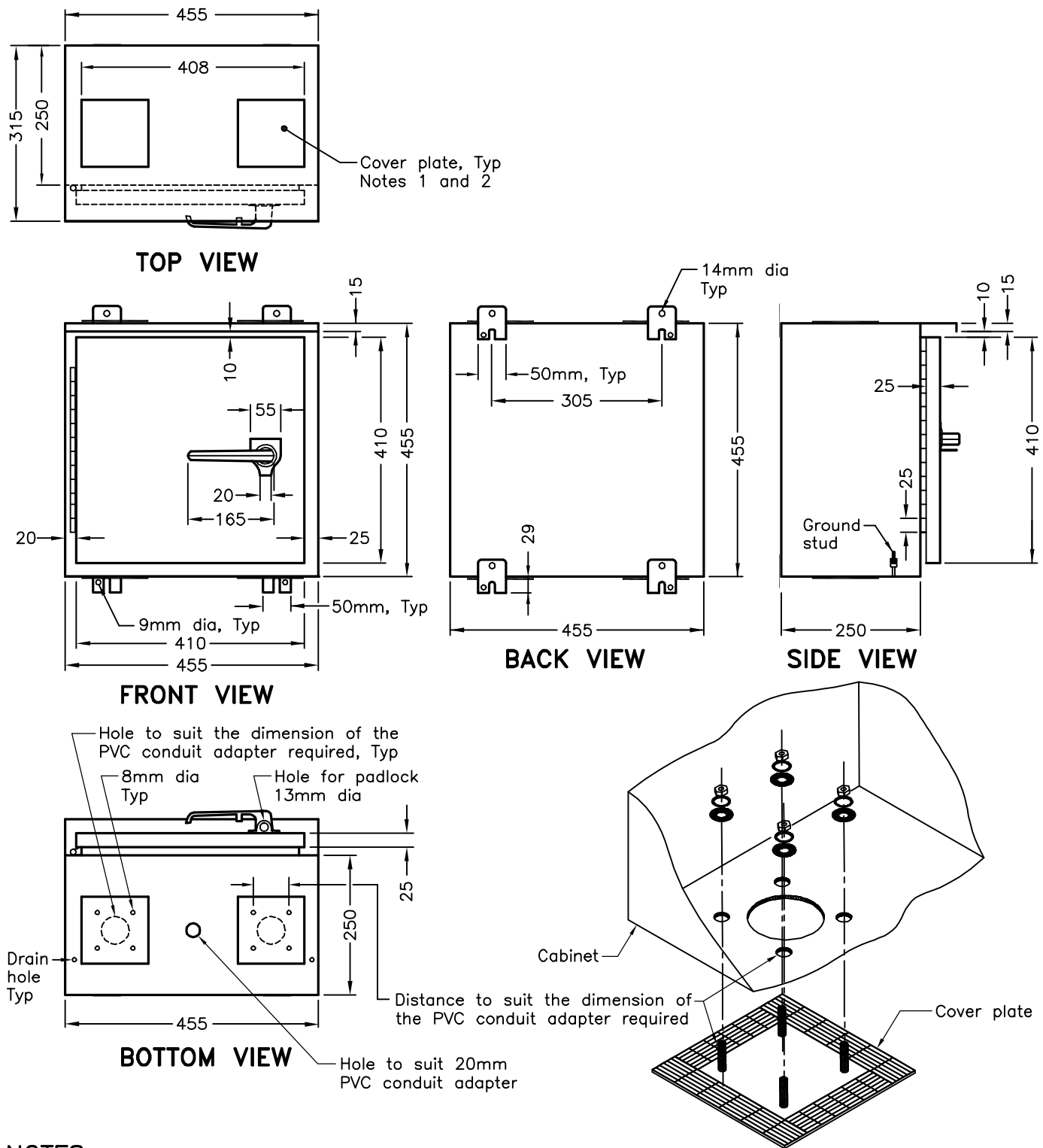
Nov 2014 | Rev | 1

**SUPPLY CONTROL CABINET
ASSEMBLY TYPE 3**

120/240V, 100A, 1–PHASE, 3–WIRE



OPSD 2441.000



NOTES:

- 1 All plates shall suit the dimensions and quantity of the PVC conduit adapter required.
 - 2 Bolt and hole pattern shall suit meter hub.
- A Tolerances shall be within $\pm 3\text{mm}$ unless otherwise shown.
 B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

SUPPLY CONTROL CABINET ASSEMBLY TYPE 3

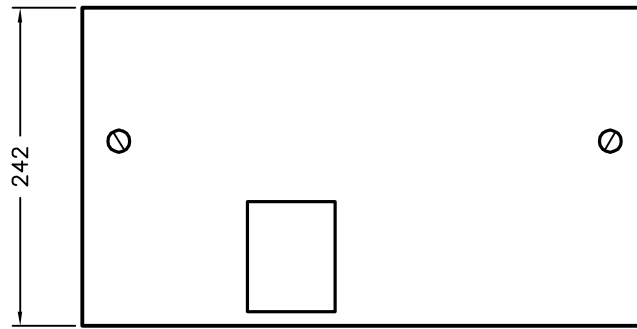
ENCLOSURE

Nov 2014

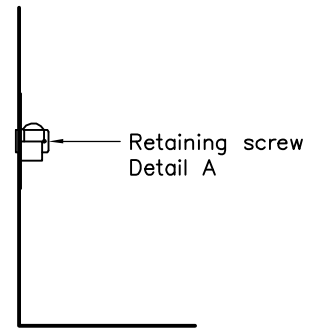
Rev 1



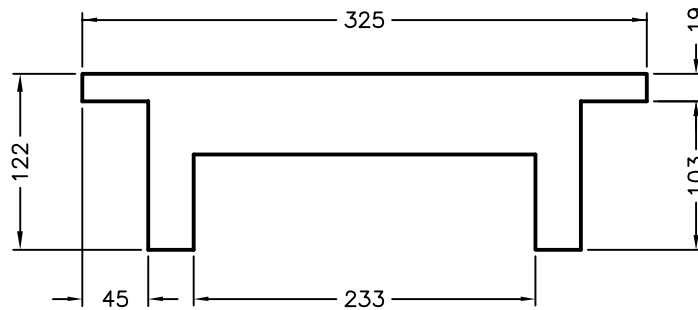
OPSD 2441.010



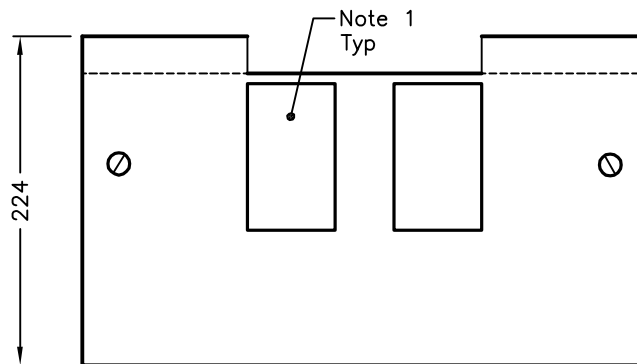
FRONT VIEW



SIDE VIEW



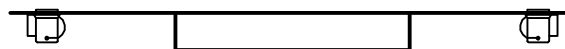
BOTTOM VIEW
DEAD FRONT A



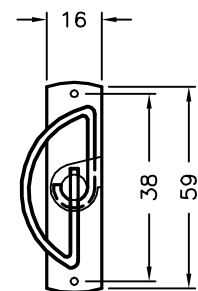
FRONT VIEW



SIDE VIEW



BOTTOM VIEW
DEAD FRONT B



BACK VIEW OF
RETAINING SCREW
DETAIL A

NOTES:

1 Size and position of openings to suit main and branch circuit breakers.

A All dimensions are shown for guidance only. Dimensions shall be modified as necessary to meet the requirements of the Ontario Electrical Safety Code.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

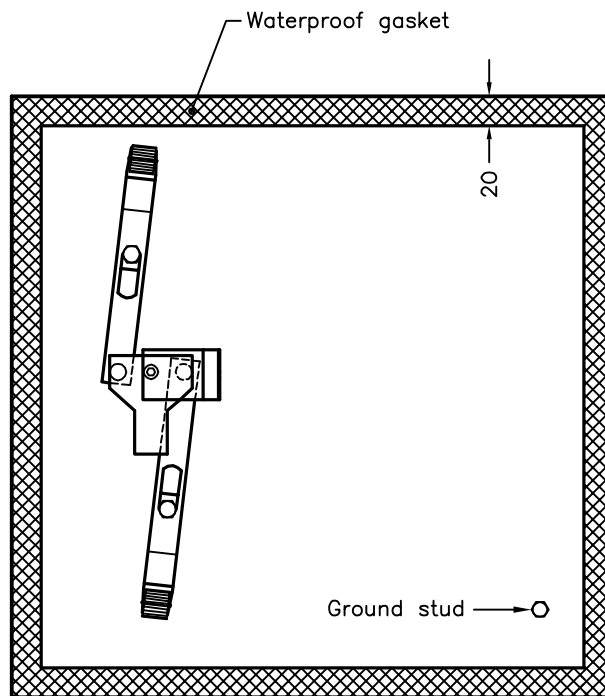
Nov 2014

Rev 1

**SUPPLY CONTROL CABINET
ASSEMBLY TYPE 3
DEAD FRONT PANELS**

OPSD 2441.020





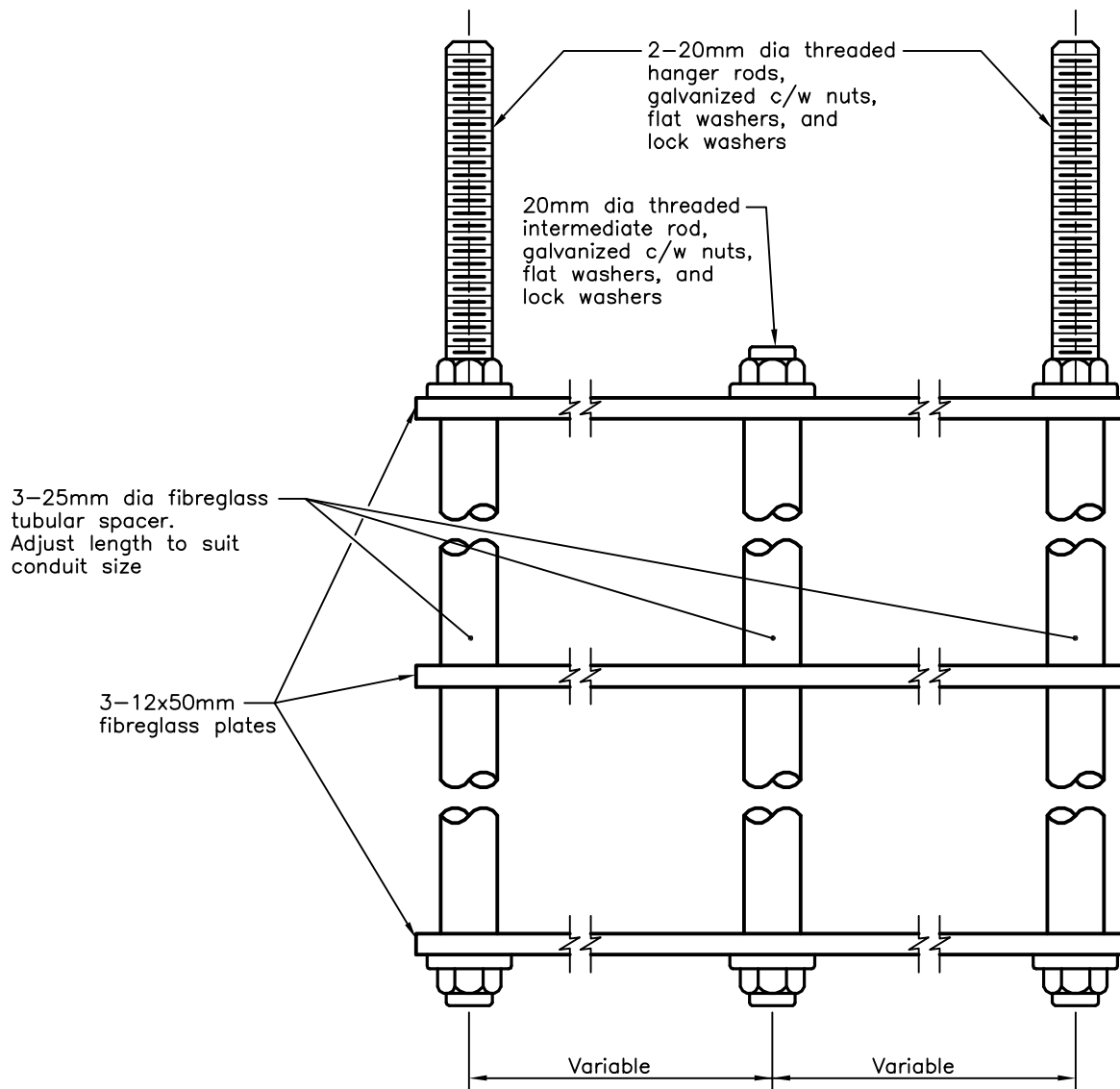
INSIDE DOOR VIEW

NOTES:

A Tolerances shall be within $\pm 3\text{mm}$ unless otherwise shown.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2014	Rev	0	
SUPPLY CONTROL CABINET ASSEMBLY TYPE 3 3-POINT DOOR LATCH		----- -----			
		OPSD 2441.030			



NOTES:

- A Arrange hanger system to accommodate duct arrangement in trench.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

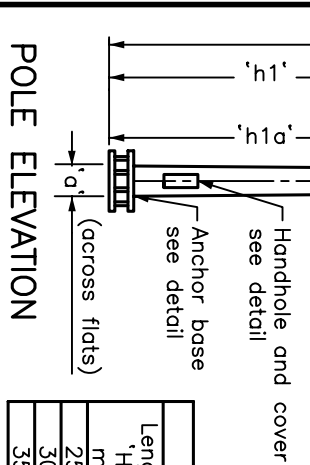
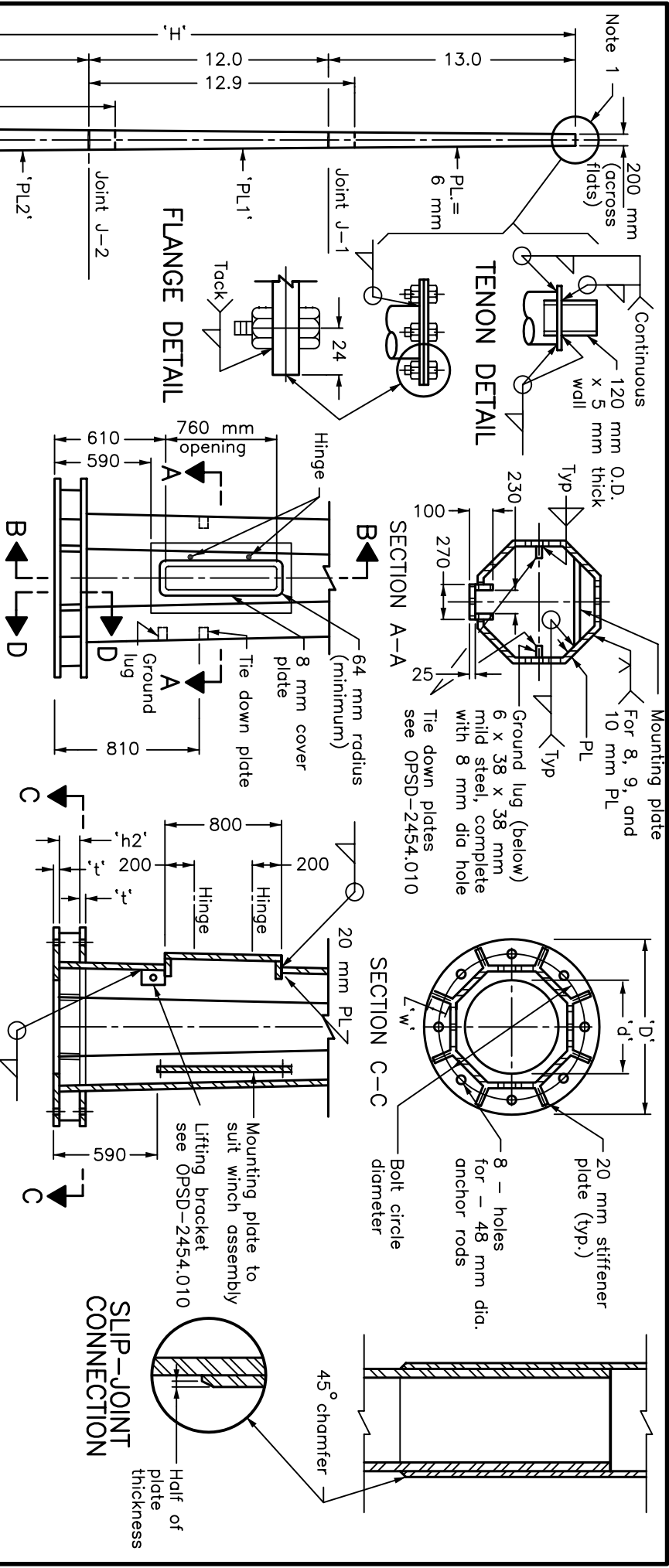
Nov 2015

Rev 0

DUCT HANGER

OPSD 2442.010





POLE DATA						ANCHOR BASE DATA									
Length 'H' m	'h1' m	'h1a' m	'PL1' mm	'PL2' mm	'a' mm	Moment kNm	Shear kN	'D' mm	Bolt Circle Diameter mm	'd' mm	'h2' mm	't' mm	'w' mm		
25	—	—	8	—	538	300	22	1000	800	422	180	35	190		
30	5	6.35	8	9	592	475	30	1000	800	474	180	35	160		
35	10	11.35	8	10	662	690	39	1100	900	542	180	40	175		

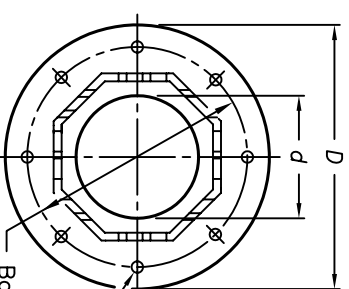
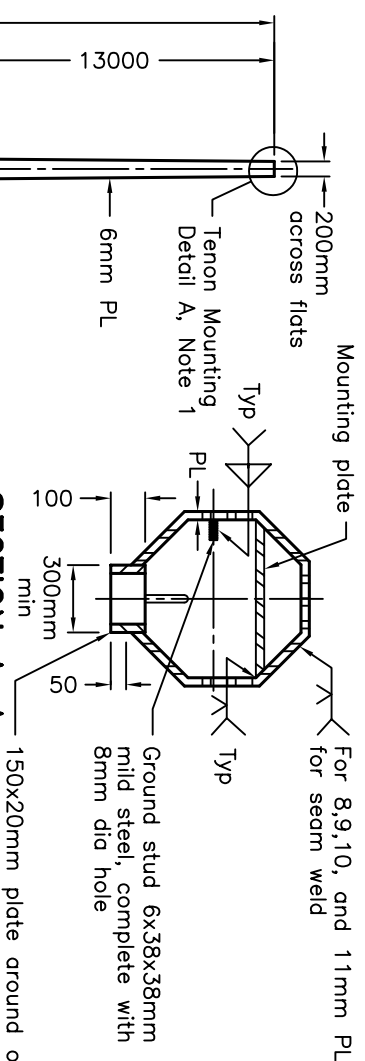
NOTES:

1 Detail of tenon or flange shall suit luminaire raising and lowering equipment.

A For Section D-D, see OPSD-2454.010.

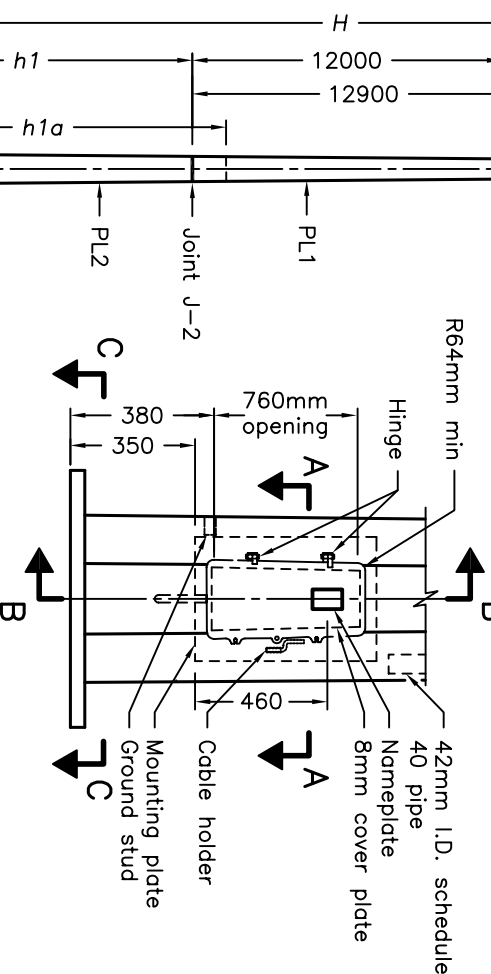
B All dimensions are in millimetres or metres unless otherwise shown.

JOINT	FINAL FORCE OF ASSEMBLY
J-1	26kN
J-2	46kN



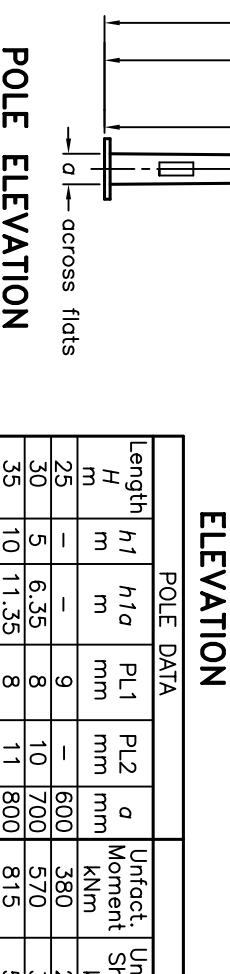
SECTION C-C

DETAIL B



SECTION B-B

DETAIL A



POLE DATA						POLE BASE DATA					
Length H m	h1 m	h1a m	PL1 mm	PL2 mm	a mm	Unfact. Moment kNm	Unfact. Shear kN	D mm	Bolt Circle Diameter mm	d mm	t mm
25	—	—	9	—	600	380	29	900	750	422	50
30	5	6.35	8	10	700	570	38	1000	850	500	50
35	10	11.35	8	11	800	815	50	1100	950	600	60

NOTES:
 1 Detail of tenon mounting shall suit luminaire raising and lowering equipment.
 A This drawing shall be read in conjunction with OPSD-2453.010 and 2453.050.
 B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2003

Rev 0

HIGH MAST LIGHTING POLE

25, 30, AND 35m 8-SIDED POLE

OPSD - 2450.011

JOINT	FINAL FORCE OF ASSEMBLY
J-1	26kN
J-2	46kN



JOINT	FINAL FORCE OF ASSEMBLY
J-1	41kN
J-2	68kN
J-3	97kN

POLE ELEVATION

POLE DATA										ANCHOR BASE DATA					
Length 'H'	'h1'	'h2'	'PL1'	'PL2'	'PL3'	'd'	Moment kNm	Shear kN	'D'	Bolt Circle Diameter	'd'	'h3'	't'	'w'	
m	m	m	mm	mm	mm	mm			mm	mm	mm	mm	mm	mm	mm
40	10	5	8	9	11	750	995	47	1200	1000	650	300	45	195	
45	10	10	8	10	12	800	1290	56	1200	1000	700	300	45	170	

HANDHOLE AND ANCHOR BASE DETAIL

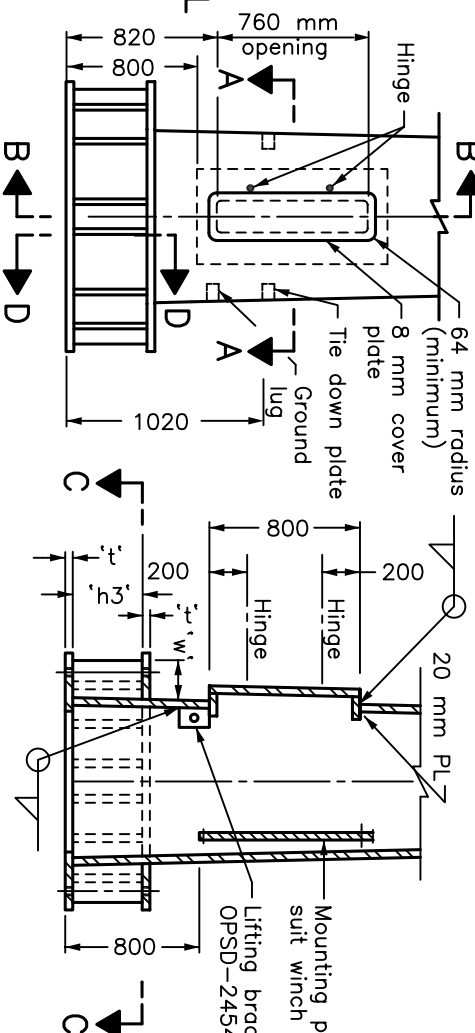
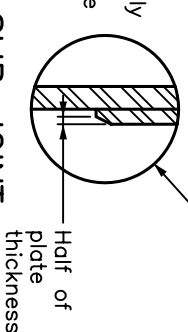
ELEVATION

SECTION B-B

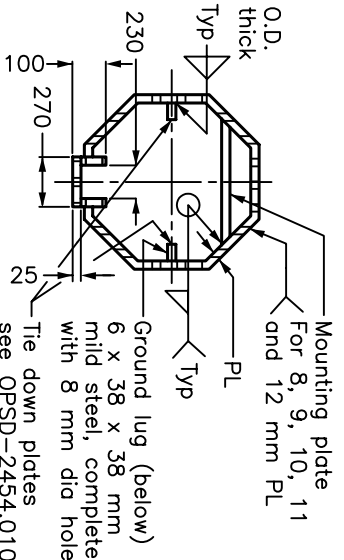
NOTES:

- Detail of tenon or flange shall suit luminaire raising and lowering equipment.
- For section D-D, see OPSD-2454.010.
- All dimensions are in millimetres or metres unless otherwise shown.

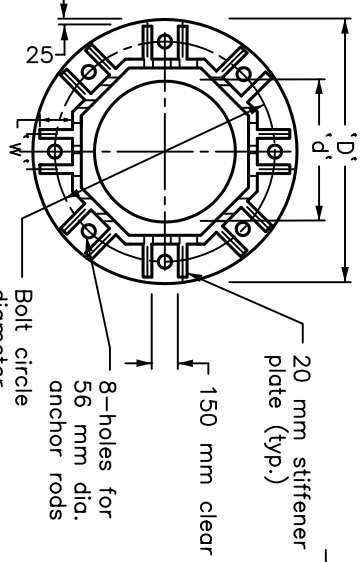
SLIP-JOINT CONNECTION



SECTION A-A

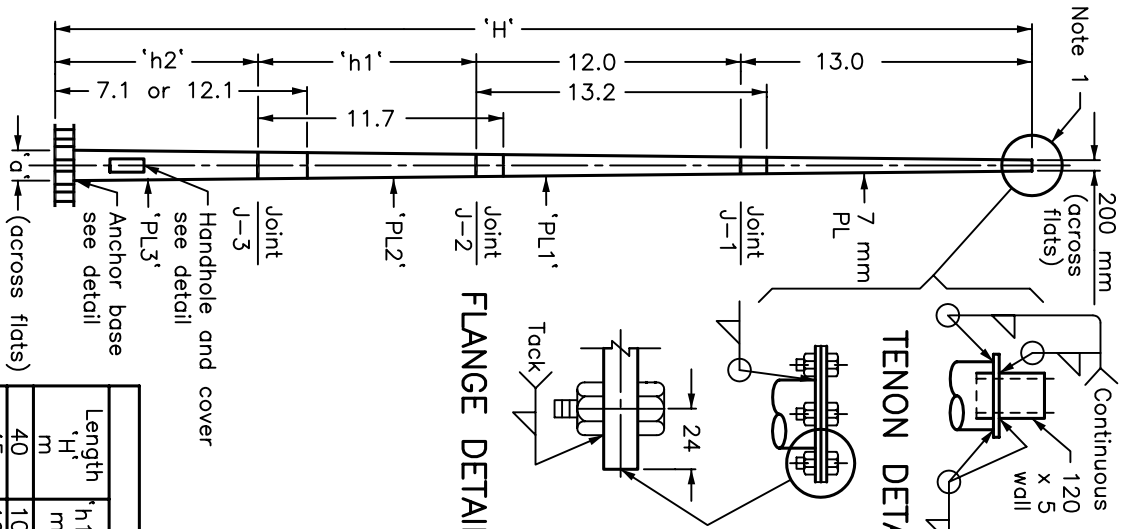


SECTION C-C



TENON DETAIL

FLANGE DETAIL



ONTARIO PROVINCIAL STANDARD DRAWING

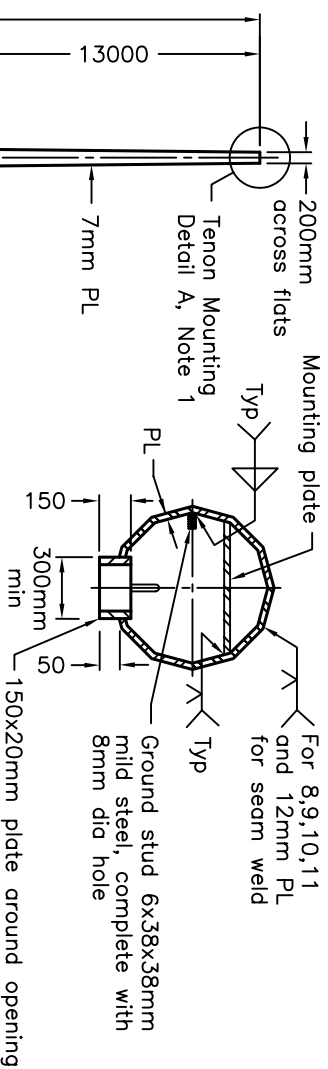
HIGH MAST LIGHTING 40 AND 45m OCTAGONAL POLE WITH DOUBLE BASE PLATE

Nov 2003

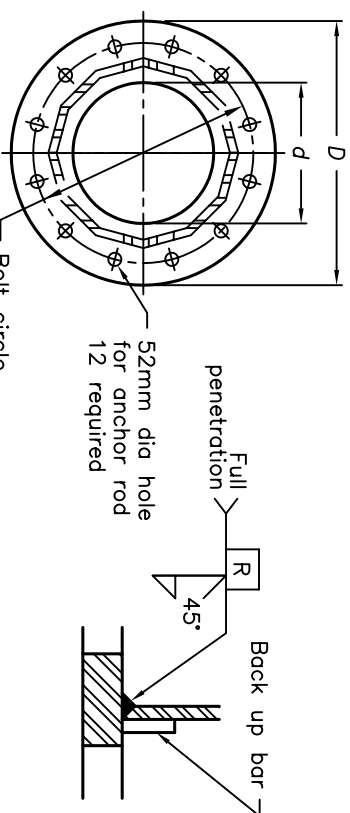
Rev 0

OPSD - 2450.020



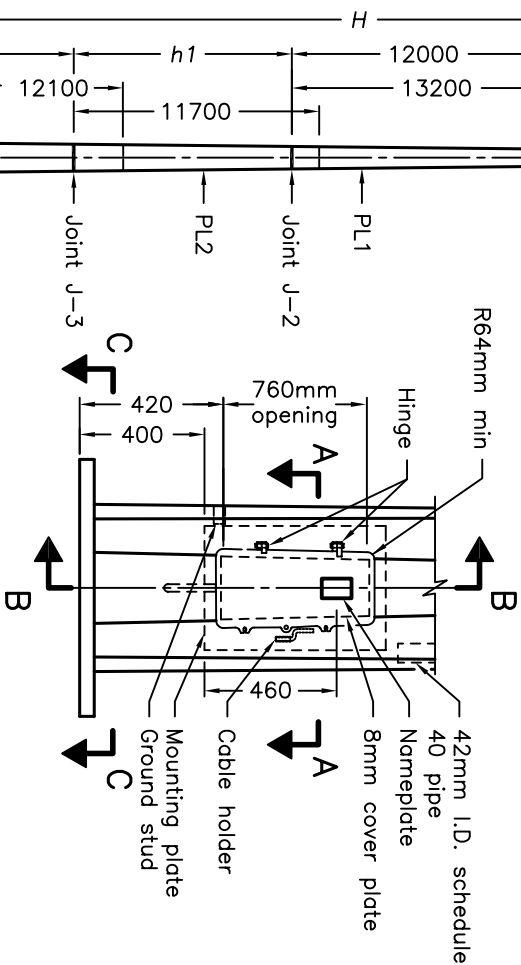


SECTION A-A



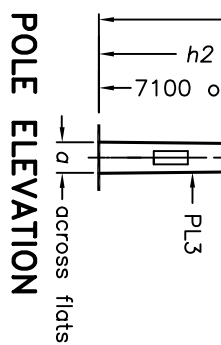
SECTION C-C

DETAIL B



SECTION B-B

DETAIL A



POLE DATA							POLE BASE DATA					
Length <i>H</i> m	<i>h</i> 1 m	<i>h</i> 2 m	PL1 mm	PL2 mm	PL3 mm	<i>a</i> mm	Unfact. Moment kNm	Unfact. Shear kN	<i>D</i> mm	Bolt Circle Diameter mm	<i>d</i> mm	<i>t</i> mm
40	10	5	8	9	11	900	895	48	1200	1075	700	65
45	10	10	8	10	12	950	1155	56	1200	1075	750	70

NOTES:
 1 Detail of tenon mounting shall suit luminaire raising and lowering equipment.
 A This drawing shall be read in conjunction with OPSD-2453.010 and 2453.050.
 B All dimensions are in millimetres unless otherwise shown.

JOINT	FINAL FORCE OF ASSEMBLY
J-1	41kN
J-2	68kN
J-3	97kN

ONTARIO PROVINCIAL STANDARD DRAWING

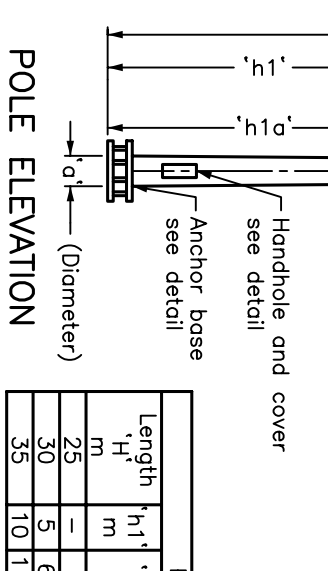
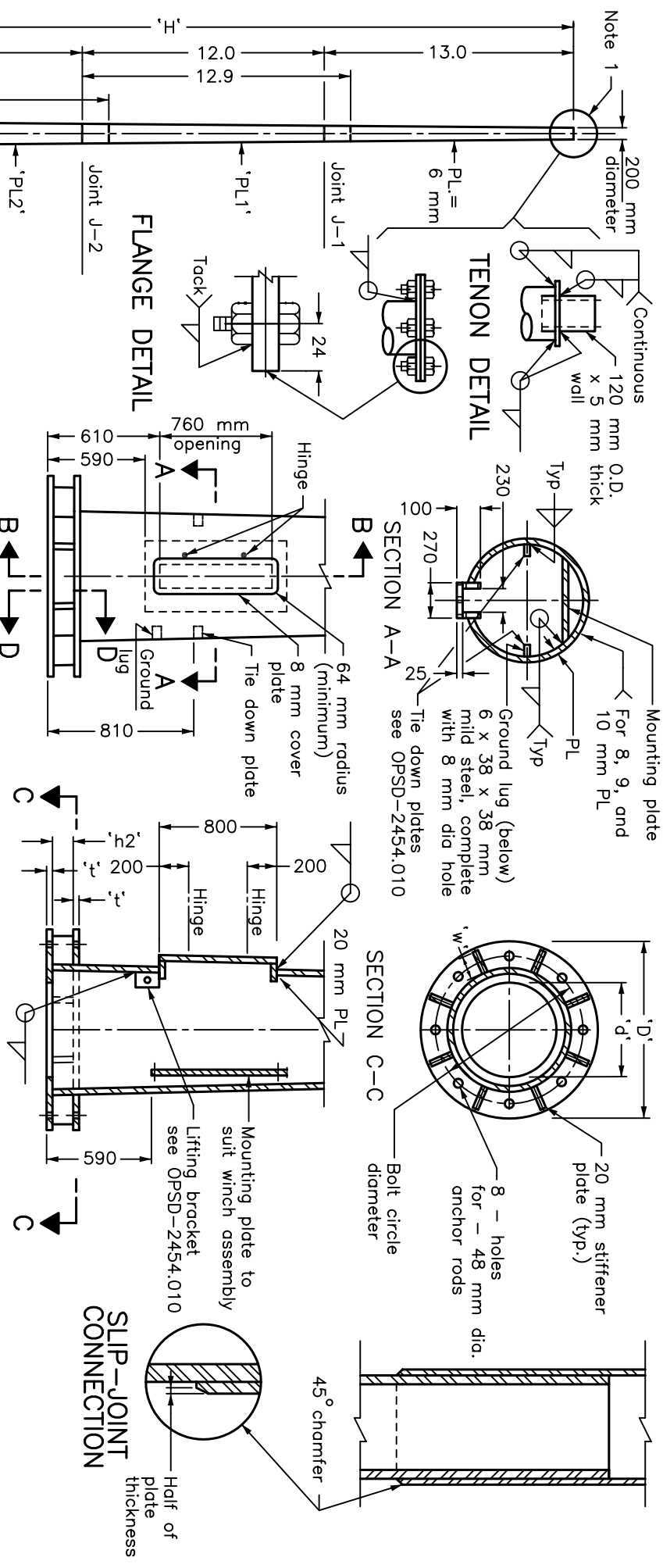
Nov 2003 Rev 0

HIGH MAST LIGHTING POLE

40 AND 45m 12-SIDED POLE

OPSD - 2450.021





POLE DATA					ANCHOR BASE DATA									
Length 'H' m	'h1' m	'h1d' mm	'PL1' mm	'PL2' mm	'a' mm	Moment kNm	Shear kN	'D' mm	Bolt Circle mm	'd' mm	'h2' mm	't' mm	'w' mm	
25	-	-	8	-	538	300	22	1000	800	422	180	35	220	
30	5	6.35	8	9	592	475	30	1000	800	474	180	35	190	
35	10	11.35	8	10	662	690	39	1100	900	542	180	40	205	

NOTES:

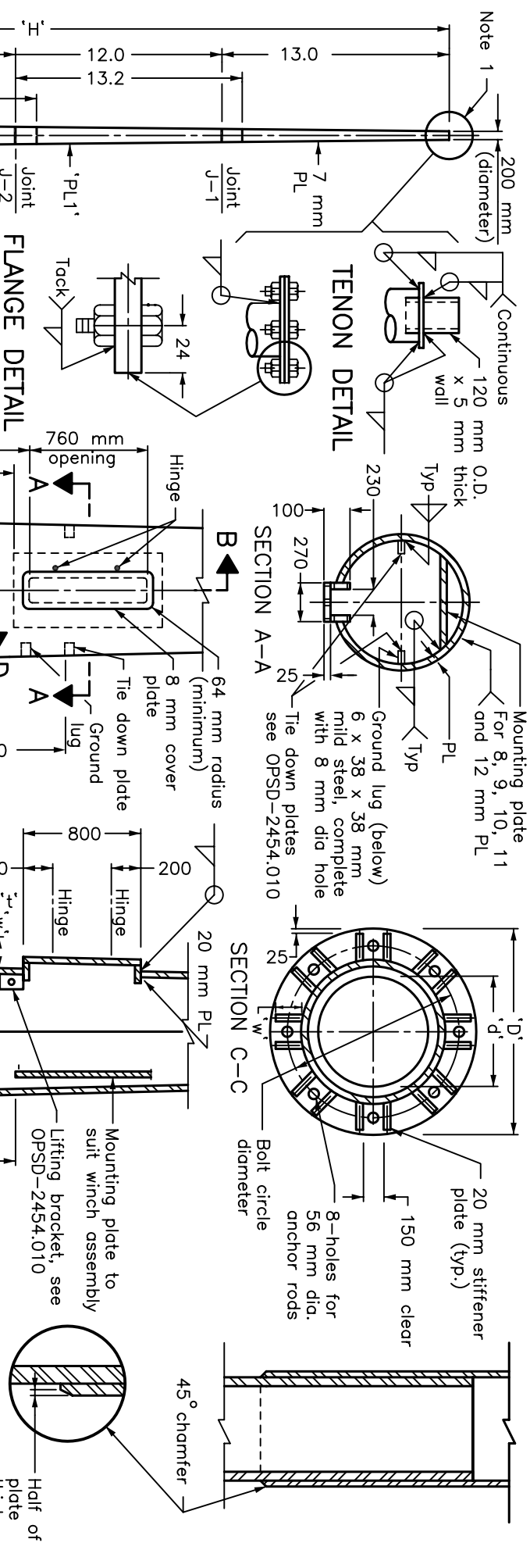
1 Detail of tenon or flange shall suit luminaire raising and lowering equipment.

A For Section D-D, see OPSD-2454.010.

B All dimensions are in millimetres or metres unless otherwise shown.

POLE ELEVATION

JOINT	FINAL FORCE OF ASSEMBLY
J-1	26kN
J-2	46kN



POLE DATA										ANCHOR BASE DATA									
Length 'H'	'h1'	'h2'	'PL1'	'PL2'	'PL3'	'a'	Moment	Shear	'D'	Bolt Circle	'd'	'h3'	't'	'w'					
m	m	m	mm	mm	mm	mm	kNm	kN	mm	mm	mm	mm	mm	mm					
40	10	5	8	9	11	750	995	47	1200	1000	650	300	45	195					
45	10	10	8	10	12	800	1290	56	1200	1000	700	300	45	170					

POLE ELEVATION

HANDHOLE AND ANCHOR BASE DETAIL

ELEVATION

SECTION B-B

NOTES:

- Detail of tenon or flange shall suit luminaire raising and lowering equipment.
- For section D-D, see OPSD-2454.010.
- All dimensions are in millimetres or metres unless otherwise shown.

JOINT	FINAL FORCE OF ASSEMBLY
J-1	41kN
J-2	68kN
J-3	97kN

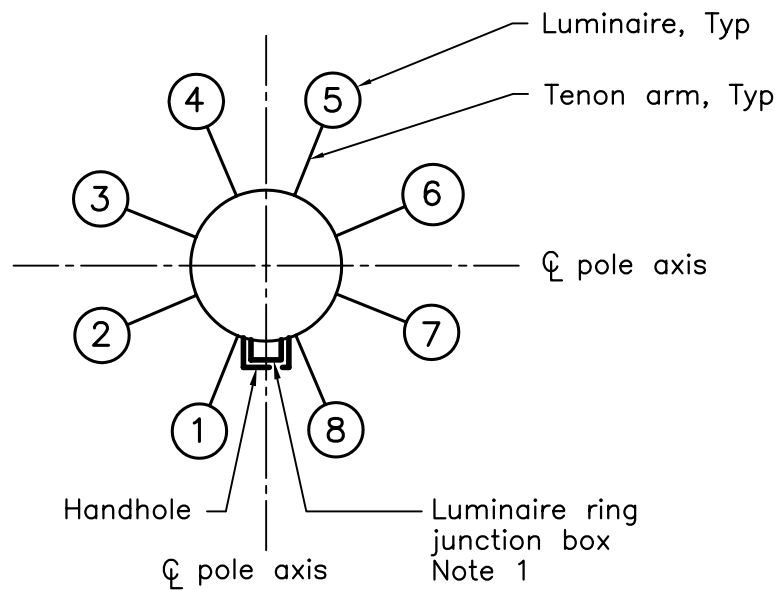
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2003 Rev 0

HIGH MAST LIGHTING 40 AND 45m ROUND POLE WITH DOUBLE BASE PLATE

OPSD - 2452.020





NOTES:

- 1 Tenon arm brackets shall be drilled and assembled so that luminaire No. 1 is always located to the left of the pole handhole and luminaire ring junction box.
- A The maximum number of luminaires on the lowering ring shall be 12—1000watts fixtures.
- B All luminaire tenon arms shall be spaced equally on the ring.
- C Only one luminaire shall be mounted on each tenon arm.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2004

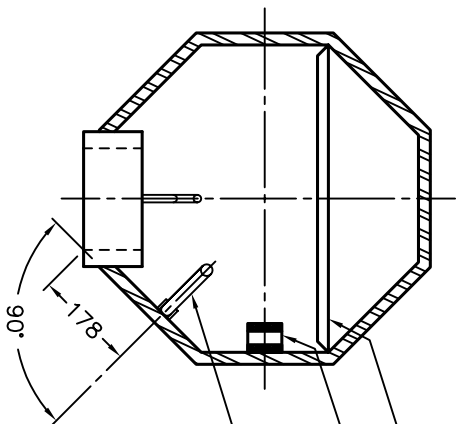
Rev 0

HIGH MAST LIGHTING POLE

LUMINAIRE AND HANDHOLE ORIENTATION

OPSD — 2453.000



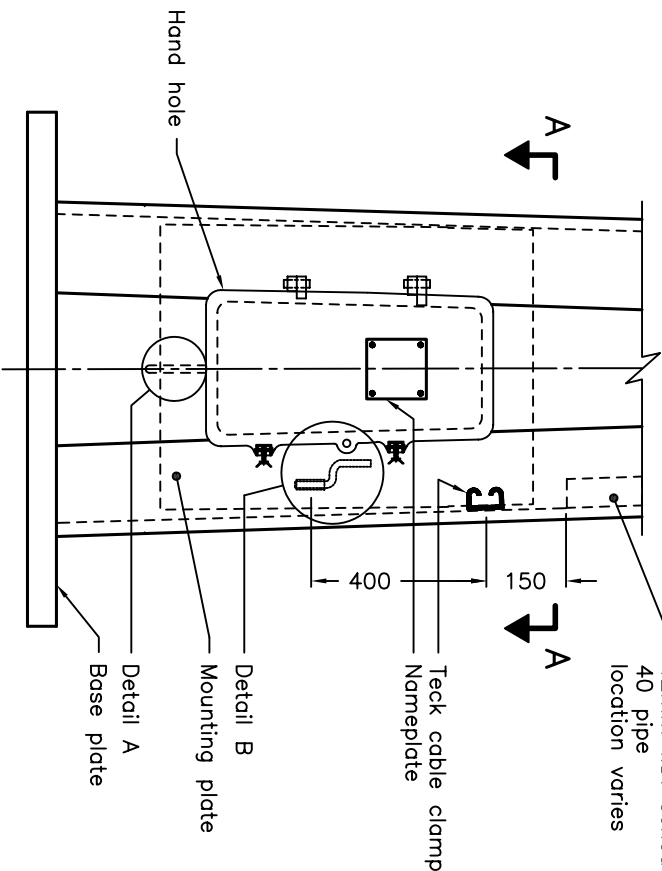


Note 1
Teck cable clamp placed
at pole section ends, not
within slip joints

Remote cable holder

SECTION A-A

42mm I.D. schedule
40 pipe
location varies

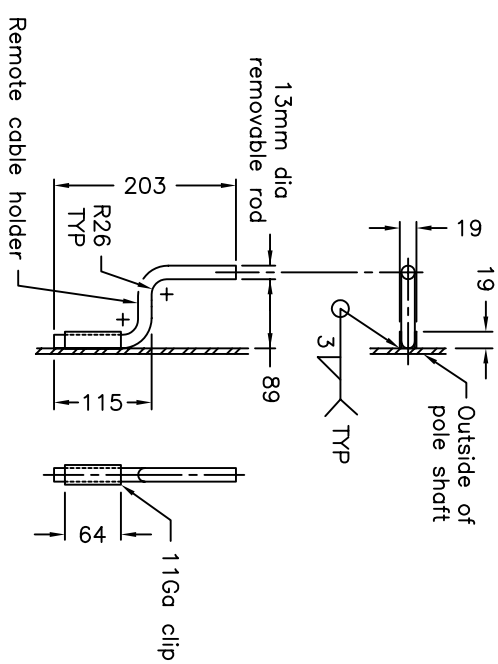


ELEVATION

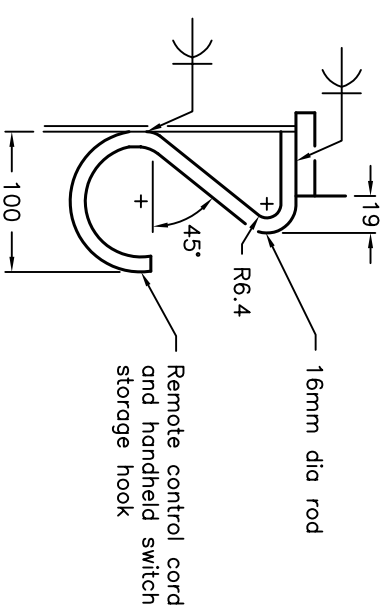
NOTES:

1 Mounting plate location varies
based on pole length.

A All dimensions are in millimetres
unless otherwise shown.



DETAIL B



DETAIL A

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2003

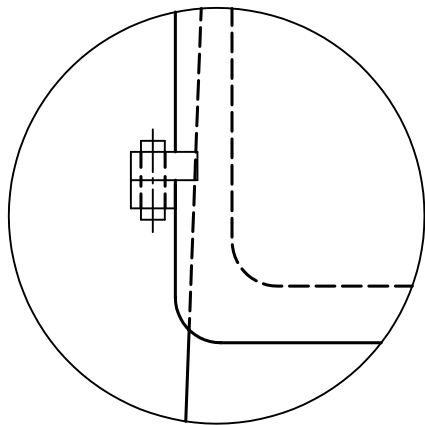
Rev 0

HIGH MAST LIGHTING POLE

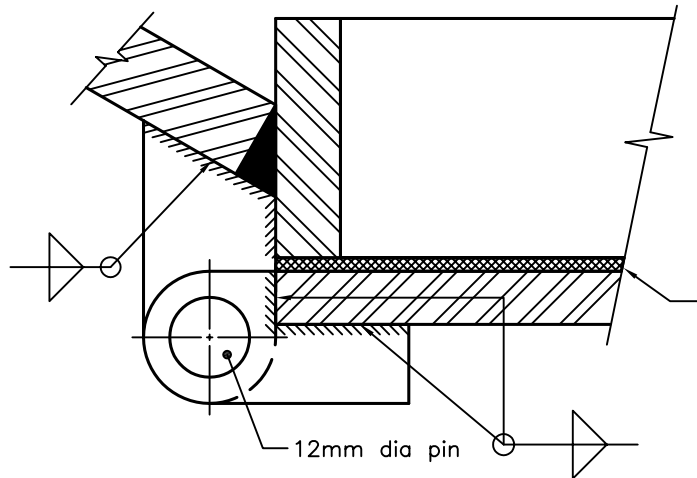
CABLE HOLDER AND STORAGE HOOK DETAILS

OPSD - 2453.010

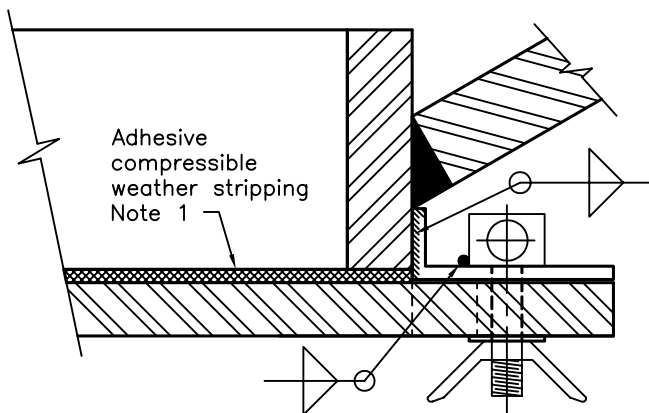




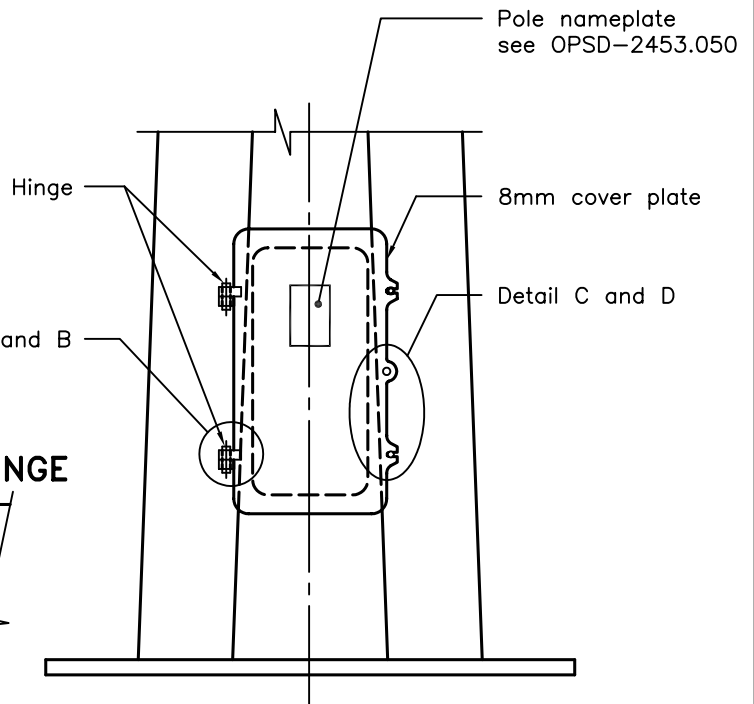
DETAIL A
FRONT VIEW OF HANDHOLE COVER HINGE



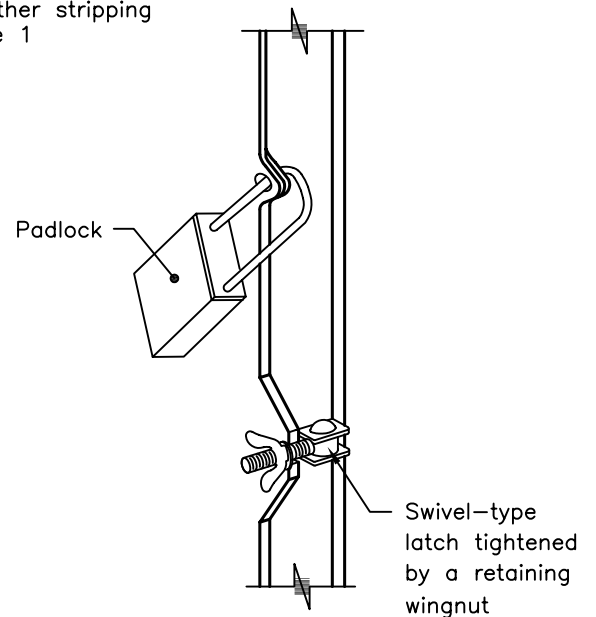
DETAIL B
TOP VIEW OF HANDHOLE COVER HINGE



DETAIL D
TOP VIEW OF HANDHOLE COVER LATCH



ELEVATION



DETAIL C
HANDHOLE COVER LATCH AND PADLOCK

NOTES:

- 1 Weather stripping shall be completely around the edge of the pole handhole opening.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2004

Rev 0

HIGH MAST LIGHTING POLE

HANDHOLE COVER HINGES, LATCHES, AND PADLOCK



OPSD - 2453.020

150

200

POLE No. _____

CONTRACT No. _____

POLE MANUFACTURER _____

DATE OF MANUFACTURE _____

LUMINAIRE MANUFACTURER _____

LUMINAIRE DISTRIBUTION TYPE _____

LOWERING DEVICE MANUFACTURER _____

12mm
Typ

12mm
Typ

NOTES:

- A Nameplate shall be stainless steel, 4mm thick.
- B Nameplate shall be supplied with a 4mm neoprane or rubber backing and shall be riveted to the hand hole cover.
- C All lettering including fill-in information shall be engraved and painted black. Letter height shall be a minimum of 4mm.
- D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2003

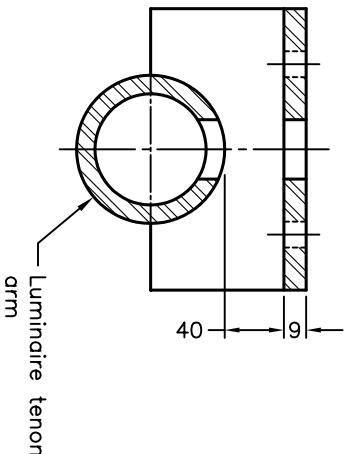
Rev 0

HIGH MAST LIGHTING POLE

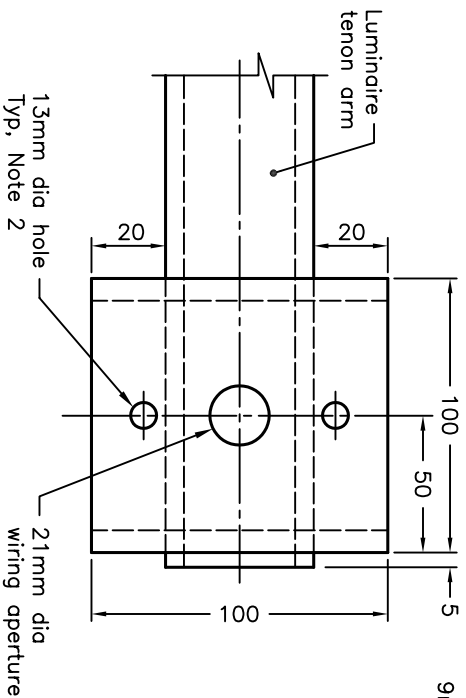
NAMEPLATE DETAILS



OPSD - 2453.050

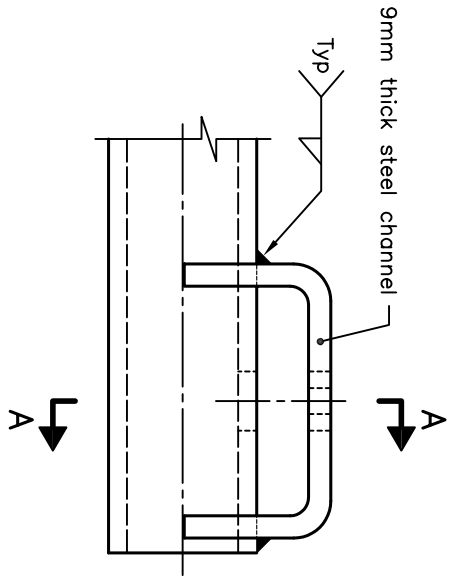


SECTION A-A

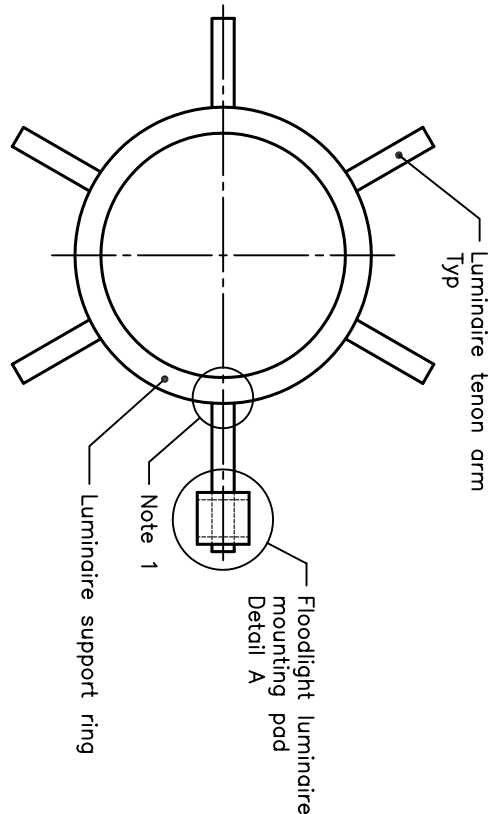


PLAN

DETAIL A



ELEVATION

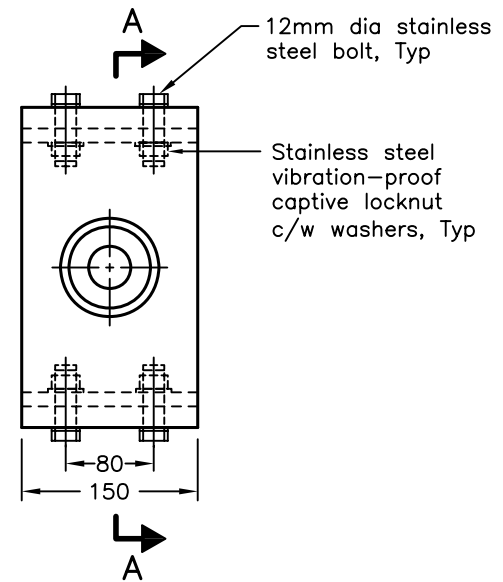
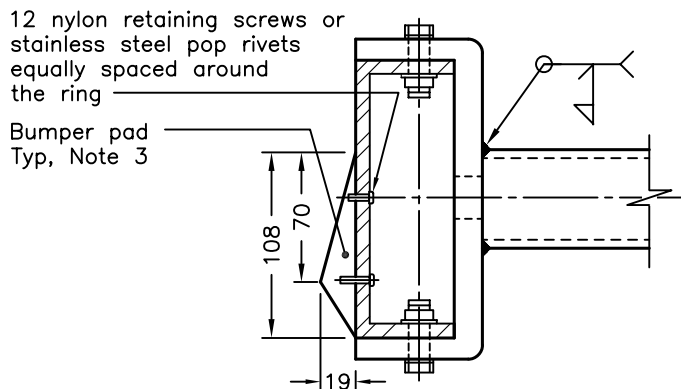
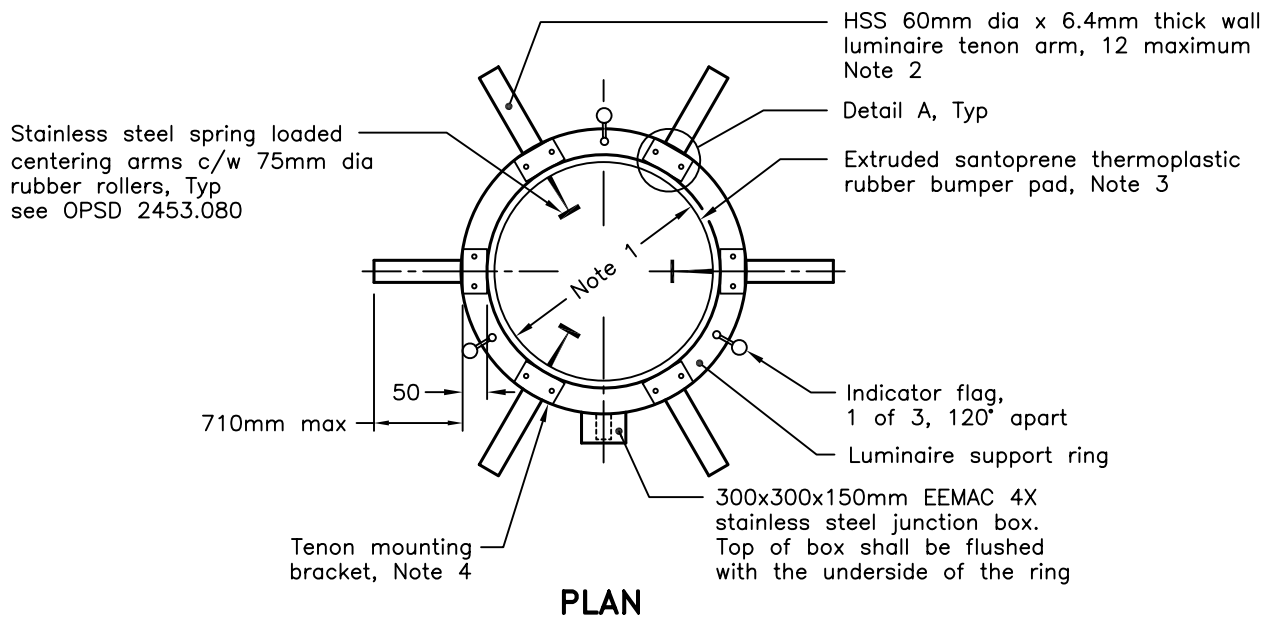


PLAN

NOTES:

- 1 For luminaire support ring details see OPSD-2453.070.
- 2 Hole to be drilled to match floodlight mounting requirements.
- A Orientation, number of luminaire tenon arms, and pads required as specified.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING			HIGH MAST LIGHTING POLE FLOOD LIGHT LUMINAIRE MOUNTING DETAILS		
Nov 2005			Rev 0		
-----			-----		
-----			-----		
OPSD - 2453.060					



DETAIL A

LEGEND:

HSS – Hollow Structural Section
EEMAC – Electrical Equipment Manufacturers of Canada

NOTES:

- 1 The inner diameter of the ring shall be suitable for the maximum pole diameter specified. A minimum clearance of 100mm from the bumper pad to the pole surface shall be provided all around the pole when the ring is in the lowest position.
- 2 Orientation and number of luminaire arms as specified.
- 3 Dimensions and bumper shape shown are typical. Bumper pads shall be glued and fastened to the ring such that the screws or rivets do not come in contact with the pole surface.
- 4 Tenon mounting bracket shall be manufactured to fit the exact radius of the lowering ring. The mounting plate shall not be abruptly bent or notched.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

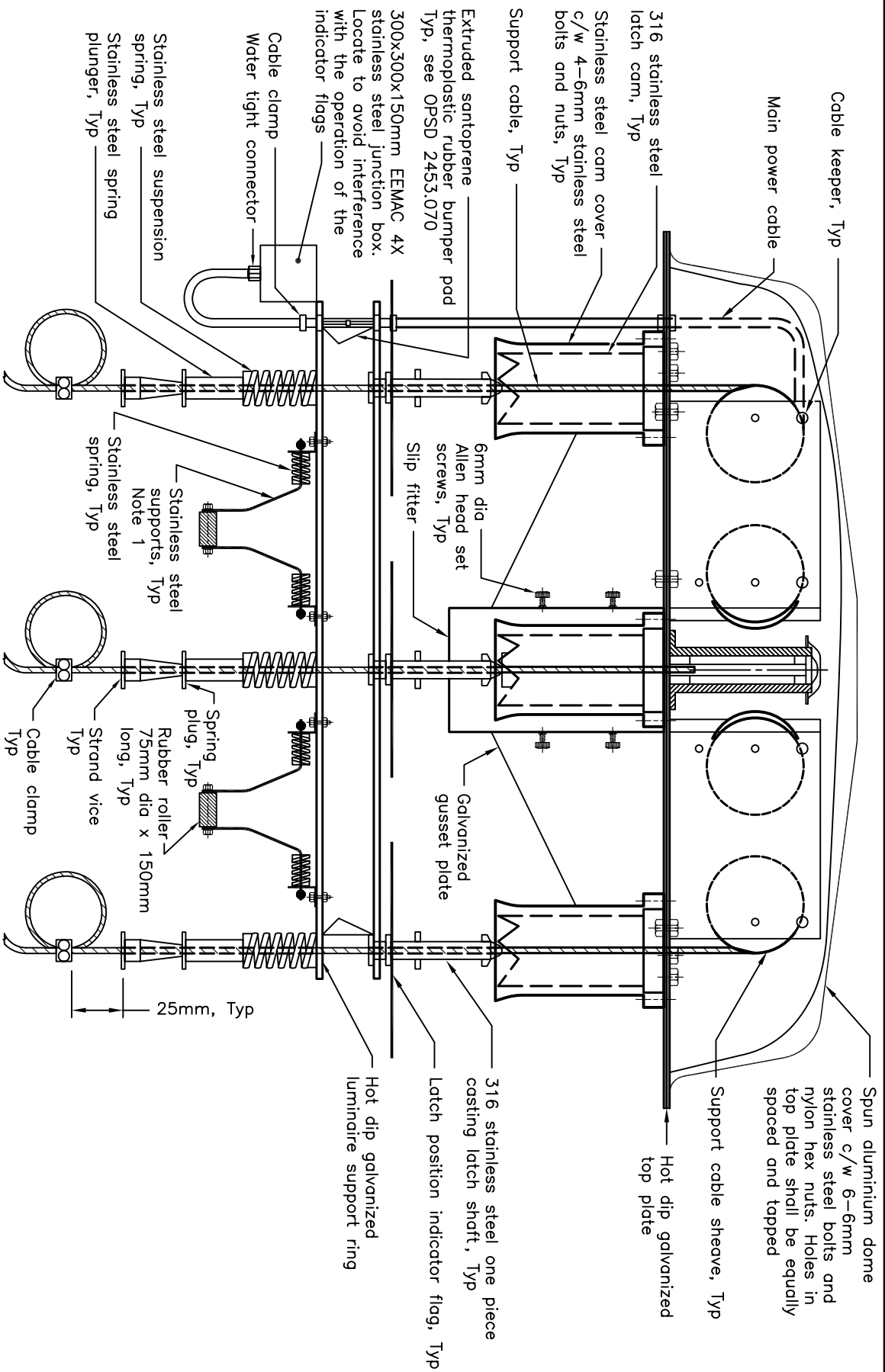
Nov 2006 Rev 1

HIGH MAST LIGHTING POLE

LUMINAIRE SUPPORT RING



OPSD 2453.070



NOTES:

- 1 Spring loaded centering arm assembly shall be stainless steel c/w 75mm dia x 150mm long rubber roller. Three equally spaced arms are required per ring.
- A All mounting hardware shall be stainless steel.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

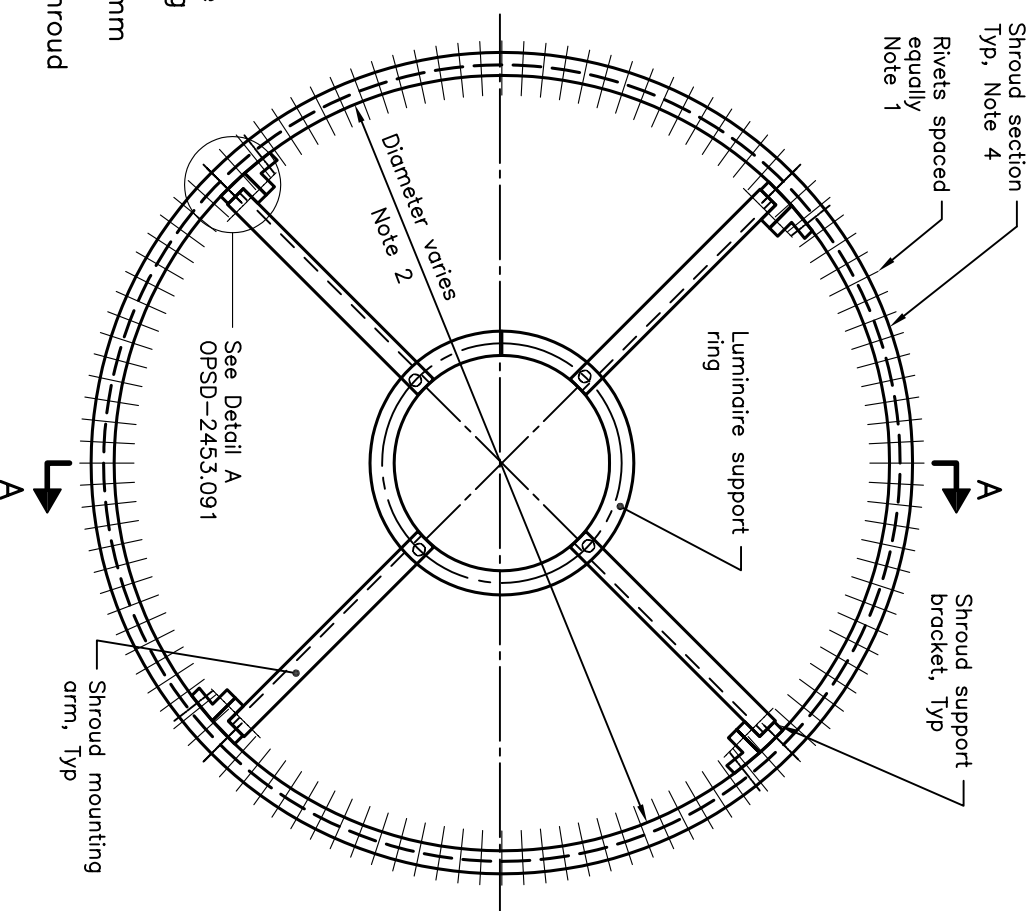
April 2009 Rev 1

HIGH MAST LIGHTING POLE

HEAD FRAME AND RING ASSEMBLY

OPSD 2453.080



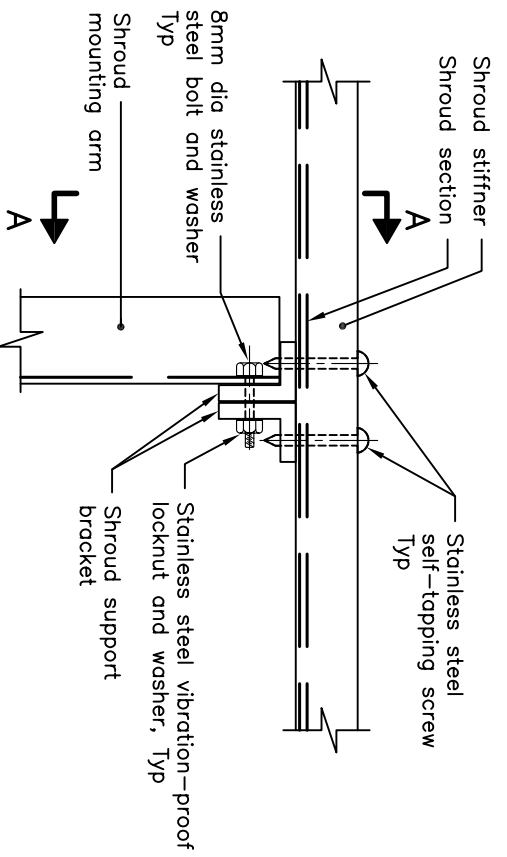


NOTES:

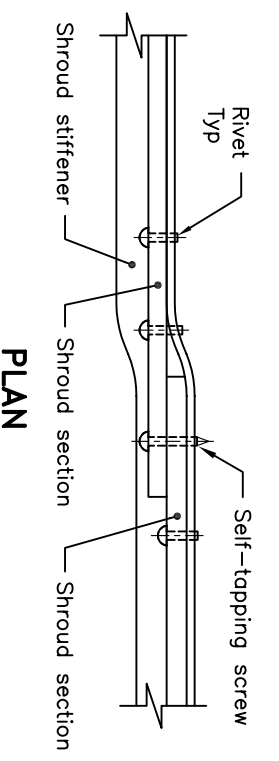
- 1 Shroud sections shall be riveted to shroud stiffeners at intervals of no more than 3 degrees.
- 2 Shroud diameter to suit maximum number of luminaires and luminaire size mounted on each lowering ring assembly.
- 3 Shroud section depth shall be 600mm or greater.
- 4 Diameter of shroud sections and shroud stiffeners to suit diameter of shroud assembly.
- 5 All dimensions are in millimetres unless otherwise shown.



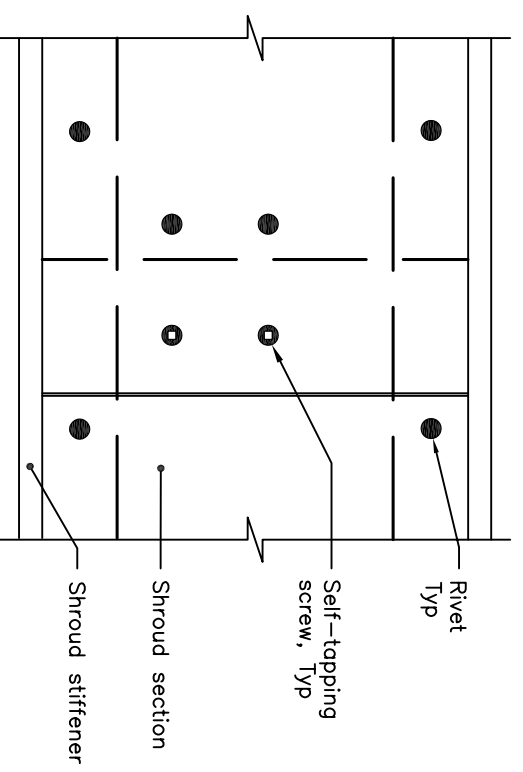
OPSD – 2453.090



**ATTACHMENT OF SHROUD MOUNTING ARM
TO SHROUD SUPPORT BRACKET**

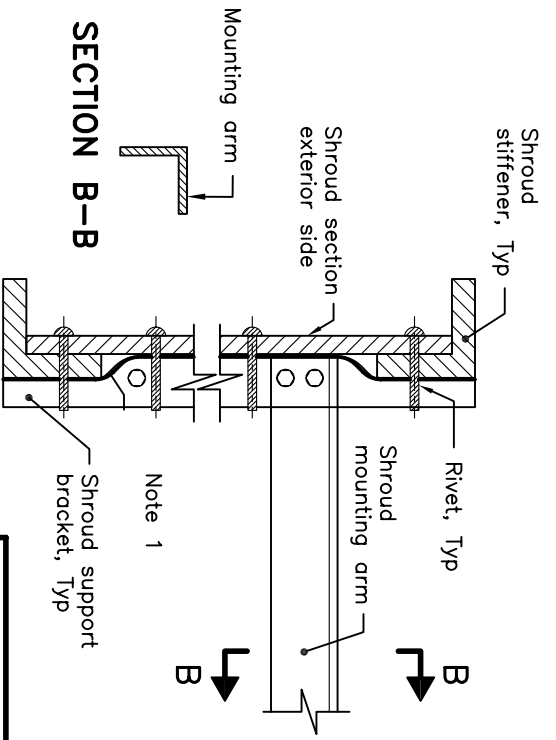


PLAN



ELEVATION

SHROUD SECTION OVERLAP



SECTION A-A

- NOTES:**
- 1 Bend shroud support bracket at top and bottom shroud stiffener.
 - A Length of shroud support bracket to suit shroud assembly depth.
 - B Length of mounting arm to suit diameter of shroud assembly.
 - C Shroud sections shall be overlapped midway between shroud support brackets and shall be held in place by self-tapping screws.
 - D This OPSPD to be read in conjunction with OPSPD-2453.090.
 - E All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING			HIGH MAST LIGHTING POLE		
			LUMINAIRE SHROUD DETAILS		
Nov 2005			Rev 0		
			OPSPD - 2453.091		



ID No.	QTY	PART DESCRIPTION
①	1	GALVANIZED STEEL WINCH AND EQUIPMENT MOUNTING PLATE
②	1	GEAR MOTOR, VOLTAGE _____, HP _____
③	1	TORQUE LIMITER
④	1	JUNCTION BOX
⑤	1	WINCH WITH DRUM SUPPORT
⑥	1	TERMINAL BOARD
⑦	1	MOTOR CONTROLLER
⑧	3	MOTOR STARTER OVERLOAD PROTECTION (HEATER)
⑨	1	____V / 30V MAX CONTROL XFMR
⑩	3	SINGLE POLE BREAKER, _____ A, _____V
⑪	1	THREE POLE BREAKER, _____ A, _____V
⑫	1	BREAKER BOX
⑬	1	BREAKER MOUNTING BRACKET
⑭	2	STRAIN RELIEF CONNECTOR
⑮	4	90° STRAIN RELIEF CONNECTOR
⑯	4	O-RING
⑰	4	LOCKNUT
⑱	1	PUSH BUTTON SWITCH AND PENDANT
⑲	1	OVERLOAD RESET BUTTON
⑳	1	BREAKER BOX COVER PLATE, SHOWN DETACHED
㉑	1	ADHESIVE LABEL: "CATALOGUE NUMBER"
㉒	1	ADHESIVE LABEL: "PHASE A (RED)"
㉓	1	ADHESIVE LABEL: "PHASE B (BLACK)"
㉔	1	ADHESIVE LABEL: "PHASE C (BLUE)"
㉕	1	ADHESIVE LABEL: "MAIN BREAKER"
㉖	1	BREAKER BOX COVER DOOR

NOTES:

A Voltages, amperages, and horsepower ratings as specified.
B This OPSD to be read in conjunction with OPSD-2453.150.

ONTARIO PROVINCIAL STANDARD DRAWING

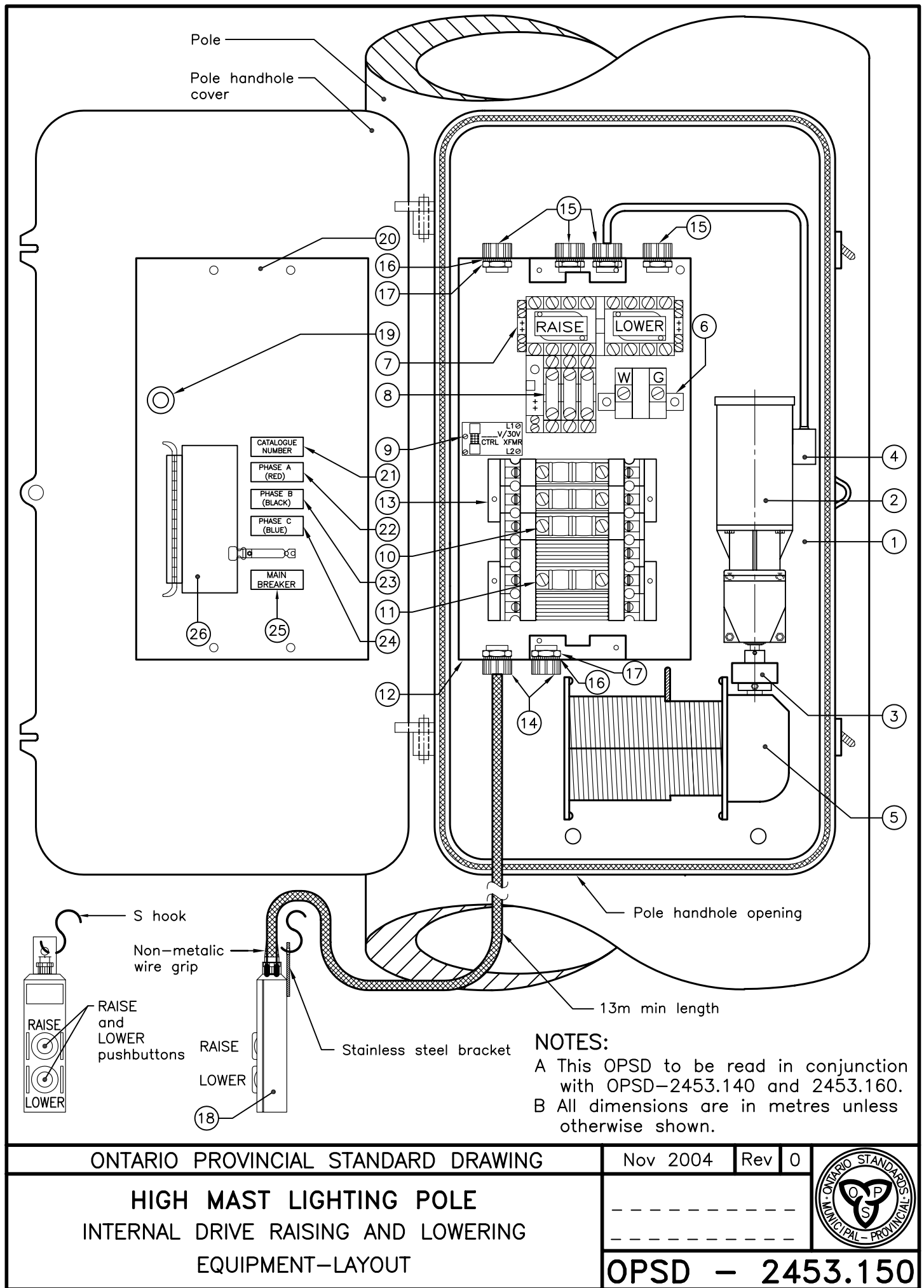
Nov 2004

Rev 0

HIGH MAST LIGHTING POLE
INTERNAL DRIVE RAISING AND LOWERING
EQUIPMENT—LIST OF COMPONENTS

OPSD – 2453.140





ONTARIO PROVINCIAL STANDARD DRAWING

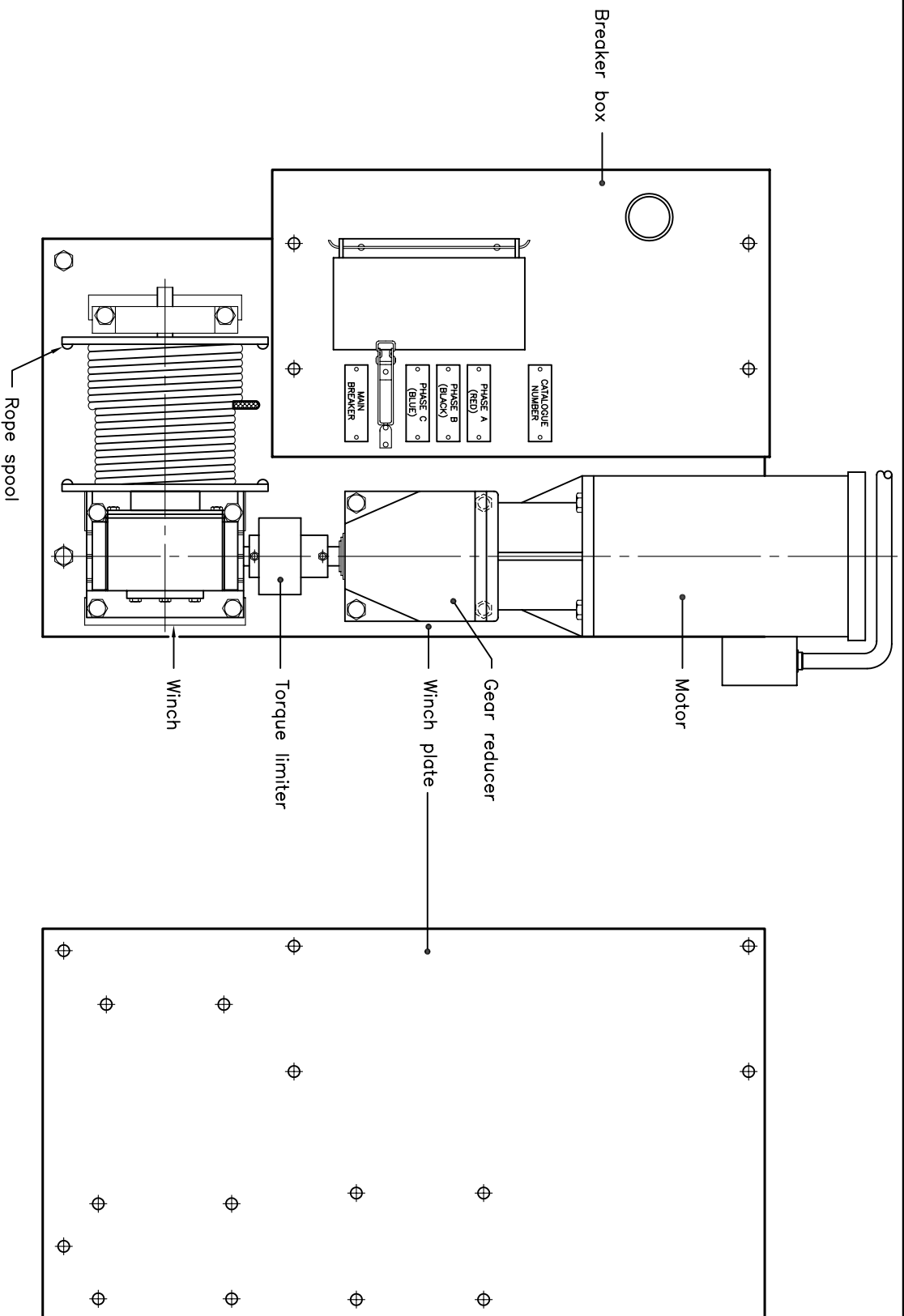
Nov 2004

Rev 0

HIGH MAST LIGHTING POLE
INTERNAL DRIVE RAISING AND LOWERING
EQUIPMENT-LAYOUT

OPSD - 2453.150





WINCH PLATE ASSEMBLY

WINCH PLATE

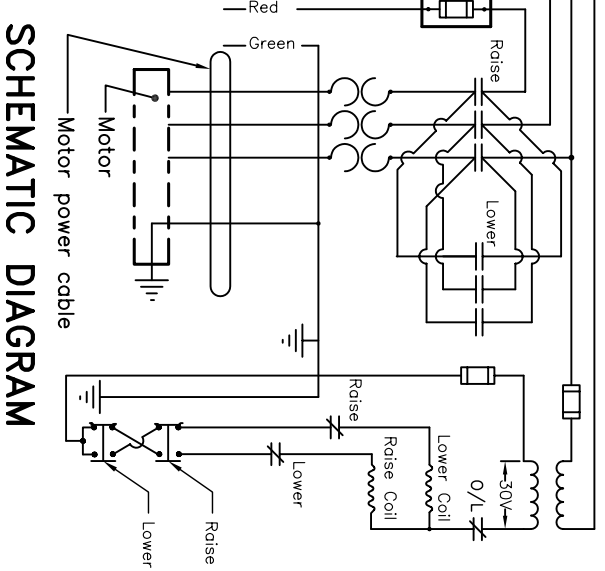
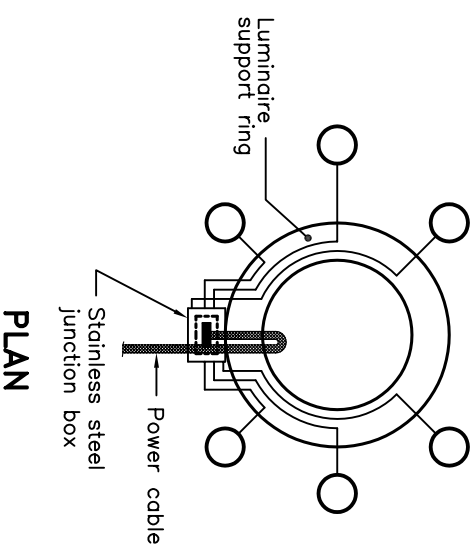
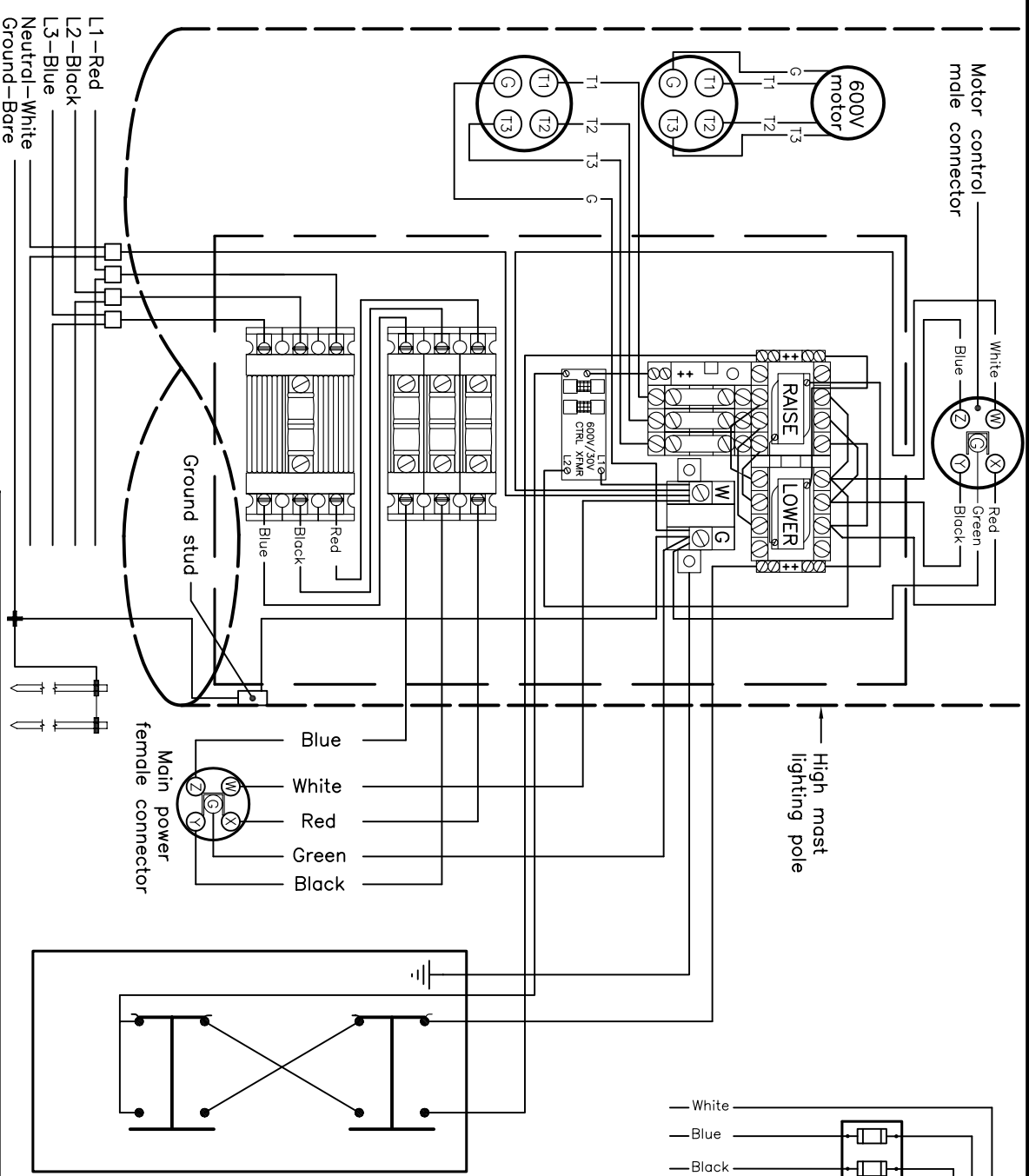
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2004 Rev 0

HIGH MAST LIGHTING POLE INTERNAL MOTOR AND WINCH DETAILS

OPSD - 2453.160





SCHEMATIC DIAGRAM

PLAN

ONTARIO PROVINCIAL STANDARD DRAWING

HIGH MAST LIGHTING POLE

INTERNAL DRIVE RAISING AND LOWERING EQUIPMENT

347/600V, 3-PHASE

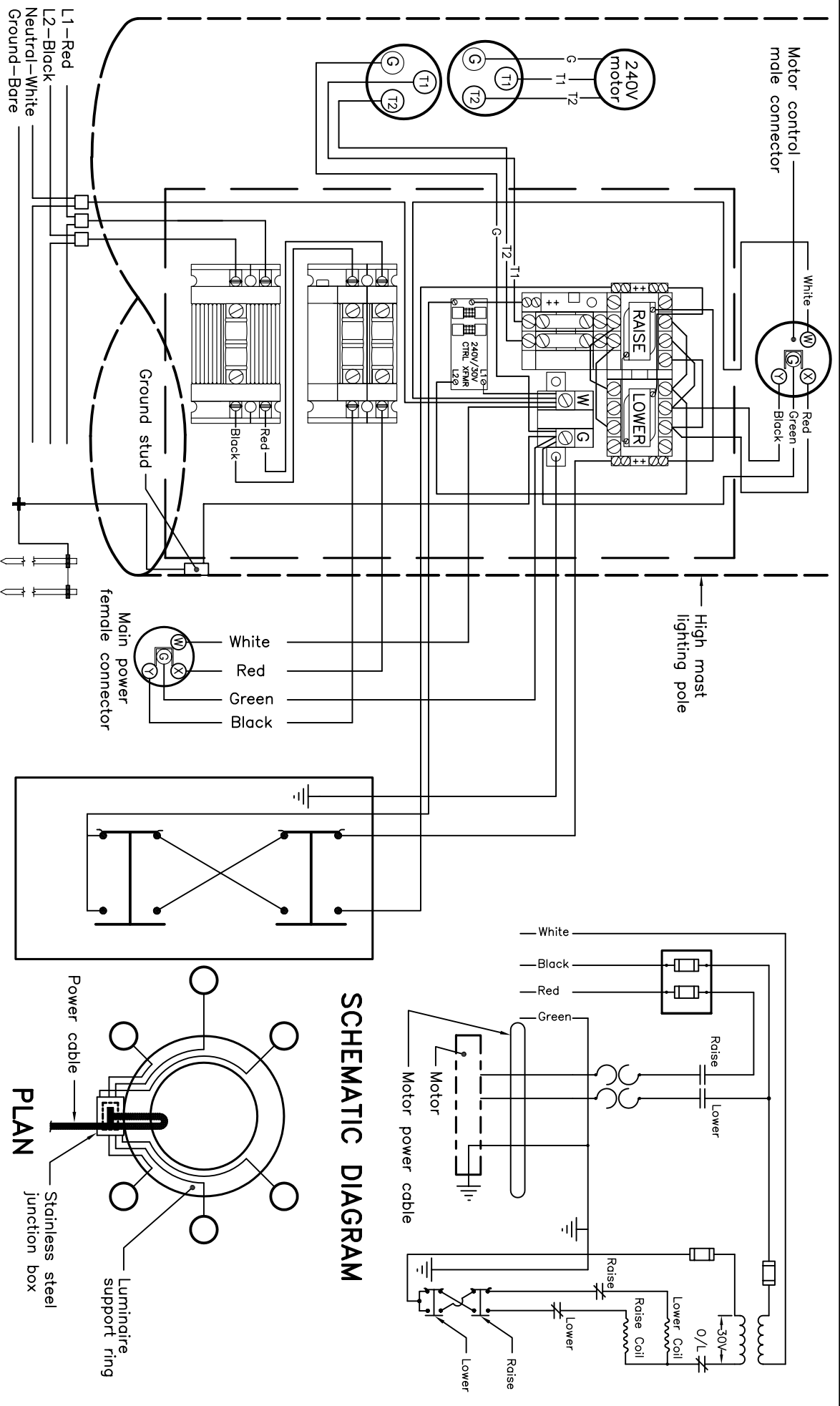
WIRING DIAGRAM

Nov 2005 Rev 0



OPSD - 2453.170

NOTE:
A Male and female connectors for the motor shall be uniquely keyed to prevent mating with other connectors.



SCHEMATIC DIAGRAM

PLAN

ONTARIO PROVINCIAL STANDARD DRAWING

HIGH MAST LIGHTING POLE

INTERNAL DRIVE RAISING AND LOWERING EQUIPMENT

120/240V, 1-PHASE

WIRING DIAGRAM

Nov 2005 Rev 0



OPSD — 2453.180

NOTE:

A Male and female connectors for the motor shall be uniquely keyed to prevent mating with other connectors.

ID No.	QTY	PART DESCRIPTION
①	1	GALVANIZED STEEL WINCH AND EQUIPMENT MOUNTING PLATE
②	1	ZINC ELECTROPLATED STEEL DRIVE SUPPORT ASSEMBLY
③	1	PRECISION WINCH WITH BUILT-IN BREAKER
④	1	WINCH WITH DRUM COMPLETE WITH CABLE
⑤	1	TERMINAL BOARD
⑥	3	SINGLE POLE BREAKER, _____ A, _____ V
⑦	1	THREE POLE BREAKER, _____ A, _____ V
⑧	1	BREAKER BOX
⑨	1	BREAKER MOUNTING BRACKET
⑩	1	STRAIN RELIEF CONNECTOR
⑪	1	O-RING
⑫	1	LOCKNUT
⑬	1	WIRE CONNECTOR
⑭	1	BREAKER BOX COVER PLATE, SHOWN DETACHED
⑮	1	ADHESIVE LABEL: "CATALOGUE NUMBER"
⑯	1	ADHESIVE LABEL: "PHASE A (RED)"
⑰	1	ADHESIVE LABEL: "PHASE B (BLACK)"
⑱	1	ADHESIVE LABEL: "PHASE C (BLUE)"
⑲	1	ADHESIVE LABEL: "MAIN BREAKER"
⑳	1	BREAKER BOX COVER DOOR
㉑	1	CONNECTOR, FEMALE TYPE, BLUE CASING, POLYESTER HOUSING, FIBRE REINFORCED _____ V, _____ A, _____ W, NEMA 3R

NOTES:

A Voltages, amperages, and wattages as specified.

B This OPSD to be read in conjunction with OPSD-2453.200.

ONTARIO PROVINCIAL STANDARD DRAWING

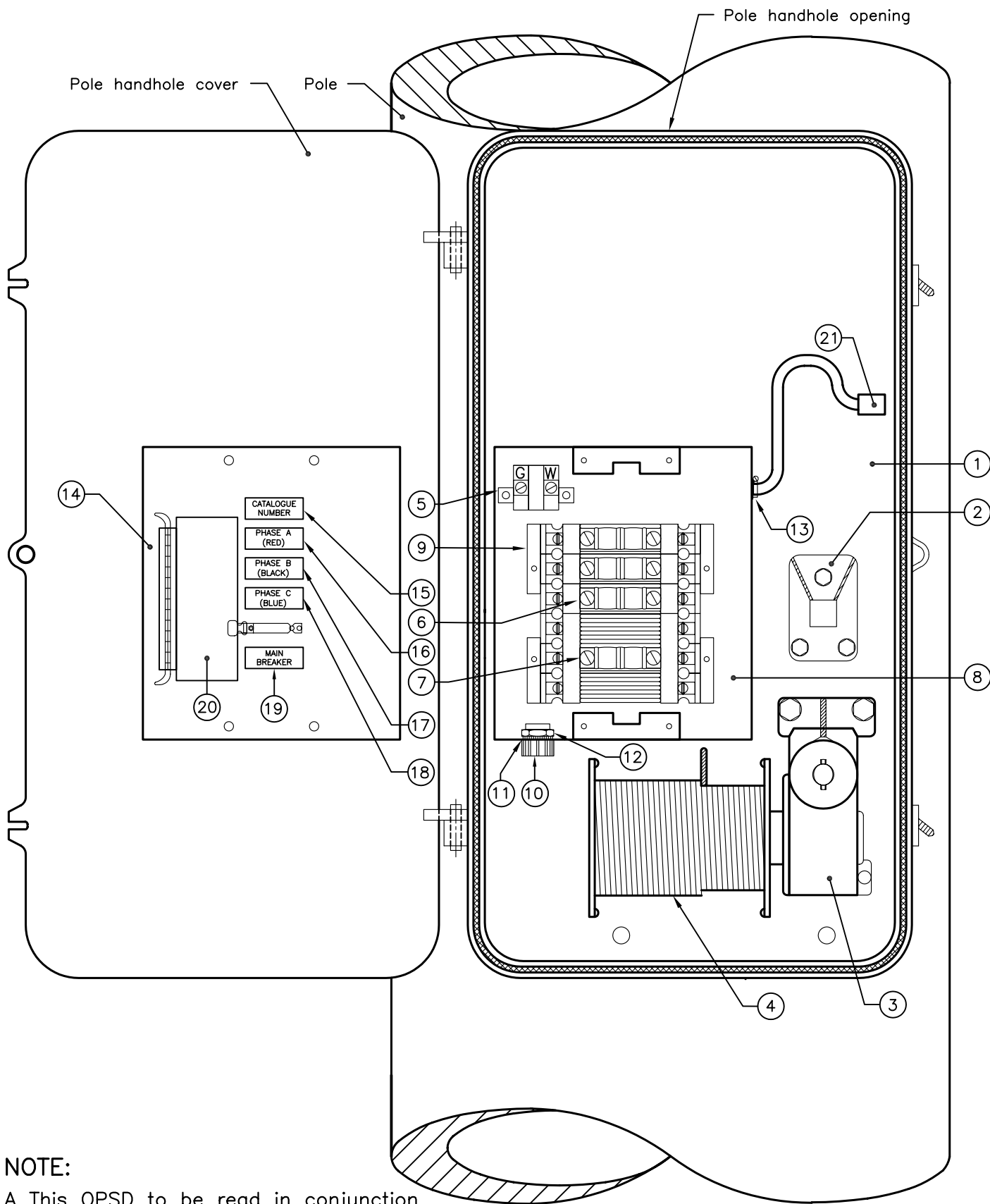
Nov 2004

Rev 0

HIGH MAST LIGHTING POLE
EXTERNAL DRIVE RAISING AND LOWERING
EQUIPMENT—LIST OF COMPONENTS

OPSD – 2453.190





NOTE:

A This OPSD to be read in conjunction with OPSD-2453.190.

ONTARIO PROVINCIAL STANDARD DRAWING

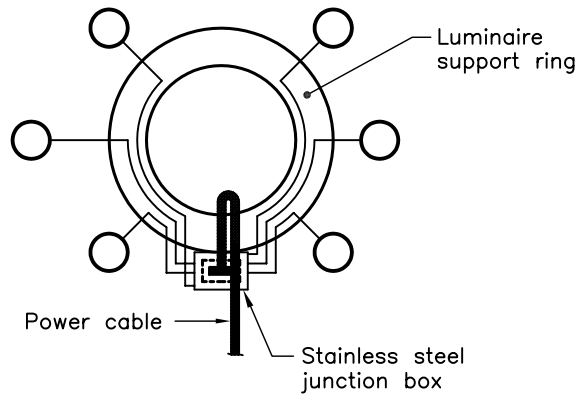
Nov 2004

Rev 0

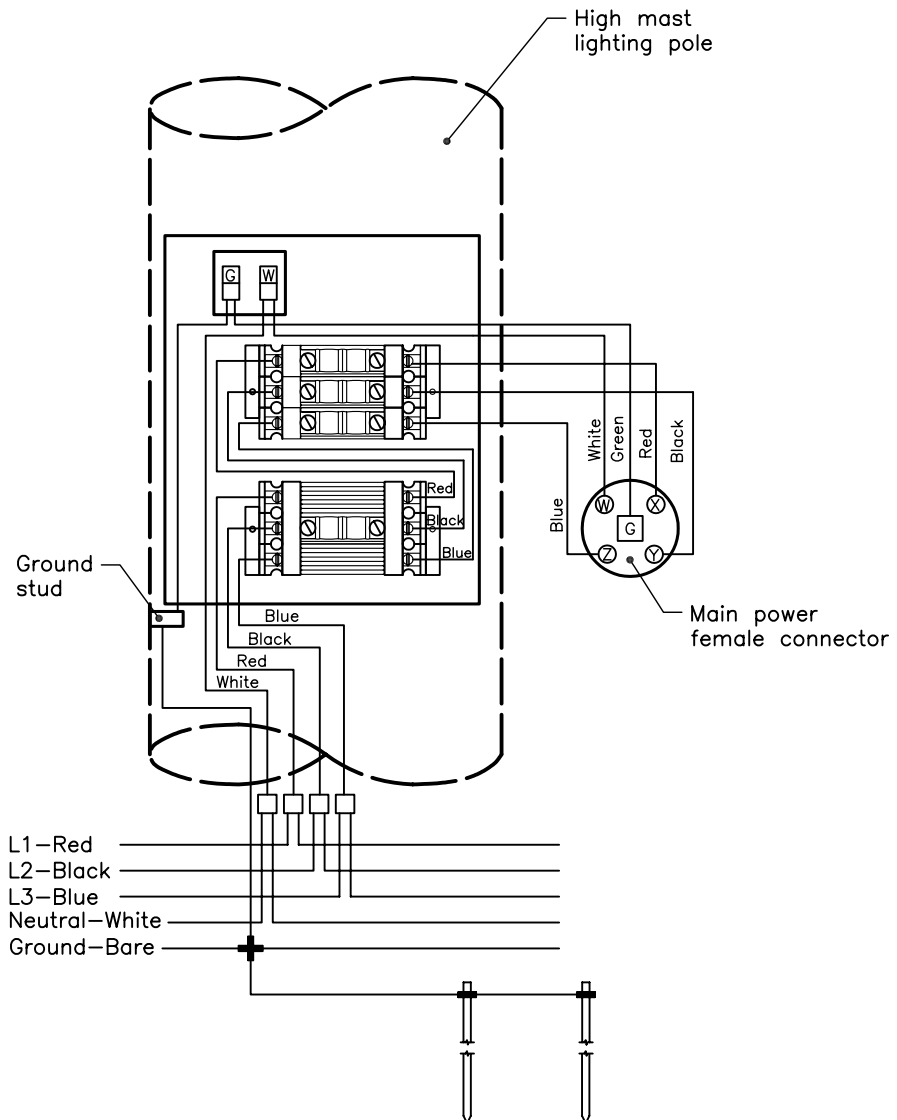
HIGH MAST LIGHTING POLE
EXTERNAL DRIVE RAISING AND LOWERING
EQUIPMENT-LAYOUT

OPSD - 2453.200





PLAN



ONTARIO PROVINCIAL STANDARD DRAWING

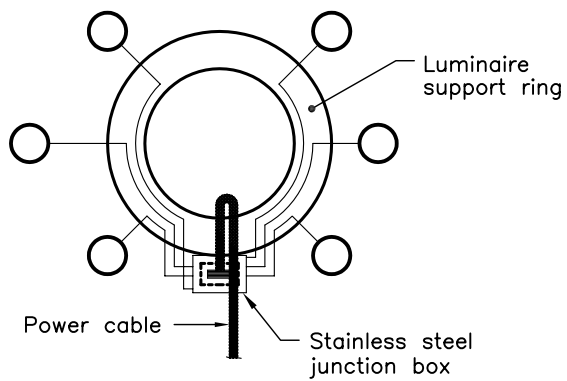
Nov 2005

Rev 0

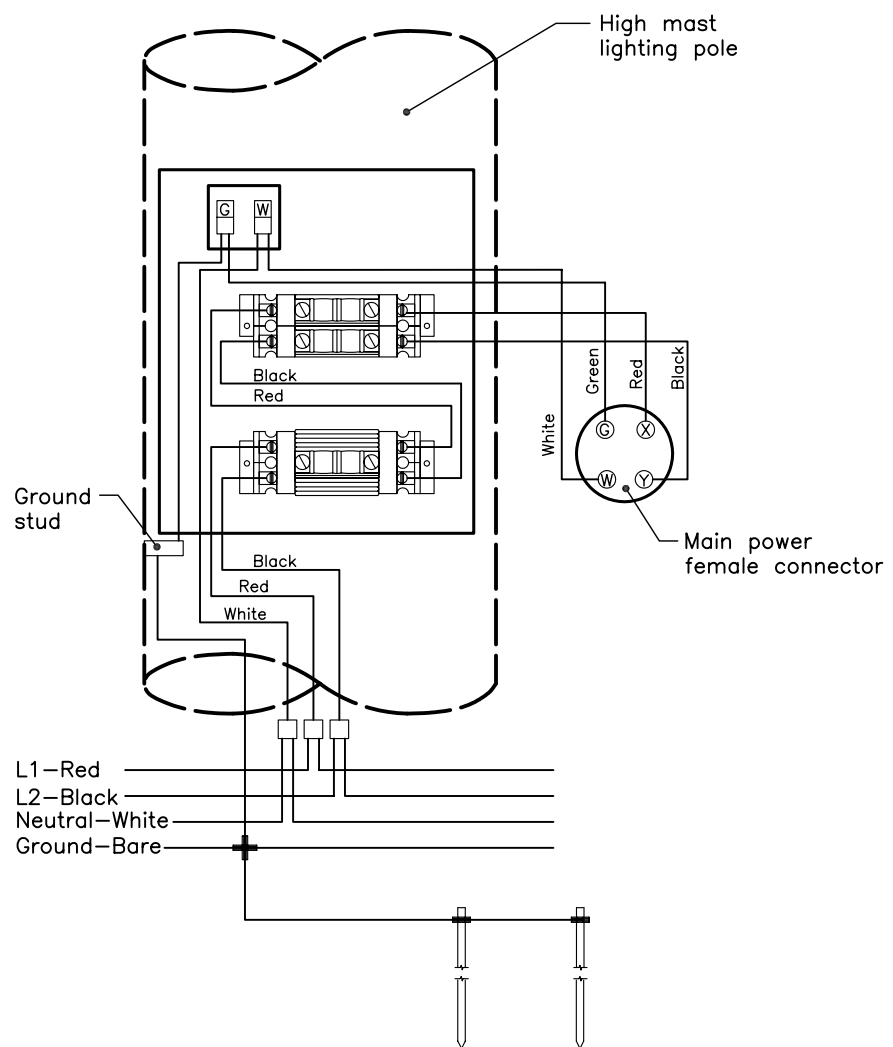
HIGH MAST LIGHTING POLE
EXTERNAL DRIVE RAISING AND LOWERING EQUIPMENT
347/600V, 3-PHASE
WIRING DIAGRAM

OPSD - 2453.210





PLAN



ONTARIO PROVINCIAL STANDARD DRAWING

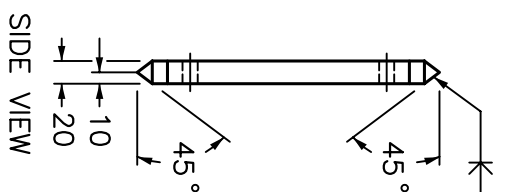
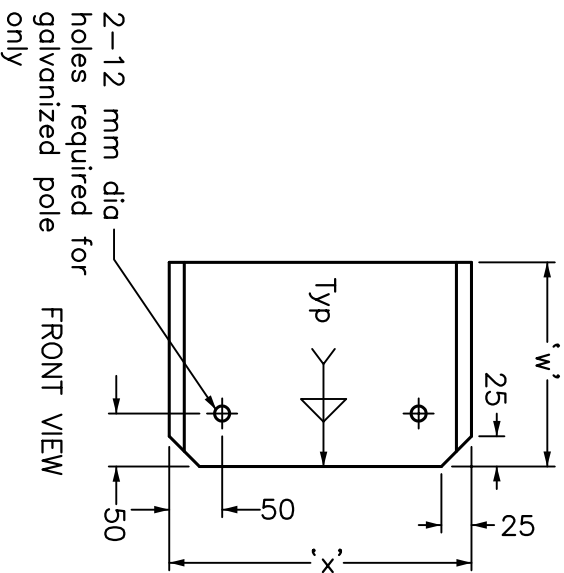
Nov 2005

Rev 0

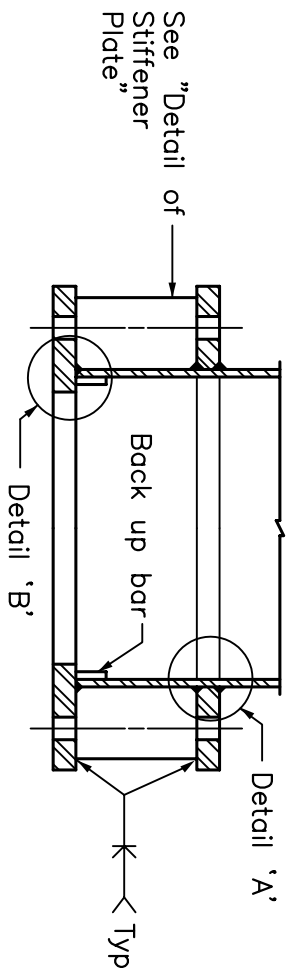
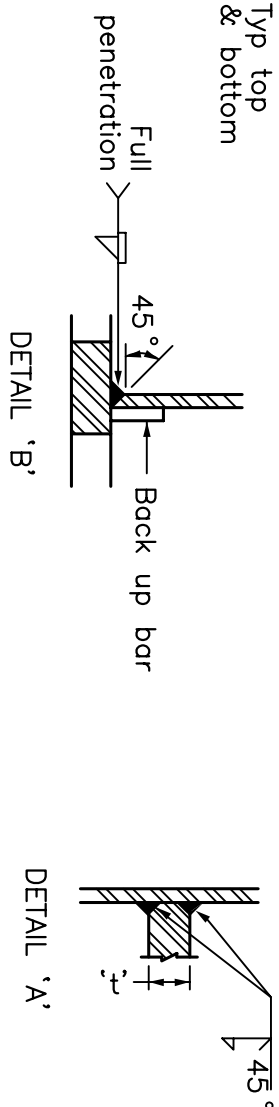
HIGH MAST LIGHTING POLE
EXTERNAL DRIVE RAISING AND LOWERING EQUIPMENT
120/240V, 1-PHASE
WIRING DIAGRAM



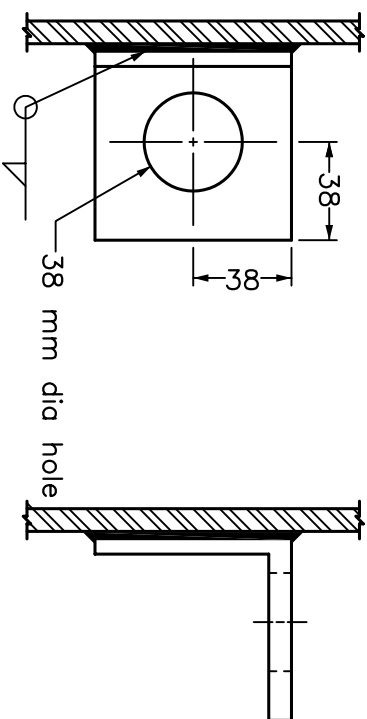
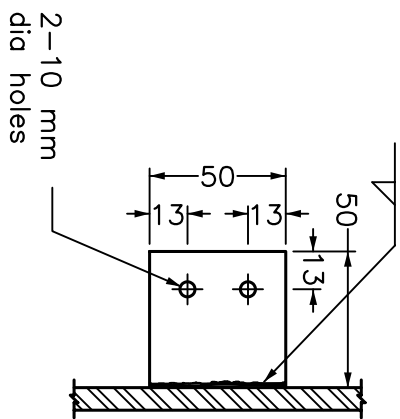
OPSD - 2453.220



DETAIL OF STIFFENER PLATE



Pole (m)	'x' (mm)	't' (mm)	'w' (mm)	
			Round pole	Octagonal pole
25.0	180	35	220	190
30.0	180	35	190	160
35.0	180	40	205	175
40.0	300	45	195	195
45.0	300	45	170	170



LIFTING BRACKET

NOTES:

A This drawing shall be read in conjunction with OPSD-2450.010, 2450.020, 2452.010, or 2452.020.
B All dimensions are in millimetres or metres unless otherwise shown.

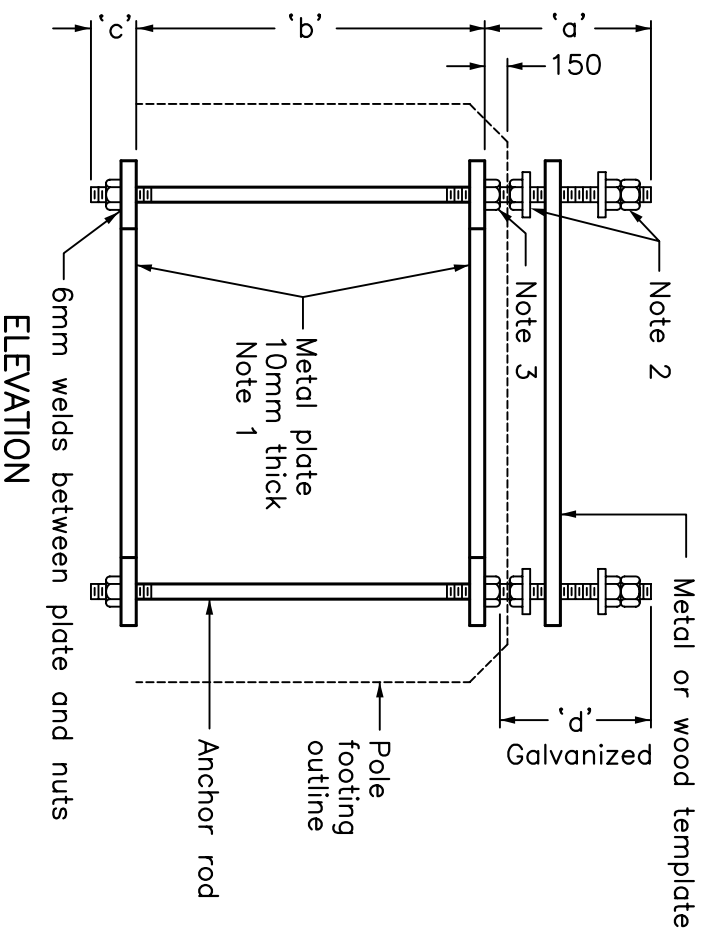
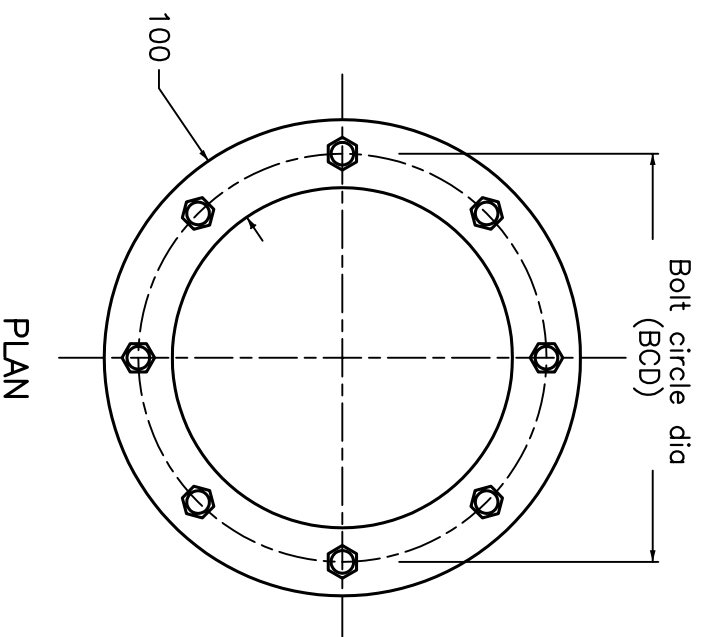
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2003 Rev 0

HIGH MAST LIGHTING POLE
DOUBLE BASE PLATE DETAILS

OPSD - 2454.010





NOTES:

- 1 Eight anchor rods equally spaced shall be provided for anchorage assembly c/w washers and nuts. The metal templates shall be 100mm wide suitable for the anchorage assembly BCD specified.
 - 2 Galvanized hexagonal nut, size to suit anchor rod, 3 required c/w
 - 2 flat washers per rod.
 - 3 Black hexagonal nut, size to suit anchor rod, 2 required per rod, tackweld to plate.
- A All dimensions are in millimetres or metres unless otherwise shown.

Pole Length m	Bolt Circle Dia mm	Anchor Rod Dia mm	'd' mm	'b' mm	'c' mm	'd' mm
25.0	800	48	650	1350	100	550
30.0	800	48	650	1350	100	550
35.0	900	48	650	1350	100	550
40.0	1000	56	800	1600	110	700
45.0	1000	56	800	1600	110	700

ONTARIO PROVINCIAL STANDARD DRAWING

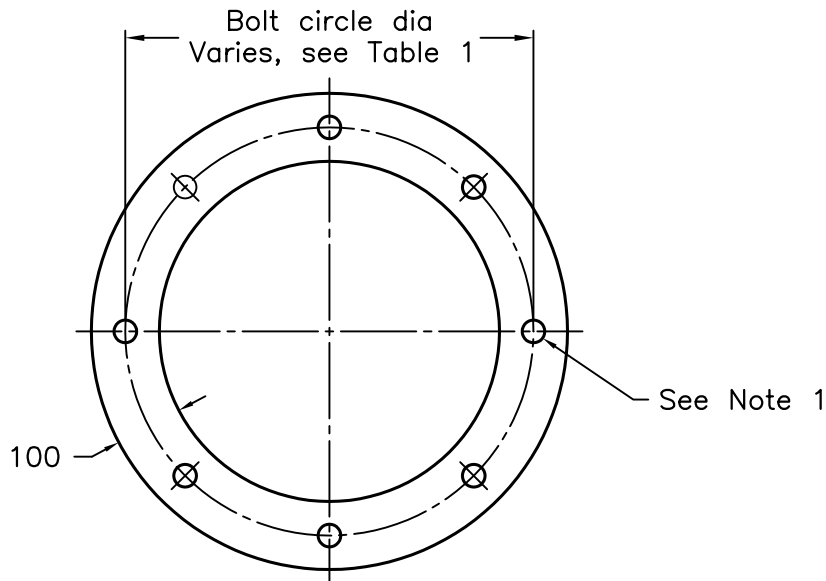
Nov 2003 Rev 0

HIGH MAST LIGHTING POLE ANCHORAGE ASSEMBLY DETAILS

FOR DOUBLE BASE PLATE

OPSD – 2456.010





METAL PLATE DETAIL

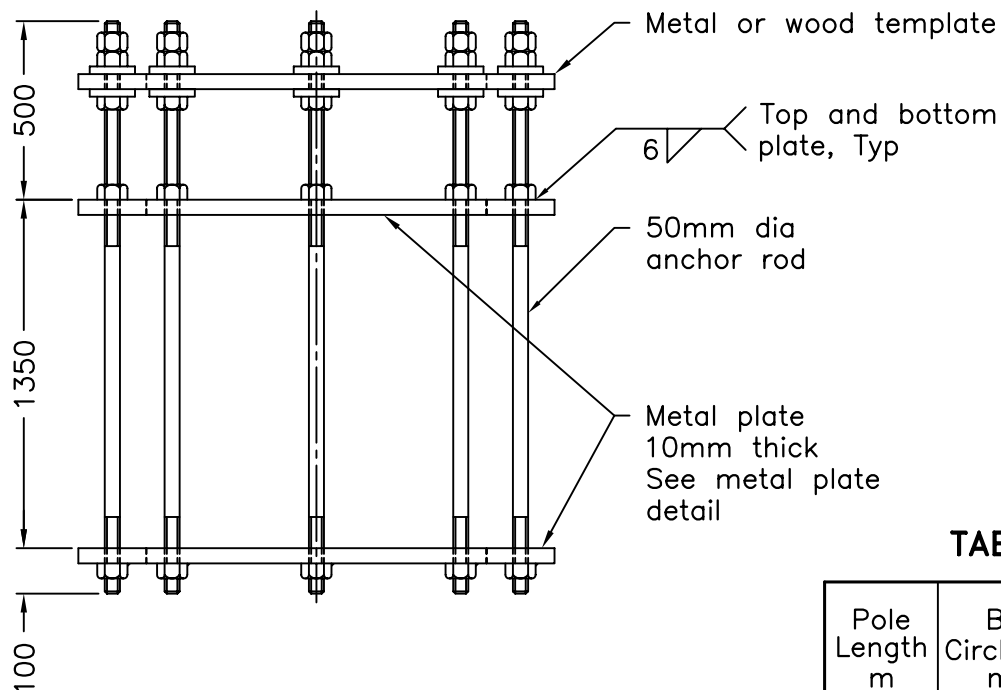


TABLE 1

Pole Length m	Bolt Circle Dia mm	No. of Anchor Rods
25	750	8
30	850	8
35	950	8
40	1075	12
45	1075	12

NOTES:

- 1 Number of anchor rod holes varies, see Table 1.
- A Anchor rods shall be equally spaced.
- B All nuts, anchor rods, metal plates, and washers of the assembly shall be galvanized.
- C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2003

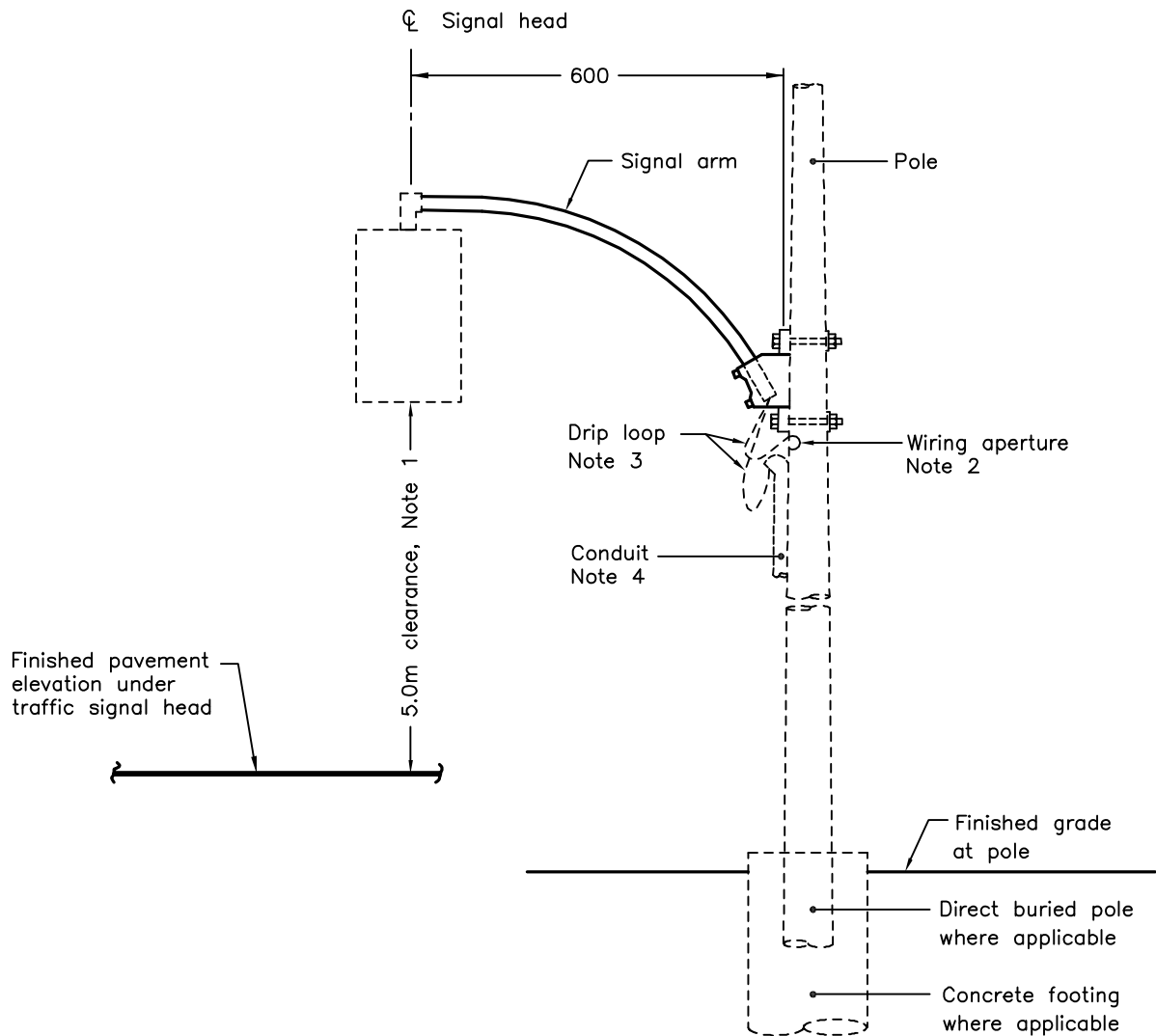
Rev 0

HIGH MAST LIGHTING POLE

ANCHORAGE ASSEMBLY DETAILS

OPSD – 2456.011





NOTES:

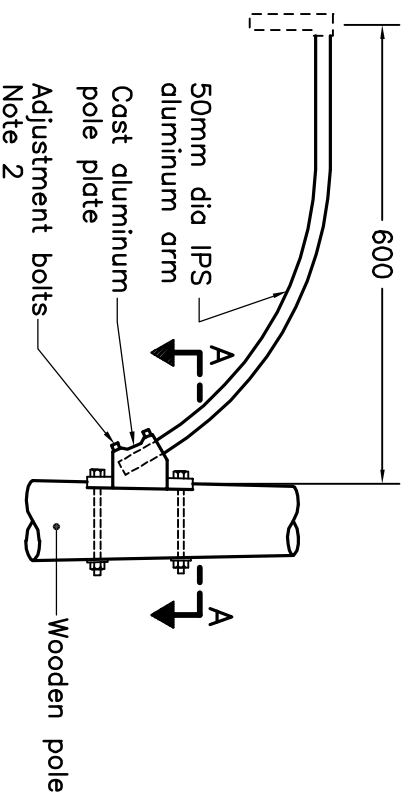
- 1 The bottom of the signal head shall be a minimum of 5.0m above the highest point on the roadway, regardless of whether the signal head is above the pavement or not.
 - 2 Wiring aperture shall be 25mm diameter field drilled complete with rubber grommet, 25mm below arm attachment or 25mm below overlapping sectional steel joints, de-burred, and protected with zinc rich paint.
 - 3 Drip loops shall be provided.
 - 4 For external conduit system on wooden or concrete poles refer to OPSD 2552.01 or OPSD 2554.010.
- A For arm attachment details refer to OPSD 2500.020.
 B For traffic signal head wiring details refer to OPSD 2528.01.
 C Traffic signal hanger details shall be as specified.
 D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2011	Rev	1	
600mm SIGNAL ARM AND SIGNAL HEAD		-----			

		OPSD 2500.010			

Pole plate — 2-16mm dia galvanized steel through bolts, nuts, and 50x50mm square washers

SECTION A-A



ATTACHMENT TYPE 2 WOODEN POLE

NOTES:

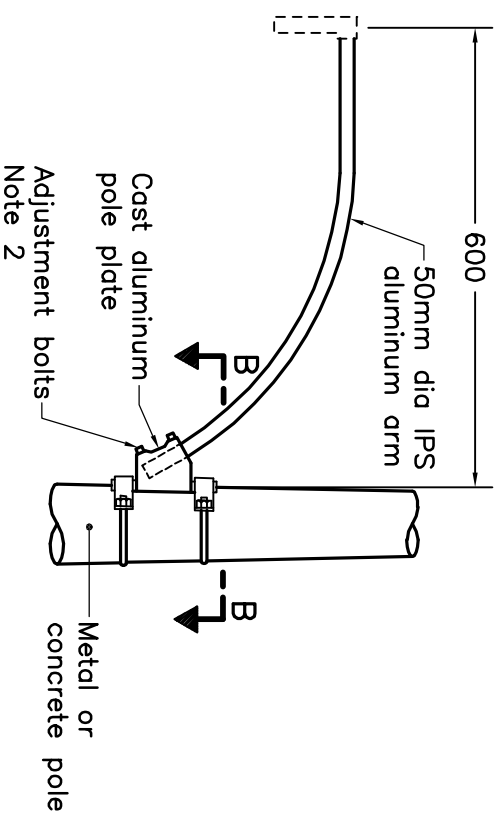
- 1 12.7mm dia U bolts shall be no more than 25mm larger in diameter than the diameter of the pole at the point of attachment.
 - 2 Adjustment bolts shall be adjusted so the straight portion of the arm is level.
 - 3 Pole plate U clamps shall be 8mm hot dip galvanized steel plate and suit the pole diameter.
- A This OPSP to be read in conjunction with OPSP 2500.010.
- B All dimensions are in millimetres unless otherwise shown.

Pole plate — 2-12.7mm dia steel U bolts, nuts, and round washers

2-Pole plate U clamps, Note 3

Note 1

SECTION B-B



ATTACHMENT TYPE 1 METAL AND CONCRETE POLE

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2009

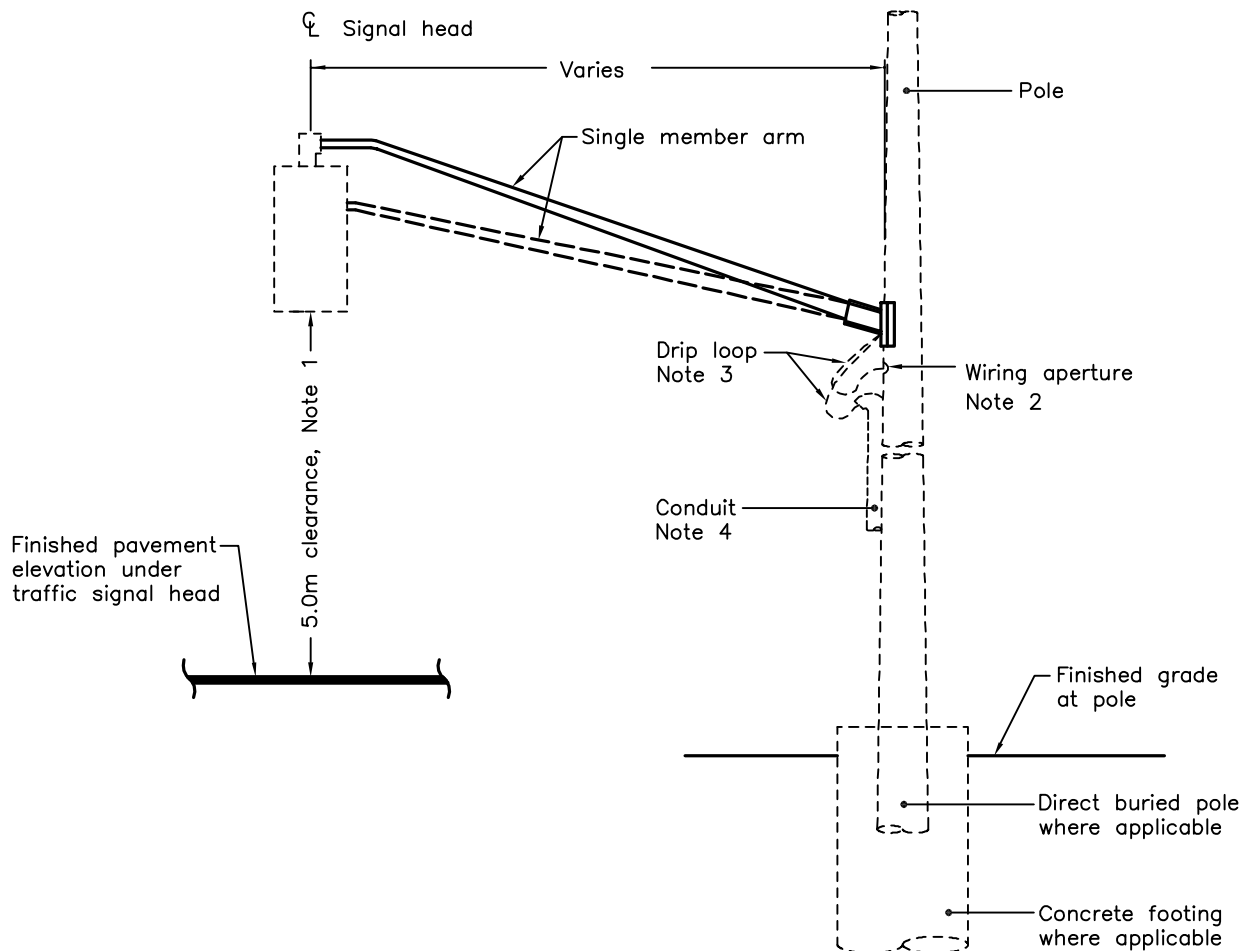
Rev 1

600mm SIGNAL ARM

ATTACHMENT TO POLES



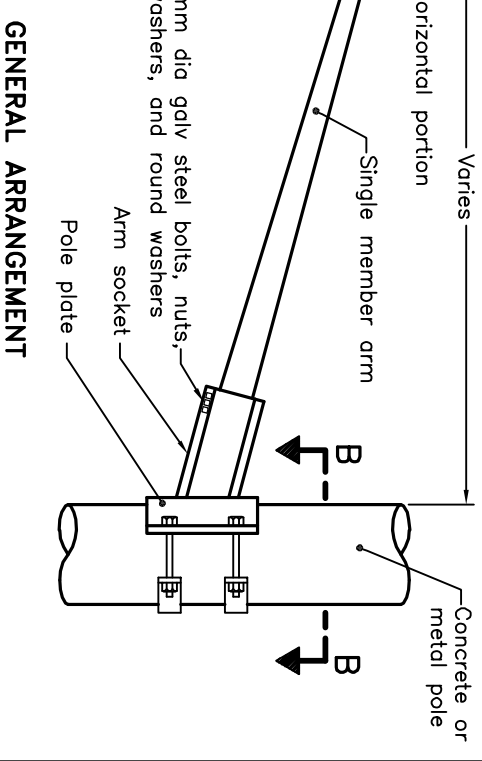
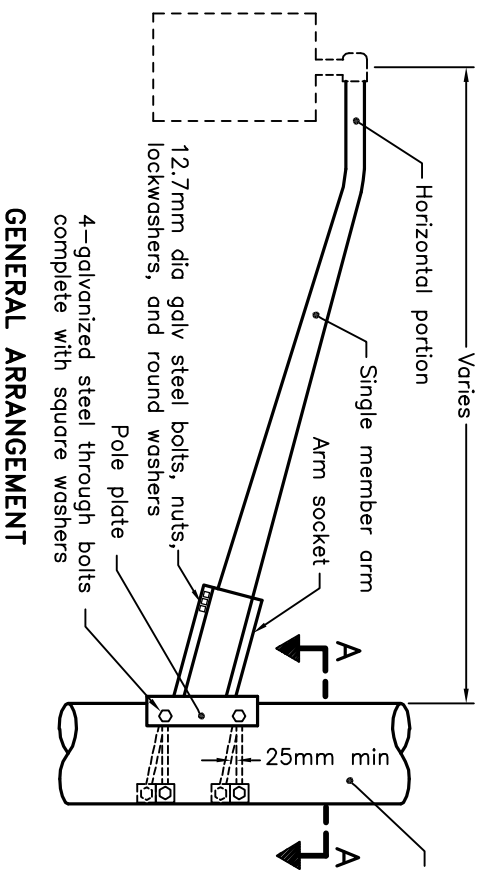
OPSP 2500.020



NOTES:

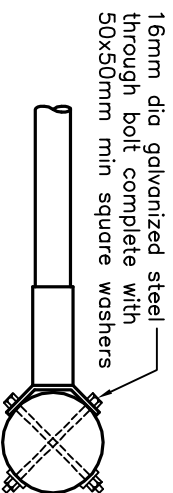
- 1 The bottom of the signal head shall be a minimum of 5.0m above the highest point on the roadway, regardless of whether the signal head is above the pavement or not.
 - 2 Wiring aperture shall be 25mm diameter field drilled complete with rubber grommet, 25mm below arm attachment or 25mm below overlapping sectional steel joints, de-burred, and protected with zinc rich paint.
 - 3 Drip loops shall be provided.
 - 4 For external conduit system on wooden or concrete poles refer to OPSD 2552.01 or OPSD 2554.010.
- A For arm attachment details refer to OPSD 2500.020.
 B For traffic signal head wiring details refer to OPSD 2528.01.
 C Traffic signal hanger details shall be as specified.
 D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2011	Rev 2	
SINGLE MEMBER ARM AND SIGNAL HEAD	-----	-----	
	OPSD 2501.01		

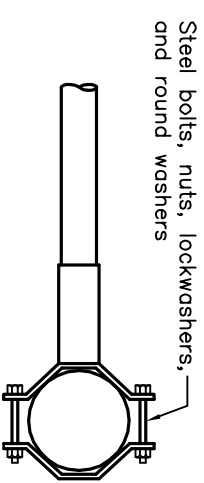


GENERAL ARRANGEMENT

GENERAL ARRANGEMENT



SECTION A-A



SECTION B-B

WOODEN POLE ATTACHMENT

CONCRETE AND METAL POLE ATTACHMENT

NOTE 1

NOTE 2

NOTES:

- 1 For 1.2 to 2.4m arms, use 3.2mm thick arm sockets and 6.3mm thick pole plates.
For 3.0 to 6.7m arms, use 4.7mm thick arm sockets and 9.5mm thick pole plates.
- 2 For 1.2 to 2.4m arms, use 3.2mm thick arm sockets, 6.3mm thick pole plates, and 15mm dia bolts.
For 3.0 to 6.7m arms, use 4.7mm thick arm sockets, 9.5mm thick pole plates, and 19mm dia bolts.
- A For pole attachment locations refer to OPSD 2501.01.
- B Traffic signal hanger details as specified.
- C All dimensions are in millimetres unless otherwise shown.

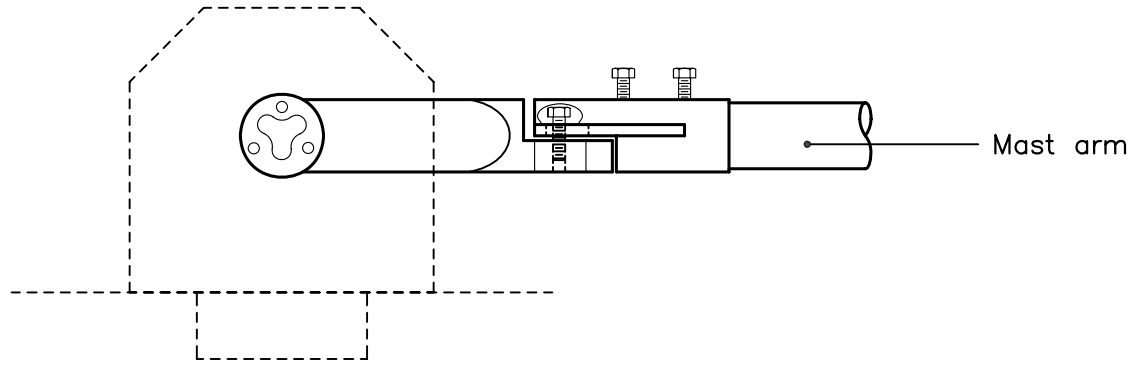
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2011 Rev 2

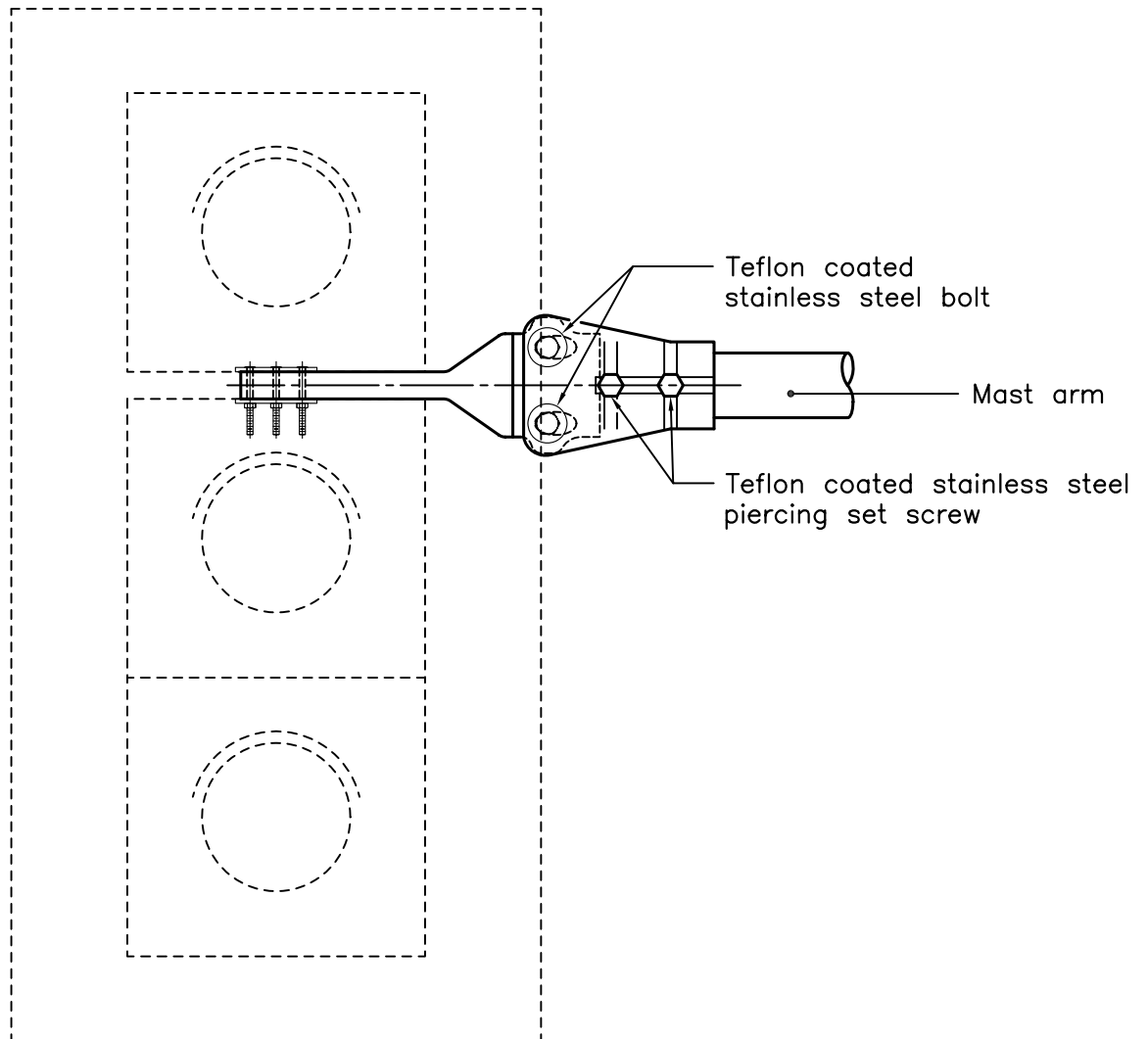
ALUMINUM SINGLE MEMBER ARM ATTACHMENT DETAILS

OPSD 2501.02





PLAN



ELEVATION

NOTE:

A This OPSD to be read in conjunction with OPSD 2501.01 and 2501.02.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2007

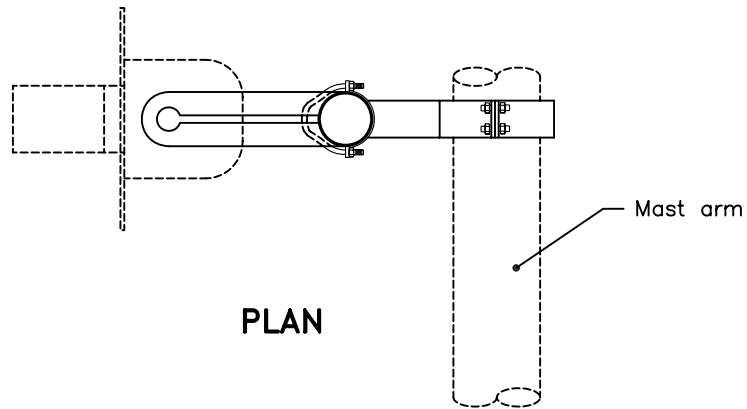
Rev 0

TRAFFIC SIGNAL

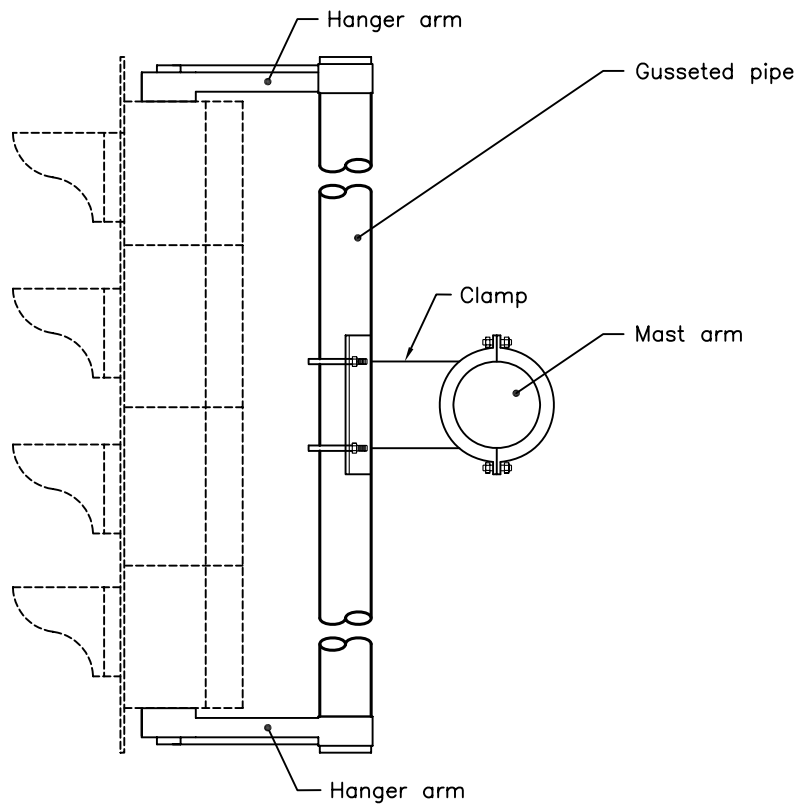
ADJUSTABLE MID-SECTION HANGER



OPSD 2502.010



PLAN



SIDE VIEW

NOTES:

A All fastening hardware shall be stainless steel.

B This OPSD to be read in conjunction with OPSD 2501.01 and 2501.02.

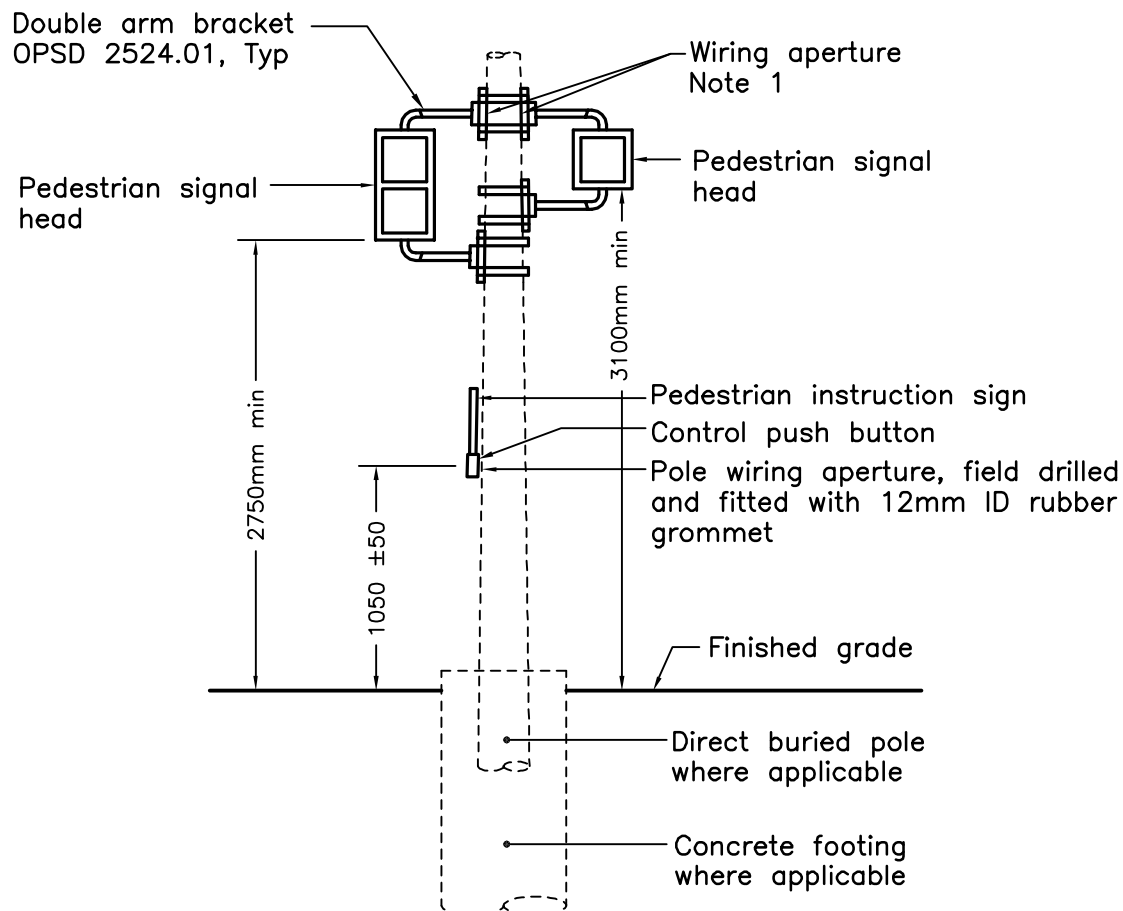
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2007 Rev 0

TRAFFIC SIGNAL
DUAL-END HANGER



OPSD 2502.011



NOTES:

- 1 Wiring aperture shall be 25mm diameter field drilled complete with rubber grommet, de-burred, and protected with zinc rich paint.
- A For external conduit system on wooden or concrete poles refer to OPSD 2552.01 or OPSD 2554.010.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

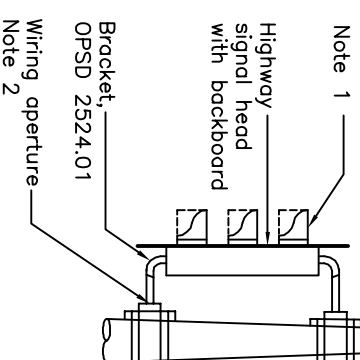
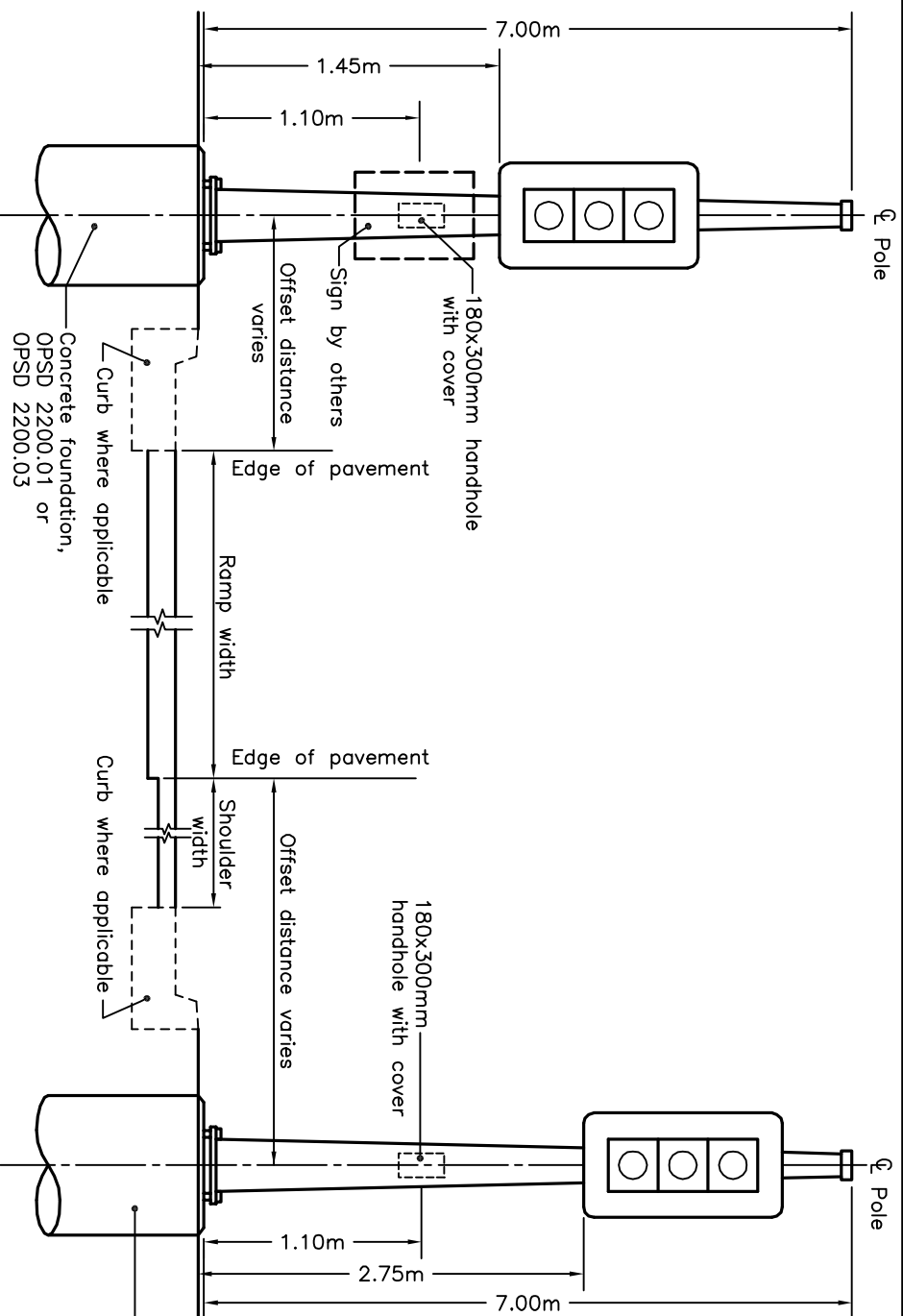
Nov 2014

Rev 1

**TRAFFIC SIGNAL
PEDESTRIAN HEAD AND
PUSH BUTTON MOUNTED ON POLE**

OPSD 2505.010





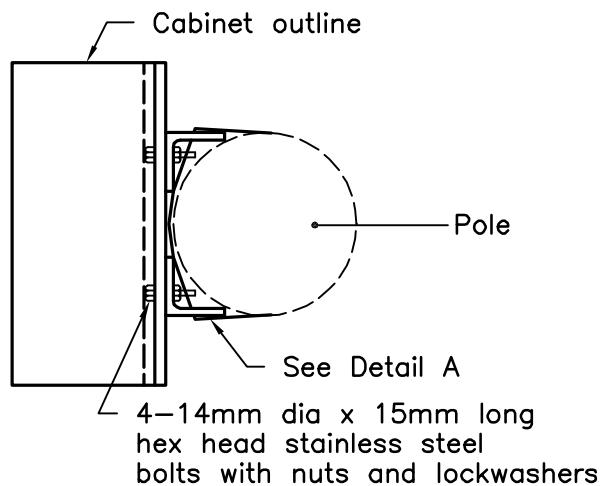
NOTES:

- Where applicable, refer to layout drawings and specifications for aiming requirements.
- Wiring aperture shall be 25mm diameter field drilled at lower bracket for primary head completed with rubber grommet, de-burred, and protected with zinc rich paint.
- For offset distances and ramp and shoulder widths refer to layout drawings.
- All dimensions are in millimetres unless otherwise shown.

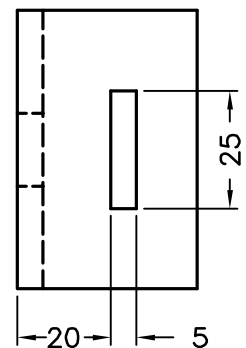
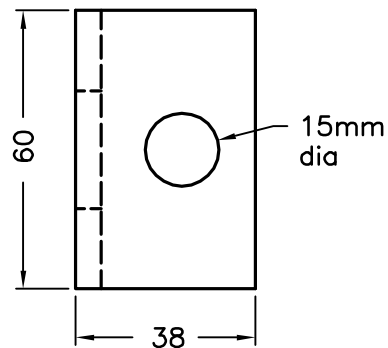
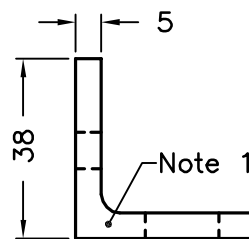
SECONDARY HEAD LOCATION **FRONT ELEVATION** **PRIMARY HEAD LOCATION**

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2011		Rev 0	
TRAFFIC SIGNAL					
SECTIONAL STEEL POLES WITH					
PRIMARY AND SECONDARY SIGNAL HEADS					
FOR RAMP METERING					
OPSP 2508.010					

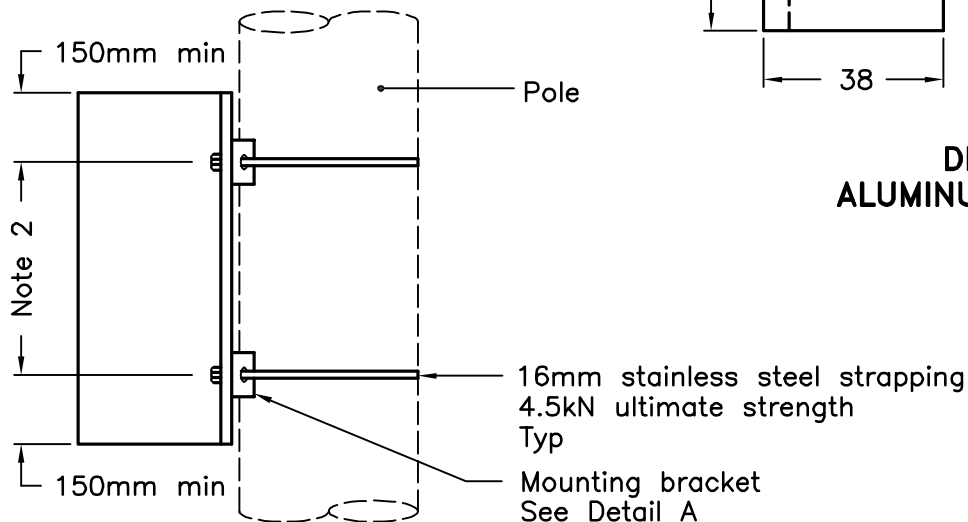




TOP VIEW



**DETAIL A
ALUMINUM POLE PLATE**



SIDE ELEVATION

NOTES:

- 1 Mounting bracket shall be extruded aluminum grade 6061-T6.
- 2 Adjust mounting location to suit internal cabinet equipment.
- A This OPSD to be read in conjunction with OPSD 2510.010.
- B All dimensions are in millimetres unless otherwise shown.

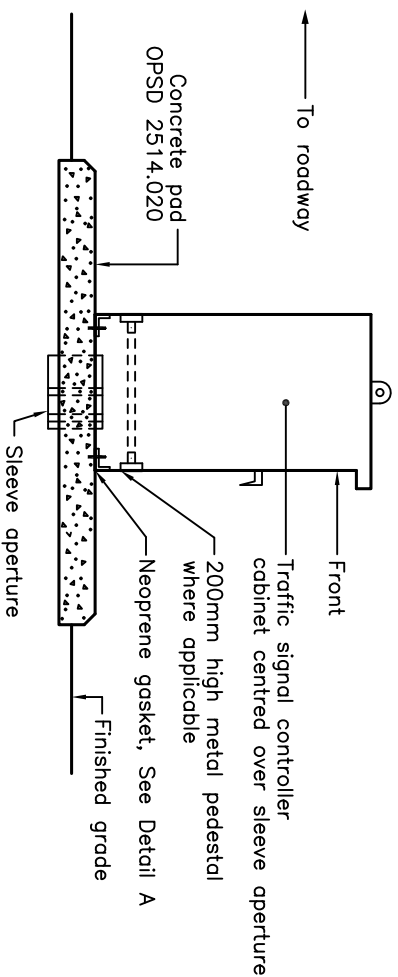
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2011 Rev 0

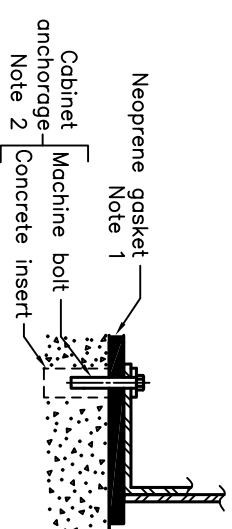
**MOUNTING BRACKET FOR POLE
MOUNTED CONTROLLER CABINET**

OPSD 2510.020





SIDE VIEW



DETAIL A

NOTES:

- 1 Cabinet shall be sealed around bottom perimeter with a 10mm thick by 65mm wide neoprene gasket. Gasket shall have a durometer hardness of 45 and shall be provided with adhesive backing for attachment to the cabinet.
- 2 Cabinet shall be secured to the pad, accurately aligned, with chuck end concrete anchors and 16mm dia x 38mm long stainless steel hexagonal head machine bolts and lockwashers. Location of anchors shall be according to manufacturer's instructions.
- A For numbers, sizes, and orientation of conduits entering sleeves in concrete pad, refer to Contract Drawings.
- B For location and orientation of cabinet and concrete pad, refer to Contract Drawings.
- C All dimensions are in millimetres unless otherwise shown.

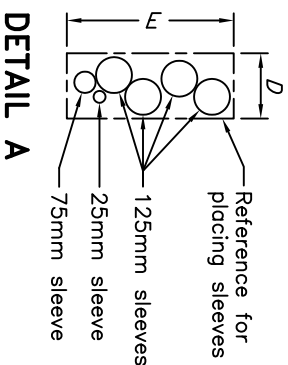
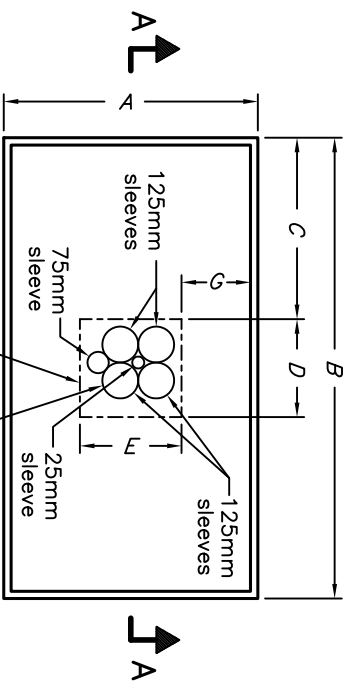
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2012 Rev 0

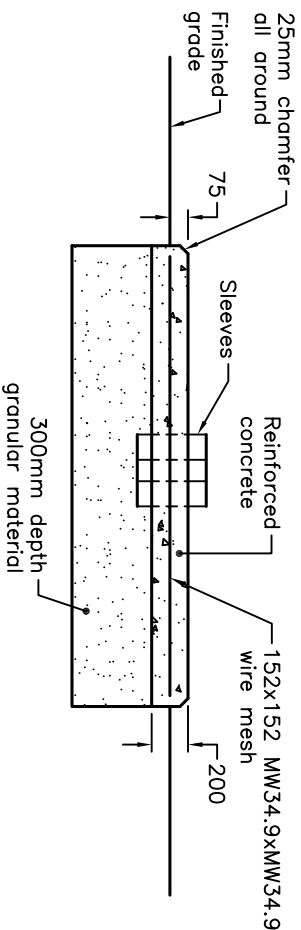
CONTROLLER CABINET ON PAD



OPSPD 2514.010



Reference for placing sleeves
Sleeves layout for cabinet type 332. For sleeves layout for other cabinet types see Detail A.



NOTES:

- A This OPSD shall be read in conjunction with OPSD 2514.010.
- B Maintain 75mm minimum cover over reinforcing steel.
- C Aperture for sleeves shall be filled with expanding foam.
- D Sleeves in concrete pad shall protrude 50mm above top of pad.
- E All dimensions are in millimetres unless otherwise shown.

PAD DIMENSIONS						
Cabinet Type	Dimensions mm					
	A	B	C	D	E	G
332	1000	2000	725	380	380	310
M	1000	1650	400	250	660	170
P	1250	1950	400	250	660	295
R	1500	1950	400	250	660	420

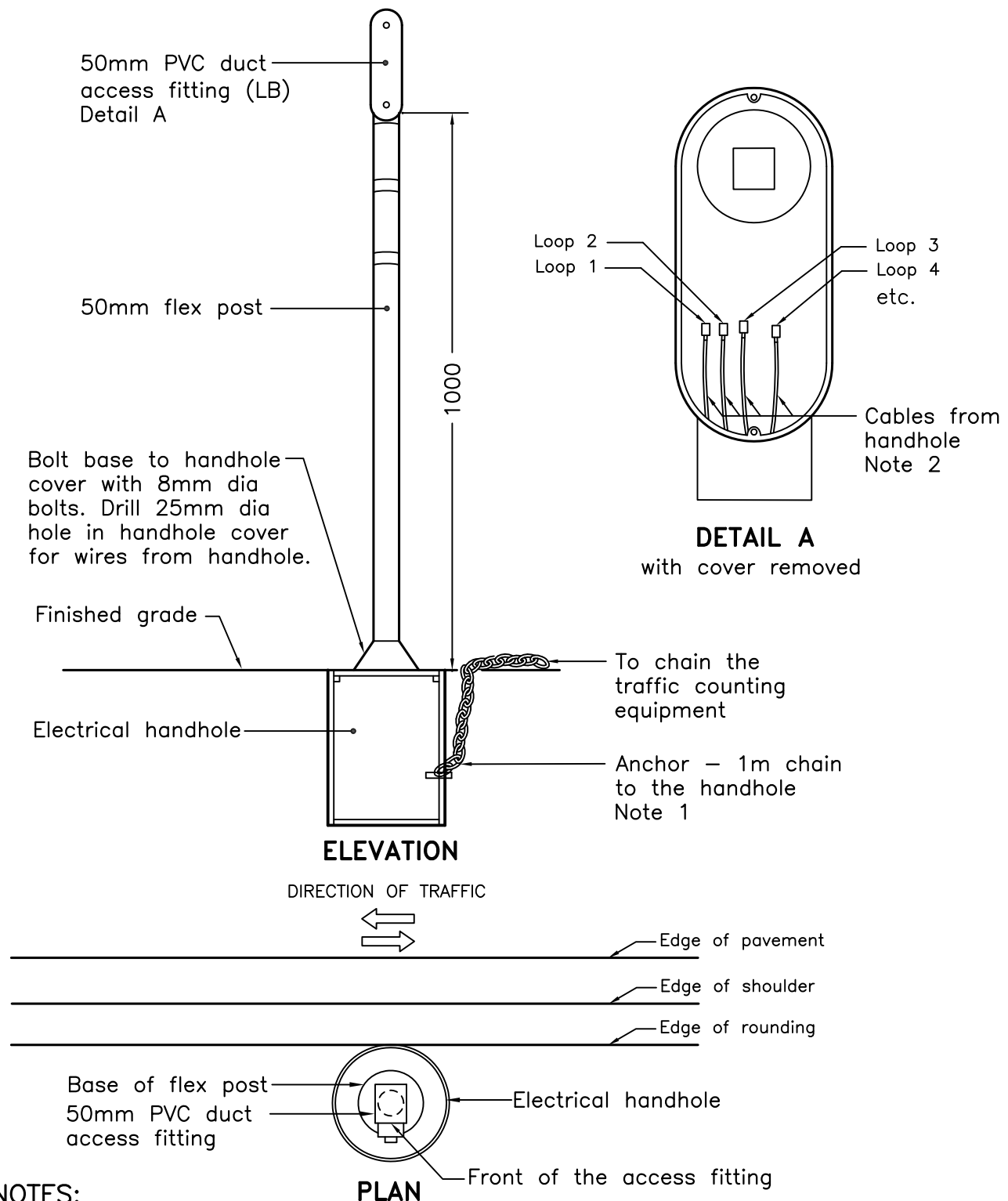
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2012 Rev 0

CONCRETE PAD
FOR CONTROLLER CABINET

OPSD 2514.020





NOTES:

- 1 1.0m long, 7mm diameter galvanized links.
- 2 Number of cables depends on number of loop detectors. Group and coil the cables to prevent from falling down the post.
- A For type of loop detector and station or offset of the handhole, refer to the layout drawings and the quantity sheets.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

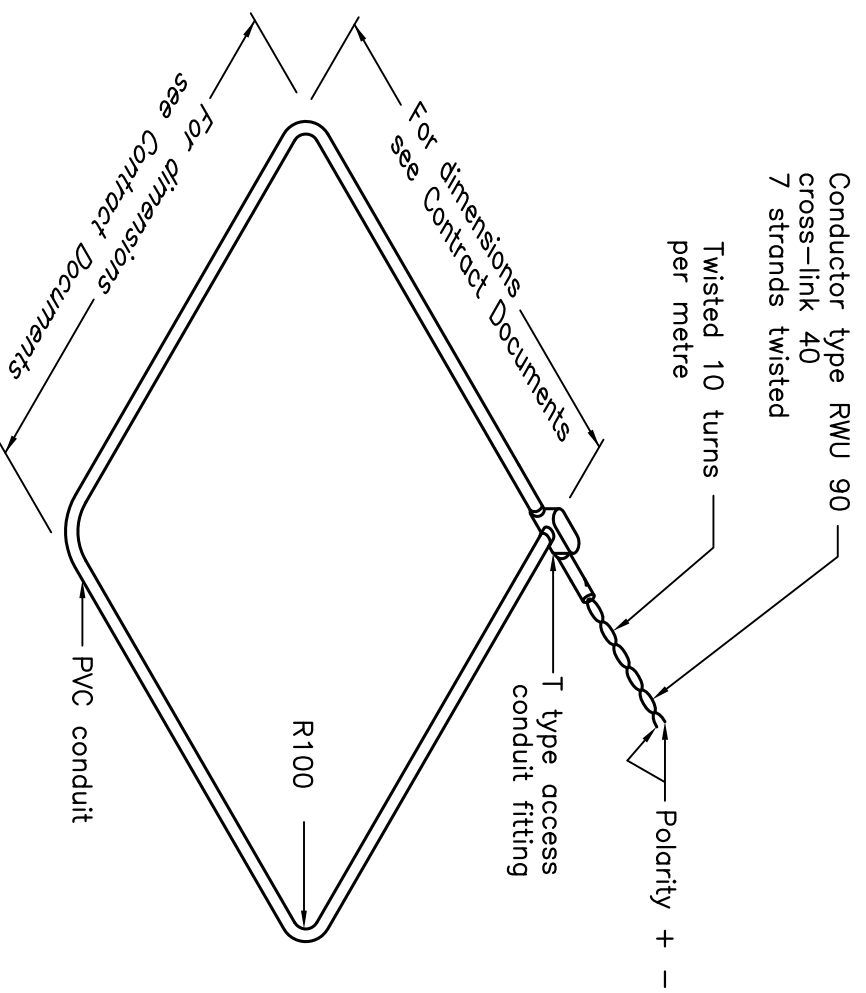
Nov 2012

Rev 0



TRAFFIC DATA COLLECTION
DATA STATION
TRAFFIC COUNTING STATION TYPE 2

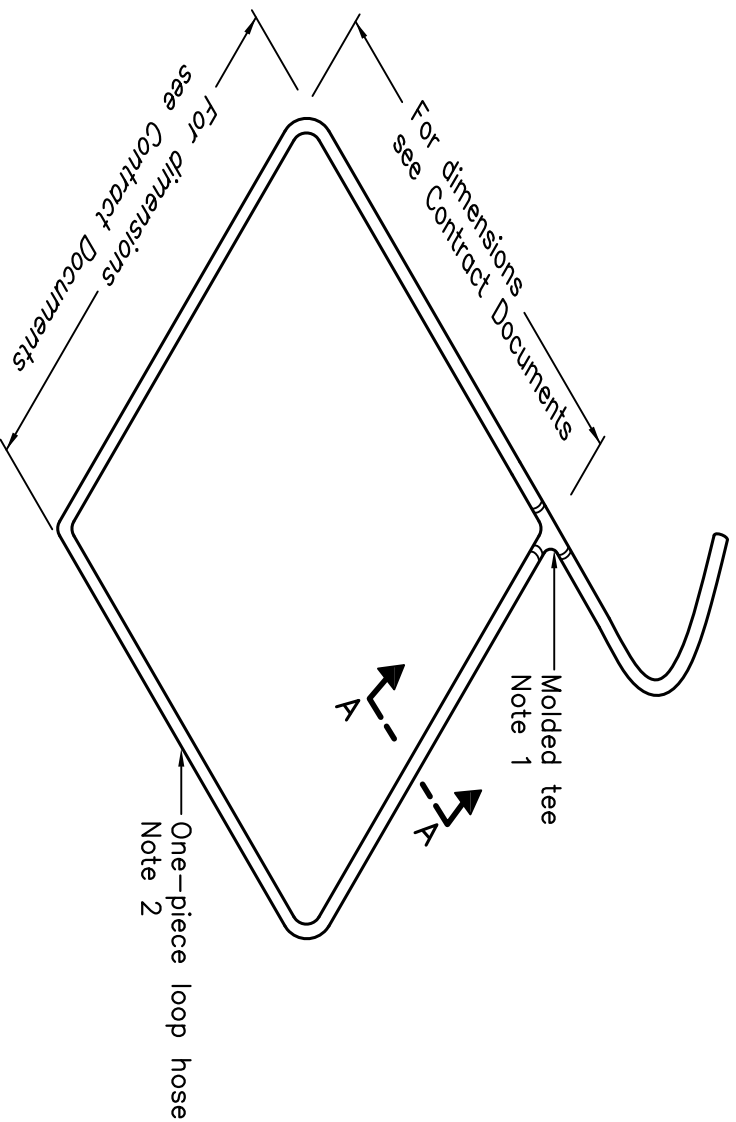
OPSD 2516.102



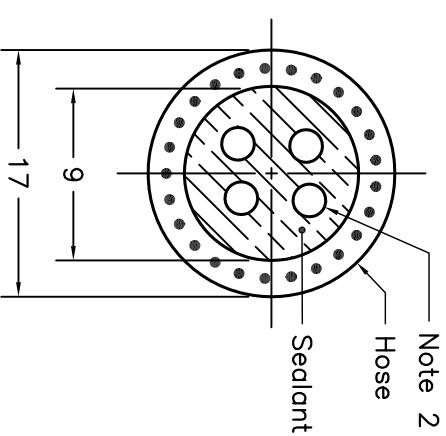
PLAN

NOTES:
A All dimensions are in millimetres
unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2012	Rev 0	
PREFABRICATED DETECTOR LOOP		----- ----- -----		
OPSD 2518.101				



PLAN

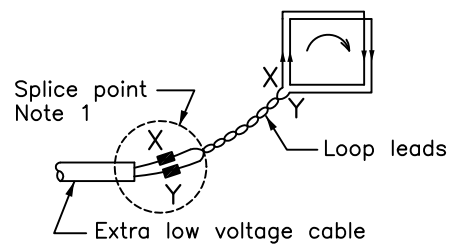
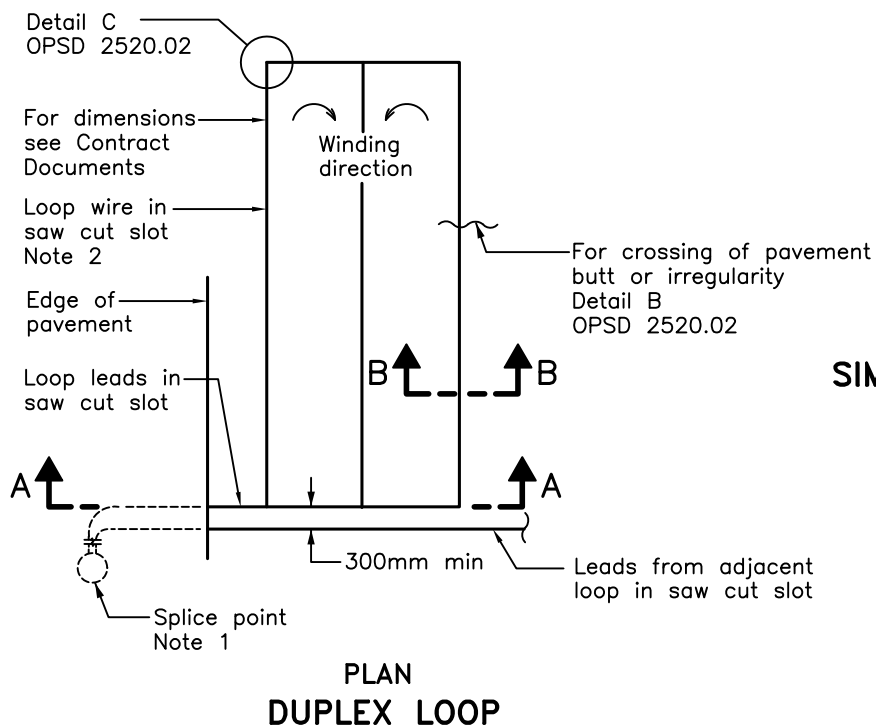
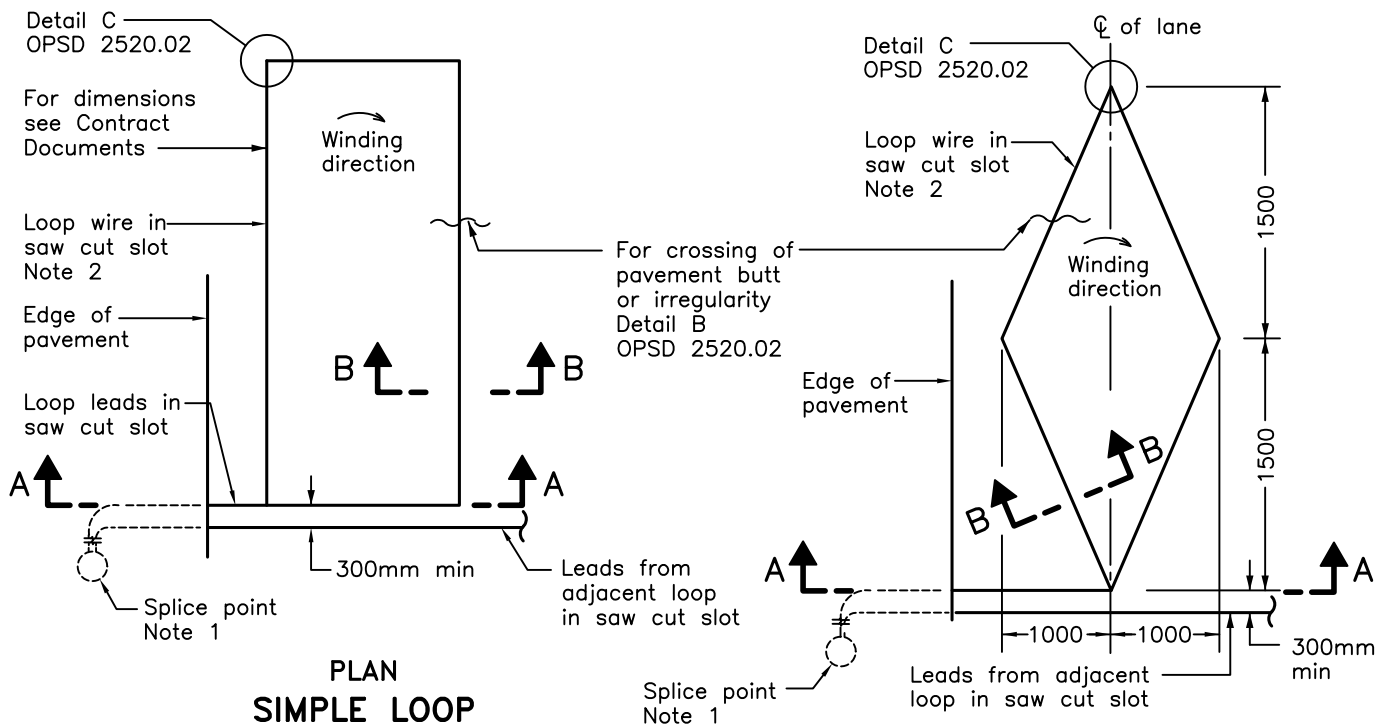


SECTION A-A

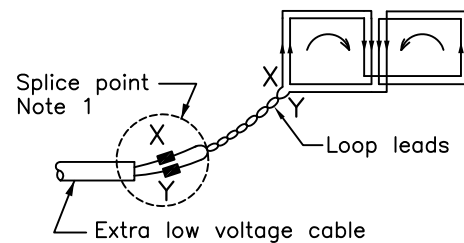
NOTES:

- 1 Tee shall be constructed of heavy duty high temperature rubber.
 - 2 Loop and lead-in wires shall be constructed within heavy duty reinforced rubber hose. Number of turns as specified.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2012	Rev 0	
TRAFFIC DATA COLLECTION DETECTOR LOOPS				
HEAVY DUTY RUBBER				
OPSD 2518.102				



**SIMPLE AND DIAMOND LOOP
CONNECTIONS**



**DUPLEX LOOP
CONNECTIONS**

NOTES:

- 1 Location of electrical chambers or pole splice as specified.
- 2 Number of turns of loop wire for loop detector as specified.
- A For Section A-A and B-B see OPSD 2520.02.
- B This OPSD shall be read in conjunction with OPSD 2520.02.
- C For splice to extra low voltage cable see OPSD 2530.01.
- D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

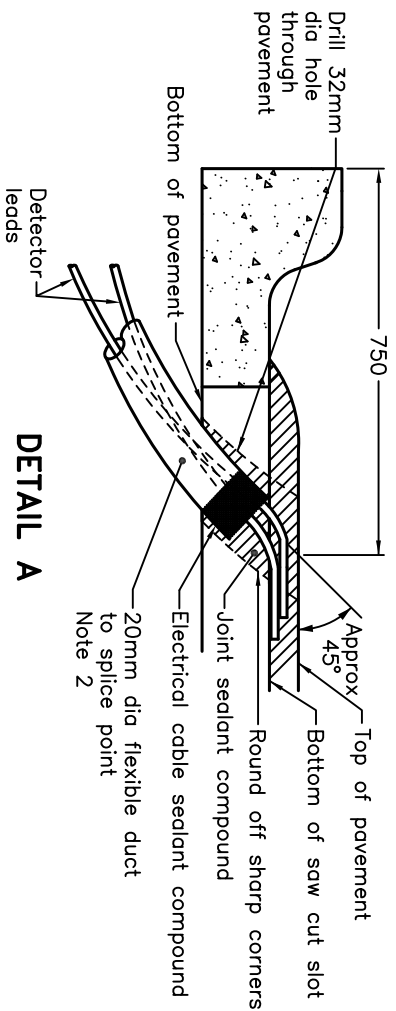
Nov 2012

Rev 0

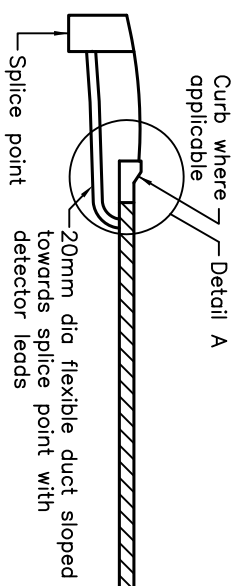
**LOOP DETECTOR
INSTALLATION DETAILS I**

OPSD 2520.010

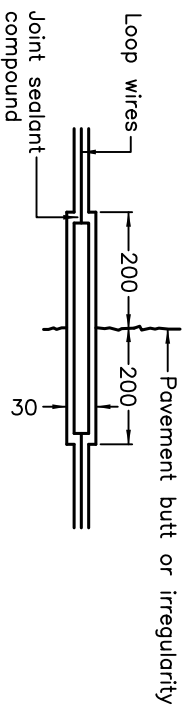




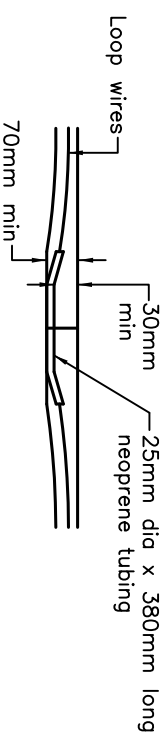
DETAIL A



SECTION A-A



PLAN



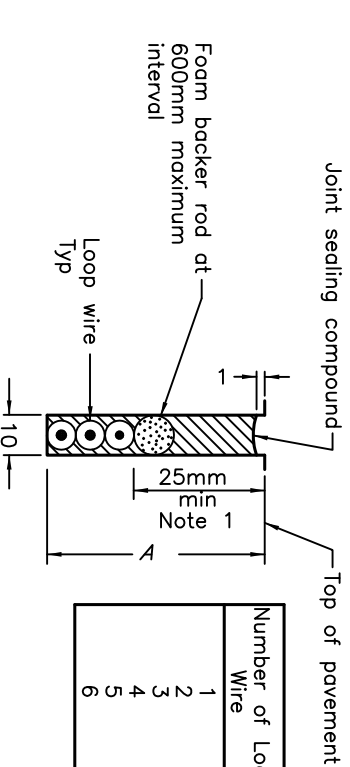
ELEVATION

**DETAIL B
PAVEMENT BUTT OR IRREGULARITY**

NOTES:

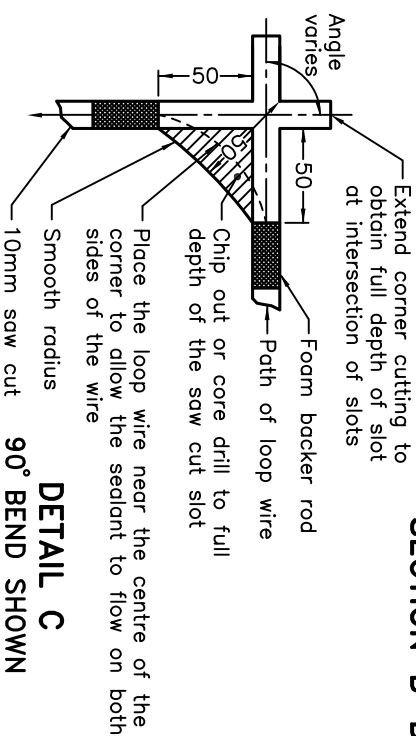
- 1 When cable is installed prior to the finished top course paving, the maximum depth of cover shall be 100mm.
- 2 Duct and cable shall be installed a minimum of 300mm below finished grade.

A This OPSD shall be read in conjunction with OPSD 2520.010.
B All dimensions are in millimetres unless otherwise shown.



SECTION B-B

Number of Loop Wire	A mm min.
1	55
2	55
3	55
4	60
5	65
6	70



**DETAIL C
90° BEND SHOWN**

ONTARIO PROVINCIAL STANDARD DRAWING

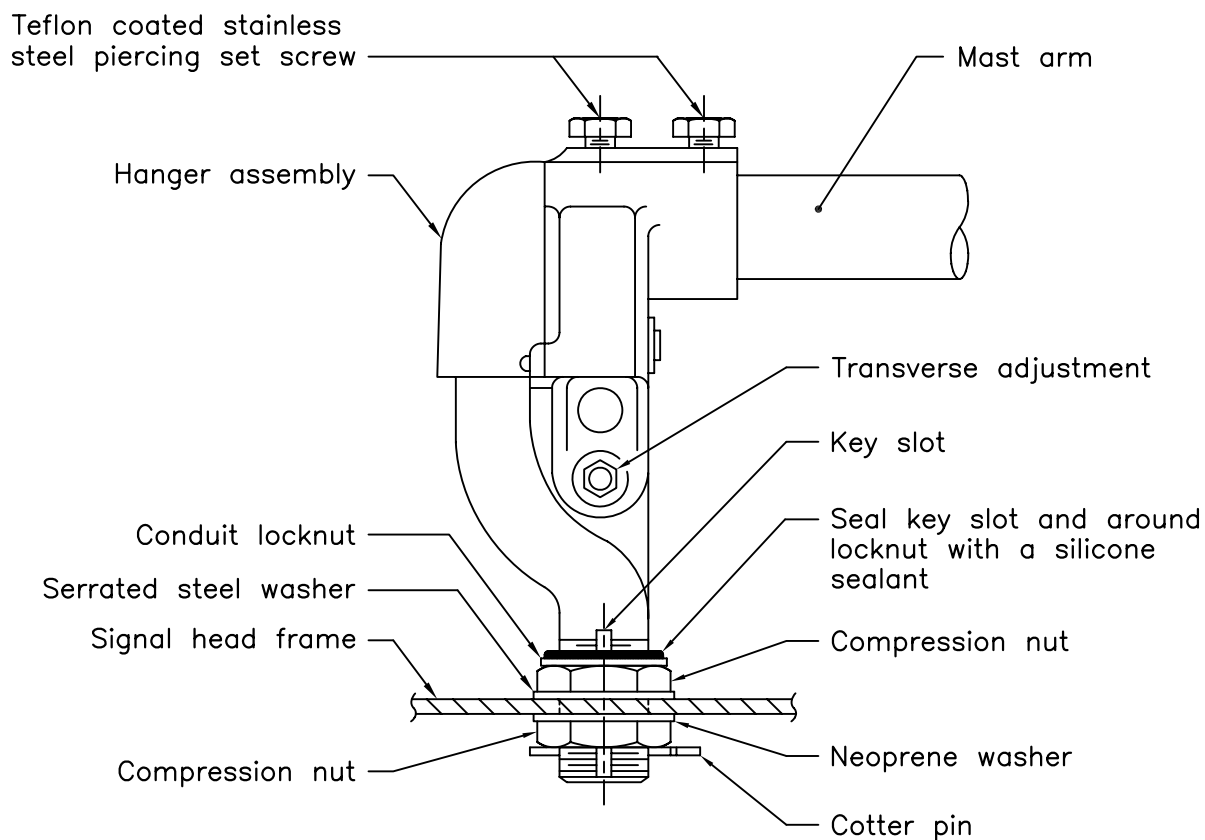
Nov 2012 Rev 4

LOOP DETECTOR

INSTALLATION DETAILS II

OPSD 2520.02





NOTE:

A This OPSD to be read in conjunction with OPSD 2501.01 and 2501.02.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2007

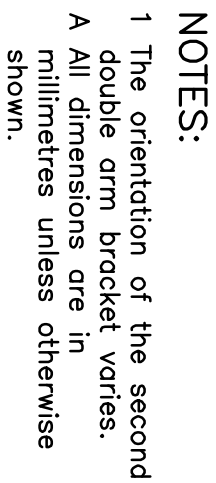
Rev 0

TRAFFIC SIGNAL

CUSHION HANGER



OPSD 2522.010



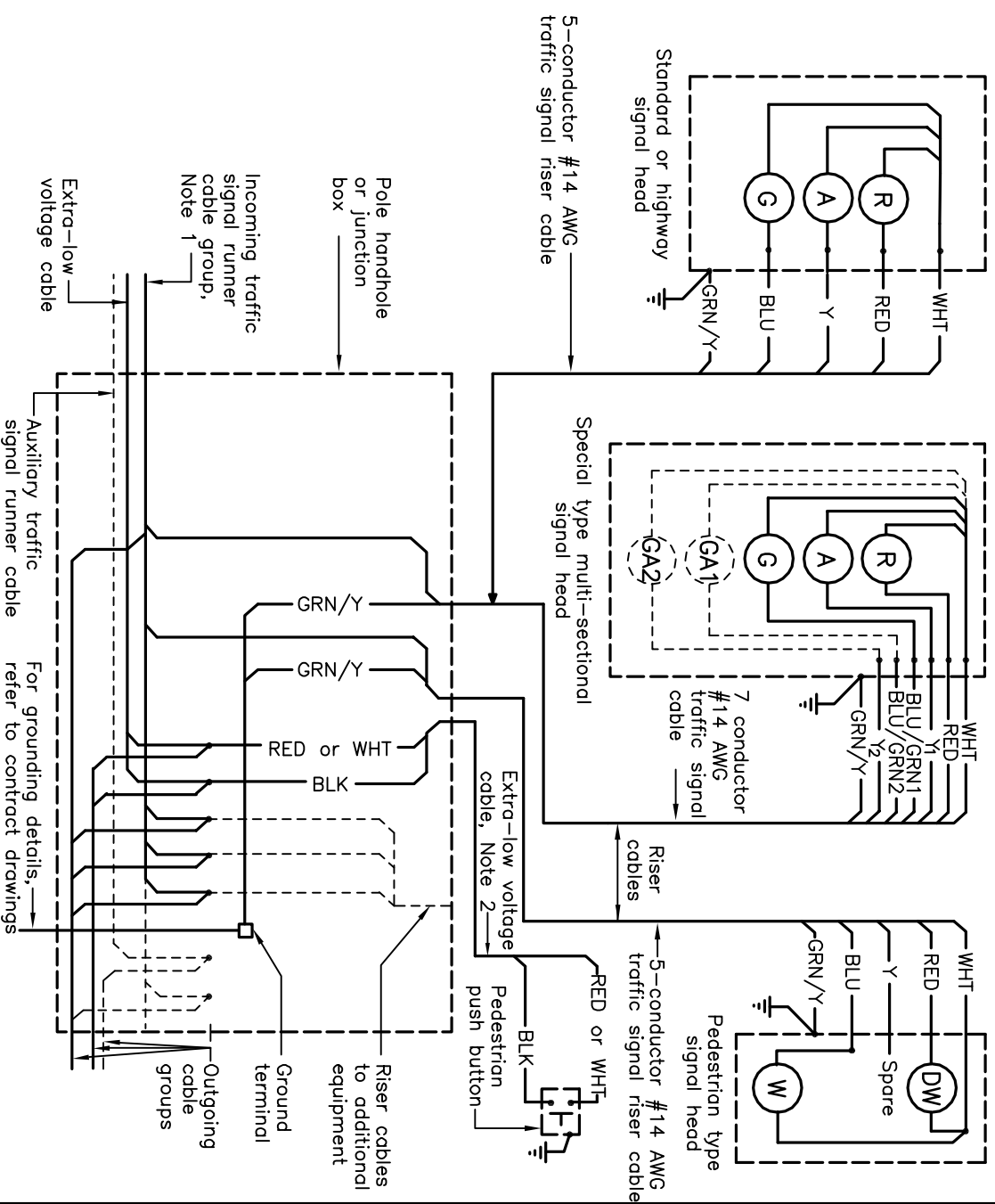
OPSD 2524.01

Colour/Marker

ABBREV.	DESCRIPTION
BLU/GRN 1	— Blue with 'green one' marker
BLU/GRN 2	— Blue with 'green two' marker
γ_1	— Yellow with marker — γ_1
γ_2	— Yellow with marker — γ_2
RED	— Red
BLU	— Blue
GRN/ γ	— Green with yellow tracer
BLK	— Black
WHT	— White
GRN	— Green

NOTES:

- 1 Riser cable connection shall be made to the designated conductor in the cable group as specified, together with connection to the outgoing conductor.
- 2 Number of conductors as specified.
- A For traffic signal cable groups, abbreviations and colour coding as specified.
- B Details shown are typical only. For multiple equipment installations on the same pole, maintain riser cable type and colour coding and connect to the designated conductors as specified.
- C Green conductors with yellow tracer used as ground shall be tagged Ground in the pole handhole or junction box.



ONTARIO PROVINCIAL STANDARD DRAWING

TRAFFIC SIGNAL EQUIPMENT

POLE WIRING DIAGRAM

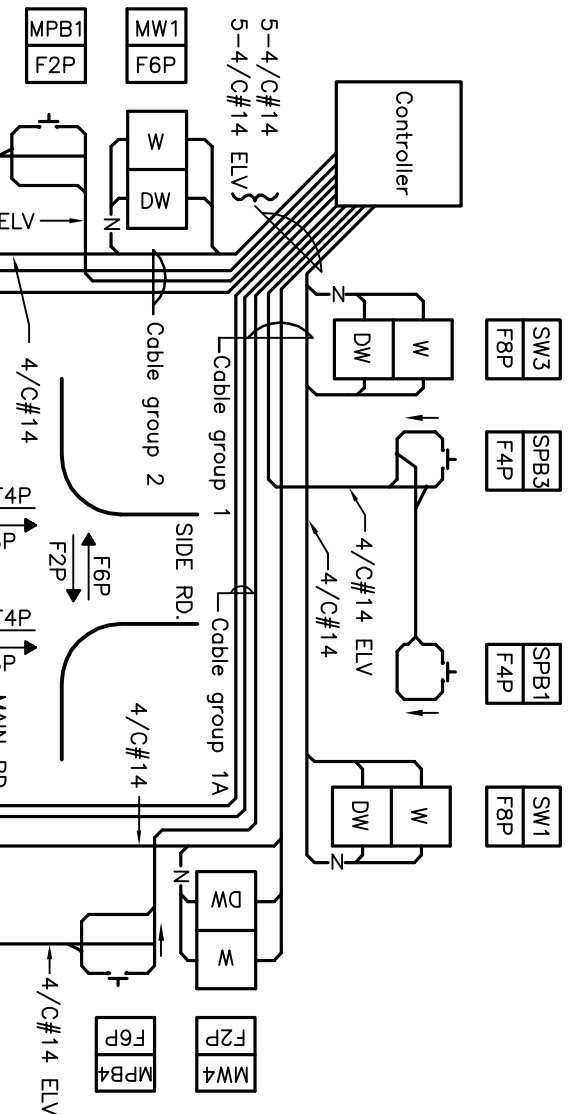
Nov 2010	Rev	2

Rev	2



OPSD 2528.01

Cond #	Colour/Mark	Cable Group 1	Cable Group 2	Cable Group 1A
1	White	Neutral	Neutral	
2	Red	DW[MW2,MW4]	DW[MW3,MW1]	
3	Yellow	Not Used, Note 1	Not Used, Note 1	
4	Blue	W[MW2,MW4]	W[MW3,MW1]	
1	White	Neutral	Neutral	
2	Red	DW[SW3,SW1]	DW[SW2]	DW[SW4] Note 3
3	Yellow	Not Used, Note 1	Not Used, Note 1	Not Used, Note 1&3
4	Blue	W[SW3,SW1]	W[SW2]	W[SW4] Note 3
1	White	MPB2,MPB4	MPB1,MPB3	
2	Black	MPB2,MPB4	MPB1,MPB3	
3	Red	Spare	Spare	
4	Green	Spare	Spare	
1	White	SPB1,SPB3	SPB2	SPB4, Note 3
2	Black	SPB1,SPB3	SPB2	SPB4, Note 3
3	Red	Spare	Spare	
4	Green	Spare	Spare	
1	White	SPB1,SPB3	SPB2	SPB4, Note 3
2	Black	SPB1,SPB3	SPB2	SPB4, Note 3
3	Red	Spare	Spare	
4	Green	Spare	Spare	



NOTES:

- 1 Conductors shown as 'Not Used' shall be left unconnected and designated as spares.
 - 2 Opposing faze pedestrian movements are normally concurrent and can normally be connected in parallel in the controller cabinet.
 - 3 If ducts are available across the far side road leg, cable group 1A may be eliminated by extension of group 2 cable through the duct to wire SW4 in parallel with SW2 and SPB4 in parallel with SPB2.
- A Connections shown are general and typical and shall be adjusted to suit intersection layout.

LEGEND:

- DW - 'DON'T WALK' display
W - 'WALK' display
MW# - Main Road pedestrian head No. #
SW# - Side Road pedestrian head No. #
MPB# - Main Road pedestrian push button No. #
SPB# - Side Road pedestrian push button No. #
F#P - Faze # pedestrian movement, Note 2
MP# - Main Road Primary No. #
MS# - Main Road Secondary No. #
MA# - Main Road Auxiliary No. #
SP# - Side Road Primary No. #
SS# - Side Road Secondary No. #
SA# - Side Road Auxiliary No. #

- M - Main Road S
S - Side Road
LT - Left Turn
RT - Right Turn
SL - Side Road Left Turn cable
ML - Main Road Left Turn cable

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2015

Rev 1

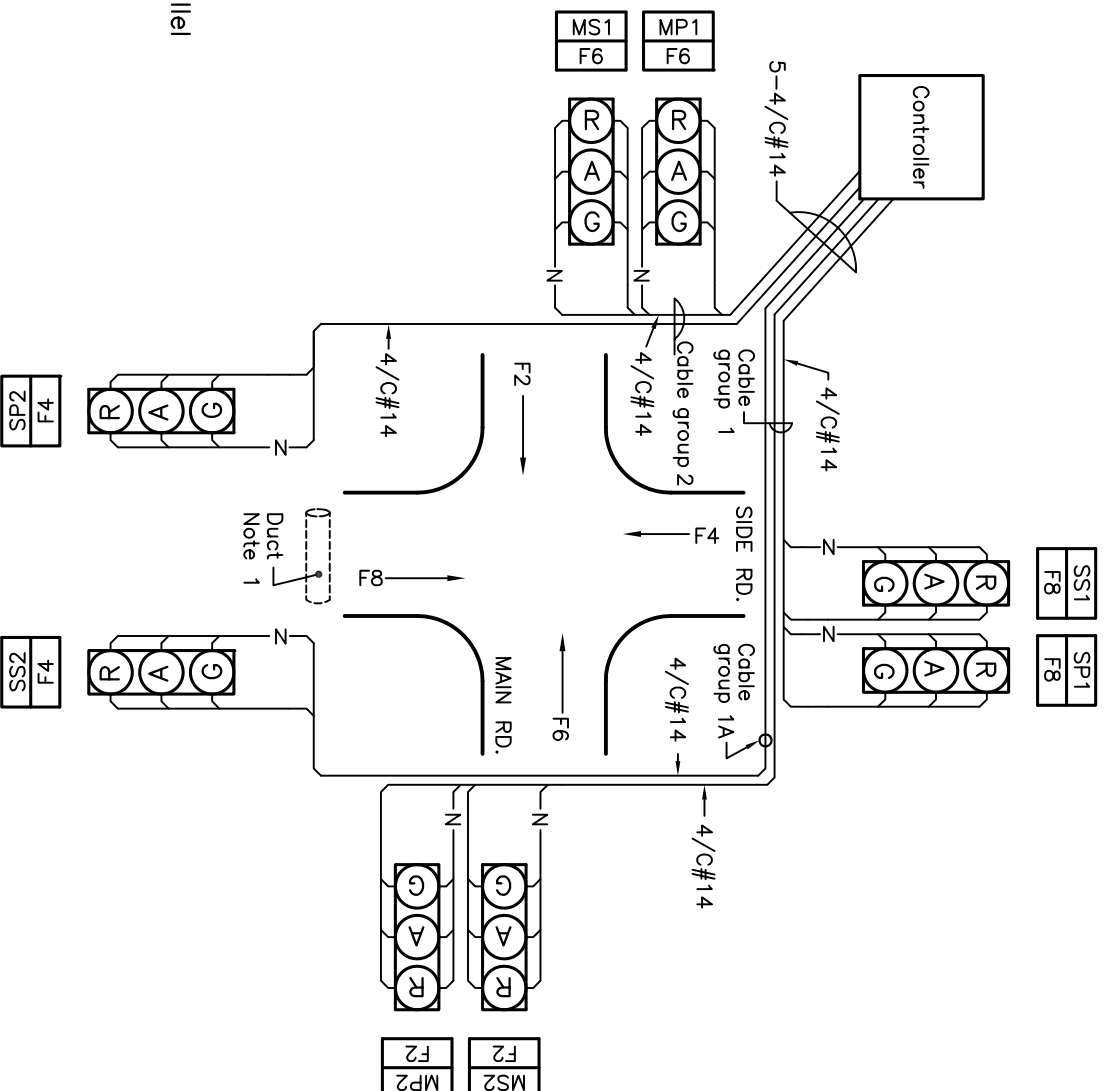
SIGNAL WIRING
FOR PEDESTRIAN FACILITIES

OPSD 2529.010



Cond #	Colour/Mark	Cable Group 1	Cable Group 2	Cable Group 1A Note 1
1	White	Main Rd. Neutral	Main Rd. Neutral	
2	Red	Main Rd. Red	Main Rd. Red	
3	Yellow	Main Rd. Amber	Main Rd. Amber	
4	Blue	Main Rd. Green	Main Rd. Green	
1	White	Side Rd. Neutral	Side Rd. Neutral	Side Rd. Neutral
2	Red	Side Rd. Red	Side Rd. Red	Side Rd. Red
3	Yellow	Side Rd. Amber	Side Rd. Amber	Side Rd. Amber
4	Blue	Side Rd. Green	Side Rd. Green	Side Rd. Green

- NOTES:**
- 1 If ducts are available across the far side road leg, cable group 1A may be eliminated by extension of group 2 cable through the duct to wire SS2 in parallel with SP2.
 - A Connections shown are general and typical and shall be adjusted to suit intersection layout.
 - B For Legend see OPSD 2529.010.
 - C For pedestrian facilities see OPSD 2529.010.
 - D If advance arrow is required use OPSD 2529.030.

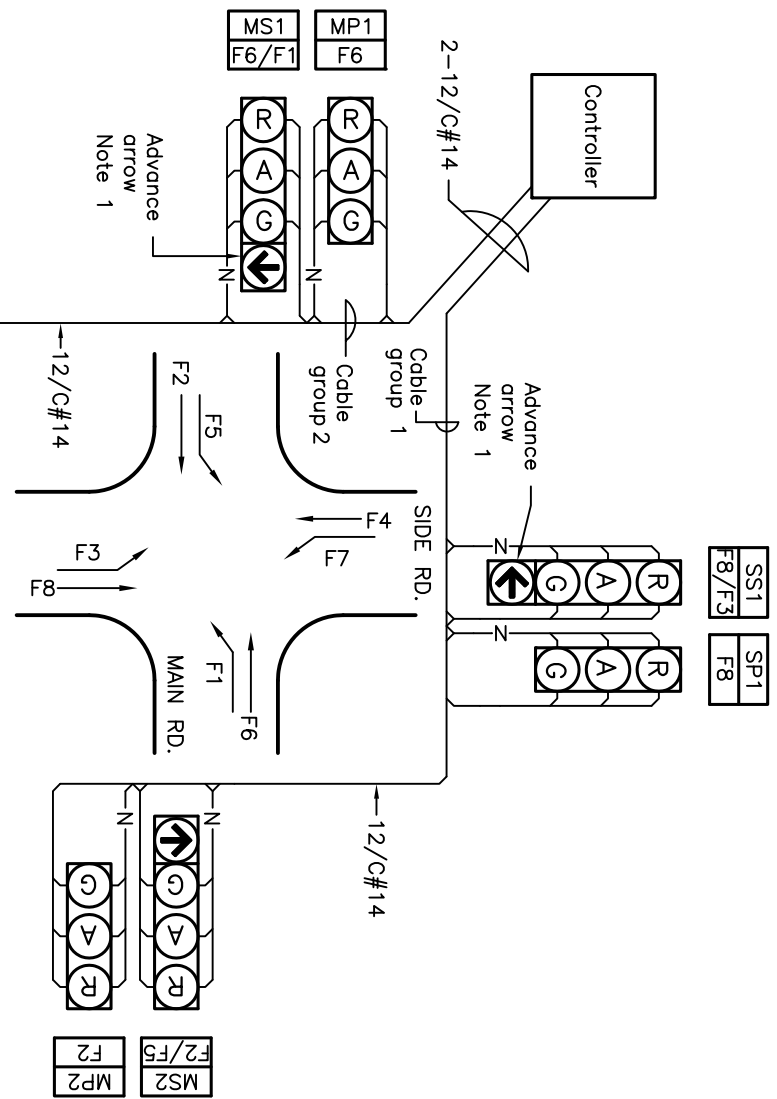


ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2012	Rev 0
SIGNAL WIRING USING 4/C CABLE CONNECTED RADIALLY, 2 PHASE			
		OPSD 2529.020	

Cond #	Colour/Mark	Cable Group 1	Cable Group 2
1	White	Neutral	Neutral
2	Black	Note 1	Note 1
3	Orange	Note 1	Note 1
4	Red/Red One	Main Rd. Red	Main Rd. Red
5	Red/Red Two	Side Rd. Red	Side Rd. Red
6	Red/Red Three	Spare	Spare
7	Yellow/Amber One	Main Rd. Amber	Main Rd. Amber
8	Yellow/Amber Two	Side Rd. Amber	Side Rd. Amber
9	Yellow/Amber Three	Note 1	Note 1
10	Blue/Green One	Main Rd. Green	Main Rd. Green
11	Blue/Green Two	Side Rd. Green	Side Rd. Green
12	Blue/Green Three	Note 1	Note 1

NOTES:

- 1 When arrow advance greens are used, use conductor #12 Blue/Green Three and conductor #9 Yellow/Amber Three for the Main Road heads; and conductor #2 Black and conductor #3 Orange for the Side Road heads.
- A Connections shown are general and typical and shall be adjusted to suit intersection layout.
- B For Legend see OPSD 2529.010.
- C For pedestrian facilities see OPSD 2529.010.
- D The system shown requires ducts all around the intersection.



ONTARIO PROVINCIAL STANDARD DRAWING

SIGNAL WIRING

USING 12/C CABLE TAPPED,
2 TO 8 PHASE

Nov 2012 Rev 0

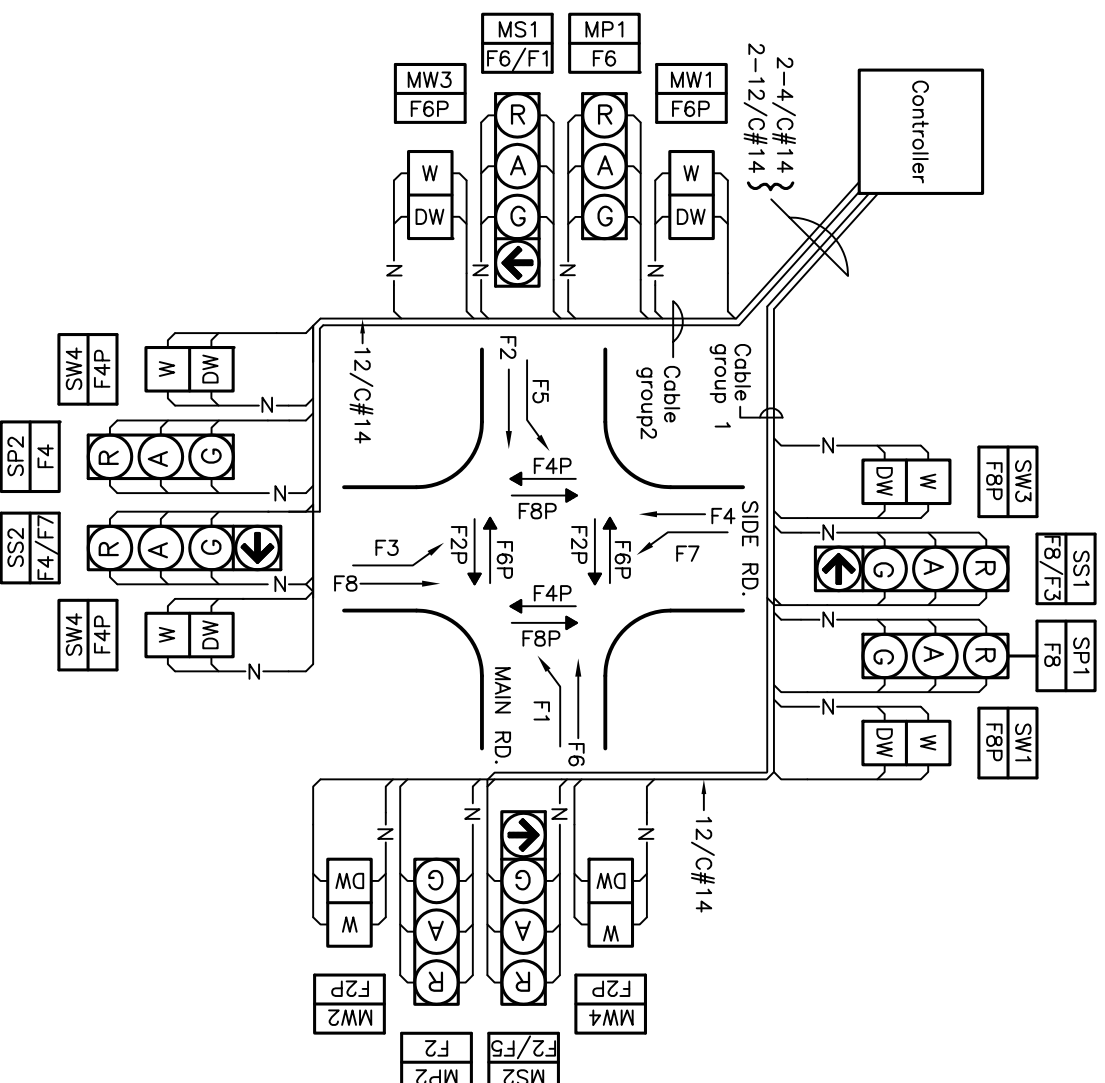


OPSD 2529.030

Cond #	Colour/Mark	Cable Group 1	Cable Group 2
1	White	Main Rd. LT Green	Main Rd. LT Green
2	Red	Main Rd. LT Amber	Main Rd. LT Amber
3	Yellow	Side Rd. LT Amber	Side Rd. LT Amber
4	Blue	Side Rd. LT Green	Side Rd. LT Green
1	White	Neutral	Neutral
2	Black	Side Rd. Don't Walk	Side Rd. Don't Walk
3	Orange	Side Rd. Walk	Side Rd. Walk
4	Red/Red One	Main Rd. Red	Main Rd. Red
5	Red/Red Two	Side Rd. Red	Side Rd. Red
6	Red/Red Three	Main Rd. Don't Walk	Main Rd. Don't Walk
7	Yellow/Amber One	Main Rd. Amber	Main Rd. Amber
8	Yellow/Amber Two	Side Rd. Amber	Side Rd. Amber
9	Yellow/Amber Three	Spare	Spare
10	Blue/Green One	Main Rd. Green	Main Rd. Green
11	Blue/Green Two	Side Rd. Green	Side Rd. Green
12	Blue/Green Three	Main Rd. Walk	Main Rd. Walk

NOTES:

- A Connections shown are general and shall be adjusted to suit intersection layout.
- B Additional cable is required where arrow advance greens are used, see OPD 2529.060.
- C The system shown requires ducts all around the intersection.
- D The system includes pedestrian facilities without pedestrian actuation.
- E For Legend see OPD 2529.010.
- F For pedestrian facilities see OPD 2529.010.



ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2012	Rev	0

SIGNAL WIRING

USING 4/C AND 12/C CABLE TAPPED,

2 TO 8 PHASE

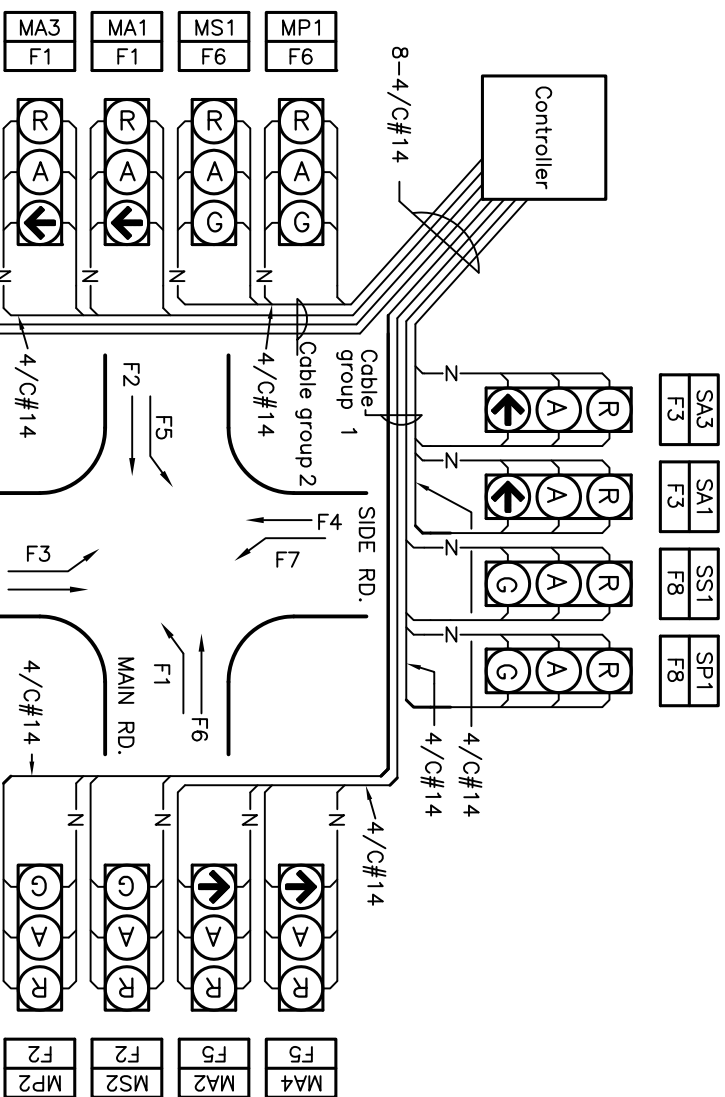
OPSD 2529.040



Cond #	Colour/Mark	Cable Group 1	Cable Group 2
4/C#14(S)	1 White	Neutral	Neutral
	2 Red	Side Rd. Red	Side Rd. Red
	3 Yellow	Side Rd. Green	Side Rd. Green
	4 Blue	Side Rd. Amber	Side Rd. Amber
4/C#14(SL)	1 White	Neutral	Neutral
	2 Red	Side Rd. LT Red	Side Rd. LT Red
	3 Yellow	Side Rd. LT Green	Side Rd. LT Green
	4 Blue	Side Rd. LT Amber	Side Rd. LT Amber
4/C#14(M)	1 White	Neutral	Neutral
	2 Red	Main Rd. Red	Main Rd. Red
	3 Yellow	Main Rd. Green	Main Rd. Green
	4 Blue	Main Rd. Amber	Main Rd. Amber
4/C#14(ML)	1 White	Neutral	Neutral
	2 Red	Main Rd. LT Red	Main Rd. LT Red
	3 Yellow	Main Rd. LT Green	Main Rd. LT Green
	4 Blue	Main Rd. LT Amber	Main Rd. LT Amber

NOTES:

- A Connections shown are general and typical and shall be adjusted to suit intersection layout.
- B For Legend see OPSD 2529.010.
- C For pedestrian facilities see OPSD 2529.010.
- D The system shown requires ducts all around the intersection. Cable to SA4 and SA2 may follow with group 1, if desired.



ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2012 Rev 0

SIGNAL WIRING

USING 4/C CABLE CONNECTED RADIALLY,
2 TO 8 PHASE

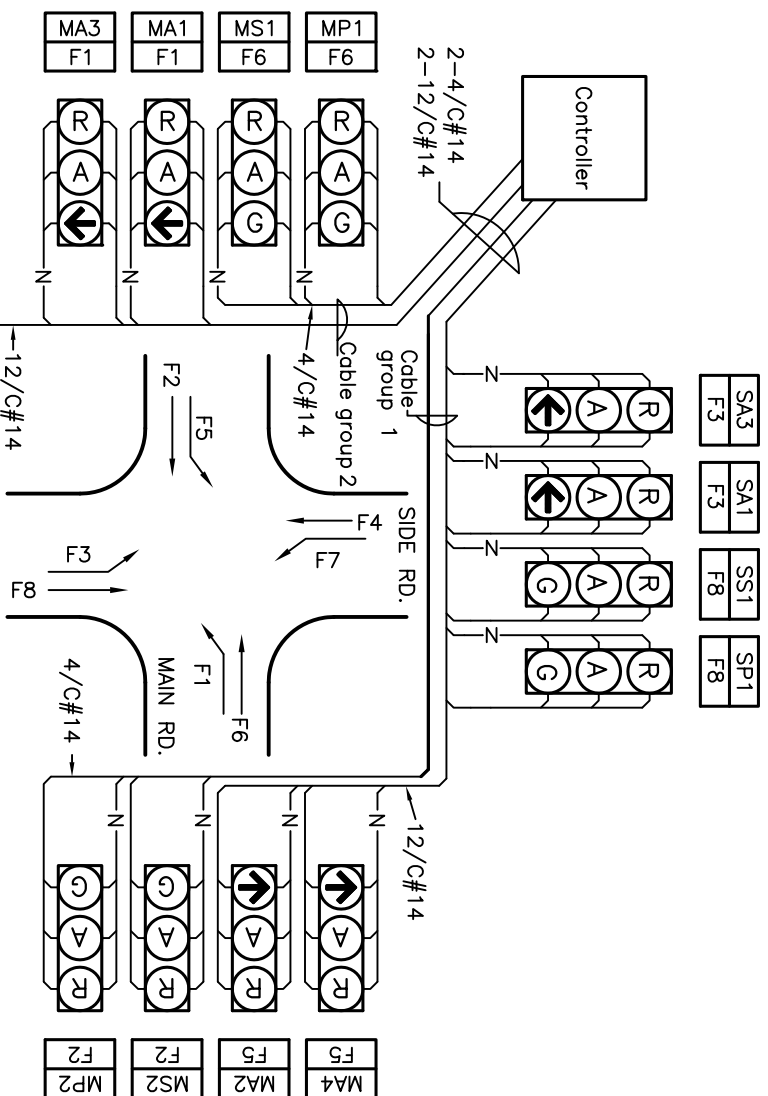
OPSD 2529.050



Cond #	Colour/Mark	Cable Group 1	Cable Group 2
4/C#14			
1	White	Neutral	Neutral
2	Red	Main Rd. Red	Main Rd. Red
3	Yellow	Main Rd. Green	Main Rd. Green
4	Blue	Main Rd. Amber	Main Rd. Amber
12/C#14			
1	White	Neutral	Neutral
2	Black	Spare	Spare
3	Orange	Spare	Spare
4	Red/Red One	Main Rd. LT Red	Main Rd. LT Red
5	Red/Red Two	Side Rd. Red	Side Rd. Red
6	Red/Red Three	Side Rd. LT Red	Side Rd. LT Red
7	Yellow/Amber One	Main Rd. LT Amber	Main Rd. LT Amber
8	Yellow/Amber Two	Side Rd. Amber	Side Rd. Amber
9	Yellow/Amber Three	Side Rd. LT Amber	Side Rd. LT Amber
10	Blue/Green One	Main Rd. LT Green	Main Rd. LT Green
11	Blue/Green Two	Side Rd. Green	Side Rd. Green
12	Blue/Green Three	Side Rd. LT Green	Side Rd. LT Green

NOTES:

- A Connections shown are general and typical and shall be adjusted to suit intersection layout.
- B For legend see OPSD 2529.010.
- C For pedestrian facilities see OPSD 2529.010.
- D The system shown requires ducts all around the intersection.



ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2012 Rev 0

SIGNAL WIRING

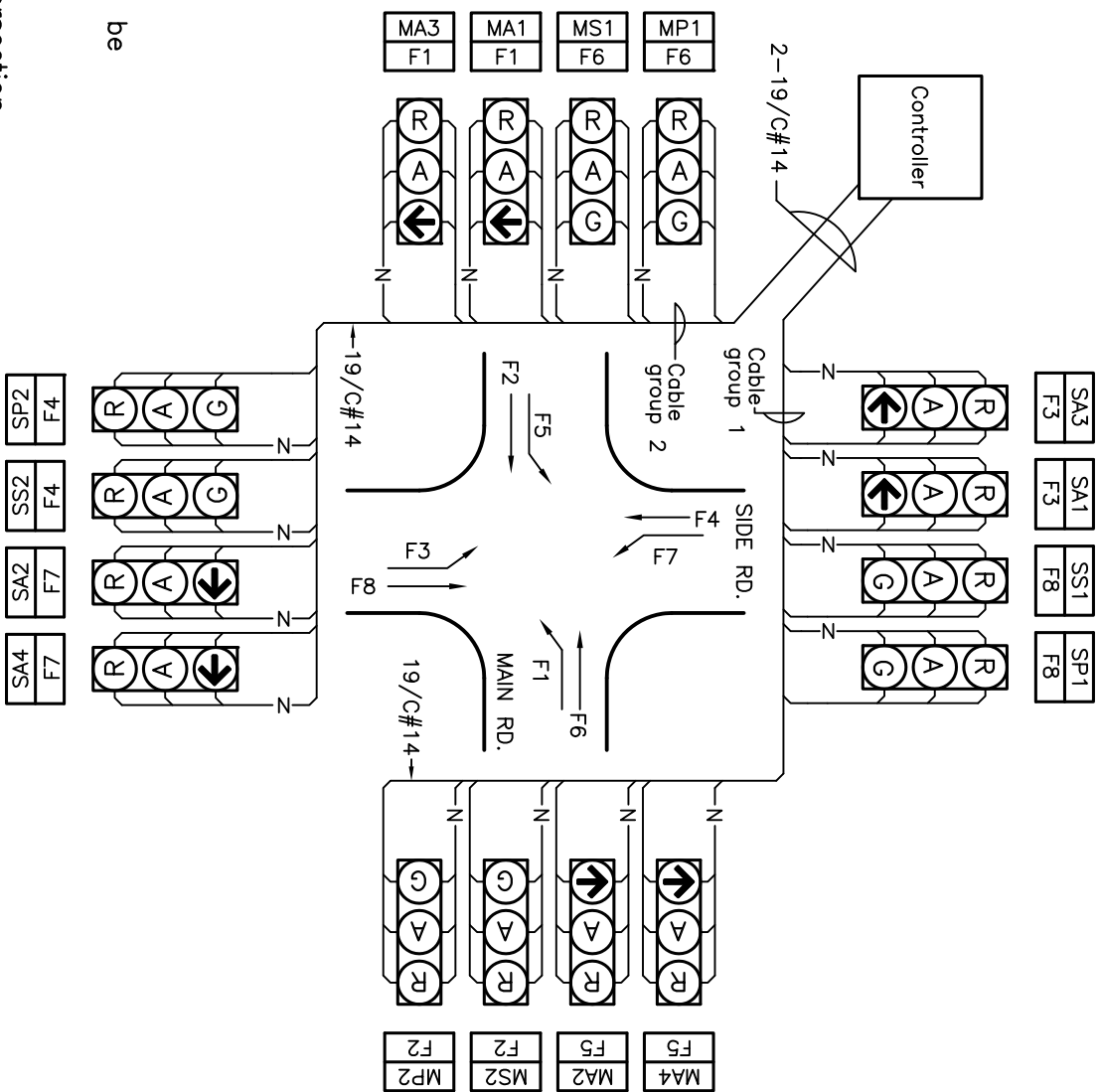
USING 4/C CABLE CONNECTED RADIALLY
AND 12/C CABLE TAPPED, 2 TO 8 PHASE

OPSD 2529.060



Cond #	Colour/Mark	Cable Group 1	Cable Group 2
1	White/White One	Main Rd. Neutral	Main Rd. Neutral
2	White/White Two	Side Rd. Neutral	Side Rd. Neutral
3	Black	Spare	Spare
4	Orange	Spare	Spare
5	Red/Red One	Main Rd. Red-F2	Main Rd. Red-F6
6	Red/Red Two	Main Rd. LT Red-F5	Main Rd. LT Red-F1
7	Red/Red Three	Side Rd. Red-F8	Side Rd. Red-F4
8	Red/Red Four	Side Rd. LT Red-F3	Side Rd. LT Red-F7
9	Red/Red Five	Spare	Spare
10	Yellow/Amber One	Main Rd. Amb-F2	Main Rd. Amb-F6
11	Yellow/Amber Two	Main Rd. LT Amb-F5	Main Rd. LT Amb-F1
12	Yellow/Amber Three	Side Rd. Amb-F8	Side Rd. Amb-F4
13	Yellow/Amber Four	Side Rd. LT Amb-F3	Side Rd. LT Amb-F7
14	Yellow/Amber Five	Spare	Spare
15	Blue/Green One	Main Rd. Green-F2	Main Rd. Green-F6
16	Blue/Green Two	Main Rd. LT Gr-F5	Main Rd. LT Gr-F1
17	Blue/Green Three	Side Rd. Green-F8	Side Rd. Green-F4
18	Blue/Green Four	Side Rd. LT Gr-F3	Side Rd. LT Gr-F7
19	Blue/Green Five	Spare	Spare

19/C#14



NOTES:

- Connections shown are general and typical and shall be adjusted to suit intersection layout.
- For legend see OPSPD 2529.010.
- For pedestrian facilities see OPSPD 2529.010.
- The system shown requires ducts all around the intersection.

ONTARIO PROVINCIAL STANDARD DRAWING

SIGNAL WIRING

USING 19/C CABLE TAPPED,
2 TO 8 PHASE

Nov 2012 Rev 0

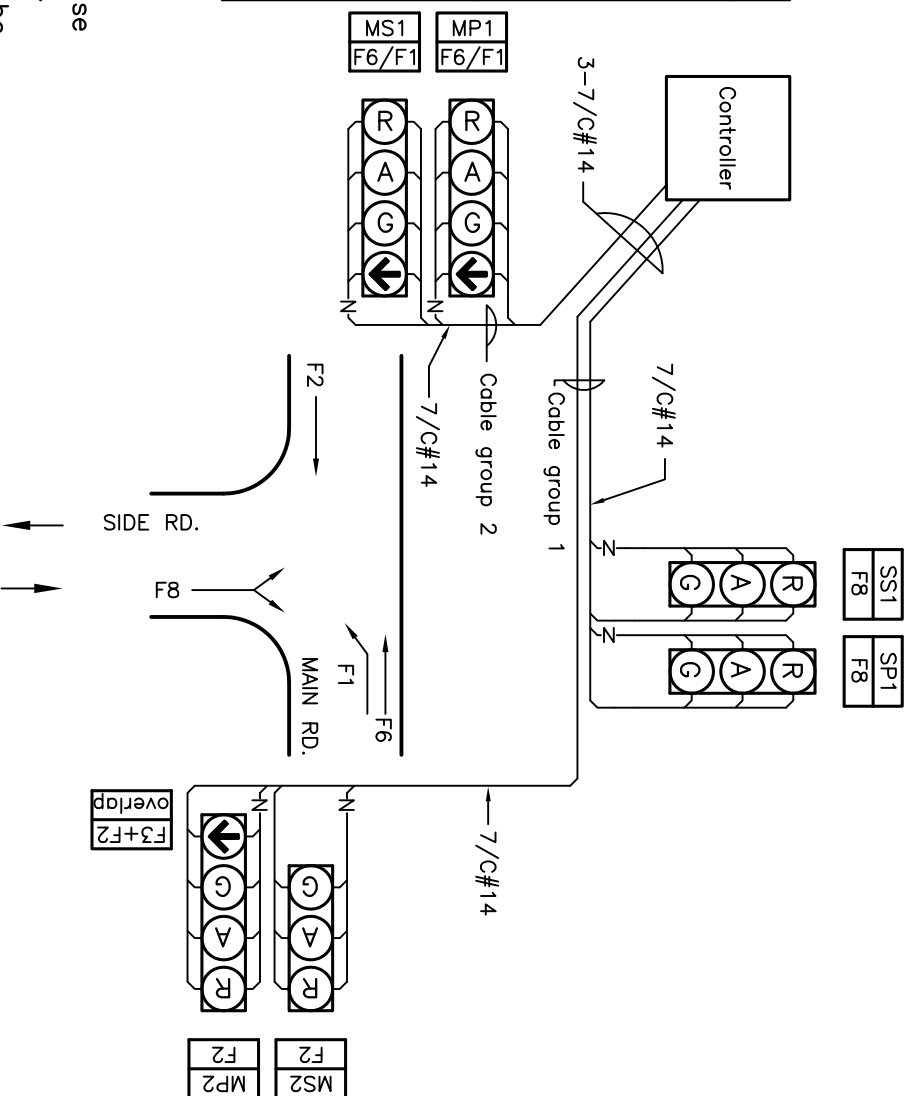


OPSPD 2529.070

Cond #	Colour/Mark	Cable Group 1	Cable Group 2
1	White	Neutral	Neutral
2	Red/Red One	Main Rd. Red F2	Main Rd. Red F6
3	Red/Red Two	Spare	Spare
4	Yellow/Amber One	Main Rd. Amber	Main Rd. Amber
5	Yellow/Amber Two	Spare	Spare or Note 1
6	Blue/Green One	Main Rd. Green	Main Rd. Arrow
7	Blue/Green Two	Main Rd. RT Arrow	Main Rd. LT Arrow
7/C#14(M)			
1	White	Neutral	
2	Red/Red One	Side Rd. Red	
3	Red/Red Two	Spare	
4	Yellow/Amber One	Side Rd. Amber	
5	Yellow/Amber Two	Spare	
6	Blue/Green One	Side Rd. LT Green	
7	Blue/Green Two	Spare	
7/C#14(S)			
1	White	Neutral	
2	Red/Red One	Side Rd. Red	
3	Red/Red Two	Spare	
4	Yellow/Amber One	Side Rd. Amber	
5	Yellow/Amber Two	Spare	
6	Blue/Green One	Side Rd. LT Green	
7	Blue/Green Two	Spare	

NOTES:

- When the left turn arrow is of the fibre optic type, use conductor #5 Yellow/Amber Two for the arrow amber.
- Connections shown are general and typical and shall be adjusted to suit intersection layout.
- For Legend see OPSD 2529.010.
- For pedestrian facilities see OPSD 2529.010.



ONTARIO PROVINCIAL STANDARD DRAWING

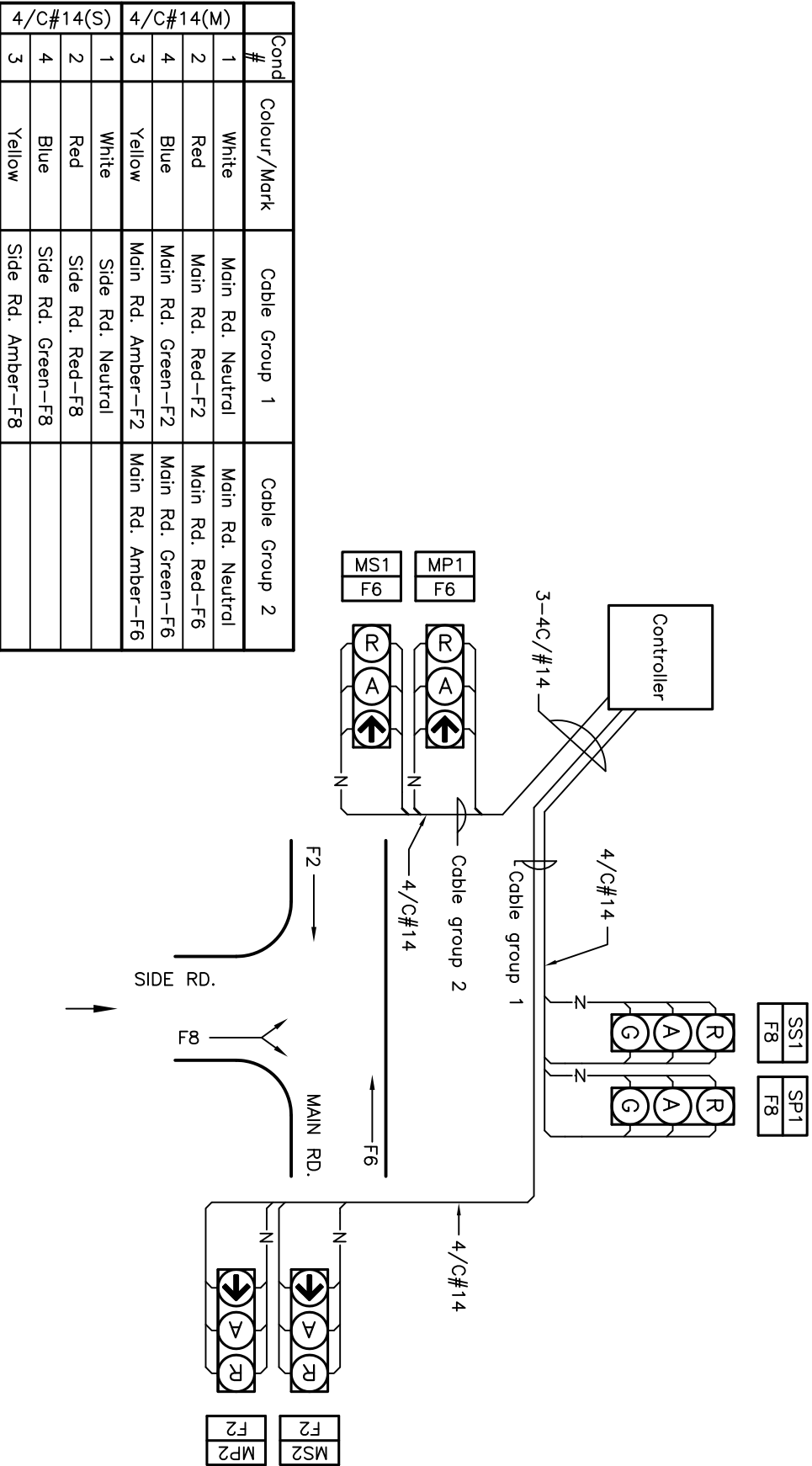
Nov 2012 Rev 0

SIGNAL WIRING

USING 7/C CABLE CONNECTED RADIALLY
T-INTERSECTION, 2 TO 3 PHASE

OPSD 2529.080

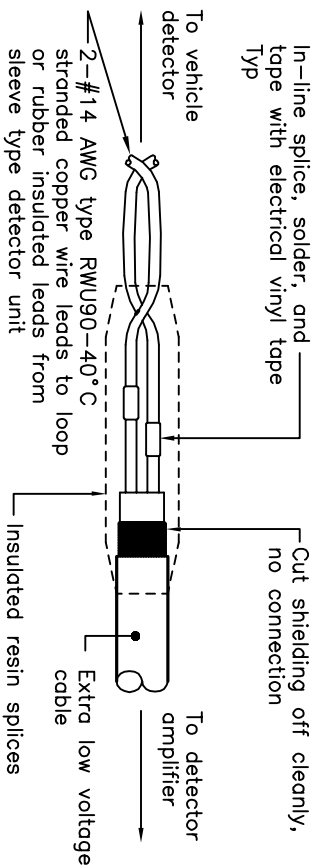




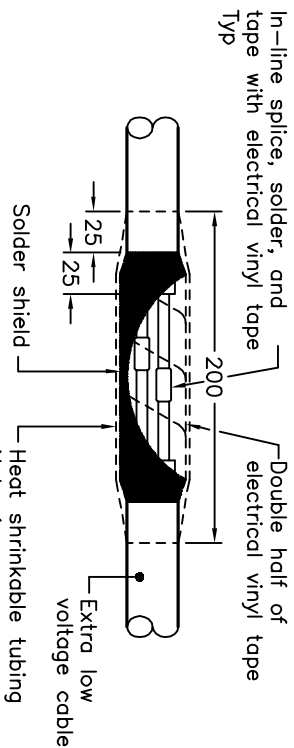
NOTES:

- A Connections shown are general and typical and shall be adjusted to suit intersection layout.
- B For Legend see OPSD 2529.010.
- C For pedestrian facilities see OPSD 2529.010.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2012	Rev 0
SIGNAL WIRING USING 4/C CABLE CONNECTED RADially T-INTERSECTION, 2 PHASE			
		OPSD 2529.090	



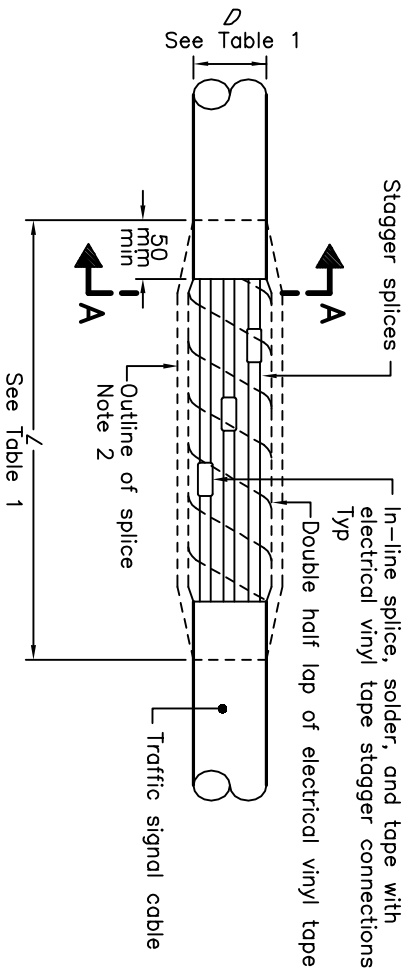
EXTRA LOW VOLTAGE CABLE TO DETECTOR CABLE SPLICING DETAIL



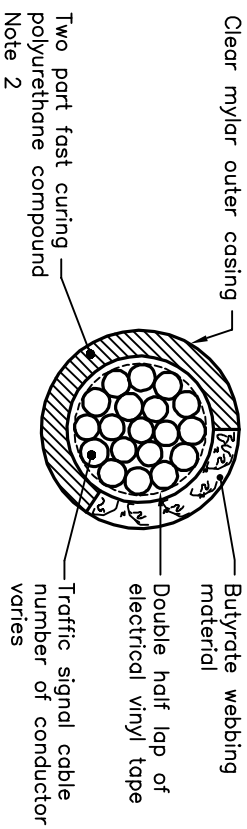
EXTRA LOW VOLTAGE CABLE SPLICING DETAIL

NOTES:

- 1 Heat shrinkable tubing shall be 2.4mm wall thickness, 19mm diameter, and 600 volt.
- 2 Splices shall be of suitable diameter and length as shown in Table 1 and installed according to manufacturer's instructions.
- A Splices shall not be used unless shown on the wiring diagrams, quantity sheets, or layout drawings, unless otherwise approved by the Engineer.
- B All dimensions are in millimetres unless otherwise shown.



TRAFFIC SIGNAL CABLE SPLICING DETAIL



SECTION A-A

TABLE 1

TRAFFIC SIGNAL CABLE	D	L
4 Conductor	12	300
7 Conductor	16	450
12 Conductor	21	450
19 Conductor	25	500

ONTARIO PROVINCIAL STANDARD DRAWING

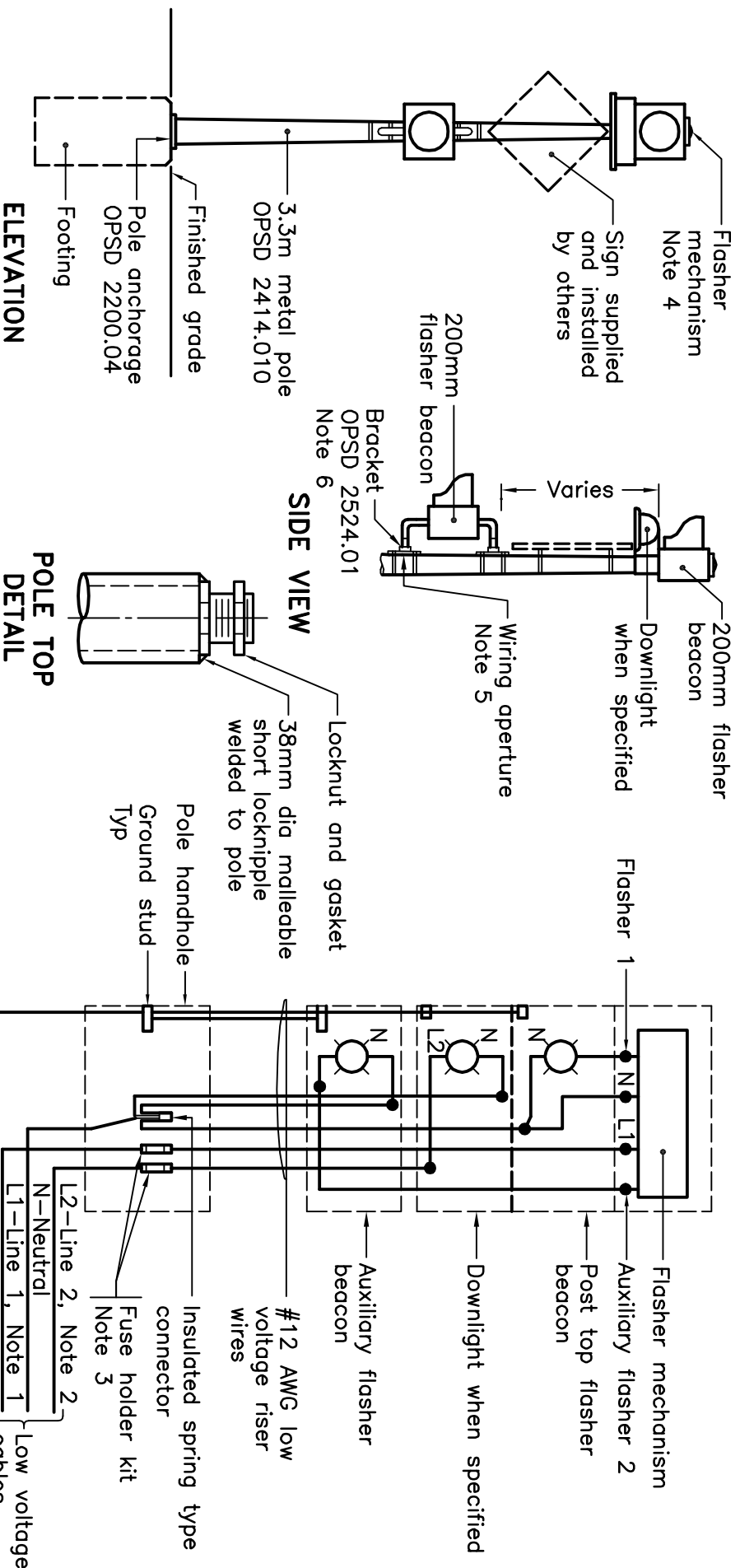
SPLICES FOR

TRAFFIC SIGNAL CABLE AND
EXTRA LOW VOLTAGE CABLE

Nov 2013 Rev 1

OPSD 2530.01





NOTES:

- 1 Line L1 shall be connected to 120V circuit of power supply.
- 2 Line L2 shall be connected to a photoelectric control or to a 120V lighting system.
- 3 Fuse holder shall be in-line type, 600V, complete with 15A fuse and insulating boots.
- 4 Flasher mechanism shall be installed into knockout hole on the top of flasher beacon.
- 5 Drill 25mm diameter aperture at lower bracket location for auxiliary flasher. Install rubber grommet.
- 6 Bracket shall be 150mm long.

- A All field cuts, threads, and holes shall be deburred and coated with zinc rich paint.
- B All dimensions are in millimetres unless otherwise shown.

WIRING DIAGRAM

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2015

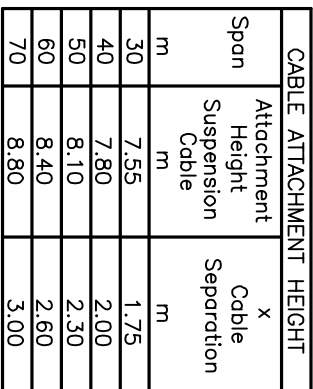
Rev 2

FLASHER BEACONS FOR ROADWAY SIGN AND DOWNLIGHT

AND WIRING DIAGRAM

OPSPD 2536.010

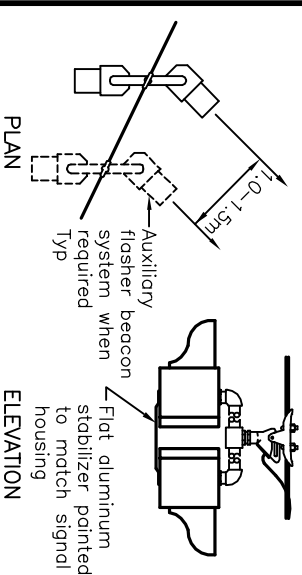
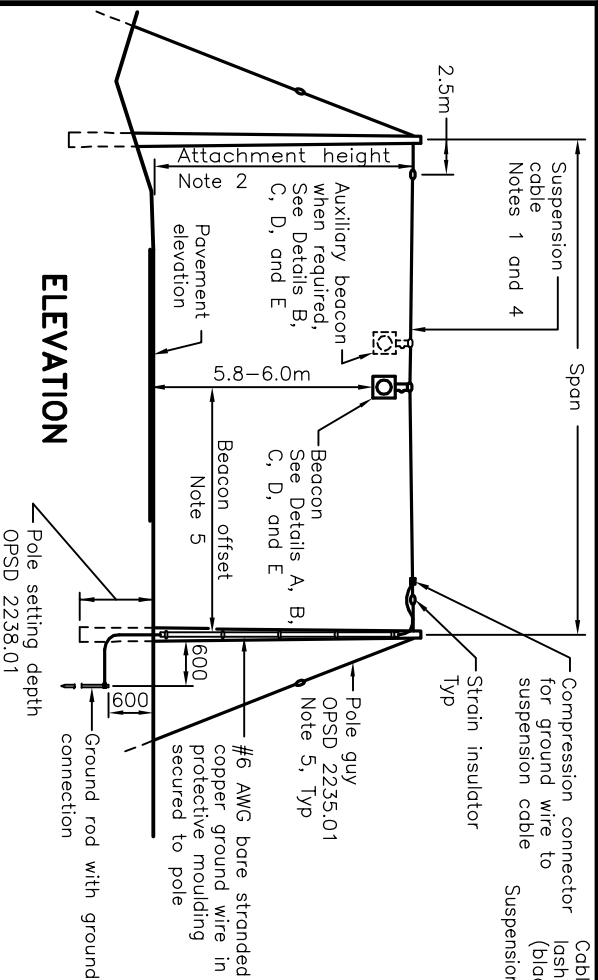




DETAIL A

- OPSD 2540.01

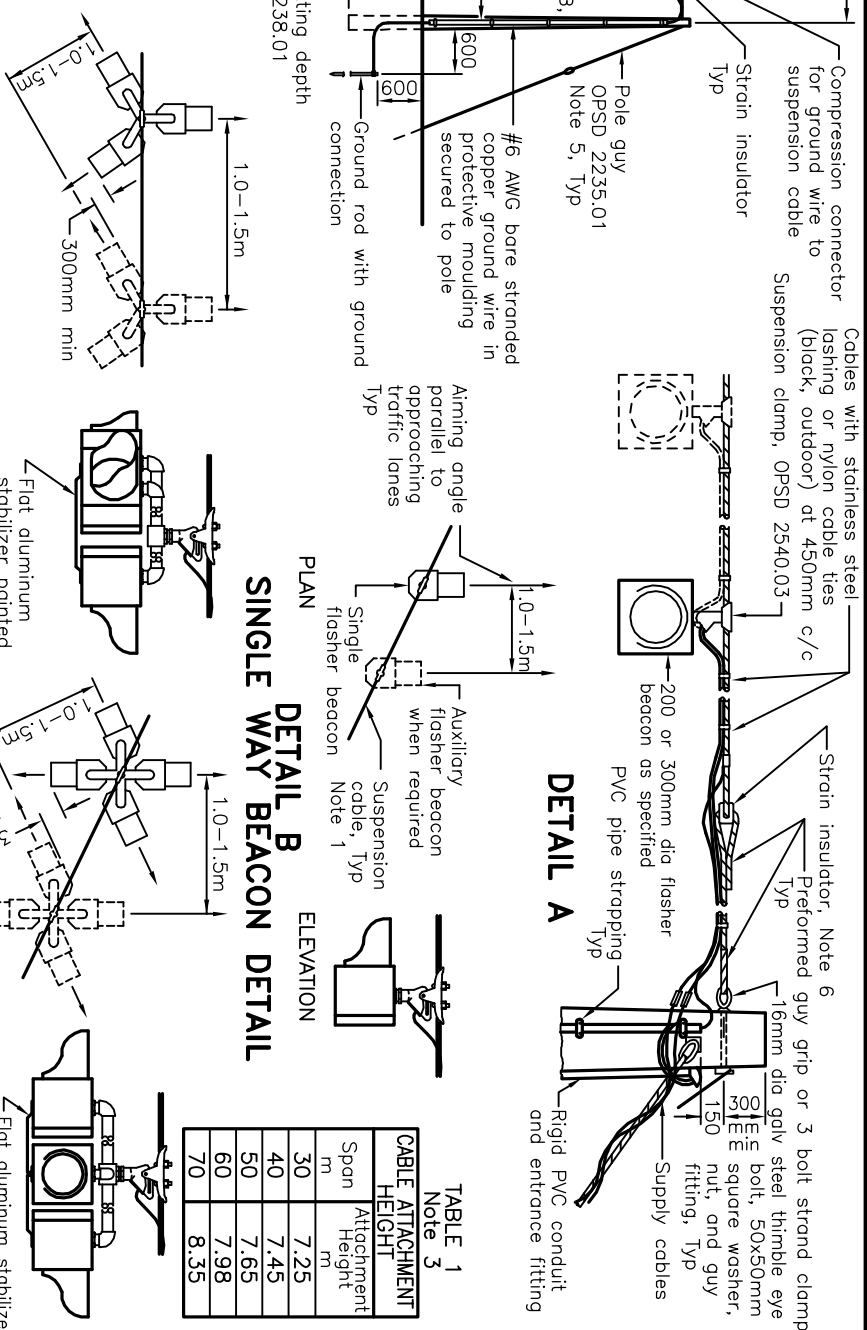




DETAIL C TWO-WAY BEACON DETAIL

NOTES:

- 1 Suspension cable shall be 9mm diameter Grade 160 steel strand cable.
- 2 Attachment height shall be set to obtain the clearance height shown under CSA heavy loading conditions. Install suspension cable attachment height according to Table 1 and allow for deviations between pavement elevation and finished grade elevation at the pole.
- 3 Values shown in Table 1 shall be interpolated to obtain intermediate values.
- 4 Cable shall be installed using the tension as shown in OPSPD 2245.01.



PLAN

DETAIL D THREE-WAY BEACON DETAIL

ELEVATION

PLAN

DETAIL E FOUR-WAY BEACON DETAIL

ELEVATION

DETAIL B SINGLE WAY BEACON DETAIL

PLAN

ELEVATION

TABLE 1
Note 3

CABLE ATTACHMENT HEIGHT	Attachment Height
Span	m
30	7.25
40	7.45
50	7.65
60	7.98
70	8.35

- 5 For orientation and location of signal heads and poles, refer to layout drawings.
- 6 Strain insulators shall be used only for attachment to utility poles or poles with live cables installed above the suspension cable.

A All dimensions are in millimetres unless otherwise shown.

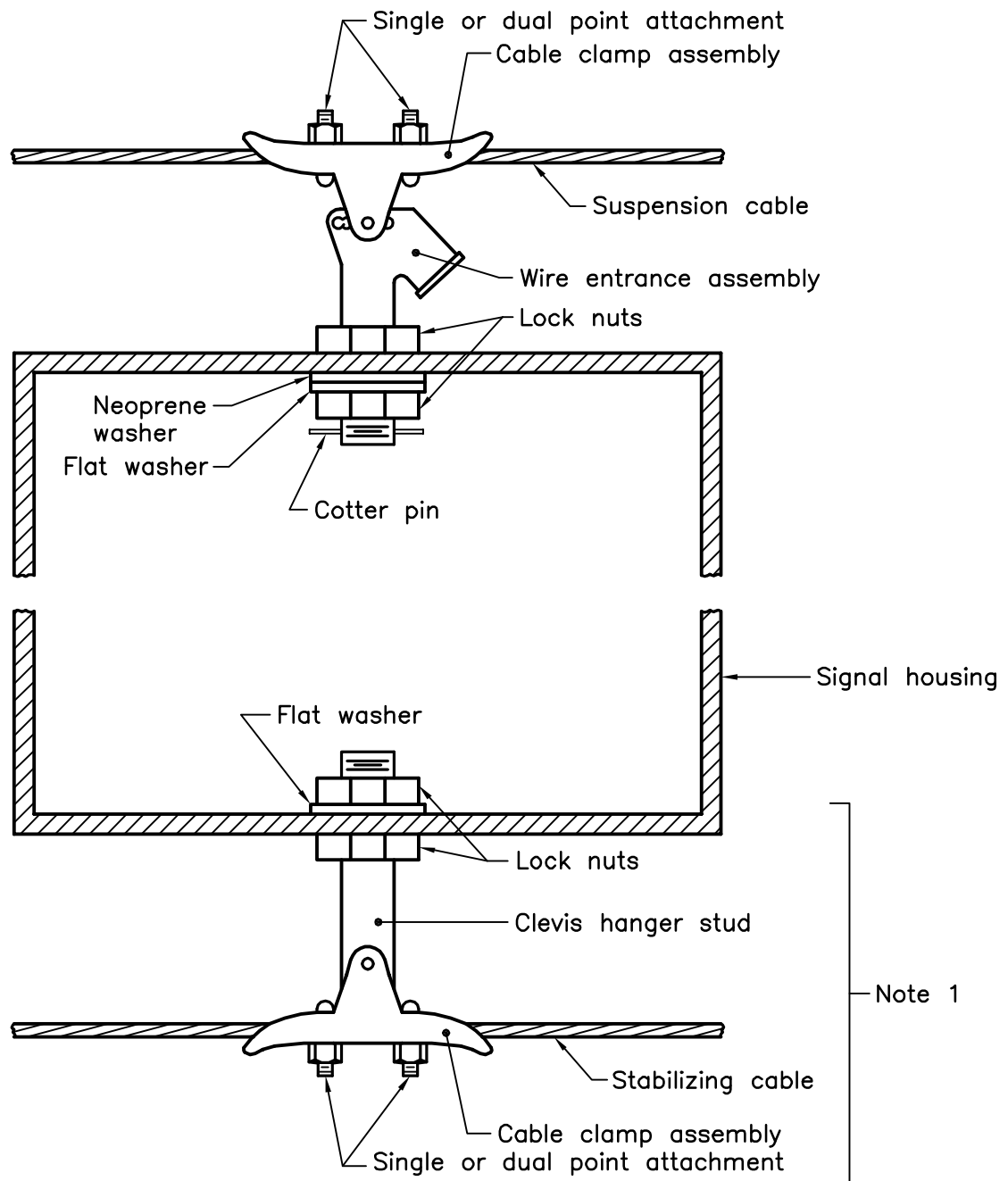
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2013 Rev 2

AERIAL FLASHER BEACON INSTALLATION

OPSPD 2540.02





NOTES:

1 Lower assembly applies to signal heads only.

A All hardware fittings shall be cast aluminum with stainless steel mounting hardware.

B This OPSD shall be read in conjunction with OPSD 2540.01 and OPSD 2540.02.

ONTARIO PROVINCIAL STANDARD DRAWING

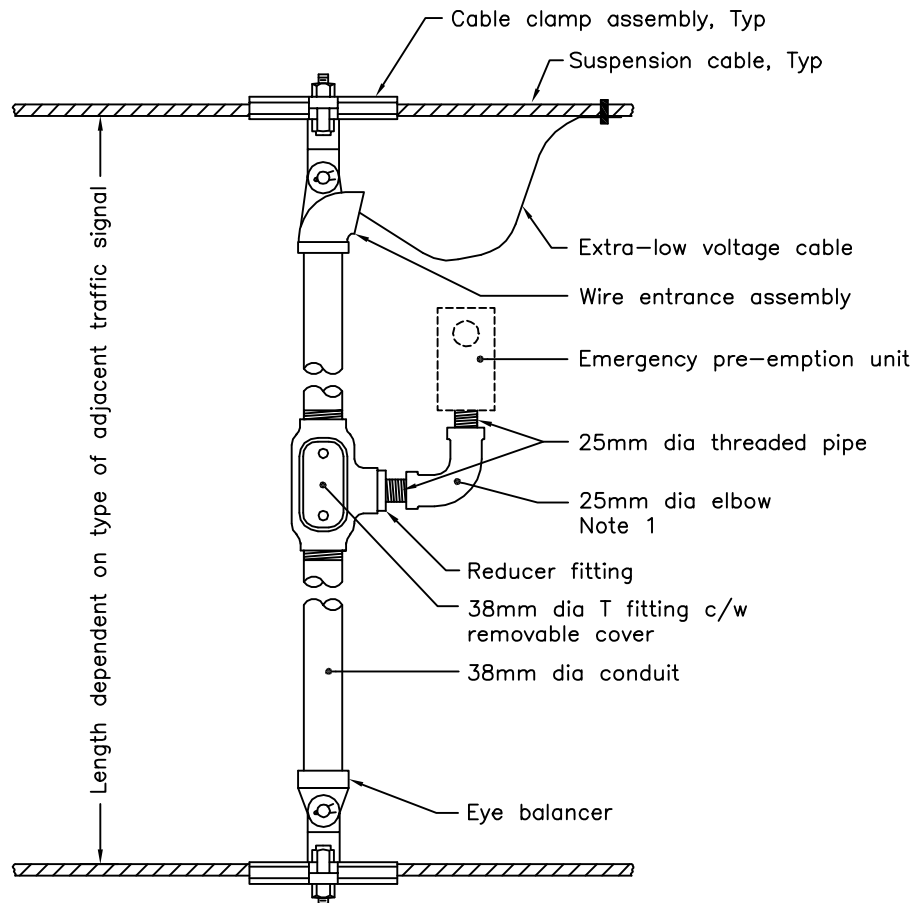
Nov 2013

Rev 0

**AERIAL SUSPENSION MOUNTING BRACKET
SIGNAL HEADS AND FLASHING BEACONS**



OPSD 2540.030



NOTES:

- 1 Elbow may be eliminated when side mounted emergency pre-emption unit is used.
- A Assembly shall be mounted on span cables as specified.
- B This OPSD to be read in conjunction with OPSD 2540.01.
- C All hardware fittings shall be cast aluminum with stainless steel mounting hardware.
- D All dimensions are in millimetres unless otherwise shown.

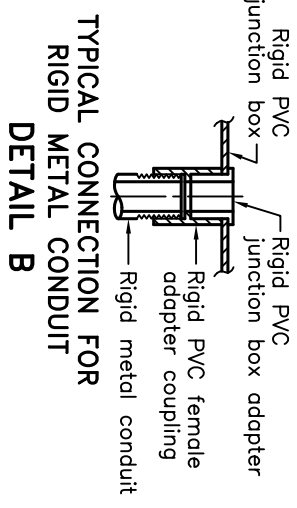
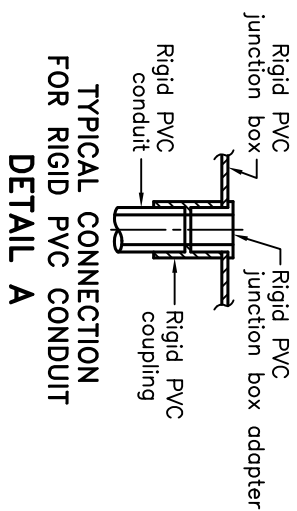
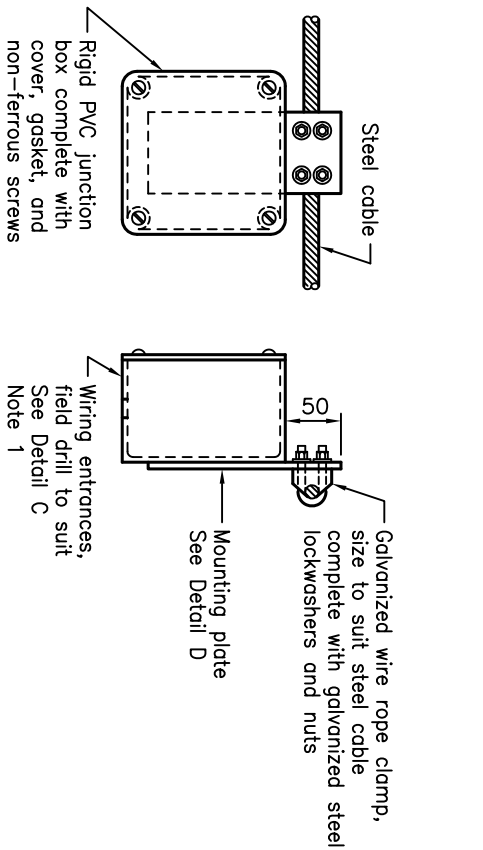
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2009 Rev 0

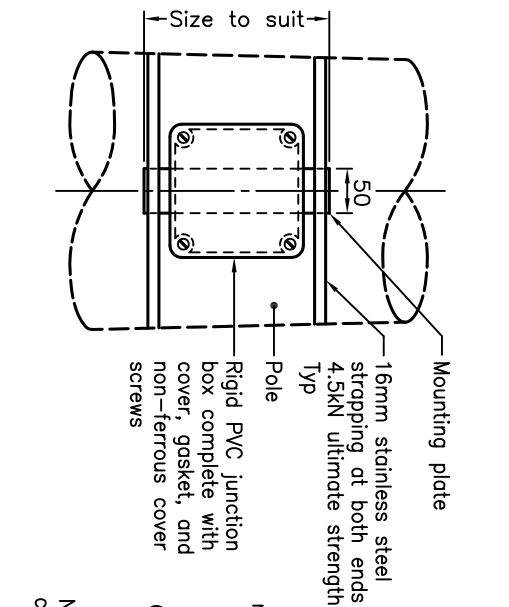
**AERIAL SUSPENSION
MOUNTING BRACKET
EMERGENCY PRE-EMPTION UNIT**

OPSD 2540.100



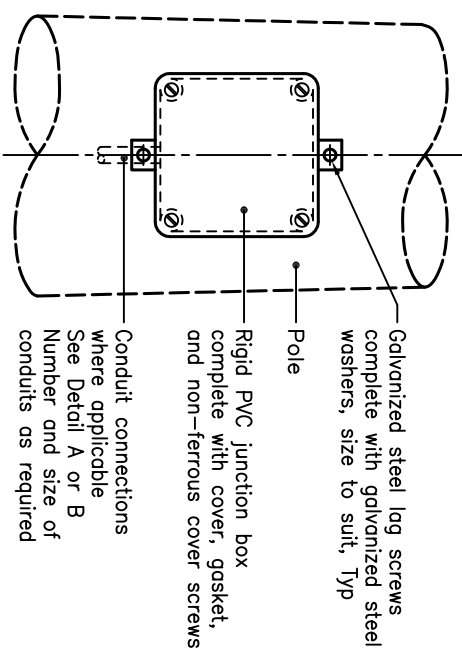


AERIAL SUSPENSION DETAIL



TYPICAL LIQUID TIGHT STRAIN RELIEF CONNECTOR DETAIL C

MOUNTING PLATE FOR AERIAL SUSPENSION DETAIL D



NOTES:

- For aerial suspension, drill wiring entrances, number as required, to suit size of cable connector. Wiring entrances shall be located in bottom of junction box only.
- All dimensions are in millimetres unless otherwise shown.

MOUNTING ON CONCRETE OR METAL POLE

MOUNTING ON WOODEN POLE

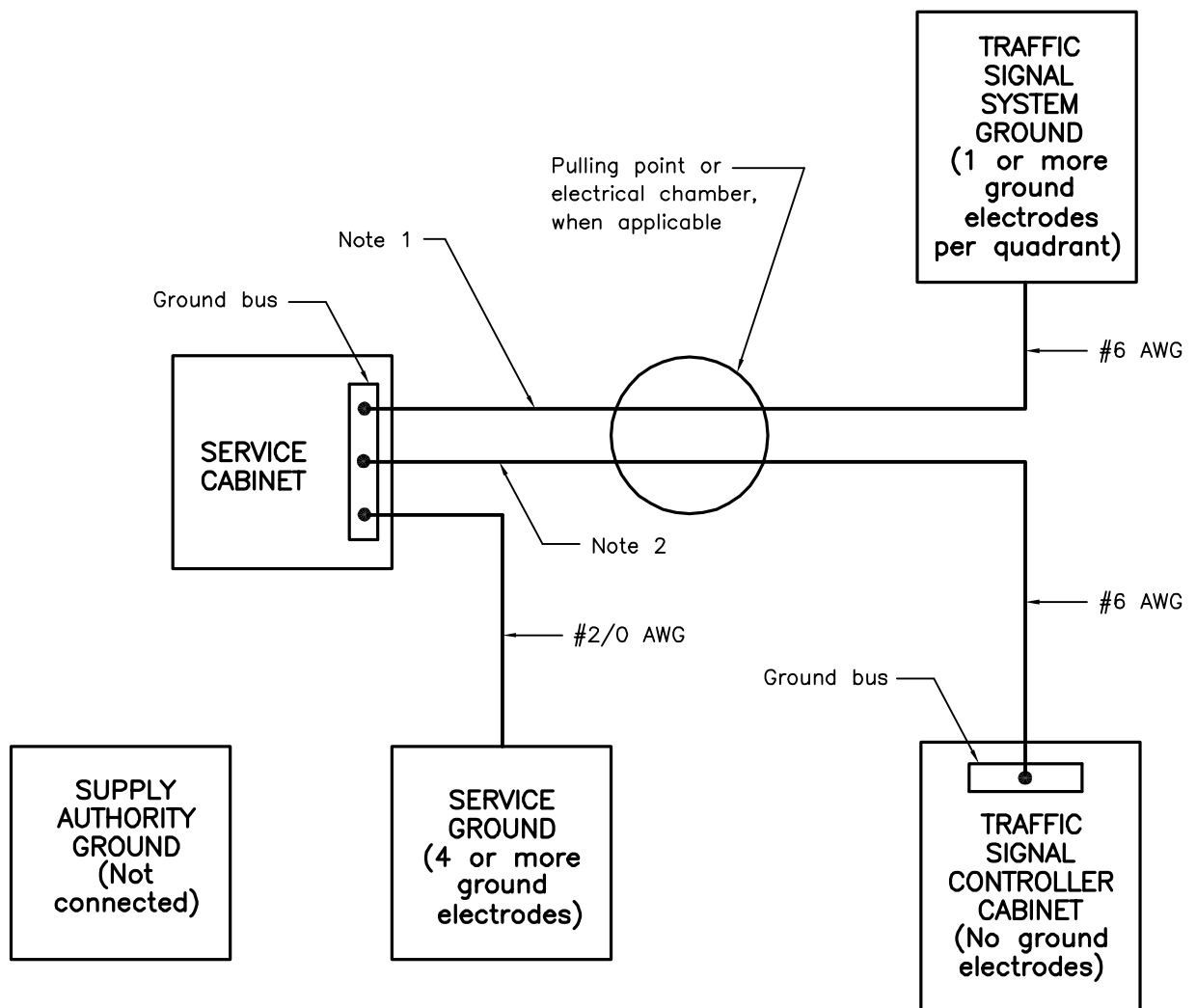
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2012 Rev 1

PVC JUNCTION BOX
FOR SIGNAL CABLE SPLICING

OPSD 2545.01





NOTES:

- 1 The #6 AWG pole system ground, with or without lighting, may connect to the #2/0 grid of the service ground or to the ground bus of the service cabinet.
- 2 The #6 AWG traffic controller cabinet ground shall not be bonded to any ground system, except at the ground bus of the service cabinet.

ONTARIO PROVINCIAL STANDARD DRAWING

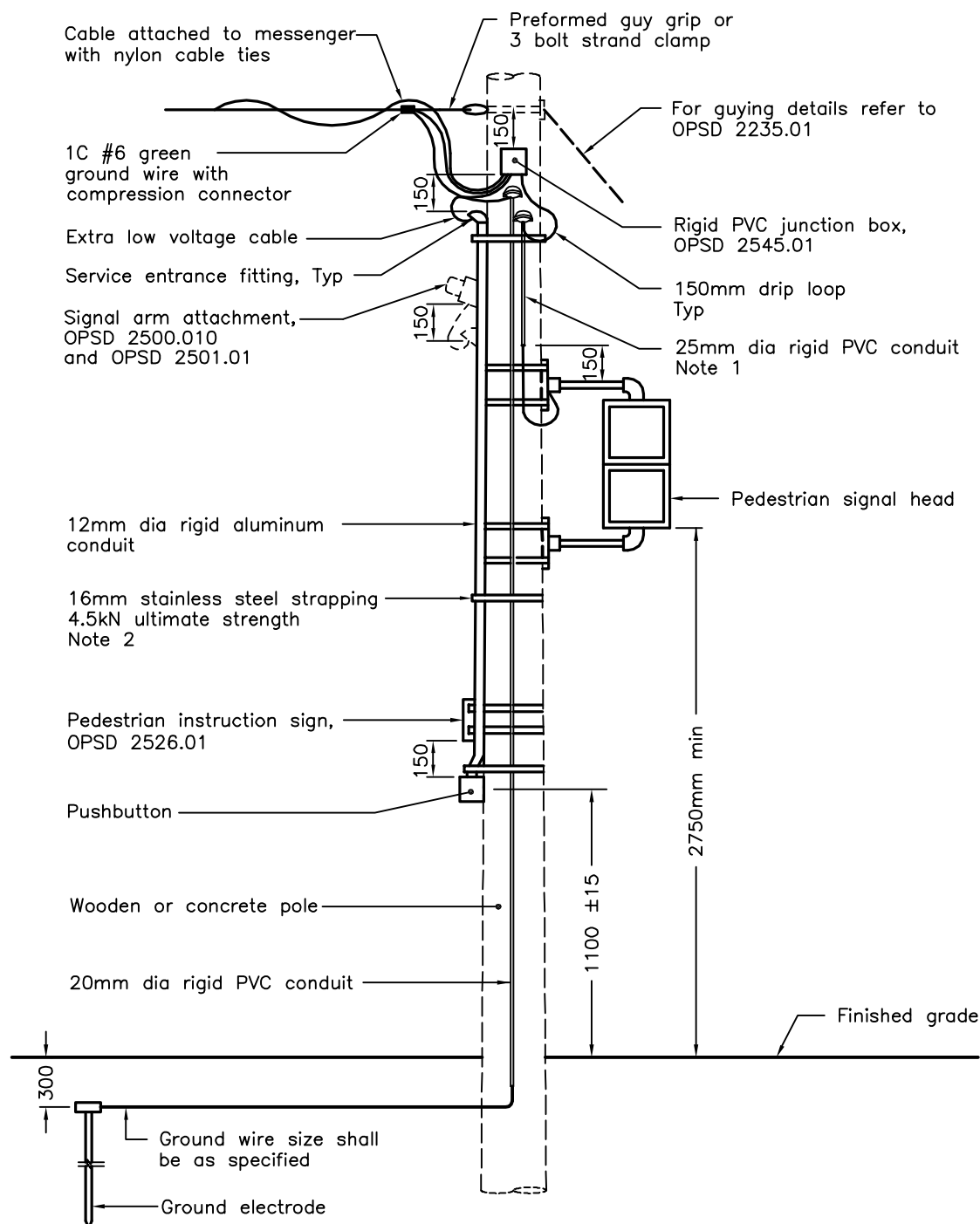
Nov 2014

Rev 1

TRAFFIC SIGNAL AND ILLUMINATION GROUNDING SYSTEM

OPSD 2547.010



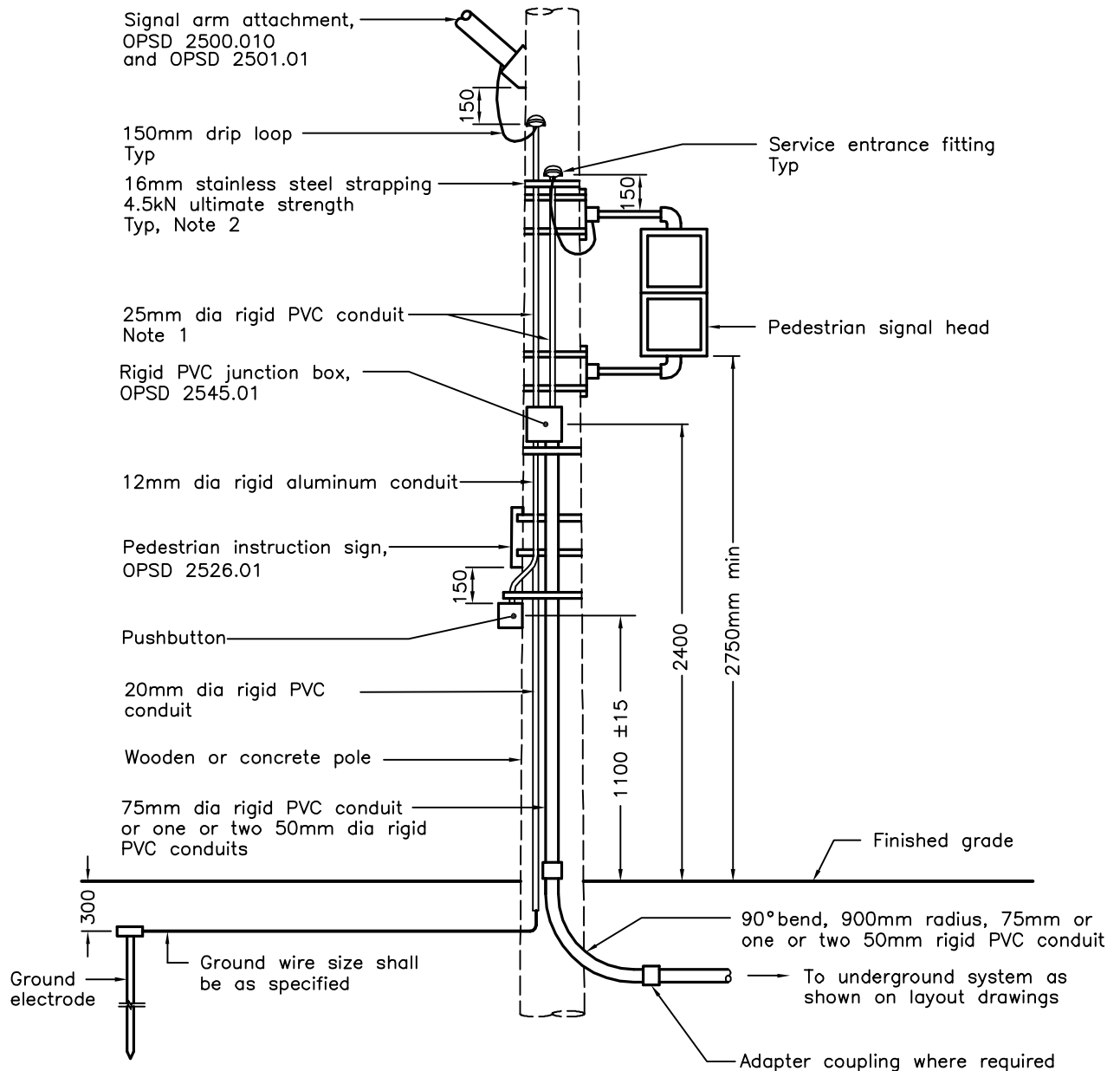


NOTES:

- 1 One 25mm diameter rigid PVC conduit required for each signal head. Install all signal heads prior to installing conduit. Install conduit system to obtain a neat and straight installation.
 - 2 On concrete poles, mount conduits using 16mm stainless steel strapping and buckles. On wooden poles, mount conduits using PVC coated steel or galvanized pipe straps with 6x38mm lag screws.
- A For orientation and location of poles and equipment refer to layout drawings.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2011	Rev	2	
TRAFFIC SIGNAL SYSTEM EQUIPMENT ON WOODEN OR CONCRETE POLES OVERHEAD WIRING INSTALLATION	-----			

OPSD 2552.01				



NOTES:

- 1 One 25mm diameter rigid PVC conduit required for each signal head. Install all signal heads prior to installing conduit. Install conduit system to obtain a neat and straight installation.
- 2 On concrete poles, mount conduits using 16mm stainless steel strapping and buckles. On wooden poles, mount conduits using PVC coated steel or galvanized pipe straps with 6x38mm lag screws.

A For orientation and location of poles and equipment refer to layout drawings.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

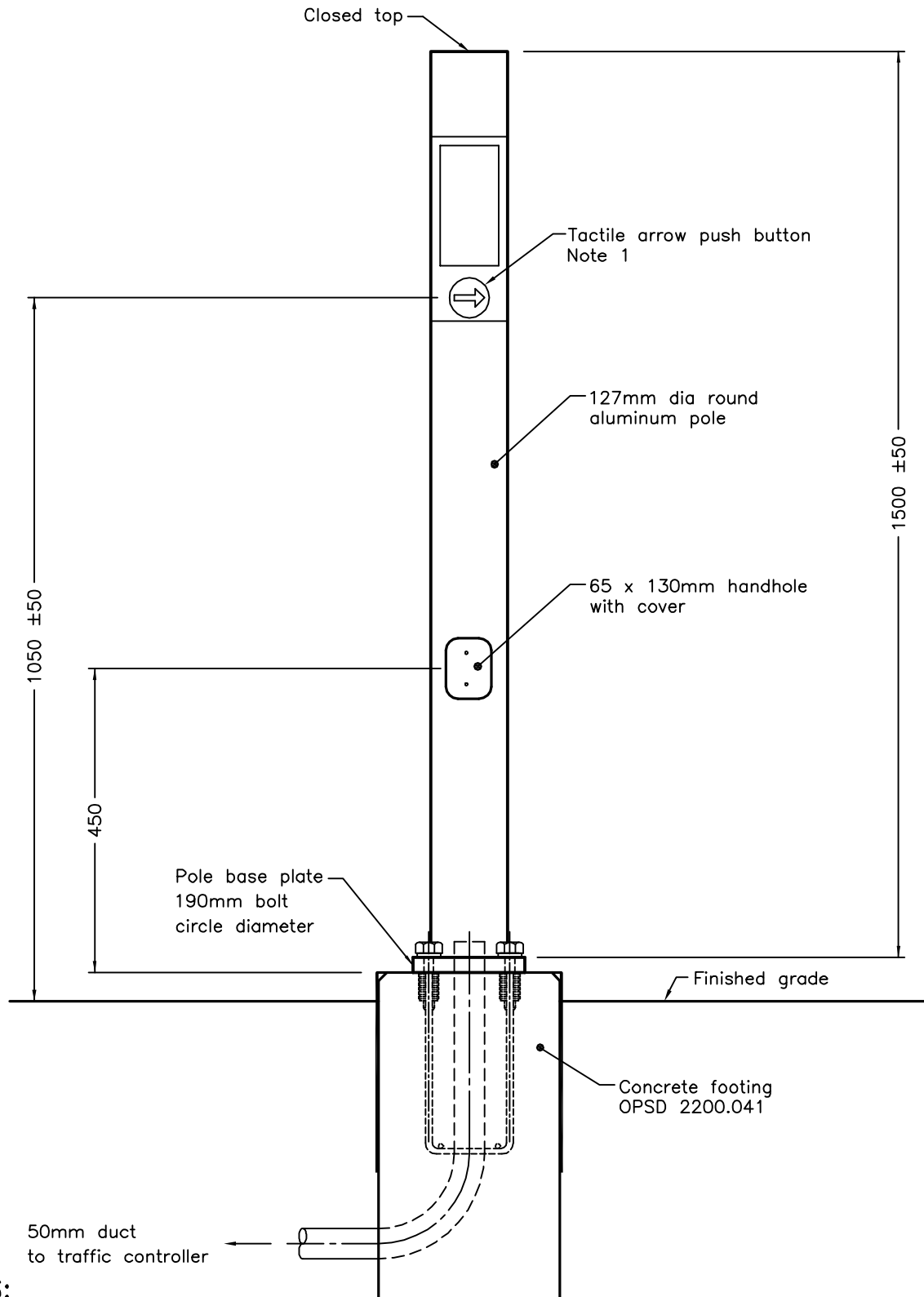
TRAFFIC SIGNAL SYSTEM EQUIPMENT
ON WOODEN OR CONCRETE POLES
UNDERGROUND WIRING INSTALLATION

Nov 2011

Rev 0



OPSD 2554.010



NOTES:

- 1 Accessible Pedestrian Signal tactile arrow push button shall align with direction of crosswalk.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

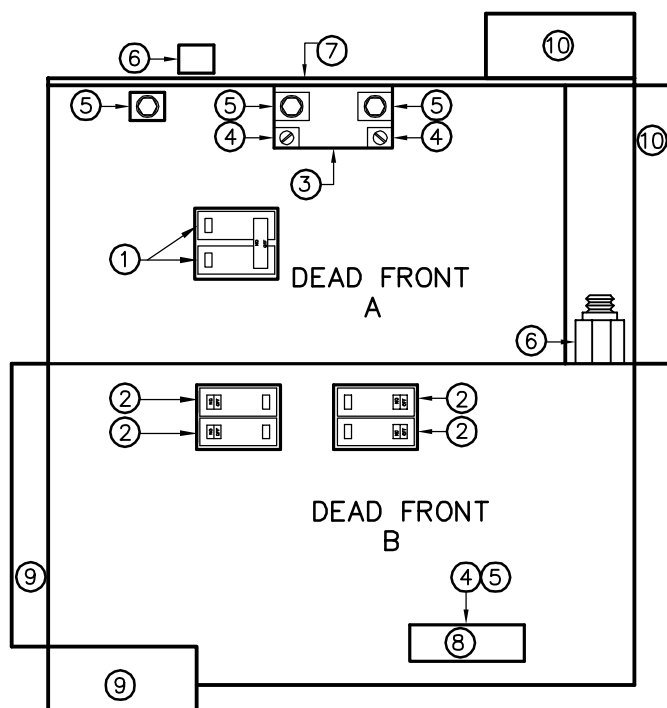
Nov 2014 | Rev | 0

**POLE FOR ACCESSIBLE
PEDESTRIAN SIGNAL PUSH BUTTON**

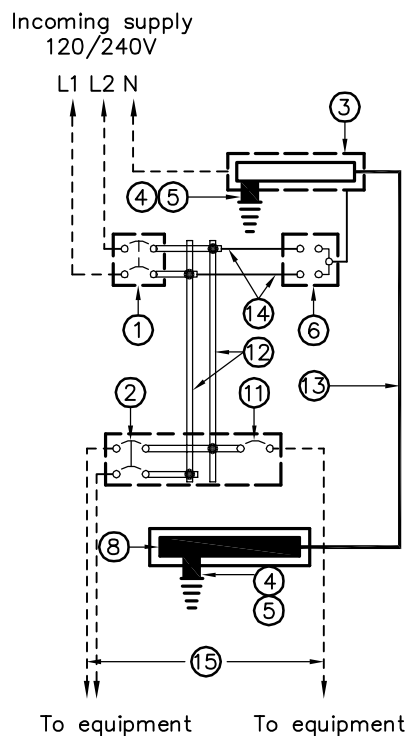
OPSD 2558.000



EQUIPMENT LAYOUT



SCHEMATIC WIRING DIAGRAM



ELECTRICAL EQUIPMENT LIST

- ① Main circuit breaker – 100A, 2–pole
- ② Branch circuit breaker – 2–pole and 1–pole, number of breakers and ampacity as specified
- ③ Solid neutral assembly – 100A minimum, copper
- ④ Ground lug for No. 6 AWG stranded copper ground wire
- ⑤ Ground lug for No. 2/0 AWG stranded copper ground wire
- ⑥ Secondary lightning arrester – 650V, 2–pole
- ⑦ Drip shield
- ⑧ Secondary neutral and ground bus according to CSA and as specified
- ⑨ Primary barrier
- ⑩ Secondary barrier
- ⑪ Circuit breaker for equipment
- ⑫ Copper bus bar
- ⑬ No. 6 AWG RWU90 wire
- ⑭ No. 12 AWG RWU90 wire
- ⑮ Field wiring

NOTE:

A This OPSD shall be read in conjunction with OPSD 2441.010, 2441.020 and 2441.030.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2015	Rev	0
ADVANCED TRAFFIC MANAGEMENT SYSTEM SUPPLY CONTROL CABINET 120/240V, 100A, 1–PHASE, 3–WIRE		-----		

		OPSD 2902.322		



