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REVISION INFORMATION SHEET

ONTARIO PROVINCIAL STANDARDS FOR ROADS AND PUBLIC WORKS

VOLUME 3 MUNICIPAL AND PROVINCIAL COMMON DRAWINGS FOR ROADS, BARRIERS, DRAINAGE, SANITARY SEWERS, WATERMAINS, AND STRUCTURES

MANUAL REVISION #70

November 2016

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for use of Ontario Provincial Standards; therefore, manual holders are cautioned about immediately discarding superseded and cancelled standards.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.rags.mto.gov.on.ca/techpubs/ops.nsf/OPSHomepage>)
- Hard-copy format available from Publications Ontario by telephone at 1-800-668-9938 or online. Updates and OPS manuals are available for a cost-recovery fee.
(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.
(www.publications.serviceontario.ca)

At the Publications Ontario web page, you can type "Ontario Provincial Standards," "OPS," "OPSS," or "OPSD" in the search box, and all related products for the Ontario Provincial Standards will be listed, click on the item you wish to purchase, add the item to your cart, then follow the instructions to complete your order. If trying to order an OPS product online from Publications Ontario and it is shown as Out of Stock, you can backorder the product by telephone at 1-800-668-9938.

In order to receive the Municipal Engineers Association (MEA) purchase price, MEA members should visit the MEA website (www.municipalengineers.on.ca/) for the MEA Publications Ontario order form for hard-copy manuals and CDs.

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.

Links to Publications Ontario and the Ontario Provincial Standards on the MTO Library website are available on the OPS website (www.ops.on.ca). Also on this site under News and Activities are notices for updates and changes in OPS.

Questions should be directed by email to Ontario.Prov.Standards@ontario.ca.

YOU SHOULD REGISTER YOUR OPS MANUALS AND CDs

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.

Owners of OPS manuals, who have not yet done so, are requested to register their OPS hard-copy manuals and CDs with Ontario.Prov.Standards@ontario.ca. The registration form and submission instructions are available on the OPS website (www.ops.on.ca), Miscellaneous Info, OPS Forms.

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 3

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

Standard Drawings Volume 3

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
202.010	2	202.010	3	“SLOPE FLATTENING USING SURPLUS EXCAVATED MATERIAL ON EARTH OR ROCK EMBANKMENT” This drawing has been reaffirmed with no changes to technical information.
202.030	5	202.030	6	“ROADWAY WIDENING FOR ECCENTRIC LOADER TERMINAL SYSTEM” See Summary of Revisions.
202.031	0	202.031	1	“ROADWAY WIDENING FOR STEEL BEAM ENERGY ATTENUATING TERMINAL APPROACH END” See Summary of Revisions.
202.032	1	202.032	2	“ROADWAY WIDENING FOR STEEL BEAM ENERGY ATTENUATING TERMINAL LEAVING END AND CONSTRAINED APPROACH END” See Summary of Revisions.
202.033	0	202.033	1	“ROADWAY WIDENING SINGLE SIDED ENERGY ATTENUATING TERMINALS APPROACH END” Plan View, Label Energy attenuator, OPSD 922.131 or 923.530 renamed to Energy attenuator.
205.010	2	205.010	3	“TRANSITION TREATMENT, EARTH CUT TO EARTH FILL” Transverse Section A-A, addition of 3% grade label to subgrade.
205.020	2	205.020	3	“TRANSITION TREATMENT, ROCK CUT TO ROCK FILL” Transverse Section A-A, addition of 3% grade label.

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
205.030	2	205.030	3	“TRANSITION TREATMENT, ROCK CUT TO EARTH FILL” Transverse Section A-A, addition of 3% grade label.
205.040	2	205.040	3	“TRANSITION TREATMENT, EARTH FILL TO ROCK FILL AND EATH FILL TO GRANULAR FILL” This drawing has been reaffirmed with no changes to technical information.
205.050	2	205.050	3	“TRANSITION TREATMENT, ROCK CUT TO EARTH FILL” This drawing has been reaffirmed with no changes to technical information.
207.010	2	207.010	3	“CONCRETE PAVEMENT ON OPEN GRADED DRAINAGE LAYER DIVIDED HIGHWAY” This drawing has been reaffirmed with no changes to technical information.
207.020	2	207.020	3	“COMPOSITE PAVEMENT ON OPEN GRADED DRAINAGE LAYER DIVIDED HIGHWAY” This drawing has been reaffirmed with no changes to technical information.
207.030	1	207.030	2	“CONCRETE AND COMPOSITE PAVEMENT ON OPEN GRADED DRAINAGE LAYER – URBAN SECTION” This drawing has been reaffirmed with no changes to technical information.
207.041	3	207.041	4	“SUBDRAIN PIPE - OPEN GRADED DRAINAGE LAYER – HOT MIX ASPHALT, CONCRETE OR COMPOSITE PAVEMENT” This drawing has been reaffirmed with no changes to technical information.
207.044	4	207.044	5	“SUBDRAIN PIPE – CONNECTION AND OUTLET – OPEN GRADED DRAINAGE LAYER” This drawing has been reaffirmed with no changes to technical information.

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
209.020	2	209.020	3	“WIDENING EXISTING ROCK CUT WITH GRADE RAISE” This drawing has been reaffirmed with no changes to technical information.
210.070	3	210.070	4	“GRANULAR SEALING” This drawing has been reaffirmed with no changes to technical information.
214.010	1	214.010	2	“SINGLE LANE RAMP GRADING FOR ASPHALT PAVEMENT WITH GRANULAR BASE AND SHOULDER” This drawing has been reaffirmed with no changes to technical information.
214.020	1	214.020	2	“SINGLE LANE RAMP GRADING FOR ASPHALT PAVEMENT WITH GRANULAR BASE AND ASPHALT SHOULDER” This drawing has been reaffirmed with no changes to technical information.
214.030	2	214.030	3	“SINGLE LANE RAMP GRADING FOR ASPHALT PAVEMENT WITH GRANULAR BASE AND ASPHALT SHOULDER AND CURB AND GUTTER” This drawing has been reaffirmed with no changes to technical information.
215.010	1	215.010	2	“TWO LANE RAMP GRADING FOR ASPHALT PAVEMENT WITH GRANULAR BASE AND ASPHALT SHOULDER” This drawing has been reaffirmed with no changes to technical information.
215.020	1	215.020	2	“TWO LANE RAMP GRADING FOR ASPHALT PAVEMENT WITH GRANULAR BASE, ASPHALT SHOULDER AND CURB AND GUTTER FOR TANGENT SECTION” This drawing has been reaffirmed with no changes to technical information.

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
215.030	2	215.030	3	"TWO LANE RAMP GRADING FOR ASPHALT PAVEMENT WITH GRANULAR BASE, ASPHALT SHOULDER AND CURB AND GUTTER FOR SUPERELEVATED SECTION" This drawing has been reaffirmed with no changes to technical information.
561.010	1	561.010	2	"INTERLOCKING CONCRETE PAVERS ON GRANULAR BASE" Note 3 added.
561.020	1	561.020	2	"INTERLOCKING CONCRETE PAVERS ON ASPHALT BASE" Note 4 added.
561.030	1	561.030	2	"INTERLOCKING CONCRETE PAVERS ON RETROFIT CROSSWALK INSTALLATION" This drawing has been reaffirmed with no changes to technical information.
708.010	2	708.010	3	"CATCH BASIN CONNECTION FOR MAIN PIPE SEWER" CONNECTION WITH RISER detail, "Concrete Bedding" detail added and corresponding text updated.
708.020	3	708.020	4	"SUPPORT FOR PIPE AT CATCH BASIN OR MAINTENANCE HOLE" This drawing has been reaffirmed with no changes to technical information.
708.030	2	708.030	3	CATCH BASIN CONNECTION FOR FLEXIBLE PIPE SEWER" This drawing has been reaffirmed with no changes to technical information.
802.095	1	802.095	2	"CLAY SEAL FOR PIPE TRENCHES" Drawing details slightly modified for more clarification.
912.101	2	912.101	3	"GUIDE RAIL SYSTEM, STEEL BEAM, RAIL, COMPONENT" See Summary of Revisions.

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
912.102	1	912.102	2	“GUIDE RAIL SYSTEM, STEEL BEAM, CHANNEL, COMPONENT” This drawing has been reaffirmed with no changes to technical information.
912.103	1	912.103	2	“GUIDE RAIL SYSTEM, STEEL BEAM, PLASTIC OFFSET BLOCKS, COMPONENT” This drawing has been reaffirmed with no changes to technical information.
912.104	2	912.104	3	“GUIDE RAIL SYSTEM, STEEL BEAM, STEEL POST WITH WOODEN OFFSET BLOCK” This drawing has been reaffirmed with no changes to technical information.
912.105	1	912.105	2	“GUIDE RAIL SYSTEM, STEEL BEAM, BASE PLATE, COMPONENT” This drawing has been reaffirmed with no changes to technical information.
		912.123	0	“GUIDE RAIL SYSTEM, STEEL BEAM, TYPE M RAIL – 476mm HOLE SPACING, COMPONENT” This is a New Drawing.
		912.128	0	“GUIDE RAIL SYSTEM, STEEL BEAM, TYPE M30 STEEL POST WITH OFFSET BLOCK, COMPONENT” This is a New Drawing.
		912.129	0	“GUIDE RAIL SYSTEM, STEEL BEAM, 30cm POLYMER OFFSET BLOCK – P-BLOCK, COMPONENT” This is a New Drawing.
912.130	2	912.130	3	“GUIDE RAIL SYSTEM, STEEL BEAM, STEEL POST WITH OFFSET BLOCK ASSEMBLY, INSTALLATION – SINGLE RAIL” 1915 mm post length deleted throughout drawing.

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
912.135	0	912.135	1	“GUIDE RAIL SYSTEM, STEEL BEAM, STEEL POST WITH STEEL OFFSET BLOCK ASSEMBLY, ADJUSTMENT – SINGLE RAIL” This drawing has been reaffirmed with no changes to technical information.
912.145	0	912.145	1	“GUIDE RAIL SYSTEM, STEEL BEAM, WOODEN POST ASSEMBLY, ADJUSTMENT – SINGLE RAIL” This drawing has been reaffirmed with no changes to technical information.
		912.185	0	“GUIDE RAIL SYSTEM, STEEL BEAM, TYPE M20, INSTALLATION” This is a New Drawing.
		912.186	0	“GUIDE RAIL SYSTEM, STEEL BEAM, TYPE M20 – ADJACENT TO 2H:1V SLOPE INSTALLATION – RAIL AT SHOULDER” This is a New Drawing.
		912.188	0	“GUIDE RAIL SYSTEM, STEEL BEAM, TYPE M20 – ADJACENT TO CONCRETE CURB, INSTALLATION” This is a New Drawing.
		912.189	0	“GUIDE RAIL SYSTEM, STEEL BEAM, TYPE M30 – ADJACENT TO SIDEWALK, INSTALLATION” This is a New Drawing.
912.234	1			“GUIDE RAIL SYSTEM, STEEL BEAM, END TREATMENT, INSTALLATION – LEAVING END COLLECTOR MEDIAN” OPSD Cancelled. The end treatment is no longer being used as there are better options.
912.240	0			“GUIDE RAIL SYSTEM, STEEL BEAM, TREATMENT AT CULVERTS WITH MINIMAL COVER INSTALLATION – SINGLE RAIL” OPSD Cancelled. The end treatment is no longer being used as there are better options.

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
		912.245	0	“GUIDE RAIL SYSTEM, STEEL BEAM, TYPE M – 7.62m LONG SPAN TREATMENT, INSTALLATION” This is a New Drawing.
		912.246	0	“GUIDE RAIL SYSTEM, STEEL BEAM, TYPE M – 5.71m LONG SPAN TREATMENT, INSTALLATION” This is a New Drawing.
		912.255	0	“GUIDE RAIL SYSTEM, STEEL BEAM, TYPE M20 AND M30 LEAVING END TREATMENT, INSTALLATION” This is a New Drawing.
		912.256	0	“GUIDE RAIL SYSTEM, STEEL BEAM, TYPE M LEAVING END TREATMENT, COMPONENT – RAIL, TERMINAL SECTION AND POST ANCHOR DETAIL” This is a New Drawing.
		912.315	0	“GUIDE RAIL SYSTEM, STEEL BEAM, TRANSITION FROM TYPE M TO STEEL BEAM GUIDE RAIL WITH CHANNEL FOR STRUCTURE CONNECTION, INSTALLATION” This is a New Drawing.
		912.316	0	“GUIDE RAIL SYSTEM, STEEL BEAM, TYPE M REDUCED DEFLECTION TREATMENT, INSTALLATION” This is a New Drawing.
912.381	1			“GUIDE RAIL SYSTEM, STEEL BEAM, PERMANENT TRANSITION INSTALLATION, SINGLE STEEL BEAM TO 3 CABLE, DIVIDED HIGHWAY” OPSD Cancelled. This single steel beam guide rail to 3 cable guide rail transition is no longer being used as there are better options.
912.530	1	912.530	2	“GUIDE RAIL SYSTEM, STEEL BEAM, STRUCTURE APPROACH TREATMENT, INSTALLATION – RURAL HIGHWAY” This drawing has been reaffirmed with no changes to technical information.

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
912.531	2			“GUIDE RAIL SYSTEM, STEEL BEAM, INSTALLATION – ENTRANCES AND INTERSECTING ROADWAYS” OPSD Cancelled. The steel beam guide rail entrance and intersecting roadways design is being cancelled due to misuse.
921.101	1	921.101	2	“ENERGY ATTENUATOR, GENERAL, INSTALLTION – GRANULAR APPROACH PAD, MEDIAN” This drawing has been reaffirmed with no changes to technical information.
923.002	0	923.002	1	“ENERGY ATTENUATOR, CRASH CUSHION, COMPONENT – ANCHOR ASSEMBLY” Optional precast concrete pad added.
		923.010	0	“ENERGY ATTENUATOR, CRASH CUSHION, NARROW SYSTEMS, COMPONENT – REINFORCED PRECAST CONCRETE PAD FOR PERMANENT INSTALLATION” This is a New Drawing.
		923.011	0	“ENERGY ATTENUATOR, CRASH CUSHION, COMPONENT – REINFORCED PRECAST CONCRETE PAD FOR MODIFIED TEMPORARY CONCRETE BARRIER” This is a New Drawing.
924.131	0	924.131	1	“ENERGY ATTENUATOR, CRASH CUSHION, ABSORB 350 SYSTEM, INSTALLATION - TEMPORARY CONCRETE BARRIER” Plan view, dimension 2.0m min revised to 1.0m min and label for Edge of driving lane revised to Edge of travelled lane.
924.135	1	924.135	2	“ENERGY ATTENUATOR, CRASH CUSHION, SLED SYSTEM, INSTALLATION - TEMPORARY CONCRETE BARRIER” Plan view, dimension 2.0m min revised to 1.0m min and label for Edge of driving lane revised to Edge of travelled lane.

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
		924.141	0	“ENERGY ATTENUATOR, CRASH CUSHION, ACZ-350 SYSTEM, INSTALLATION - TEMPORARY CONCRETE BARRIER” This is a New Drawing.
971.101	3	971.101	4	“FENCE, HIGHWAY, IN EARTH, SHALE, LOOSE ROCK, OR FRIABLE ROCK, INSTALLATION” See Summary of Revision.
971.102	1	971.102	2	“FENCE, HIGHWAY, IN SOLID ROCK, INSTALLATION” See Summary of Revision.
		971.103	0	“FENCE, HIGHWAY, INSTALLATION DETAILS” This is a New Drawing.
912.532	1	973.130	0	“FENCE, STEEL BEAM, BARRICADE, INSTALLATION” See Summary of Revisions.
		984.105	0	“FLEXIBLE DELINEATOR POST, INSTALLATION – TEMPORARY AND PERMANENT” This is a new drawing. The MTO representative recommended converting MTOD 984.105 (November 2014) into OPSD 984.105.
1003.010	2	1003.010	3	“CAST IN PLACE MAINTENANCE HOLE DROP STRUCTURE TEE” See Summary of Revisions.
1003.020	2	1003.020	3	“CAST IN PLACE MAINTENANCE HOLE DROP STRUCTURE WYE” SECTION A-A detail, “50mm min” dimension added from the overt.
1003.030	3	1003.030	4	“INTERNAL DROP STRUCTURE FOR EXISTING MAINTENANCE HOLES” This drawing has been reaffirmed with no changes to technical information.

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
1003.031	2	1003.031	3	“INTERNAL DROP STRUCTURE FOR NEW MAINTENANCE HOLES” This drawing has been reaffirmed with no changes to technical information.
1006.010	2	1006.010	3	“SEWER SERVICE CONNECTIONS FOR MAIN PIPE SEWER” See Summary of Revisions.
1006.020	2			“SEWER SERVICE CONNECTIONS FOR FLEXIBLE MAIN PIPE SEWER” This drawing is Cancelled due to redundancy, since OPSD 1006.010 has now been renamed to remove the word “Rigid” from its title.

SUMMARY OF REVISIONS TO OPSD 202.030

ROADWAY WIDENING FOR ECCENTRIC LOADER TERMINAL SYSTEM

- Title, changed Roadway Widening for Eccentric Loader Terminal System
- Plan View of Widened Roadway, label changed from Guide rail system to Eccentric loader terminal system.
- Plan View of Widened Roadway, Length varies dimension removed.
- Section A-A Fill, label changed from 3H:1V to 4H:1V.
- Section A-A Fill, dimensions, direction and elevation of guide rail system updated.
- Section A-A Fill, end barrel moved to right side, width corrected to proper scaling.
- Section A-A Cut, ditch labeling changed from 3H:1V, 3H:1V to 4H:1V, 8H:1V, 3H:1V.
- Section A-A Cut, dimensions, direction and elevation of guide rail system updated.
- Section A-A Cut, end barrel moved to right side, width corrected to proper scaling.
- Notes, Note A deleted.
- Notes, Note B renamed to Note A.

SUMMARY OF REVISIONS TO OPSD 202.031

ROADWAY WIDENING FOR STEEL BEAM ENERGY ATTENUATING TERMINAL APPROACH END

- Plan View, Label SBEAT, extruder terminal system shown renamed to SBEAT.
- Notes, Note B deleted.
- Notes, Note C renamed to Note B.

SUMMARY OF REVISIONS TO OPSD 202.032

ROADWAY WIDENING FOR STEEL BEAM ENERGY ATTENUATING TERMINAL LEAVING END AND CONSTRAINED APPROACH END

- Plan View, SBEAT, extruder terminal system shown labels renamed to SBEAT.
- Notes, Note B deleted.
- Notes, Note C renamed to Note B.

SUMMARY OF REVISIONS TO OPSD 912.101

GUIDE RAIL SYSTEM, STEEL BEAM, RAIL, COMPONENT

- Front Elevation view, rail replaced with Type M rail.
- Terminal Section details deleted.

SUMMARY OF REVISIONS TO OPSD 971.101

FENCE, HIGHWAY, IN EARTH, SHALE, LOOSE ROCK, OR FRIABLE ROCK, INSTALLATION

- Highway Fence In Earth, Shale, Loose Rock, Or Friable Rock view; 305 mm wire spacing label added.
- Gate Detail view, diagonal wooden brace label deleted.
- Existing Wire Spacing Detail view deleted.
- Existing Splicing Detail view deleted.
- New Note A added. Other note reordered.

SUMMARY OF REVISIONS TO OPSD 971.102

FENCE, HIGHWAY, IN SOLID ROCK, INSTALLATION

- Highway Fence In Solid Rock view; use of wooden line post deleted.
- Existing Detail A, Detail B, and Splicing Detail views deleted. Other detail views reordered.
- Depths of overburden revised throughout drawing.
- Note 1, wooden post spacing deleted.
- Existing Note 2 deleted.
- New Note A added. Other note reordered.

SUMMARY OF REVISIONS TO OPSD 973.130

FENCE, STEEL BEAM, BARRICADE, INSTALLATION

- Drawing renumbered and title revised to be with the fence drawings, which better reflects its purpose as a barricade for traffic access control.
- Elevation view, optional roadway terminal sign requirements added.
- Terminal Section views added.

SUMMARY OF REVISIONS TO OPSS 1003.010

CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE MAINTENANCE HOLE DROP STRUCTURE TEE

- SIZE OF DROP PIPE table, Updated to include larger pipe diameters and a third column added to clarify that, after a certain size, the table only applies to Storm sewers.
- SECTION A-A detail, "50mm min" dimension added from the obvert.
- SECTION A-A detail, "650mm max" dimension removed.
- Note 2, Note updated to remove "...with 450mm long, side of the drop pipe at 300mm centres".

SUMMARY OF REVISIONS TO OPSS 1006.010

CONSTRUCTION SPECIFICATION FOR SEWER SERVICE CONNECTIONS FOR MAIN PIPE SEWER

- TITLE, The word "Rigid" removed.
- CONNECTION WITHOUT VERTICAL RISER detail, Slope specifications updated to meet Ontario Building Code specifications, and Angle changed from 67.5° to 45°.

MANUAL REVISION RECORD

Municipal and Provincial Common

Volume 3 – Drawings for Roads, Barriers, Drainage, Sanitary Sewers, Watermains, and Structures

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
51	APRIL 2005	Included in new manuals	77		
52	NOV 2005	Included in new manuals	78		
53	NOV 2006	Included in new manuals	79		
54	APRIL 2007	Included in new manuals	80		
55	NOV 2007	Included in new manuals	81		
56	APRIL 2008	Included in new manuals	82		
57	NOV 2008	Included in new manuals	83		
58	NOV 2009	Included in new manuals	84		
59	APRIL 2010	Included in new manuals	85		
60	NOV 2010	Included in new manuals	86		
61	APRIL 2011	Included in new manuals	87		
62	NOV 2011	Included in new manuals	88		
63	NOV 2012	Included in new manuals	89		
64	APRIL 2013	Included in new manuals	90		
65	NOV 2013	Included in new manuals	91		
66	NOV 2014	Included in new manuals	92		
67	APRIL 2015	Included in new manuals	93		
68	NOV 2015	Included in new manuals	94		
69	APRIL 2016	Included in new manuals	95		
70	NOV 2016	Included in new manuals	96		
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**ONTARIO
PROVINCIAL
STANDARD
SPECIFICATION**

VOLUME 3 INDEX

**MUNICIPAL AND PROVINCIAL COMMON
DRAWINGS FOR ROADS, BARRIERS,
DRAINAGE, SANITARY SEWERS,
WATERMAINS, AND STRUCTURES**

DATE	OPSD NO.	REV.	TITLE
DIVISION 100 - ABBREVIATIONS			
2010 11	100.010	4	Abbreviations, General A-C
2006 11	100.011	1	Abbreviations, General D-J
2009 11	100.012	2	Abbreviations, General L-R
2009 11	100.013	4	Abbreviations, General S-W
2006 11	100.050	1	Abbreviations, Building Descriptions
2006 11	100.060	1	Abbreviations, Geotechnical
2006 11	101.010	1	Topography Plan Features, Monument Features
2006 11	101.011	1	Topography Plan Features, Ground Features
2006 11	101.012	1	Topography Plan Features, Road Features
2006 11	101.013	1	Topography Plan Features, Barrier and Vegetation Features
2006 11	101.014	1	Topography Plan Features, Utility Features
2006 11	101.015	1	Topography Plan Features, Drainage Features
2006 11	101.016	1	Topography Plan Features, Miscellaneous Features
2008 11	101.017	3	Topography Plan Features, Right-of-Way Features
2006 11	102.010	1	Removals, Legend
2006 11	103.010	1	New Construction, Legend 1
2008 04	103.011	2	New Construction, Legend 2
2007 11	104.010	0	Miscellaneous Symbols
DIVISION 200 - GRADING			
2009 11	200.010	2	Earth/Shale Grading, Undivided Rural
2009 11	200.020	2	Earth/Shale Grading, Divided Rural
2009 11	201.010	2	Rock Grading, Undivided Rural
2009 11	201.020	2	Rock Grading, Divided Rural



**ONTARIO
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VOLUME 3 INDEX

**MUNICIPAL AND PROVINCIAL COMMON
DRAWINGS FOR ROADS, BARRIERS,
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DATE	OPSD NO.	REV.	TITLE
2016 11	202.010	3	Slope Flattening Using Surplus Excavated Material On Earth or Rock Embankment
2013 11	202.020	3	Drainage Gap for Slope Flattening on Rock or Granular Embankment
2016 11	202.030	6	Roadway Widening for Eccentric Loader Terminal System and Transitions
2016 11	202.031	1	Roadway Widening for Steel Beam Energy Attenuating Terminal Approach End
2016 11	202.032	1	Roadway Widening for Steel Beam Energy Attenuating Terminal Leaving End and Constrained Approach End
2016 11	202.033	1	Roadway Widening, Single Sided Energy Attenuating Terminals, Approach End
2010 11	203.010	3	Embankments Over Swamp, New Construction
2010 11	203.020	3	Embankments Over Swamp, Existing Slope Excavated to 1H:1V
2010 11	203.030	3	Embankments Over Swamp, Existing Slopes Maintained
2010 11	203.040	3	Embankments Over Swamp at Pipe Culvert ≤ 1500 mm
2015 11	204.010	3	Boulder Treatment, Cut Sections - Subgrade
2016 11	205.010	3	Transition Treatment, Earth Cut to Earth Fill
2016 11	205.020	3	Transition Treatment, Rock Cut to Rock Fill
2016 11	205.030	3	Transition Treatment, Rock Cut to Earth Fill
2016 11	205.040	3	Transition Treatment, Earth Fill to Rock Fill and Earth Fill to Granular Fill
2016 11	205.050	3	Transition Treatment, Rock Cut to Earth Cut
2014 11	205.060	3	Frost Heave Treatment
2009 11	206.010	1	Granular Courses, Undivided Rural
2009 11	206.020	1	Granular Courses, Divided Rural
2008 11	206.050	1	Subdrain Pipe, Connection and Outlet, Rural
2016 11	207.010	3	Concrete Pavement on Open Graded Drainage Layer, Divided Highway
2016 11	207.020	3	Composite Pavement on Open Graded Drainage Layer, Divided Highway



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DATE	OPSD NO.	REV.	TITLE
2016 11	207.030	2	Concrete and Composite Pavement on Open Graded Drainage Layer, Urban Section
2016 11	207.041	4	Subdrain Pipe, Open Graded Drainage Layer, Hot Mix Asphalt, Concrete, or Composite Pavement
2016 11	207.044	5	Subdrain Pipe, Connection and Outlet, Open Graded Drainage Layer
2013 11	208.010	3	Benching of Earth Slopes
2009 11	209.010	1	Rural Pavement Widening
2009 11	209.011	2	Rural Pavement Widening, Curb with Gutter
2016 11	209.020	3	Widening Existing Rock Cut with Grade Rise
2010 11	210.010	1	Tangent Shoulders, Rural
2010 11	210.020	1	Superelevated Shoulders, Rural
2016 11	210.070	4	Granular Sealing
2010 11	211.010	2	Partially Paved Shoulders, Existing Pavement Maintained
2010 11	211.020	2	Partially Paved Shoulders, Existing Pavement Resurfaced
2009 11	212.010	1	Resurfacing with Crossfall Correction with Hot Mix Asphalt, Tangent Section
2009 11	212.020	1	Resurfacing with Crossfall Correction with Hot Mix Asphalt, Superelevated Section
2009 11	212.030	1	Resurfacing, Existing Crossfall Maintained
83 12 01	213.01	0	Pavement Widening On Curves, Widening On Both Sides of Curve With or Without Spirals
83 12 01	213.02	0	Pavement Widening on Curves, Widening on Inside of Curves With or Without Spirals
2016 11	214.010	2	Single-Lane Ramp Grading for Asphalt Pavement with Granular Base and Shoulder
2016 11	214.020	2	Single-Lane Ramp Grading for Asphalt Pavement with Granular Base and Asphalt Shoulder
2016 11	214.030	3	Single-Lane Ramp Grading for Asphalt Pavement with Granular Base, Asphalt Shoulder, and Curb with Gutter
2016 11	215.010	2	Two-Lane Ramp Grading for Asphalt Pavement with Granular Base and Asphalt Shoulder



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DATE	OPSD NO.	REV.	TITLE
2016 11	215.020	2	Two-Lane Ramp Grading for Asphalt Pavement with Granular Base, Asphalt Shoulder, and Curb with Gutter for Tangent Section
2016 11	215.030	3	Two-Lane Ramp Grading for Asphalt Pavement with Granular Base, Asphalt Shoulder, and Curb with Gutter for Superelevated Section
2006 11	216.010	1	Boulevard Treatments, Urban Section
2008 11	216.020	1	Hot Mix, Concrete, and Composite Pavement On Granular Base, Urban Section
2008 11	216.021	2	Subdrain Pipe, Connection and Outlet, Urban
2011 11	217.050	2	Access to Hydrant Across Ditch
2011 11	217.060	2	Utility Pole Setting Depth at Ditch Locations
2015 11	219.100	2	Light-Duty Straw Bale Barrier
2015 11	219.110	2	Light-Duty Silt Fence Barrier
2015 11	219.120	0	Light-Duty Fibre Roll Barrier
2015 11	219.130	2	Heavy-Duty Silt Fence Barrier
2015 11	219.131	0	Heavy-Duty Wire-Backed Silt Fence Barrier
2015 11	219.150	2	Sandbag Barrier
2015 11	219.160	0	Fibre Roll Grade Breaks
2015 11	219.180	2	Straw Bale Flow Check Dam
2015 11	219.191	0	Fibre Roll Flow Check Dam
2015 11	219.200	2	Sandbag Flow Check Dam
2015 11	219.210	2	Temporary Rock Flow Check Dam, V-Ditch
2015 11	219.211	2	Temporary Rock Flow Check Dam, Flat Bottom Ditch
2015 11	219.220	2	Sediment Trap In Ditch
2015 11	219.230	4	Temporary Slope Drain for Sediment Trap
2015 11	219.231	1	Temporary Berm Barrier for Slope Drain
2015 11	219.240	2	Sediment Trap for Dewatering



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DATE	OPSD NO.	REV.	TITLE
2015 11	219.260	2	Turbidity Curtain
2015 11	219.261	2	Turbidity Curtain, Seam Detail
2007 11	220.010	0	Barrier for Tree Protection
2000 11	221.010	0	Temporary Water Passage System, Culvert in Watercourse
2000 11	221.020	0	Temporary Water Passage System, Pumping and Piping
2000 11	221.030	0	Temporary Water Passage System, Temporary Channel or Culvert Outside Watercourse
2000 11	221.040	0	Temporary Waterbody Crossing, Fill and Culvert
2000 11	221.050	0	Temporary Waterbody Crossing, Ford
2014 11	222.010	1	Rootwad Structures for Waterbody Banks
2013 11	222.020	0	Large Woody Debris for Waterbody Banks
2013 11	222.030	0	Stone Lunkers
2013 11	222.040	0	Wood Lunkers
2014 11	222.050	0	Riffles on Streambeds
2014 11	222.060	0	Pools in Streambeds
2014 11	222.070	0	Rocky Ramps on Streambeds
2014 11	222.080	0	Low Flow Channel

DIVISION 300 - ENTRANCES

2011 11	300.010	2	Side Road Intersection, Fill
2011 11	300.020	2	Side Road Intersection, Cut
2010 11	301.010	2	Rural Entrances to Roads on Fill
2010 11	301.020	2	Rural Entrances to Roads in Earth Cut
2010 11	301.030	2	Rural Entrance, Rock Cut
2015 11	302.010	2	Median Crossovers for Service and Emergency Vehicles



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DATE	OPSD NO.	REV.	TITLE
2009 11	304.010	1	Shoulder Treatment, Sideroad Intersections
2015 11	310.010	2	Concrete Sidewalk
2015 11	310.020	2	Concrete Sidewalk Adjacent to Curb and Gutter
2015 11	310.030	1	Concrete Sidewalk Ramps at Signalized Intersections
2015 11	310.031	0	Concrete Sidewalk Ramps At Signalized Intersections With Intersecting Crosswalks
2015 11	310.033	0	Concrete Sidewalk Ramps At Unsignalized Intersections
2015 11	310.039	0	Concrete Sidewalk Ramps Tactile Walking Surface Indicators Component
2015 11	310.040	2	Utility Isolation in Concrete Sidewalks
2015 11	310.050	2	Concrete Sidewalk Driveway Entrance Details
2015 11	310.060	2	Joint Detail for Concrete Pedestrian Crosswalk at Signalized and All-Way Stop Controlled Intersections
2009 11	350.010	1	Urban Industrial, Commercial, and Apartment Entrances
2009 11	351.010	1	Urban Residential Entrance

DIVISION 400 - FRAMES AND GRATES

2013 11	400.001	1	Hoisting Hook Rib for Cast Iron Frames for Catch Basins, Maintenance Holes, and Valve Chambers
2013 11	400.010	2	Cast Iron, Square Frame with Square Overflow Type Dished Grate for Catch Basins, Herring Bone Openings
2013 11	400.020	2	Cast Iron, Square Frame with Square Flat Grate for Catch Basins, Herring Bone Openings
2013 11	400.021	0	Cast Iron, Square Frame for Curb Inlet Overflow
2013 11	400.030	2	Cast Iron, Square Frame with Square V Grate for Catch Basins, Herring Bone Openings
2013 11	400.040	2	Cast Iron, One-Piece Frame and Flat Square Grate for Temporary Installation, Herring Bone Openings
2014 11	400.070	5	Cast Iron, Raised Square Frame with Circular Flat Grate for Catch Basins, Herring Bone Openings
2016 04	400.080	3	Cast Iron, Side Inlet for Catch Basins



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DATE	OPSD NO.	REV.	TITLE
2013 11	400.081	2	Cast Iron, Curb Inlet Frame with Two-Piece Raised Cover for Catch Basins Out of Roadway
2014 11	400.082	4	Cast Iron, Raised Curb Inlet Frame with Cover for Catch Basins Out of Roadway
2013 11	400.090	2	Cast Iron, Curb Inlet Overflow for Catch Basins
2013 11	400.100	2	Cast Iron, Square Frame with Square Flat Grate for Catch Basins, Perforated Openings
2013 11	400.110	2	Cast Iron, Square Frame with Square Overflow Type Flat Grate for Catch Basins, Perforated Openings
2013 11	400.120	2	Cast Iron, Square Frame with Birdcage Grate for Catch Basins
2013 11	401.010	3	Cast Iron, Square Frame with Circular Closed or Open Cover for Maintenance Holes
2013 11	401.020	3	Cast Iron, Circular Frame with Circular 745 mm Cover for Maintenance Holes
2013 11	401.030	3	Cast Iron, Square Frame with Circular Watertight Cover for Maintenance Holes
2015 04	401.040	4	Cast Iron, Raised Square Frame with Circular Closed or Open Cover for Maintenance Holes
2015 04	401.050	4	Cast Iron, Raised Square Frame with Circular Watertight Cover for Maintenance Holes
2013 11	401.060	3	Cast Iron, Circular Locking Cover for Maintenance Holes
2014 11	401.080	0	Cast Iron, Curb inlet Fish Type Cover for Catch Basins Out of Roadway
2015 11	401.081	1	Cast Iron, Square Frame Fish Type Cover
2014 11	402.010	3	Cast Iron, Square Frame with Circular Cover and Plug for Valve Chambers
2014 11	402.011	3	Cast Iron, Square Frame with Vented Circular Cover and Plug for Valve Chambers
2015 04	402.020	4	Cast Iron, Raised Square Frame with Circular Cover and Plug for Valve Chambers
2015 04	402.021	3	Cast Iron, Raised Square Frame with Vented Circular Cover and Plug for Valve Chambers
2014 11	402.030	4	Cast Iron, Rectangular Frame with Two-Piece Cover for Meter and Valve Chambers
2013 11	403.010	2	Galvanized Steel, Honey Comb Grating for Ditch Inlets



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DATE	OPSD NO.	REV.	TITLE
2012 11	403.011	0	Raised Bar Grate for Ditch Inlet, 600 x 600 mm
2012 11	404.010	1	Aluminum Safety Platform and Ladder for Rectangular Precast Concrete Valve Chambers
2013 11	404.020	3	Aluminum Safety Platform for Circular Maintenance Holes
2013 11	404.021	2	Aluminum Safety Platform for 1500 mm Diameter Circular Maintenance Holes with Drop Pipe
2013 11	404.022	2	Aluminum Safety Platform for 1800 mm Diameter Circular Maintenance Holes with Drop Pipe
2013 11	405.010	3	Maintenance Hole Steps, Hollow
2013 11	405.020	3	Maintenance Hole Steps, Solid
2013 11	406.010	2	Aluminum Ladder for Maintenance Holes
DIVISION 500 - PAVING			
2009 11	500.010	0	Turning Basins for Terminated Rural Roadways
2009 11	500.020	0	Turning Basins for Terminated Urban Roadways, Residential
2009 11	500.030	0	Turning Basins for Terminated Urban Roadways, Industrial and Commercial
2010 11	501.010	1	Bus Bays
2009 11	502.010	1	Access Lanes for Rear Lots
2011 11	503.010	1	Concrete Ripple Strip
2012 11	504.010	1	Raised Traffic Island
2009 11	506.010	1	Hot Mix Resurfacing Treatment at Structure Approaches
2015 11	508.010	2	Routing and Sealing Cracks Up to 20 mm Width in Asphalt Pavement
2008 11	508.020	2	Sealing or Resealing of Joints and Cracks in Concrete Pavement and Concrete Base
2013 11	509.010	2	Pavement Reinstatement for Utility Cuts



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DATE	OPSD NO.	REV.	TITLE
2010 11	514.010	1	Extruded Expanded Polystyrene Frost Heave Treatment, 25 mm Thickness
2010 11	514.020	1	Extruded Expanded Polystyrene Frost Heave Treatment, 40 mm Thickness
2008 11	551.010	1	Concrete and Composite Pavement Joint Spacing
2008 11	551.020	1	Concrete and Composite Pavement Joint Layout at Converging or Diverging Lanes
2008 11	551.030	2	Concrete and Composite Pavement Skewed Joint Layout at Intersections
2008 11	551.031	2	Concrete and Composite Pavement Right Angle Joint Layout at Intersections
2008 11	551.032	2	Concrete and Composite Pavement Utility Isolation
2008 11	552.010	1	Concrete Pavement Joint Details
2008 11	552.020	1	Composite Pavement Joint Details
2008 11	552.050	2	Load Transfer Device, Skewed Contraction Joint, Concrete or Composite Pavement
2008 11	552.051	2	Load Transfer Device, Right Angle Contraction Joint, Concrete or Composite Pavement
2008 11	552.060	2	Load Transfer Device, Skewed Expansion Joint, Concrete or Composite Pavement
2008 11	552.061	2	Load Transfer Device, Right Angle Expansion Joint, Concrete or Composite Pavement
2008 11	553.010	1	Concrete Pavement in Gore Areas
2008 11	553.020	1	Composite Pavement in Gore Areas
2008 11	554.010	1	Concrete Pavement Shoulder Terminal
2008 11	554.020	1	Composite Pavement Shoulder Terminal
2008 11	555.010	1	Concrete Pavement Approach Treatment to Hot Mix and Composite Pavements and Structure Approaches
2008 11	555.020	1	Composite Pavement Approach Treatment to Hot Mix and Concrete Pavements and Structure Approaches
2010 11	560.010	5	Composite or Exposed Concrete Pavements, Full Depth Concrete Slab Repair Layout
2010 11	560.020	2	Exposed Concrete Pavement, Full Depth Concrete Slab Repair, Joint Details



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DATE	OPSD NO.	REV.	TITLE
2008 11	560.025	0	Concrete Pavement and Concrete Base, Cross-Stitching Longitudinal Cracks
2010 11	560.030	1	Composite Pavement, Full Depth Concrete Slab Repair, Joint Details
2010 11	560.040	1	Partial Depth Repairs in Concrete Pavement
2016 11	561.010	2	Interlocking Concrete Pavers on Granular Base
2016 11	561.020	2	Interlocking Concrete Pavers on Concrete or Asphalt Base
2016 11	561.030	2	Interlocking Concrete Pavers for Retrofit Crosswalk Installation
DIVISION 600 - CURBS AND GUTTERS			
2012 11	600.010	2	Concrete Barrier Curb with Wide Gutter
2012 11	600.020	2	Concrete Semi-Mountable Curb with Wide Gutter
2012 11	600.030	2	Concrete Mountable Curb with Wide Gutter
2012 11	600.040	2	Concrete Barrier Curb with Standard Gutter
2012 11	600.060	2	Concrete Semi-Mountable Curb with Standard Gutter
2012 11	600.070	2	Concrete Barrier Curb with Standard Gutter, Two Stage Construction
2012 11	600.080	2	Concrete Barrier Curb with Narrow Gutter
2012 11	600.090	2	Concrete Semi-Mountable Curb with Narrow Gutter
2012 11	600.100	2	Concrete Mountable Curb with Narrow Gutter
2012 11	600.110	2	Concrete Barrier Curb
2013 11	601.010	2	Asphalt Curb and Asphalt Curb with Gutter
2012 11	603.020	2	Precast Concrete Curb
2012 11	604.010	2	90° Concrete Outlet for Concrete Curb with Gutter
2013 11	604.020	2	90° Asphalt Outlet for Asphalt Curb with Gutter
2012 11	605.010	2	45° Concrete Outlet for Concrete Curb with Gutter
2013 11	605.020	2	30° and 45° Asphalt Outlets for Asphalt Curb with Gutter



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DATE	OPSD NO.	REV.	TITLE
2012 11	605.030	2	45° Concrete Outlet for Concrete Curb with Gutter at End of Run
2013 11	605.040	2	Asphalt Spillways
2012 11	606.010	2	600 mm Radius Barrier Bullnose
2012 11	606.020	2	600 mm Radius Mountable Bullnose
2012 11	606.030	2	800 mm Radius Bullnose, Curb with Gutter Twin Inlet
2012 11	607.010	2	Over 600 mm Radius Mountable Bullnose
2012 11	607.020	2	Over 600 mm Radius Barrier Bullnose
2012 11	608.010	2	Method of Termination for Concrete Curb with Gutter
2009 11	610.010	1	Catch Basin Frame with Grate Installation at Curb with Gutter
2006 11	610.020	2	Catch Basin Frame with Grate Shoulder Installation at Concrete Barrier
2009 11	610.030	1	Frame with Grate Installation for Inlet Type Catch Basins

DIVISION 700 - CATCH BASINS AND MANHOLES

2014 11	701.010	5	Precast Concrete Maintenance Hole, 1200 mm Diameter
2014 11	701.011	5	Precast Concrete Maintenance Hole, 1500 mm Diameter
2014 11	701.012	5	Precast Concrete Maintenance Hole, 1800 mm Diameter
2014 11	701.013	5	Precast Concrete Maintenance Hole, 2400 mm Diameter
2014 11	701.014	4	Precast Concrete Maintenance Hole, 3000 mm Diameter
2014 11	701.015	4	Precast Concrete Maintenance Hole, 3600 mm Diameter
2014 11	701.021	4	Maintenance Hole Benching and Pipe Opening Alternatives
2014 11	701.030	4	Precast Concrete Maintenance Hole Components, 1200 mm Diameter, Tapered Top and Flat Cap
2014 11	701.031	2	Precast Concrete Maintenance Hole Components, 1200 mm Diameter, Riser and Monolithic Base



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2014 11	701.032	2	Precast Concrete Maintenance Hole Components, 1200 mm Diameter, Base Slab
2014 11	701.040	4	Precast Concrete Maintenance Hole Components, 1500 mm Diameter, Transition Cone and Slabs
2014 11	701.041	2	Precast Concrete Maintenance Hole Components, 1500 mm Diameter, Riser and Bases
2014 11	701.050	4	Precast Concrete Maintenance Hole Components, 1800 mm Diameter, Transition Slabs
2014 11	701.051	2	Precast Concrete Maintenance Hole Components, 1800 mm Diameter, Riser and Base Slab
2014 11	701.060	4	Precast Concrete Maintenance Hole Components, 2400 mm Diameter, Transition Slab
2014 11	701.061	2	Precast Concrete Maintenance Hole Components, 2400 mm Diameter, Riser and Base Slab
2014 11	701.070	3	Precast Concrete Maintenance Hole Components, 3000 mm Diameter, Transition Slab
2014 11	701.071	2	Precast Concrete Maintenance Hole Components, 3000 mm Diameter, Riser and Base Slab
2014 11	701.080	3	Precast Concrete Maintenance Hole Components, 3600 mm Diameter, Transition Slab
2014 11	701.081	2	Precast Concrete Maintenance Hole Components, 3600 mm Diameter, Riser and Base Slab
2010 11	701.100	2	Frost Strap Installation
2014 11	702.040	3	Precast Concrete Ditch Inlet Maintenance Hole - Type A, 1200 x 1200 mm
2014 11	702.050	3	Precast Concrete Ditch Inlet Maintenance Hole - Type B, 1200 x 1200 mm
2014 11	703.011	2	Precast Concrete Single Inlet Flat Cap, 1500 mm Diameter
2014 11	703.012	2	Precast Concrete Single Inlet Flat Cap, 1800 mm Diameter
2014 11	703.013	2	Precast Concrete Single Inlet Flat Cap, 2400 mm Diameter
2014 11	703.014	2	Precast Concrete Single Inlet Flat Cap, 3000 mm Diameter
2014 11	703.015	2	Precast Concrete Single Inlet Flat Cap, 3600 mm Diameter



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2014 11	703.021	2	Precast Concrete Twin Inlet Flat Cap, 1500 mm Diameter
2014 11	703.022	2	Precast Concrete Twin Inlet Flat Cap, 1800 mm Diameter
2014 11	703.023	2	Precast Concrete Twin Inlet Flat Cap, 2400 mm Diameter
2014 11	703.024	2	Precast Concrete Twin Inlet Flat Cap, 3000 mm Diameter
2014 11	704.010	3	Precast Concrete Adjustment Units for Maintenance Holes, Catch Basins, and Valve Chambers
2008 11	704.011	1	High Density Polyethylene Adjustment Units for Maintenance Holes, Catch Basins, and Valve Chambers
2013 04	704.012	0	Expanded Polystyrene (EPS) Adjustment Units for maintenance Holes, Catch Basins, and Valve Chambers
2014 11	705.001	0	Concrete Catch Basin Apron, Mountable Curb with Wide Gutter
2014 11	705.002	0	Concrete Catch Basin Apron, Barrier Curb with Standard Gutter
2014 11	705.010	3	Precast Concrete Catch Basin, 600 x 600 mm
2014 11	705.020	3	Precast Concrete Twin Inlet Catch Basin, 600 x 1450 mm
2014 11	705.030	3	Precast Concrete Ditch Inlet, 600 x 600 mm
2014 11	705.040	3	Precast Concrete Ditch Inlets, 600 x 1200 mm
2014 11	706.010	3	Precast Concrete Ditch Inlets, 600 x 1200 mm with 1500 mm Diameter Flat Cap
2014 11	706.020	3	Precast Concrete Ditch Inlets, 600 x 1200 mm with 1800 mm Diameter Flat Cap
2014 11	706.030	3	Precast Concrete Ditch Inlet - Type A, 600 x 1200 mm with 2400 mm Diameter Flat Cap
2014 11	706.031	2	Precast Concrete Ditch Inlet - Type B, 600 x 1200 mm with 2400 mm Diameter Flat Cap
2014 11	706.040	3	Precast Concrete Ditch Inlet - Type A, 600 x 1200 mm with 3000 mm Diameter Flat Cap
2014 11	706.041	2	Precast Concrete Ditch Inlet - Type B, 600 x 1200 mm with 3000 mm Diameter Flat Cap



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2014 11	707.010	3	Precast Concrete Maintenance Hole Manufactured Tee
2016 11	708.010	3	Catch Basin Connection for Rigid Main Pipe Sewer
2016 11	708.020	4	Support for Pipe at Catch Basin or Maintenance Hole
2016 11	708.030	3	Catch Basin Connection for Flexible Main Pipe Sewer
2013 11	710.010	3	Capping Existing Structures, Maximum 4.0 m Cover

DIVISION 800 - CULVERTS AND DRAINS

2012 11	800.010	2	Concrete Pipe Culvert and Sewer Extensions Using Corrugated Steel Pipe, Temporary Conditions
2012 11	800.011	2	Concrete Rigid Frame Box and Open Culvert Extensions Using Corrugated Steel Pipe, Temporary Conditions
2012 11	801.010	2	Cut End Finish Circular Pipe and Pipe-Arch, Corrugated Steel Pipe
2012 11	801.020	1	End Section Details, Corrugated Steel Pipe
2012 11	801.030	2	Bevel Details, Circular and Pipe-Arch Structural Plate, Corrugated Steel Pipe
2012 11	801.040	2	Culvert and Sewer Safety Slope End Treatment Notes and Tables
2012 11	801.041	2	Culvert and Sewer Safety Slope End Treatment, Assembly Details
2012 11	801.042	2	Culvert and Sewer Safety Slope End Treatment, Connection Details
2012 11	801.043	2	Culvert and Sewer Safety Slope End Treatment, Installation Details
2014 11	802.010	3	Flexible Pipe Embedment and Backfill, Earth Excavation
2014 11	802.013	3	Flexible Pipe Embedment and Backfill, Rock Excavation
2014 11	802.014	3	Flexible Pipe Embedment in Embankment, Original Ground: Earth or Rock
2015 11	802.020	3	Flexible Pipe Arch Embedment and Backfill, Earth Excavation
2015 11	802.023	3	Flexible Pipe Arch Embedment and Backfill, Rock Excavation



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2015 11	802.024	3	Flexible Pipe Arch Embedment in Embankment, Original Ground: Earth or Rock
2015 11	802.030	3	Rigid Pipe Bedding, Cover, and Backfill, Type 1 or 2 Soil - Earth Excavation
2015 11	802.031	3	Rigid Pipe Bedding, Cover, and Backfill, Type 3 Soil - Earth Excavation
2015 11	802.032	3	Rigid Pipe Bedding, Cover, and Backfill, Type 4 Soil - Earth Excavation
2015 11	802.033	3	Rigid Pipe Bedding, Cover, and Backfill, Rock Excavation
2015 11	802.034	3	Rigid Pipe Bedding and Cover in Embankment, Original Ground: Earth or Rock
2015 11	802.050	3	Horizontal Elliptical Rigid Pipe Bedding, Cover, and Backfill, Type 1 or 2 Soil - Earth Excavation
2015 11	802.051	3	Horizontal Elliptical Rigid Pipe Bedding, Cover, and Backfill, Type 3 Soil - Earth Excavation
2015 11	802.052	3	Horizontal Elliptical Rigid Pipe Bedding, Cover, and Backfill, Type 4 Soil - Earth Excavation
2015 11	802.053	3	Horizontal Elliptical Rigid Pipe Bedding, Cover, and Backfill, Rock Excavation
2015 11	802.054	3	Horizontal Elliptical Rigid Pipe Bedding and Cover in Embankment, Original Ground: Earth or Rock
2016 11	802.095	2	Clay Seal for Pipe Trenches
2015 11	803.010	3	Backfill and Cover for Concrete Culverts with Spans Less Than or Equal to 3.0 m
2015 11	803.030	3	Frost Treatment - Pipe Culverts, Frost Penetration Line Below Bedding Grade
2015 11	803.031	4	Frost Treatment - Pipe Culverts, Frost Penetration Line Between Top of Pipe and Bedding Grade
2006 11	804.030	1	Concrete Headwall for Pipe Less Than 900 mm Diameter
2006 11	804.040	0	Concrete Headwall for Sewer or Culvert Pipe Outlet
2013 11	804.050	1	Grating for Concrete Endwall
2014 11	805.010	2	Height of Fill Table, Round Corrugated Steel Pipe and Structural Plate Corrugated Steel Pipe
2014 11	805.020	2	Height of Fill Table, Corrugated Steel Pipe-Arch and Structural Plate Corrugated Steel Pipe-Arch



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DATE	OPSD NO.	REV.	TITLE
2014 11	805.030	2	Height of Fill Table, Spiral Rib Round Pipe
2014 11	805.040	2	Height of Fill Table, Spiral Rib Pipe-Arch
2014 11	806.020	2	Height of Fill Table, Dual Wall Corrugated Polyethylene Gravity Sewer Pipe, 320 kPa and RSC 160
2014 11	806.021	2	Height of Fill Table, Closed Profile Wall Polyethylene Pipe, RSC 160 and RSC 250
2014 11	806.022	2	Height of Fill Table, Dual Wall Corrugated Polyethylene Gravity Sewer Pipe, RSC 100 and RSC 160
2014 11	806.023	0	Height of Fill Table, Solid Wall Polyethylene Pipe, SDR 32.5
2013 11	806.030	0	Height of Fill Table, Dual and Triple Wall Corrugated Polypropylene Gravity Sewer Pipe, 320 kPa
2015 11	806.040	3	Height of Fill Table, Polyvinyl Chloride Gravity Sewer Pipe, 210, 320, and 625 kPa
2014 11	806.060	1	Height of Fill Table, Polyvinyl Chloride Pressure Pipe for Different Dimension Ratios
2015 11	807.010	3	Height of Fill Table, Reinforced Concrete Pipe - Confined Trench, Class 50-D, 65-D, 100-D, and 140-D
2015 11	807.030	3	Height of Fill Table, Reinforced Concrete Pipe - Embankment, Class 50-D, 65-D, 100-D, and 140-D
2015 11	807.040	2	Height of Fill Table, Non-Reinforced Concrete Pipe, Class 3
2015 11	807.050	3	Height of Fill Table, Horizontal Elliptical Concrete Pipe, Class HE-A, HE-I, HE-II, HE-III, and HE-IV
2013 11	809.010	3	Perforated Pipe Subdrain in Granular Trench Main Storm Sewer Connection to Drainage Structure
2013 11	810.010	2	General Rip-Rap Layout for Sewer and Culvert Outlets
2013 11	810.020	2	General Rip-Rap Layout for Ditch Inlets
2006 11	812.010	0	Cut Off Wall for Structural Plate Pipe Arch and Circular CSP

DIVISION 900 - FENCING, GUIDE RAILS

2015 11	911.130	1	Guide Rail System, Concrete Barrier, Cast-In-Place, Type A, Installation
2015 11	911.131	1	Guide Rail System, Concrete Barrier, Cast-In-Place, Type C, Installation



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2015 11	911.132	1	Guide Rail System, Concrete Barrier, Cast-In-Place, Tall Wall, Installation
2015 11	911.134	1	Guide Rail System, Concrete Barrier, Installation - Median Concrete Barrier to Structure
2015 11	911.135	0	Guide Rail System, Concrete Roadside Barrier, Cast-In-Place Or Slipformed, Installation
2013 11	911.140	1	Guide Rail System, Concrete Barrier, Precast I-Lock Connection, Installation - Temporary and Permanent
2013 11	911.143	1	Guide Rail System, Concrete Barrier, Precast I-Lock Connection, Type TW, Installation - Permanent
2013 11	911.150	0	Guide Rail System, Concrete Barrier, Type J Connection, 4m Length, Installation - Temporary
2013 11	911.151	0	Guide Rail System, Concrete Barrier, Type J Connection, 6m Length, Installation - Temporary
2013 11	911.160	0	Guide Rail System, Concrete Barrier, Type M Connection, Installation - Temporary 1
2013 11	911.161	0	Guide Rail System, Concrete Barrier, Type M Connection, Installation - Temporary 2
2013 11	911.162	0	Guide Rail System, Concrete Barrier, Type M Connection, Installation - Temporary Restraint System, Pinned to Asphalt Pavement
2013 11	911.163	0	Guide Rail System, Concrete Barrier, Type M Connection, Installation - Temporary Restraint System, Strapped to Concrete
2013 11	911.164	0	Guide Rail System, Concrete Barrier, Type M Connection, Installation - Temporary Restraint System, Strapped to Concrete with Asphalt Surface
2013 11	911.167	0	Guide Rail System, Concrete Barrier, Type m Connection, Installation - Temporary Restraint System, Bolted Through Concrete
2013 11	911.168	0	Guide Rail System, Concrete Barrier, Type M Connection, Installation - Temporary Restraint System, Bolted Through Concrete with Asphalt Surface
2014 11	911.170	1	Guide Rail System, Concrete Barrier, Type M Connection, Installation - Temporary Restraint System, Transition to Pinned TCB



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DATE	OPSD NO.	REV.	TITLE
2014 11	911.171	1	Guide Rail System, Concrete Barrier, Type M Connection, Installation - Temporary Restraint System, Transition to Strapped TCB
2014 11	911.172	1	Guide Rail system, Concrete Barrier, Type M Connection, Installation - Temporary Restraint System, Transition to Bolted TCB
2015 11	911.173	1	Guide Rail System, Concrete Barrier, Type M Connection, Installation - Temporary Restraint System, Transition to Permanent Concrete Barrier
2015 11	911.174	1	Guide Rail System, Concrete Barrier, Type M Connection, Component - Thrie Beam Transition
2013 11	911.180	0	Guide Rail System, Concrete Barrier, Type T Connection, 4.0m Length, Installation - Temporary
2013 11	911.181	0	Guide Rail System, concrete Barrier, Type T Connection, 6.0m Length, Installation - Temporary
2015 11	911.230	1	Guide Rail System, Concrete Barrier, Median End Treatment Installation
2014 11	911.232	1	Guide Rail System, Concrete Barrier, Energy Attenuator, Installation - Temporary
2001 11	911.330	0	Guide Rail System, Concrete Barrier, Temporary Transition Installation - Rail Method, Concrete Barrier to Temporary Concrete Barrier
2013 11	911.340	0	Guide Rail System, Concrete Barrier, Temporary Concrete Barrier Transition, Installation - Temporary
2015 11	911.380	1	Guide Rail System, Concrete Barrier, Permanent Transition, Installation at Piers and Poles
2015 11	911.381	2	Guide Rail System, Concrete Barrier, Permanent Transition Installation, Roadside Concrete Barrier to Structure
2015 11	911.382	1	Guide Rail System, Concrete Barrier, Dowel Connection Detail
2015 11	911.383	0	Guide Rail System, Concrete Barrier, Permanent Transition Installation At Lighting Pole And Sign Support Footings



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2015 11	911.430	1	Guide Rail System, Concrete Barrier, Temporary - Leaving End Treatment, Installation – Divided Highway
2016 11	912.101	3	Guide Rail System, Steel Beam, Rail, Component
2016 11	912.102	2	Guide Rail System, Steel Beam, Channel, Component
2016 11	912.103	2	Guide Rail System, Steel Beam, Plastic Offset Blocks, Component
2016 11	912.104	3	Guide Rail System, Steel Beam, Steel Post with Wooden Offset Block, Component
2016 11	912.105	2	Guide Rail System, Steel Beam, Base Plate, Component
2016 11	912.123	0	Guide Rail System, Steel Beam, Type M Rail – 476mm Hole Spacing, Component
2016 04	912.124	0	Guide Rail System, Steel Beam, Type M Transition Rail, Component
2016 04	912.125	0	Guide Rail System, Steel Beam, Type M Rail, Component
2016 04	912.127	0	Guide Rail System, Steel Beam, M20 Steel Post with Offset Block, Component
2016 11	912.128	0	Guide Rail System, Steel Beam, Type M30 Steel Post With Offset Block, Component
2016 11	912.129	0	Guide Rail System, Steel Beam, 30cm Polymer Offset Block – P-Block, Component
2016 11	912.130	3	Guide Rail System, Steel Beam, Steel Post with Wooden Offset Block Assembly, Installation - Single Rail
2016 11	912.135	1	Guide Rail System, Steel Beam, Steel Post with Steel Offset Block Assembly, Adjustment - Single Rail
2010 11	912.140	2	Guide Rail System, Steel Beam, Wooden Post Assembly, Installation - Single Rail
2010 11	912.141	2	Guide Rail System, Steel Beam, Wooden Post Assembly, Installation - Double Rail
2016 11	912.145	1	Guide Rail System, Steel Beam, Wooden Post Assembly, Adjustment - Single Rail



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2016 11	912.185	0	Guide Rail System, Steel Beam, Type M20, Installation
2016 11	912.186	0	Guide Rail System, Steel Beam, Type M20 – Adjacent To 2H:1V Slope Installation – Rail At Shoulder
2016 11	912.188	0	Guide Rail System, Steel Beam, Type M20 – Adjacent To Concrete Curb, Installation
2016 11	912.189	0	Guide Rail System, Steel Beam, Type M30 – Adjacent To Sidewalk, Installation
2010 11	912.235	1	Guide Rail System, Steel Beam, Leaving End Treatment, Installation
2016 11	912.245	0	Guide Rail System, Steel Beam, Type M – 7.62m Long Span Treatment, Installation
2016 11	912.246	0	Guide Rail System, Steel Beam, Type M – 5.71m Long Span Treatment, Installation
2016 11	912.255	0	Guide Rail System, Steel Beam, Type M20 AND M30 Leaving End Treatment, Installation
2016 11	912.256	0	Guide Rail System, Steel Beam, Type M Leaving End Treatment, Component – Rail, Terminal Section And Post Anchor Detail
2016 11	912.315	0	Guide Rail System, Steel Beam, Transition From Type M To Steel Beam Guide Rail With Channel For Structure Connection, Installation
2016 11	912.316	0	Guide Rail System, Steel Beam, Type M Reduced Deflection Treatment, Installation
2002 11	912.330	1	Guide Rail System, Steel Beam, Temporary Transition Installation - Rail Method, Single Steel Beam to Temporary Concrete Barrier
2002 11	912.331	1	Guide Rail System, Steel Beam, Temporary Transition Installation, Single Steel Beam to Temporary Concrete Barrier
2008 11	912.380	1	Guide Rail System, Steel Beam, Permanent Transition Installation, Channel Termination, Median



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2009 11	912.382	3	Guide Rail System, Steel Beam, Permanent Transition Installation, Steel Beam With Eccentric Loader to 3 Cable, Divided and Undivided Highway
2010 11	912.401	1	Guide Rail System, Steel Beam, Structure Connection, Component - Rail and Channel
2010 11	912.430	3	Guide Rail System, Steel Beam, Structure Connection
2008 11	912.480	2	Guide Rail System, Steel Beam, Permanent Connection Installation, Single Steel Beam to Concrete Barrier
2008 11	912.481	2	Guide Rail System, Steel Beam, Permanent Connection Installation, Double Steel Beam to Concrete Barrier
2016 11	912.530	2	Guide Rail System, Steel Beam, Structure Approach Treatment, Installation - Rural Highway
2008 11	913.101	1	Guide Rail System, Cable, Component - Cable Fittings
2008 11	913.102	1	Guide Rail System, Cable, Component - Concrete Anchor Blocks
2008 11	913.103	1	Guide Rail System, Cable, Component - Wooden Post Base Plate
2008 11	913.130	1	Guide Rail System, Cable, Installation - Shoulder
2014 11	913.131	0	Guide Rail System, Cable, Installation - Entrances and Intersecting Roads
2013 11	913.135	0	Guide Rail System, Cable, Adjustment - Shoulder
2016 11	921.101	2	Energy Attenuator, General, Installation - Granular Approach Pad, Median
2011 11	922.131	2	Energy Attenuator, Crash Cushion, QuadTrend System, Installation - Concrete Barrier
2011 11	922.133	2	Energy Attenuator, Crash Cushion, QuadTrend System, Installation - Concrete Pad and Rear Cable Anchor Block



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2016 04	922.161	0	Energy Attenuator, End Treatment, Steel Beam Energy Attenuating Terminal, Soft Top Terminal System Installation
2016 04	922.170	0	Energy Attenuator, End Treatment, Steel Beam Energy Attenuating Terminal, X-Lite Tangent Terminal System With Steel Posts, Installation
2010 11	922.180	2	Energy Attenuator, End Treatment, Steel Beam Energy Attenuating Terminal, Sequential Kinking Terminal System with Wooden Posts, Installation
2010 11	922.181	2	Energy Attenuator, End Treatment, Steel Beam Energy Attenuating Terminal, Sequential Kinking Terminal System with Steel Posts, Installation
2013 11	922.330	3	Energy Attenuator, End Treatment, Crash-Cushion Attenuating Terminal (CAT-350) System, Assembly
2013 11	922.401	2	Energy Attenuator, End Treatment, Eccentric Loader Terminal System, Component - Loader Assembly
2013 11	922.402	2	Energy Attenuator, End Treatment, Eccentric Loader Terminal System, Component - Rail and Cable Attachment
2013 11	922.410	2	Energy Attenuator, End Treatment, Eccentric Loader Terminal System, Assembly - Loader Detail
2013 11	922.430	7	Energy Attenuator, End Treatment, Eccentric Loader Terminal System, Installation - Layout and Post
2010 11	922.530	5	Energy Attenuator, End Treatment, Steel Beam Energy Attenuating Terminal, Extruder Terminal System with Wooden Posts, Installation
2010 11	922.532	2	Energy Attenuator, End Treatment, Steel Beam Energy Attenuating Terminal, Extruder Terminal System with Steel Posts, Installation
2011 11	923.001	3	Energy Attenuator, Crash Cushion, Narrow Systems, Component - Reinforced Concrete Pad
2016 11	923.002	1	Energy Attenuator, Crash Cushion, Component - Anchor Assembly
2011 11	923.004	0	Energy Attenuator, Crash Cushion, Wide Systems, Component - Reinforced Concrete Pad
2011 11	923.005	0	Energy Attenuator, Crash Cushion, Extra Wide Systems, Component - Reinforced Concrete Pad
2015 11	923.006	0	Energy Attenuator, Crash Cushion, Quadguard Super Wide System, Component – Reinforced Concrete Pad



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2016 11	923.010	0	Energy Attenuator, Crash Cushion, Narrow Systems, Component – Reinforced Precast Concrete Pad for Permanent Installation
2016 11	923.011	0	Energy Attenuator, Crash Cushion, Component – Reinforced Precast Concrete Pad for Modified Temporary Concrete Barrier
2011 11	923.180	1	Energy Attenuator, Crash Cushion, QuadGuard System, Installation - Temporary, Unidirectional
2011 11	923.181	1	Energy Attenuator, Crash Cushion, QuadGuard System, Installation - Temporary, Bidirectional
2011 11	923.182	1	Energy Attenuator, Crash Cushion, QuadGuard System, Installation - Permanent, Unidirectional
2011 11	923.183	1	Energy Attenuator, Crash Cushion, QuadGuard System, Installation - Permanent, Bidirectional
2011 11	923.184	0	Energy Attenuator, Crash Cushion, QuadGuard Wide System, Installation - Temporary, Unidirectional
2011 11	923.185	0	Energy Attenuator, Crash Cushion, QuadGuard Wide System, Installation - Temporary, Bidirectional
2011 11	923.186	0	Energy Attenuator, Crash Cushion, QuadGuard Wide System, Installation - Permanent, Unidirectional
2011 11	923.187	0	Energy Attenuator, Crash Cushion, QuadGuard Wide System, Installation - Permanent, Bidirectional
2011 11	923.188	0	Energy Attenuator, Crash Cushion, QuadGuard Extra Wide System, Installation - Temporary, Unidirectional
2011 11	923.189	0	Energy Attenuator, Crash Cushion, QuadGuard Extra Wide System, Installation - Temporary, Bidirectional
2011 11	923.190	0	Energy Attenuator, Crash Cushion, QuadGuard Extra Wide System, Installation - Permanent, Unidirectional
2011 11	923.191	0	Energy Attenuator, Crash Cushion, QuadGuard Extra Wide System, Installation - Permanent, Bidirectional
2015 11	923.192	0	Energy Attenuator, Crash Cushion, Quadguard Super Wide System, Installation – Temporary, Unidirectional
2015 11	923.193	0	Energy Attenuator, Crash Cushion, Quadguard Super Wide System, Installation – Temporary, Bidirectional
2015 11	923.194	0	Energy Attenuator, Crash Cushion, Quadguard Super Wide System, Installation – Permanent Unidirectional



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2015 11	923.195	0	Energy Attenuator, Crash Cushion, Quadguard Super Wide System, Installation – Permanent Bidirectional
2013 11	923.201	2	Energy Attenuator, Crash Cushion, Connecticut Impact Attenuation System, Component - Steel Cylinder
2013 11	923.202	2	Energy Attenuator, Crash Cushion, Connecticut Impact Attenuation System, Component - Polyethylene Lid
2013 11	923.204	2	Energy Attenuator, Crash Cushion, Connecticut Impact Attenuation System, Component - Concrete Backwall
2013 11	923.242	2	Energy Attenuator, Crash Cushion, Connecticut Impact Attenuation System, Installation
2013 11	923.244	1	Energy Attenuator, Crash Cushion, Connecticut Impact Attenuation System, Installation - Long Median Hazard
2013 11	923.245	2	Energy Attenuator, Crash Cushion, Connecticut Impact Attenuation System, Installation - Short Median Hazard
2011 11	923.280	1	Energy Attenuator, Crash Cushion, TRACC System, Installation - Temporary, Unidirectional
2011 11	923.281	1	Energy Attenuator, Crash Cushion, TRACC System, Installation - Temporary, Bidirectional
2011 11	923.282	1	Energy Attenuator, Crash Cushion, TRACC System, Installation - Permanent, Unidirectional
2011 11	923.283	1	Energy Attenuator, Crash Cushion, TRACC System, Installation - Permanent, Bidirectional
2011 11	923.380	1	Energy Attenuator, Crash Cushion, TAU II System, Installation - Temporary, Unidirectional
2011 11	923.381	1	Energy Attenuator, Crash Cushion, TAU II System, Installation - Temporary, Bidirectional
2011 11	923.382	1	Energy Attenuator, Crash Cushion, TAU II System, Installation - Permanent, Unidirectional
2011 11	923.383	1	Energy Attenuator, Crash Cushion, TAU II System, Installation - Permanent, Bidirectional
2011 11	923.384	0	Energy Attenuator, Crash Cushion, TAU II Wide System, Installation - Temporary, Unidirectional
2011 11	923.385	0	Energy Attenuator, Crash Cushion, TAU II Wide System, Installation - Temporary, Bidirectional
2011 11	923.386	0	Energy Attenuator, Crash Cushion, TAU II Wide System, Installation - Permanent, Unidirectional
2011 11	923.387	0	Energy Attenuator, Crash Cushion, TAU II Wide System, Installation - Permanent, Bidirectional



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2011 11	923.388	0	Energy Attenuator, Crash Cushion, TAU II Extra Wide System - TL-2, Installation - Temporary, Unidirectional
2011 11	923.389	0	Energy Attenuator, Crash Cushion, TAU II Extra Wide System - TL-2, Installation - Temporary, Bidirectional
2011 11	923.390	0	Energy Attenuator, Crash Cushion, TAU II Extra Wide System - TL-3, Installation - Temporary, Unidirectional
2011 11	923.391	0	Energy Attenuator, Crash Cushion, TAU II Extra Wide System - TL-3, Installation - Temporary, Bidirectional
2011 11	923.392	0	Energy Attenuator, Crash Cushion, TAU II Extra Wide System - TL-2, Installation - Permanent, Unidirectional
2011 11	923.393	0	Energy Attenuator, Crash Cushion, TAU II Extra Wide System - TL-2, Installation - Permanent, Bidirectional
2011 11	923.394	0	Energy Attenuator, Crash Cushion, TAU II Extra Wide System - TL-3, Installation - Permanent, Unidirectional
2011 11	923.395	0	Energy Attenuator, Crash Cushion, TAU II Extra Wide System - TL-3, Installation - Permanent, Bidirectional
2010 11	923.480	0	Energy Attenuator, Crash Cushion, Smart System, Installation - Temporary, Unidirectional
2010 11	923.481	0	Energy Attenuator, Crash Cushion, Smart System, Installation - Temporary, Bidirectional
2010 11	923.482	0	Energy Attenuator, Crash Cushion, Smart System, Installation - Permanent, Unidirectional
2010 11	923.483	0	Energy Attenuator, Crash Cushion, Smart System, Installation - Permanent, Bidirectional
2011 11	923.530	1	Energy Attenuator, Crash Cushion, Box Beam Bursting Energy Absorbing Terminal, Installation - Layout
2011 11	923.531	1	Energy Attenuator, Crash Cushion, Box Beam Bursting Energy Absorbing Terminal, Installation - Impact Head and Post
2016 11	924.131	1	Energy Attenuator, Crash Cushion, ABSORB 350 System, Installation - Temporary Concrete Barrier
2016 11	924.135	2	Energy Attenuator, Crash Cushion, ACZ-350 System, Installation - Temporary Concrete Barrier
2016 11	924.141	0	Energy Attenuator, Crash Cushion, ACZ-350 System, Installation - Temporary Concrete Barrier
2013 11	925.010	0	Guide Rail System, Thrie Beam, Component – Rail
2013 11	925.030	0	Guide Rail System, Thrie Beam, Component - Terminal Connector



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2016 11	971.101	4	Fence, Highway, In Earth, Shale, Loose Rock, Or Friable Rock, Installation
2016 11	971.102	2	Fence, Highway, In Solid Rock, Installation
2016 11	971.103	0	Fence, Highway, Installation Details
2012 11	972.101	2	Fence, Chain-Link, Component - Barbed Wire
2012 11	972.102	2	Fence, Chain-Link, Component - Gate
2012 11	972.130	2	Fence, Chain-Link, Installation - Roadway
2012 11	972.131	2	Fence, Chain-Link, Installation - Concrete Barrier
2012 11	972.132	0	Fence, Chain-Link, Details and Table
2016 11	973.130	0	Fence, Steel Beam, Barricade, installation
2009 11	980.101	2	Pedestrian Barricade, Installation
2009 11	982.101	1	Splash Guard, Pedestrian, Installation
2014 11	984.101	1	Post Mounted Delineator, Installation
2016 11	984.105	0	Flexible Delineator Post, Installation – temporary and Permanent
2010 11	984.201	0	Energy Attenuator, End Treatment, Delineation, Installation - Approach End
2010 11	984.202	0	Energy Attenuator, End Treatment, Delineation, Installation - Leaving End
2010 11	984.203	0	Energy Attenuator, Crash Cushion, Delineation, Installation - Temporary
2010 11	984.204	0	Energy Attenuator, Crash Cushion, Delineation, Installation - Permanent
2013 11	984.205	0	Energy Attenuator, Crash Cushion, Connecticut Impact Attenuation System, Delineation, Installation - Permanent
2013 11	985.110	0	Small Sign Support System, Single Breakaway Wooden Post, 89x89mm, 89x140mm, 140x140mm, and 140x148mm, Installation - Single Post Assembly
2013 11	985.210	0	Small Sign Support System, Double Breakaway Wooden Post, 89x89mm and 89x140mm, Installation - Double Post Assembly



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2013 11	985.220	0	Small Sign Support System, Double Breakaway Wooden Post, 140x140mm and 140x184mm, Installation - Double Post Assembly
2013 11	987.101	0	Small Sign Support System, Lap Splice Rib-Bak Breakaway System, Components
2013 11	987.110	0	Small Sign Support, Lap Splice Rib-Bak Breakaway System, Installation - Single Post Assembly
2013 11	987.210	0	Small Sign Support System, Lap Splice Rib-Bak Breakaway System, Installation - Double Post Assembly
2013 11	987.310	0	Small Sign Support System, Lap Splice Rib-Bak Breakaway System, Installation - Triple Post Assembly
2013 11	989.110	0	Small Sign Support System, Sqr-Loc Perforated Steel Square Sign Post System, Installation - Single Post Assembly
2013 11	989.210	0	Small Sign Support System, Sqr-Loc Perforated Steel Square Post System, Installation - Double Post
2014 11	990.110	1	Small Sign Support System, Non-Breakaway U-Flange Post, Installation - Single Post Assembly
2014 11	991.130	3	Expanded Metal Anti-Glare Screen, Installation - Concrete Barrier
2014 11	991.131	3	Expanded Metal Anti-Glare Screen, Installation - Steel Beam Guide Rail with Wooden Post
2012 11	991.132	2	Expanded Metal Anti-Glare Screen, Installation - Chain-Link Fence

DIVISION 1000 - SANITARY SEWERS

2016 11	1003.010	3	Cast-in-Place Maintenance Hole Drop Structure Tee
2016 11	1003.020	3	Cast-in-Place Maintenance Hole Drop Structure Wye
2016 11	1003.030	4	Internal Drop Structure for Existing Maintenance Hole
2016 11	1003.031	3	Internal Drop Structure for New Maintenance Hole
2016 11	1006.010	3	Sewer Service Connections for Rigid Main Pipe Sewer



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DIVISION 1100 - WATERMAINS			
2014 11	1100.010	3	Cast-in-Place Chamber for Valves Up to 350 mm Diameter
2014 11	1100.011	2	Piping Layout for Butterfly and Gate Valves Up to 350 mm Diameter in Cast-in-Place Chambers
2015 11	1101.010	4	Precast Valve Chamber, 1200 mm and 1500 mm Diameter
2013 11	1101.012	2	Precast Concrete Valve Chamber with Poured-in-Place Thrust Blocks, 1800 x 2400 mm Components
2013 11	1101.013	2	Precast Concrete Valve Chamber with Poured-in-Place Thrust Blocks, 1800 x 2400 mm, Riser and Base
2013 11	1101.014	2	Precast Concrete Valve Chamber with Poured-in-Place Thrust Blocks, 1800 x 2400 mm, Thrust Blocks
2013 11	1101.015	2	Precast Concrete Valve Chamber with Poured-in-Place Thrust Blocks, 1800 x 2400 mm, Chimney and Cap
2013 11	1101.016	2	Precast Concrete Valve Chamber with Poured-in-Place Thrust Blocks, 2400 x 3000 mm Components
2013 11	1101.017	2	Precast Concrete Valve Chamber with Poured-in-Place Thrust Blocks, 2400 x 3000 mm Riser and Base
2013 11	1101.018	3	Precast Concrete Valve Chamber with Poured-in-Place Thrust Blocks, 2400 x 3000 mm Thrust Blocks
2013 11	1101.019	2	Precast Concrete Valve Chamber with Poured-in-Place Thrust Blocks, 2400 x 3000 mm Chimney and Cap
2013 11	1101.020	3	Valve Operator
2013 11	1101.030	0	Precast Concrete Valve Chamber with Poured-in-Place Thrust Blocks, 3000 x 3000 mm Components
2013 11	1101.031	0	Precast Concrete Valve Chamber with Poured-in-Place Thrust Blocks, 3000 x 3000 mm Riser and Base
2013 11	1101.032	0	Precast Concrete Valve Chamber with Poured-in-Place Thrust Blocks, 3000 x 3000 mm Thrust Blocks
2013 11	1101.033	0	Precast Concrete Valve Chamber with Poured-in-Place Thrust Blocks, 3000 x 3000 mm Chimney and Cap
2013 11	1101.040	0	Precast Concrete Valve Chamber with Poured-in-Place Thrust Blocks, 3600 x 3000 mm Components
2013 11	1101.041	1	Precast Concrete Valve Chamber with Poured-in-Place Thrust Blocks, 3600 x 3000 mm Riser and Base



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DATE	OPSD NO.	REV.	TITLE
2013 11	1101.042	0	Precast Concrete Valve Chamber with Poured-in-Place Thrust Blocks, 3600 x 3000 mm Thrust Blocks
2013 11	1101.043	0	Precast Concrete Valve Chamber with Poured-in-Place Thrust Blocks, 3600 x 3000 mm Chimney and Cap
2013 11	1103.010	2	Concrete Thrust Blocks for Tees, Plugs, and Horizontal Bends
2013 11	1103.020	3	Concrete Thrust Blocks for Vertical Bends
2013 11	1103.021	0	Dimension Tables for Concrete Thrust Blocks for Vertical ends
2013 11	1104.010	3	Water Service Connection, 19 and 25 mm Diameter Sizes
2013 11	1104.020	2	Water Service Connection, 32, 38, and 50 mm Diameter Sizes
2013 11	1104.030	2	Blow Off Installation
2013 11	1105.010	2	Hydrant Installation
2014 11	1107.010	2	Piping Layout for Water Meters 50 mm and Smaller in Chambers
2014 11	1107.020	2	Piping Layout for Water Meters 75 to 250 mm in Chambers with By-Pass
2014 11	1107.030	2	Piping Layout for Water Meters in Building with By-Pass
2013 11	1108.010	2	Cast-in-Place Water Meter Chamber for 75 to 250 mm Meters
2015 11	1109.010	2	Cathodic Protection for Metallic Watermain Systems
2015 11	1109.011	2	Cathodic Protection for PVC Watermain Systems
2015 11	1109.012	1	Cathodic Protection of Existing Metallic Watermains, Exposed Service or Pipe Method
2015 11	1109.013	1	Anode Installation Over Pipe Method for Existing Metallic Watermains
2015 11	1109.014	1	Horizontal Anode Bank at Service
2015 11	1109.015	1	Vertical Anode Bank at Service
2015 11	1109.025	1	Waterproofing of Splices
2015 11	1109.030	0	Insulation For Sewers And Watermains In Shallow Trenches



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DATE	OPSD NO.	REV.	TITLE
DIVISION 3000 - STRUCTURES			
2010 11	3000.100	2	Foundation, Piles, Steel H-Pile Driving Shoe
2010 11	3000.150	1	Foundation, Piles, Steel H-Pile Splice
2010 11	3000.201	1	Foundation, Piles, Steel HP 310 Oslo Point
2010 11	3001.100	1	Foundation, Piles, Steel Tube Pile Driving Shoe
2010 11	3001.150	1	Foundation, Piles, Steel Tube Pile Splice
2010 11	3002.200	1	Foundation, Piles, Steel Sheet Pile Anchorage
2010 11	3003.100	1	Foundation, Piles, Wooden Pile Driving Shoe
2010 11	3003.150	1	Foundation, Piles, Wooden Pile Head Protection
2010 11	3090.100	1	Foundation, Frost Penetration Depths for Northern Ontario
2010 11	3090.101	1	Foundation, Frost Penetration Depths for Southern Ontario
2010 11	3101.150	1	Walls, Abutment, Backfill, Minimum Granular Requirement
2010 11	3101.200	1	Walls, Abutment, Backfill, Rock
2010 11	3102.100	1	Walls, Abutment, Backfill Drain
2010 11	3120.100	2	Walls, Retaining, Concrete Toe Wall
2010 11	3121.150	1	Walls, Retaining, Backfill, Minimum Granular Requirement
2011 04	3190.100	2	Walls, Retaining and Abutment, Wall Drain
2011 11	3290.100	1	Piers, Cutwater Assembly
2010 11	3310.100	1	Deck, Girders, Concrete, Method of Obtaining Screed Elevations
2011 11	3310.150	1	Deck, Girders, Concrete, Positive Moment Connection at Piers
2010 11	3311.100	1	Deck, Girders, Steel, Method of Obtaining Screed Elevations
2015 11	3311.900	2	Deck, Girders, Steel Box, Access Hatch



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DATE	OPSD NO.	REV.	TITLE
2011 11	3329.100	1	Deck, Reinforcement, Supports for Reinforcing Steel for Slab Depths 300 mm or Less
2011 11	3329.101	1	Deck, Reinforcement, Supports for Reinforcing Steel for Slab Depths Greater Than 300 mm
2011 11	3332.100	1	Deck, Round Voids, Form Supports and Tie-Downs
2010 11	3333.100	1	Deck, Round Voids, Drains
2010 11	3333.101	1	Deck, Trapezoid Void, Drains
2011 11	3339.100	1	Deck, Voids, Access Hatch for Concrete Bridges, Assembly
2011 11	3339.101	1	Deck, Voids, Access Hatch for Concrete Bridges, Installation
2014 11	3340.100	2	Deck, Drains with Downspout
2014 11	3340.102	2	Deck, Drains with Sloped Downspout
2012 11	3340.150	2	Deck, Drains with Transverse Bar Openings
2012 11	3340.153	2	Deck, Drains, Median with Transverse Bar Openings
2012 11	3340.200	2	Deck, Drains with Downspout Modification for Addition of Asphalt to Existing Structure
2012 11	3340.201	2	Deck, Drains, with Sloped Downspout Modification for Addition of Asphalt to Existing Structure
2012 11	3340.250	2	Deck, Drains, with Transverse or Longitudinal Bar Openings, Modification for Addition of Asphalt to Existing Structure
2012 11	3349.100	2	Deck, Drains, Drainage of New Deck Below Asphalt Wearing Surface
2012 11	3349.101	2	Deck, Drains, Drainage of Existing Deck Below Asphalt Wearing Surface
2016 04	3360.100	2	Deck, Light Pole Bases, Structures with Barrier Walls
2016 04	3360.200	2	Deck, Light Pole Bases, Structures with Parapet Walls
2008 11	3370.100	2	Deck, Waterproofing Hot Applied Asphalt Membrane with Protection Board
2008 11	3370.101	2	Deck, Waterproofing Hot Applied Asphalt Membrane at Active Cracks Greater Than 2 mm Wide and Construction Joints
2012 11	3390.100	2	Deck, Drip Channel

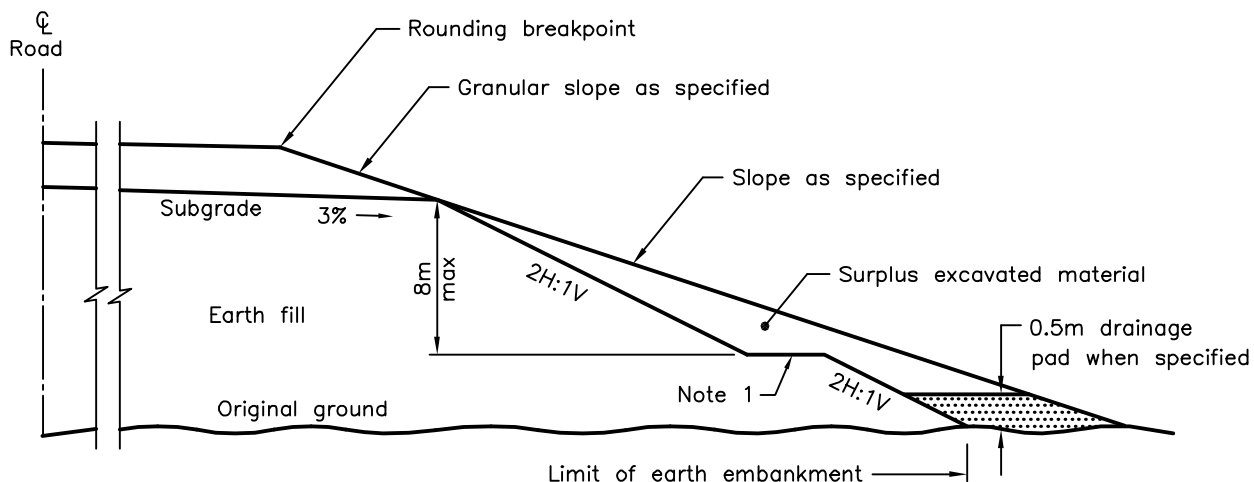


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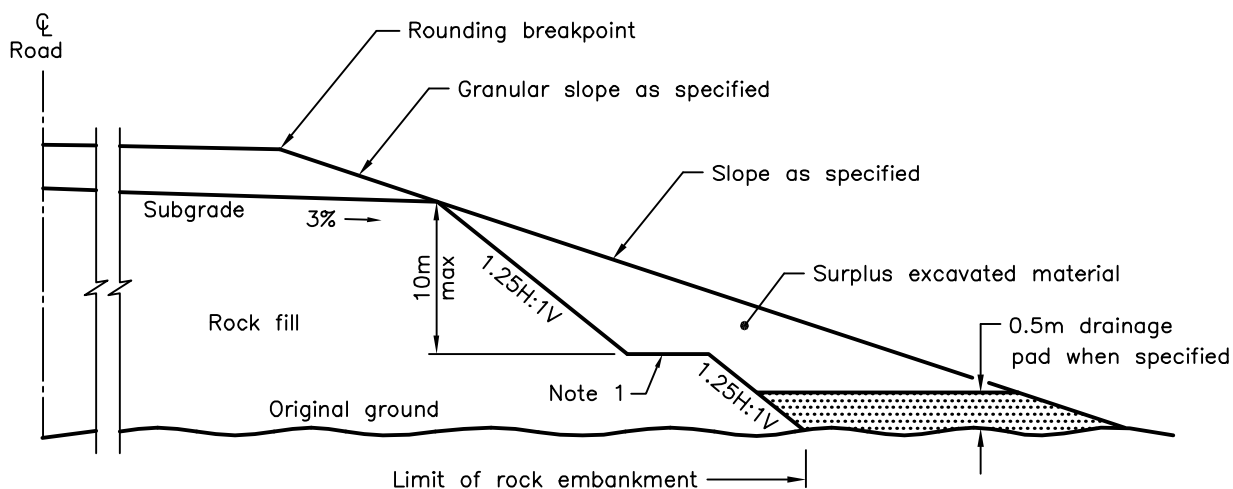
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WATERMAINS, AND STRUCTURES**

DATE	OPSD NO.	REV.	TITLE
2005 11	3390.150	0	Falsework Clearance to Traffic Lanes
2010 11	3419.100	1	Barriers and Railings, Steel Beam, Guide Rail and Channel Anchorage
2010 11	3419.150	1	Barriers and Railings, Steel, Single Railing Anchorage
2010 11	3419.155	1	Barriers and Railings, Steel, Double Railing Anchorage
2012 11	3900.100	1	Utilities, Duct Location
2011 11	3900.150	1	Utilities, Duct Termination at Bridge Approaches
2015 11	3920.100	0	Precast Reinforced Concrete Box Culvert With Height Of Fill $\geq 0.6\text{m}$
2016 04	3920.110	1	Precast Reinforced Concrete Box Culvert With Height Of Fill $< 0.6\text{m}$
2010 11	3940.150	2	Figures in Concrete, Warning Message, Layout
2010 11	3940.151	2	Figures in Concrete, Warning Message, Letters
2013 11	3941.200	2	Figures in Concrete, Site Number and Date, Layout
2011 11	3950.100	1	Joints, Concrete Expansion and Construction on Structure



EARTH EMBANKMENT



ROCK EMBANKMENT

NOTES:

1 Benches 2m minimum in width are required along slopes at maximum vertical intervals as shown.

A Height of fill is the vertical difference between top of subgrade and top of original ground measured at new road centreline.

B Surplus excavated material placed shall not extend beyond the right-of-way.

C All dimensions are in metres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2016

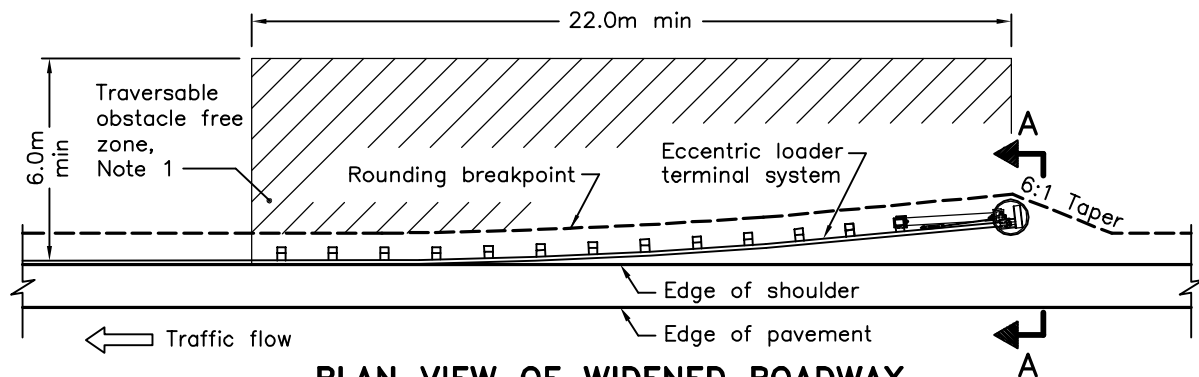
Rev

3

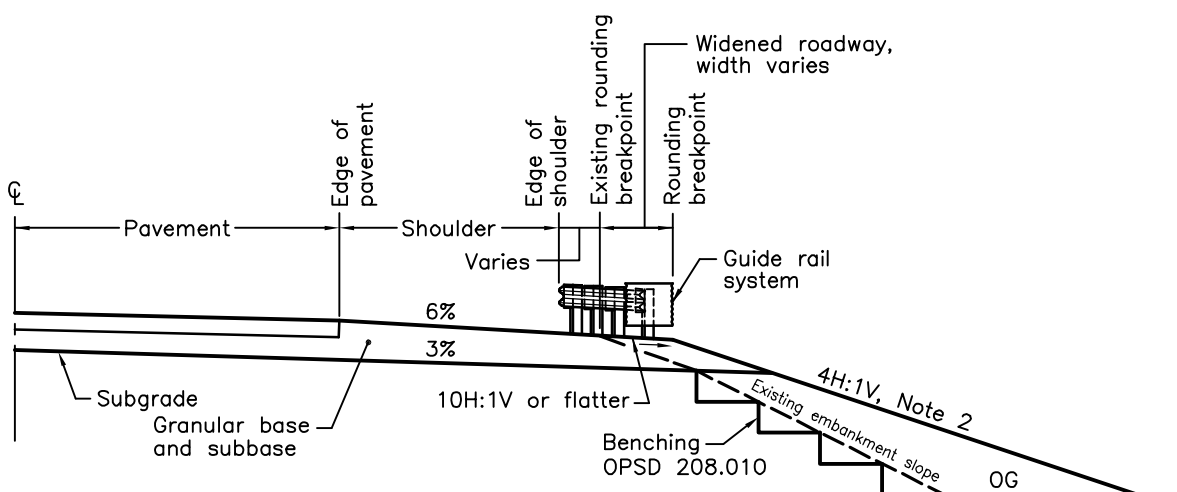
**SLOPE FLATTENING
USING SURPLUS EXCAVATED MATERIAL
ON EARTH OR ROCK EMBANKMENT**

OPSD 202.010

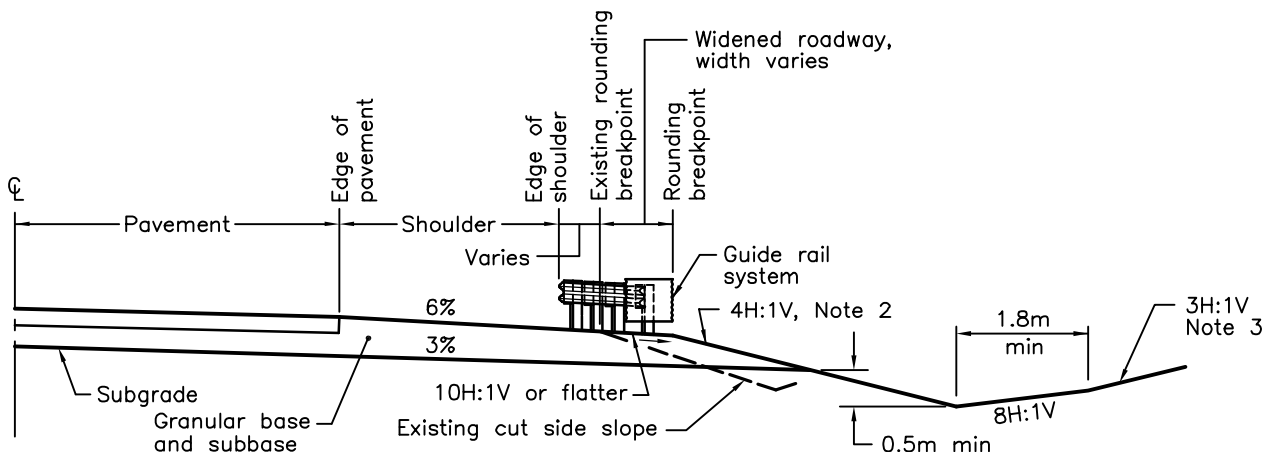




PLAN VIEW OF WIDENED ROADWAY



**SECTION A-A
FILL**



**SECTION A-A
CUT**

NOTES:

- 1 Required for steel beam guide rail with eccentric loader.
- 2 Slope shall be flatter when specified.
- 3 Slope shall be steeper when specified.

A All dimensions are in metres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

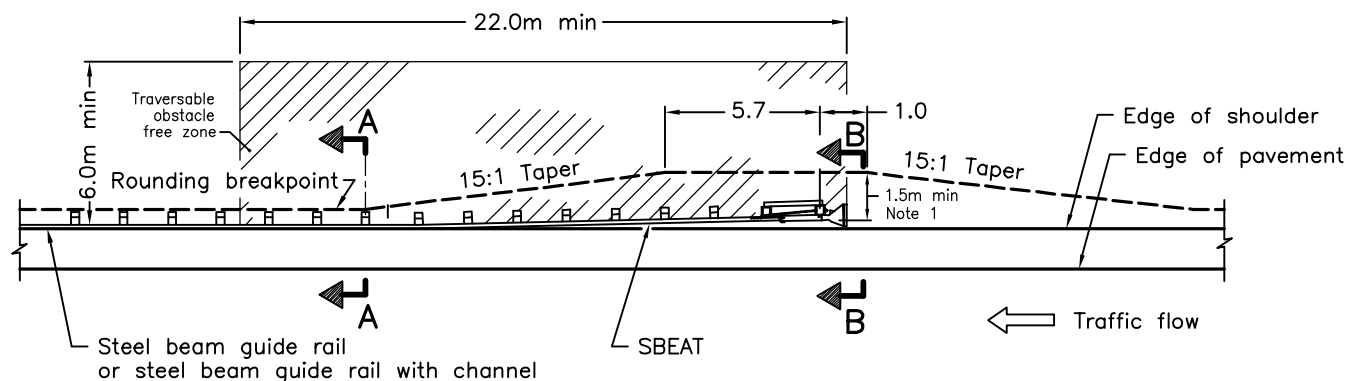
Nov 2016

Rev 6

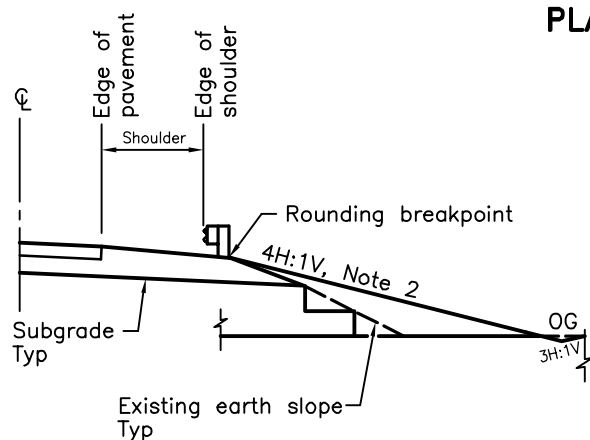
**ROADWAY WIDENING
FOR ECCENTRIC LOADER TERMINAL
SYSTEM**

OPSD 202.030

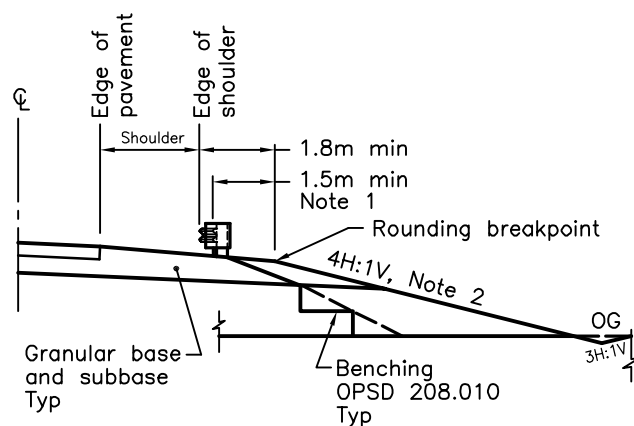




PLAN

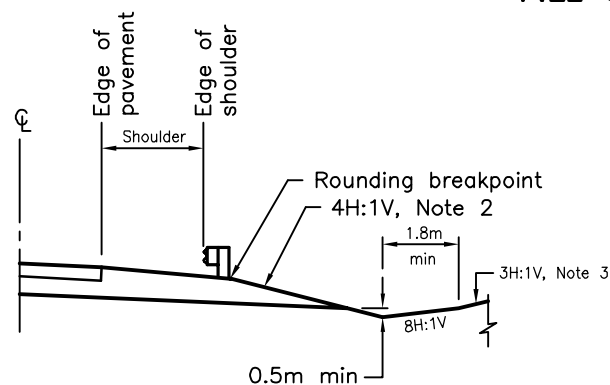


SECTION A-A

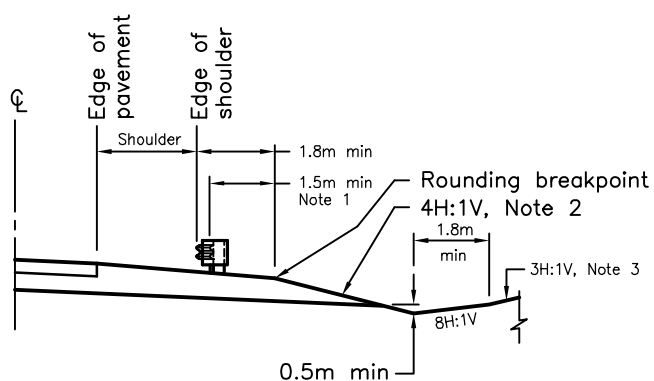


SECTION B-B

FILL SECTION



SECTION A-A



SECTION B-B

CUT SECTION

NOTES:

1 Measured from traffic side face of steel beam at the first post.

2 Slope shall be flatter when specified.

3 Slope shall be steeper when specified.

A For leaving end and constrained approach end applications, see OPSD 202.032.

B All dimensions are in metres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

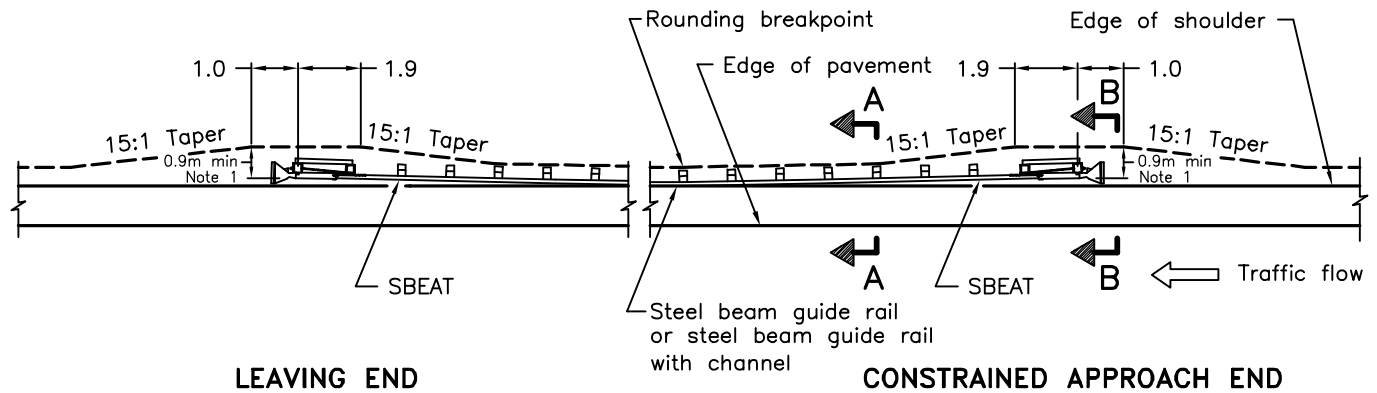
Nov 2016

Rev 1

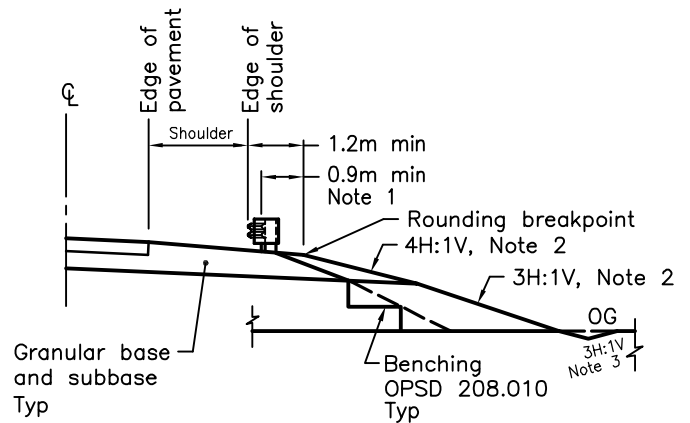
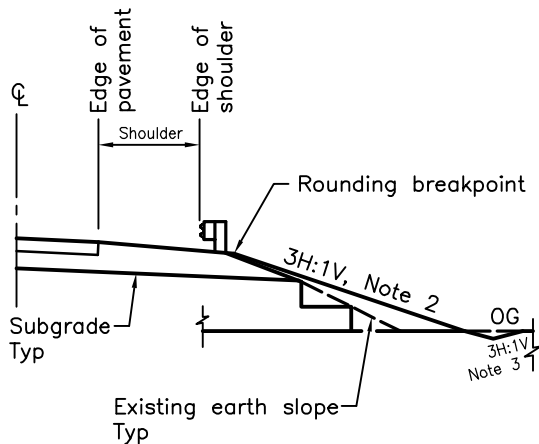
ROADWAY WIDENING FOR
STEEL BEAM ENERGY ATTENUATING TERMINAL
APPROACH END



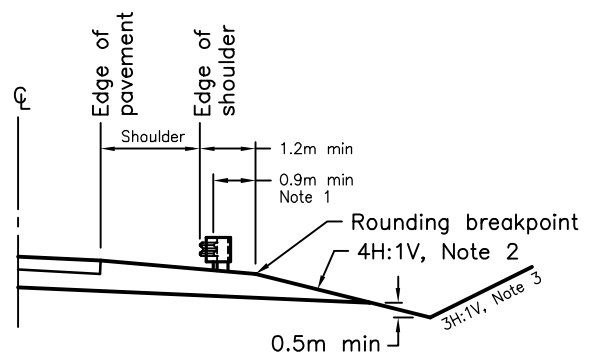
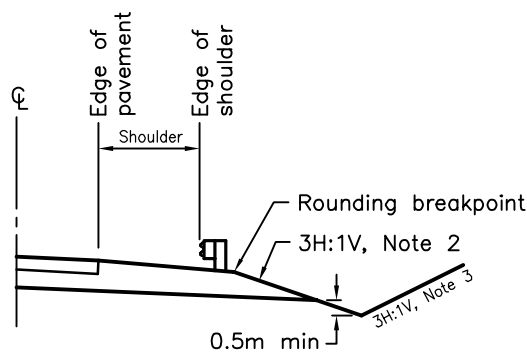
OPSD 202.031



PLAN



FILL SECTION



CUT SECTION

NOTES:

- 1 Measured from traffic side face of steel beam at the first post.
- 2 Slope shall be flatter when specified.
- 3 Slope shall be steeper when specified.
- A For approach end application see OPSPD 202.031.
- B All dimensions are in metres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

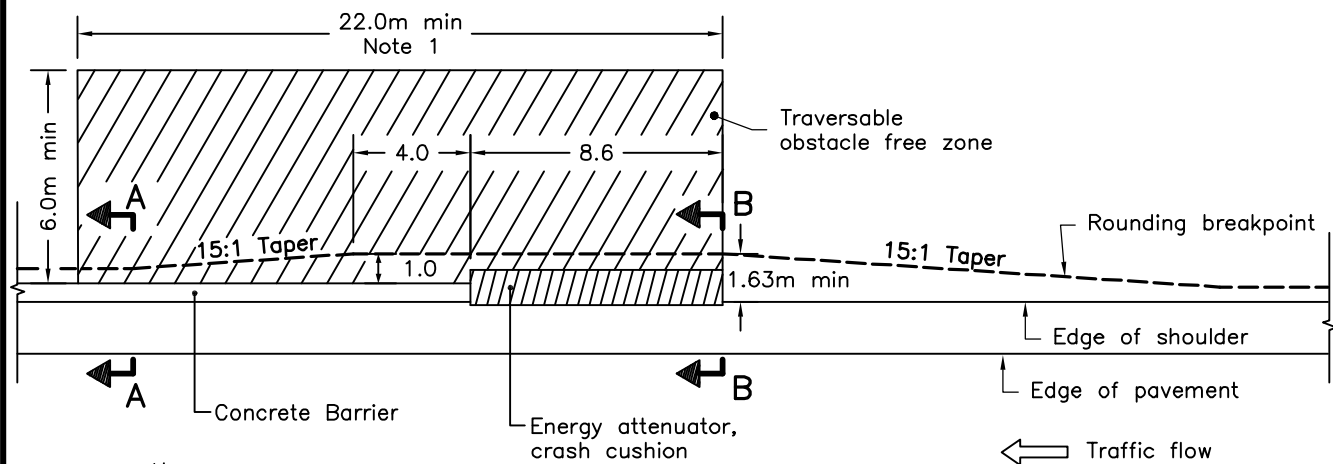
Nov 2016

Rev 2

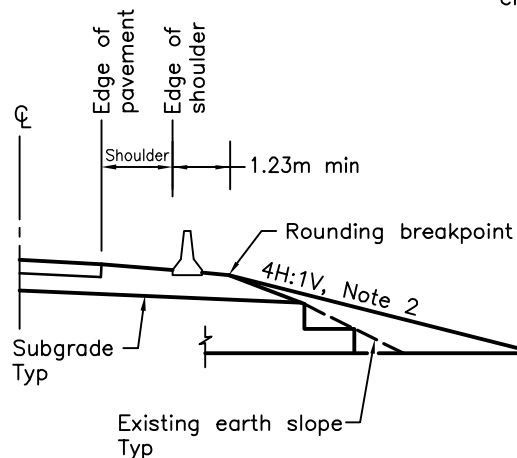
**ROADWAY WIDENING FOR
STEEL BEAM ENERGY ATTENUATING TERMINAL
LEAVING END AND
CONSTRAINED APPROACH END**



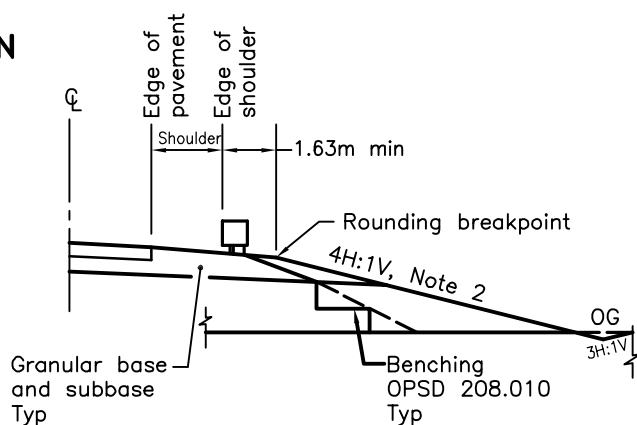
OPSD 202.032



PLAN

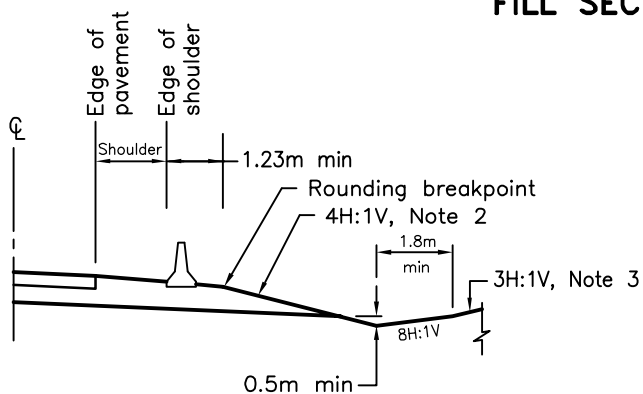


SECTION A-A

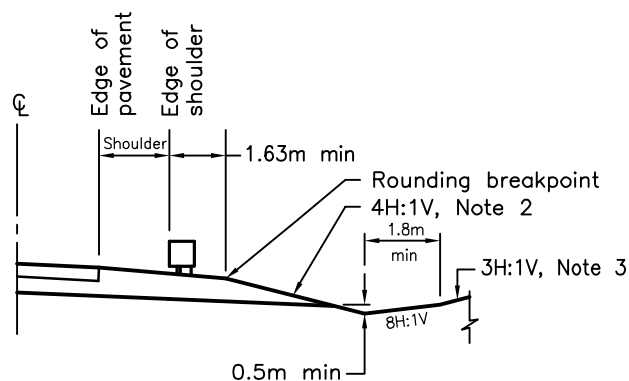


SECTION B-B

FILL SECTION



SECTION A-A



SECTION B-B

CUT SECTION

NOTES:

- 1 Measured from impact head or nose assembly of terminal.
 - 2 Slope shall be flatter when specified.
 - 3 Slope shall be steeper when specified.
- A All dimensions are in meters unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

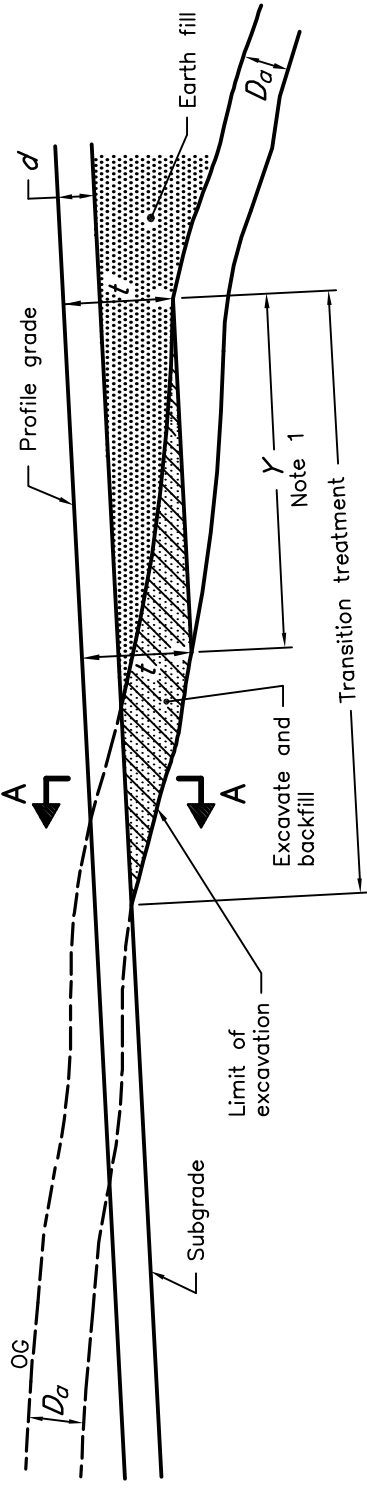
Nov 2016

Rev 1

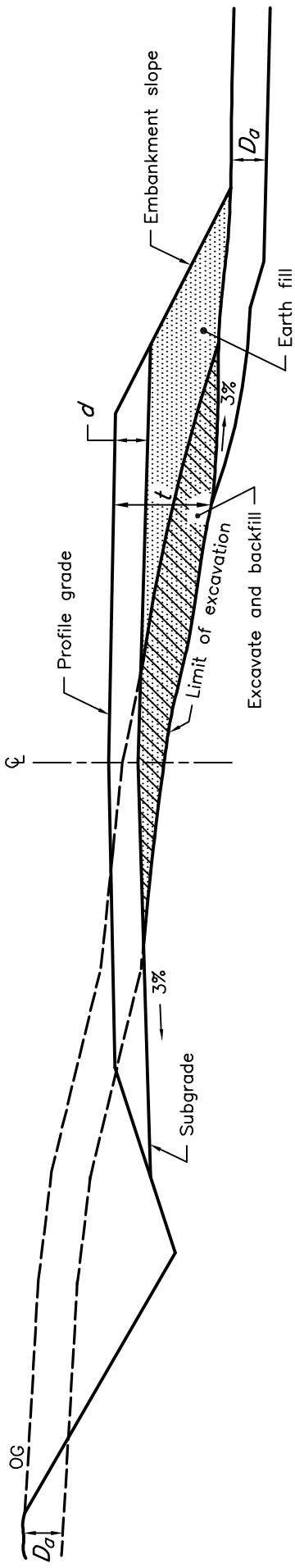
ROADWAY WIDENING
SINGLE SIDED ENERGY ATTENUATING TERMINALS
APPROACH END

OPSD 202.033





LONGITUDINAL SECTION



TRANSVERSE SECTION A-A

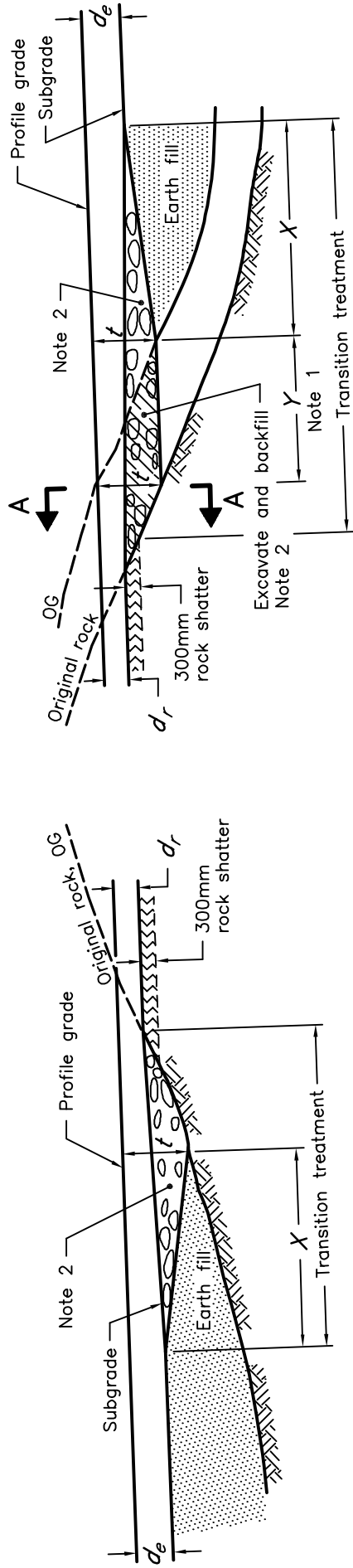
NOTES:

- 1 Longitudinal runout Y start and finish points vary across the transverse section, due to original overburden thickness. Profile grade and subgrade lines apply across the transverse section.

LEGEND:

- d – Depth of granular base and subbase
- t – Transition treatment depth, as specified
- D_o – Depth of organic, leached, and accumulated layers, as specified
- Y – Transition length through D_o

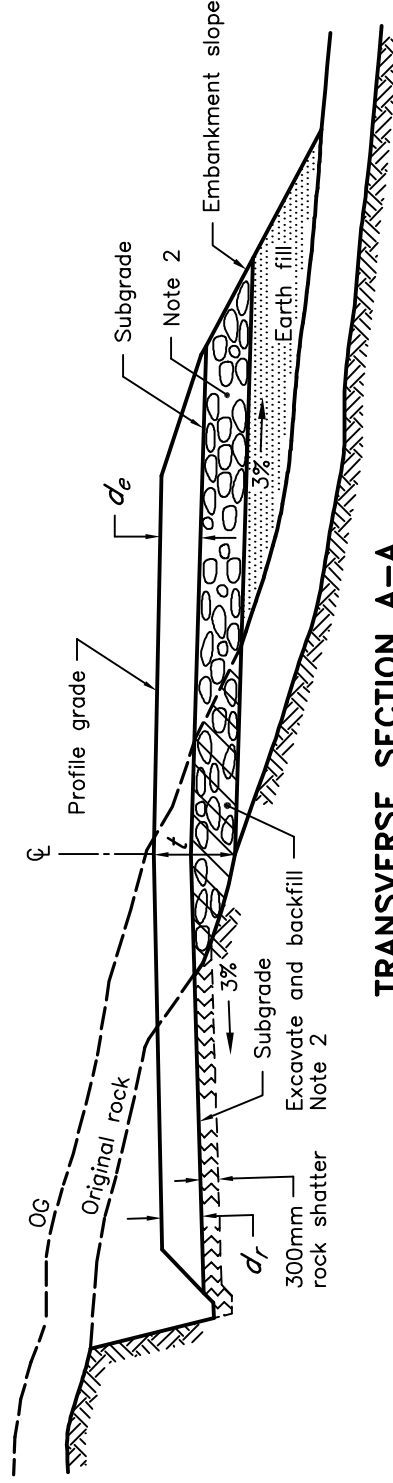
ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2016	Rev 3
TRANSITION TREATMENT EARTH CUT TO EARTH FILL			
		OPSD 205.010	



WITHOUT OVERBURDEN

LONGITUDINAL SECTIONS

WITH OVERBURDEN



TRANSVERSE SECTION A-A

NOTES:

- 1 Longitudinal runout Y start and finish points t - Transition treatment depth, as specified X - Taper to subgrade over $20(t - d_e)$ vary across the transverse section d_e - Depth of granular base and subbase over earth d_r - Depth of granular base and subbase over rock
- 2 Rock or granular fill.
- A Carry out sufficient shatter at transition to obtain drainage.
- B All dimensions are in metres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

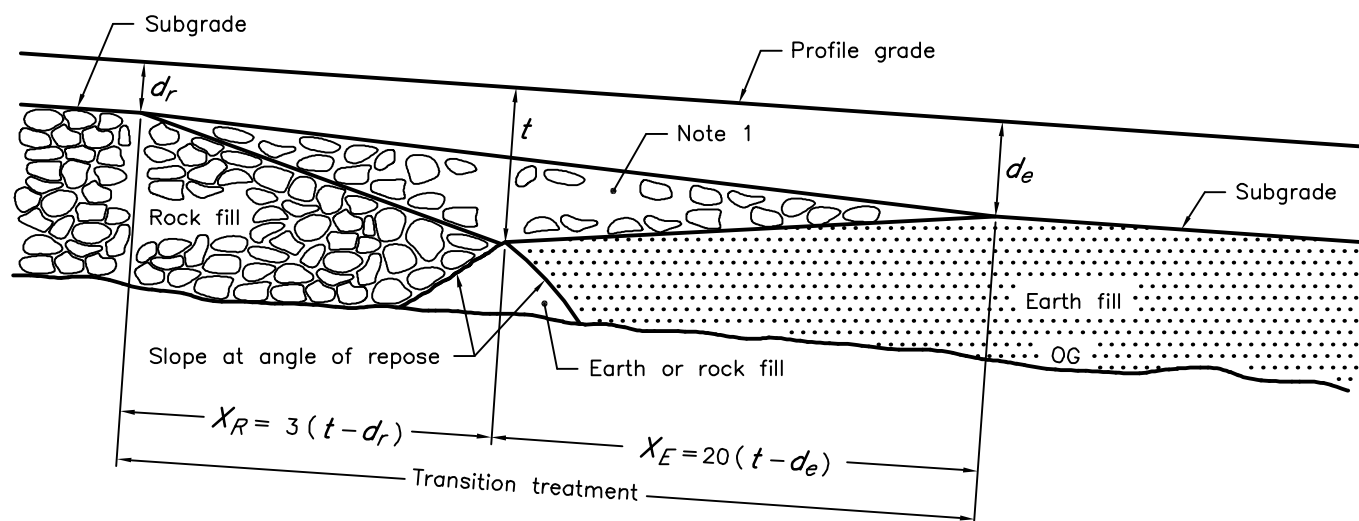
Nov 2016 Rev 3

TRANSITION TREATMENT

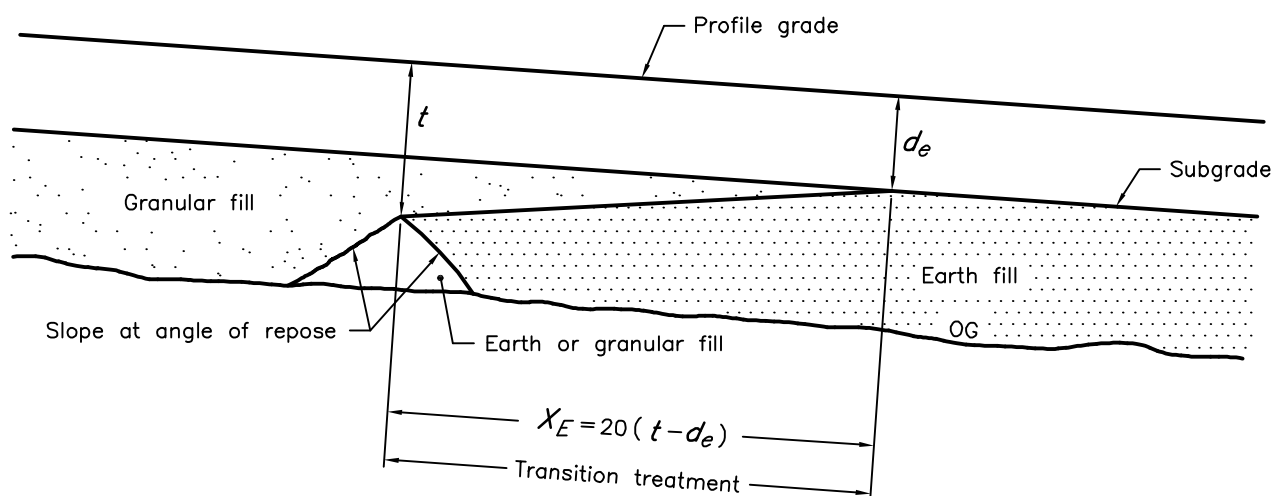
ROCK CUT TO EARTH FILL



OPSD 205.030



EARTH FILL TO ROCK FILL



EARTH FILL TO GRANULAR FILL

NOTES:

- 1 Rock or granular fill.
- A Embankment slopes to transition uniformly over distance X_R and X_E .
- B Profile grade and subgrade lines apply across the transverse section.

LEGEND:

- d_e - Depth of granular base and subbase over earth
- d_r - Depth of granular base and subbase over rock fill
- t - Transition treatment depth, as specified
- X_E - Length of transition for earth fill, 15m maximum
- X_R - Length of transition in rock fill

ONTARIO PROVINCIAL STANDARD DRAWING

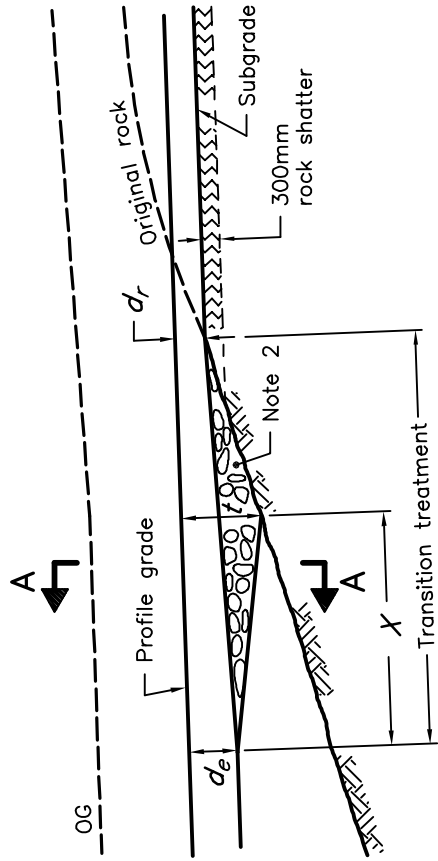
Nov 2016

Rev 3

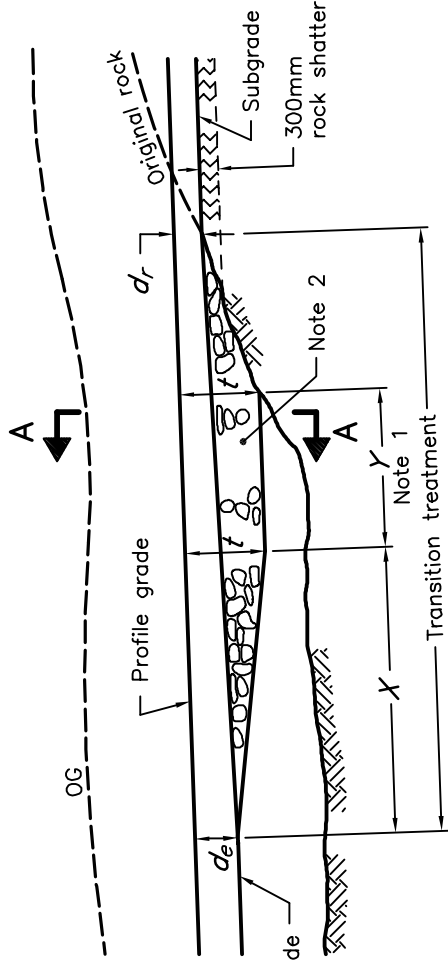
TRANSITION TREATMENT
EARTH FILL TO ROCK FILL AND
EARTH FILL TO GRANULAR FILL



OPSD 205.040

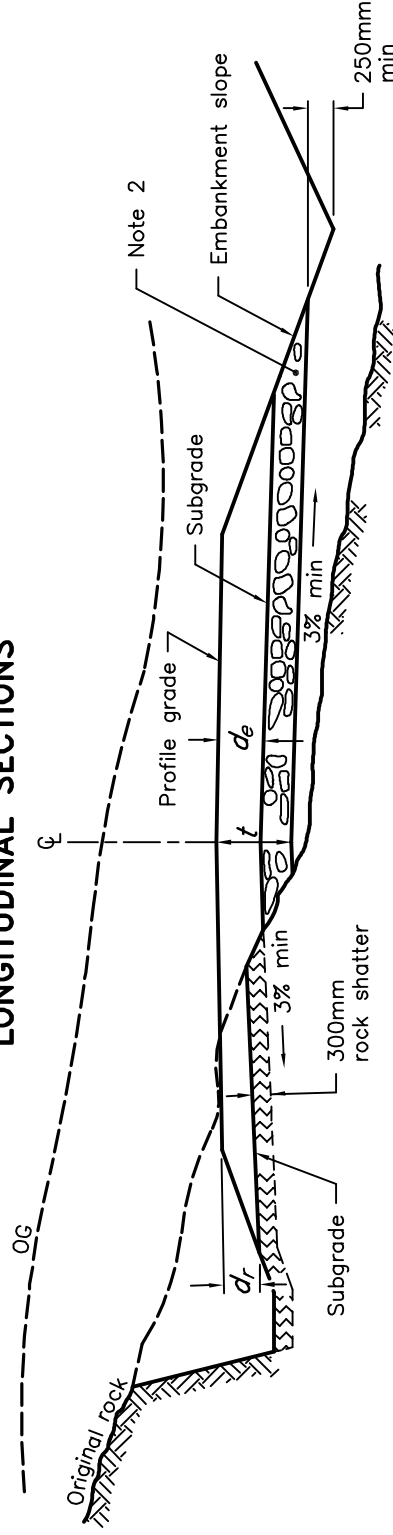


NON-FROST SUSCEPTIBLE SOILS



FROST SUSCEPTIBLE SOILS

LONGITUDINAL SECTIONS



TRANSVERSE SECTION A-A

LEGEND:

- NOTES:**
- Longitudinal runout Y start and finish points vary across the transverse section due to differences in original overburden thickness. Profile grade and subgrade line apply across the transverse section.
 - Rock or granular fill.
 - Carry out sufficient shatter at transitions to obtain drainage.
 - All dimensions are in metres unless otherwise shown.

- t – Transition treatment depth, as specified
 d_e – Depth of granular base and subbase over earth
 d_r – Depth of granular base and subbase over rock
 X – Taper to subgrade over $20(t - d_e)$
 Y – Transition length, 15.0m maximum

ONTARIO PROVINCIAL STANDARD DRAWING

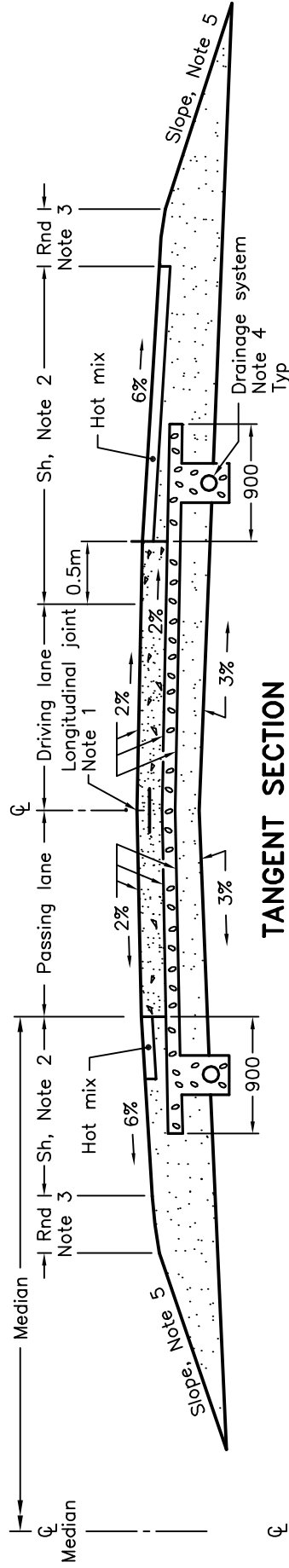
Nov 2016 Rev 3

TRANSITION TREATMENT

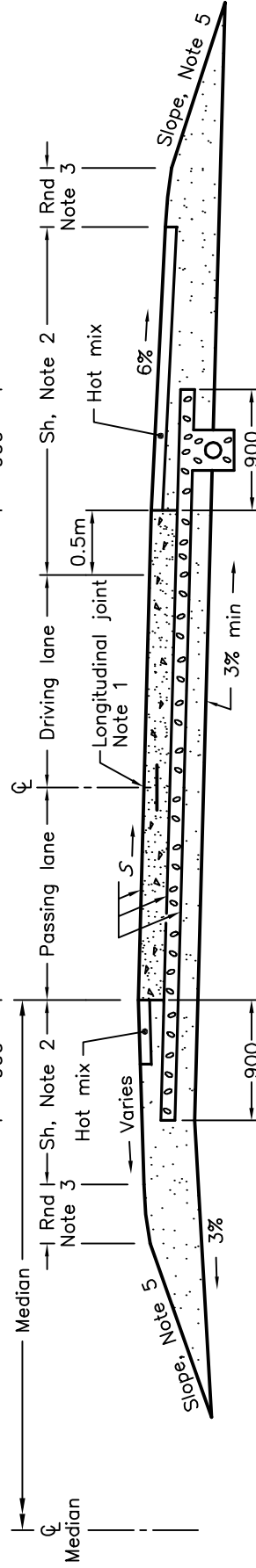
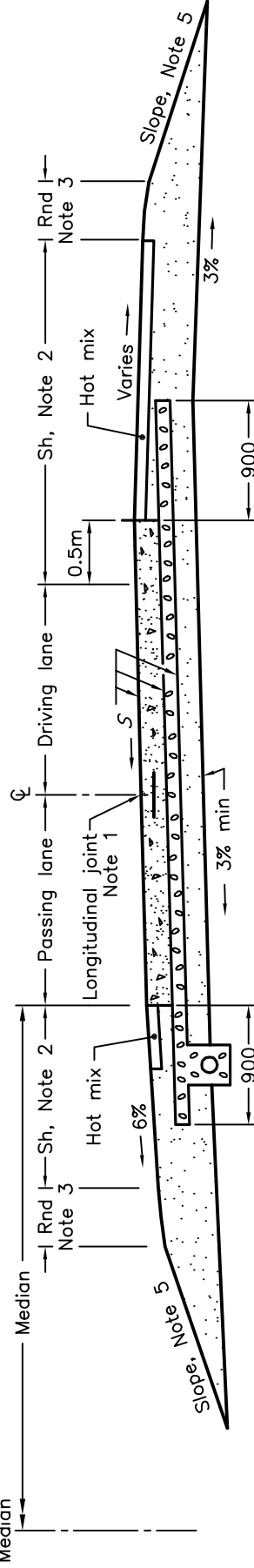
ROCK CUT TO EARTH CUT



OPSD 205.050



TANGENT SECTION



SUPERELEVATED SECTIONS

LEGEND:

S - rate of superelevation in %

Open graded drainage layer

Granular

Concrete pavement

NOTES:

1 For longitudinal joint details refer to OPSP 552.010.

2 Paved shoulder as specified.

3 Rounding shall be 0.5m or greater as specified.

4 For drainage system details refer to OPSP 207.041 and 207.044.

5 Slope shall be 4H:1V or flatter when specified.

A All dimensions are in millimetres unless otherwise shown.

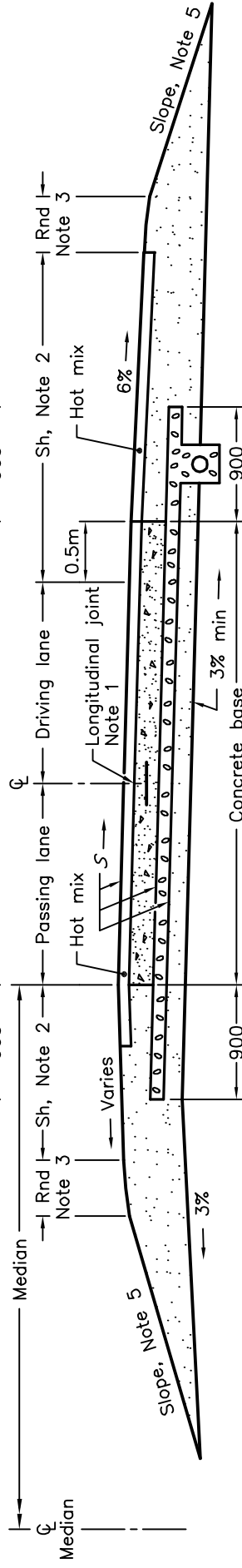
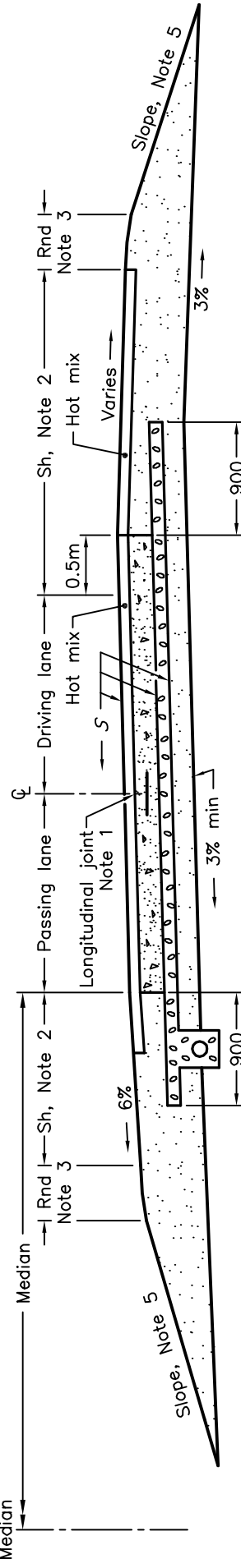
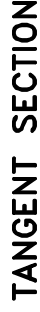
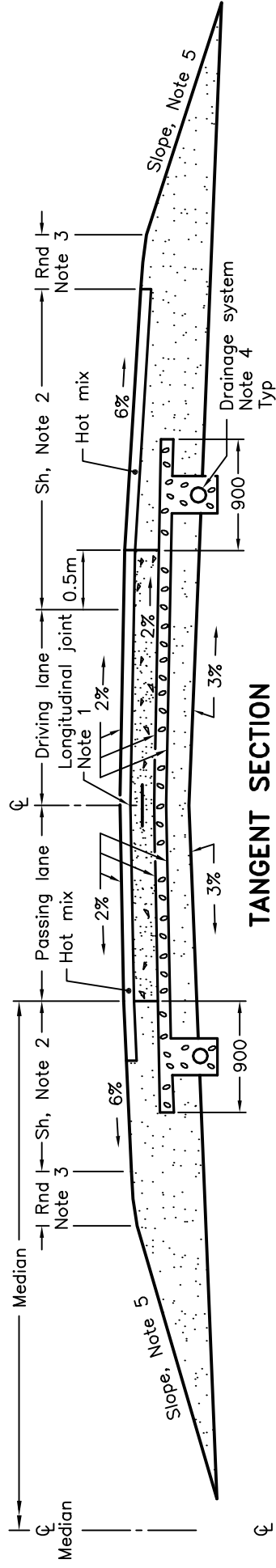
ONTARIO PROVINCIAL STANDARD DRAWING

CONCRETE PAVEMENT ON OPEN GRADED DRAINAGE LAYER DIVIDED HIGHWAY

Nov 2016 Rev 3



OPSD 207.010



SUPERELEVATED SECTIONS

LEGEND:

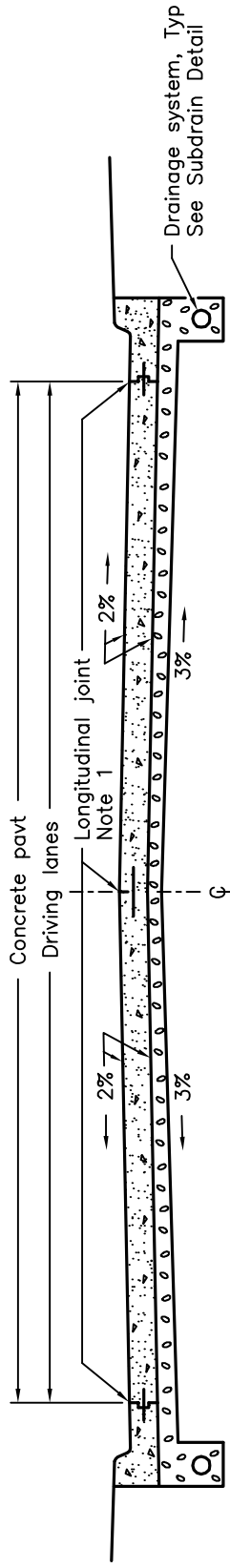
 S – rate of superelevation in %

- Open graded drainage layer
Granular
Concrete base

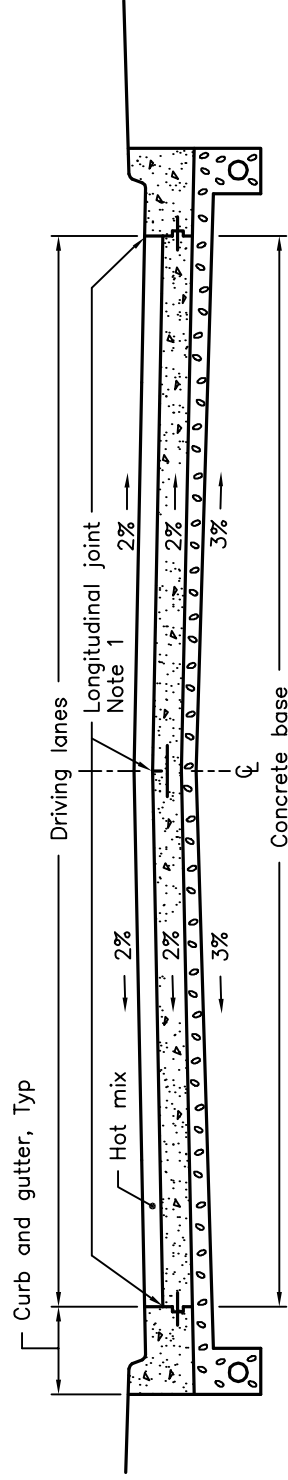
NOTES:

- 1 For longitudinal joint details refer to OPSD 552.020.
- 2 Paved shoulder as specified.
- 3 Rounding shall be 0.5m or greater as specified.
- 4 For drainage system details refer to OPSD 207.041 and 207.044.
- 5 Slope shall be 4H:1V or flatter when specified.

A All dimensions are in millimetres unless otherwise shown.



CONCRETE PAVEMENT



COMPOSITE PAVEMENT

LEGEND:

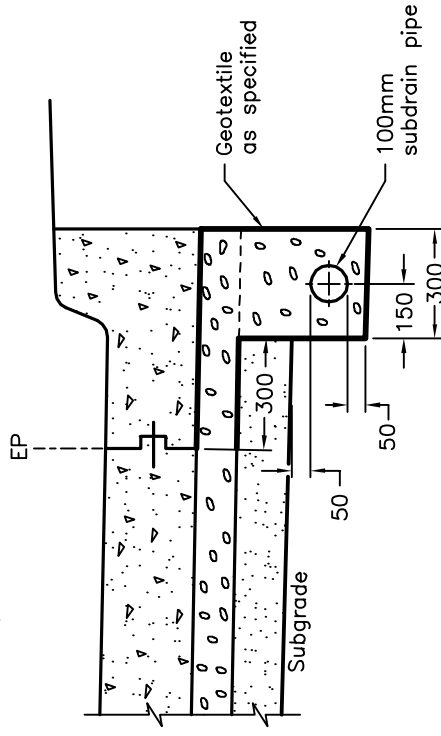
-  Granular
-  Open graded drainage layer

NOTES:

1 For longitudinal joint details refer to OPSD 552.010 and 552.020.

A Drainage system outlets at every catch basin per OPSD 207.044.

B All dimensions are in millimetres unless otherwise shown.



SUBDRAIN DETAIL

ONTARIO PROVINCIAL STANDARD DRAWING

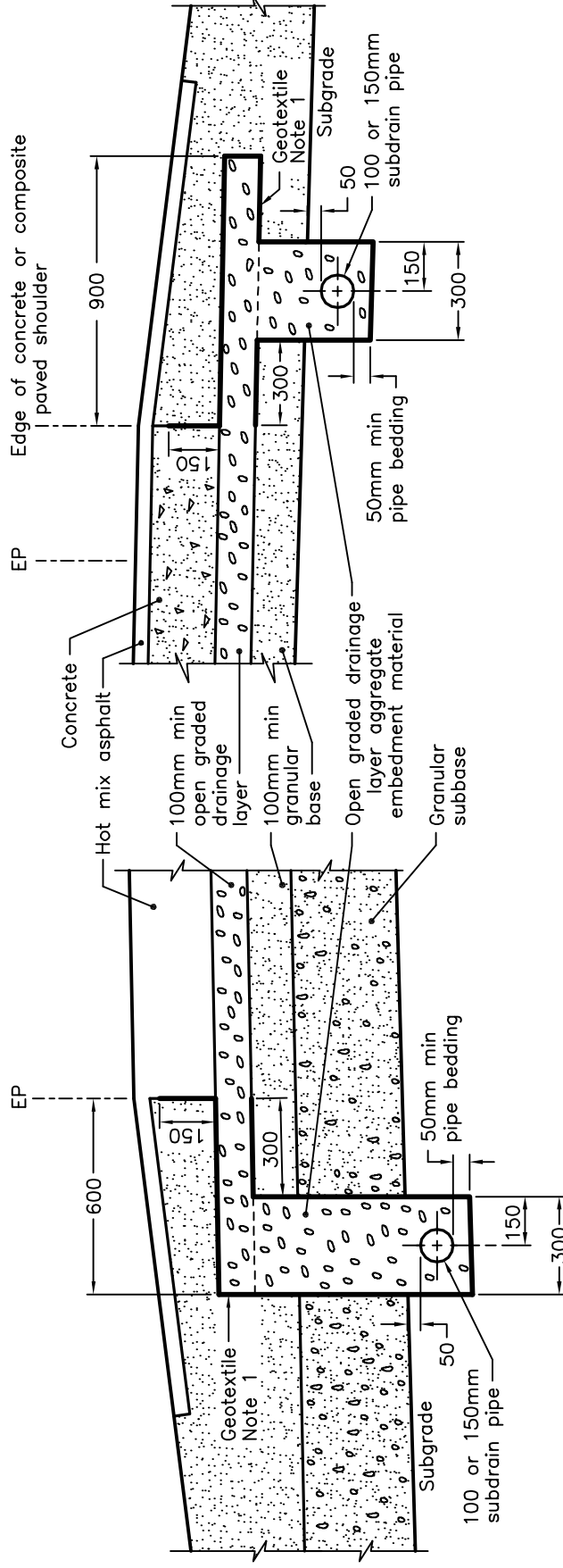
Nov 2016 Rev 2

CONCRETE AND COMPOSITE PAVEMENT ON OPEN GRADED DRAINAGE LAYER

URBAN SECTION

OPSD 207.030





HOT MIX ASPHALT PAVEMENT

EXPOSED CONCRETE OR COMPOSITE PAVEMENT

LEGEND:

-  Open graded drainage layer
-  Granular
-  Concrete pavement

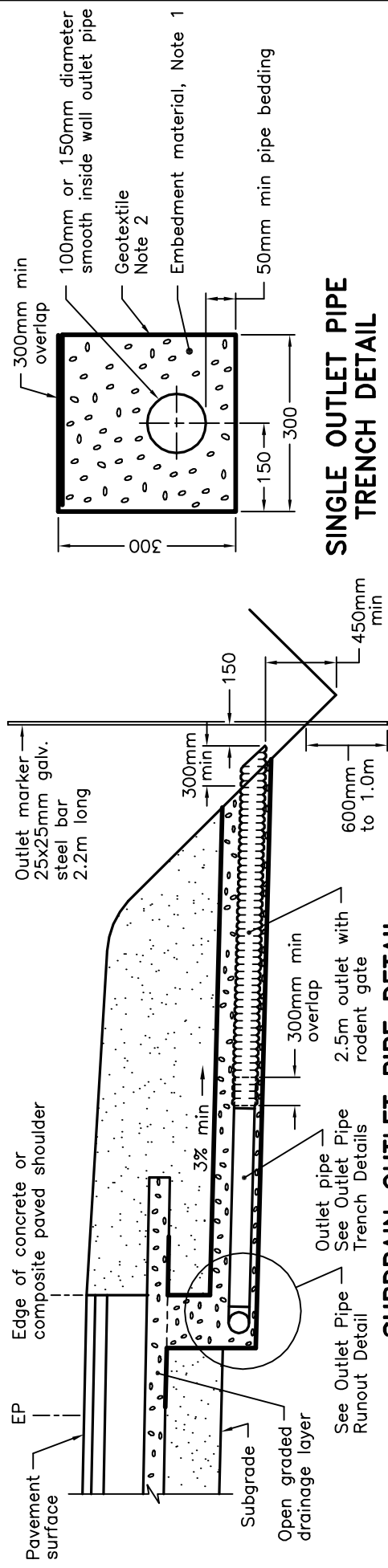
NOTES:

- 1 To prevent contamination of the trench embedment material, the 300mm geotextile flaps shall be fastened to securely enclose the subdrain trench until immediately prior to placing the open graded drainage layer, at which time the flaps shall be opened.

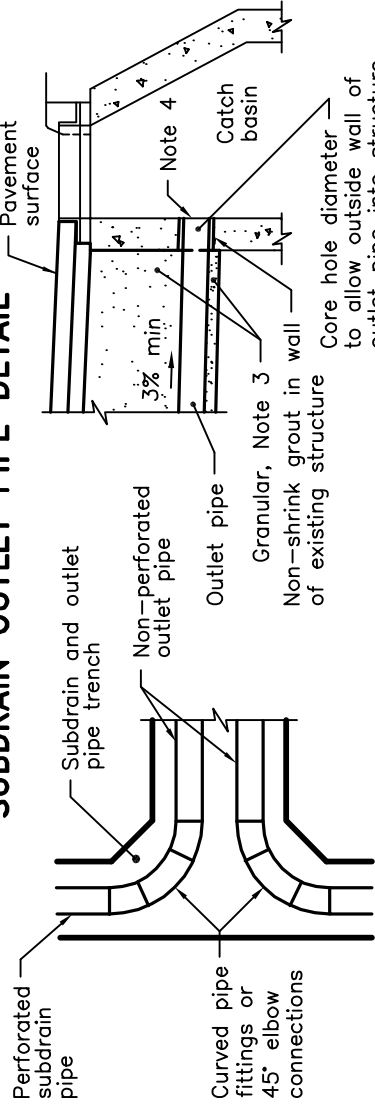
A This standard to be read in conjunction with OPSD 207.044.

B All dimensions are in millimetres unless otherwise shown.

		ONTARIO PROVINCIAL STANDARD DRAWING	
SUBDRAIN PIPE		Nov 2016	Rev 4
OPEN GRADED DRAINAGE LAYER		-----	
HOT MIX ASPHALT, CONCRETE, OR COMPOSITE PAVEMENT		-----	
OPSD 207.041		-----	



SUBDRAIN OUTLET PIPE DETAIL



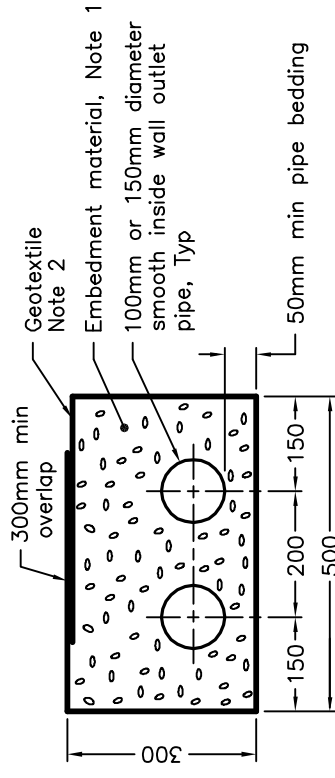
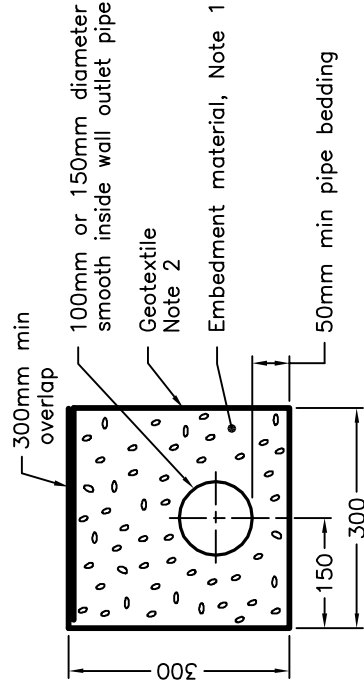
OUTLET PIPE RUNOUT DETAIL

NOTES:

- 1 Embedment material shall be open graded drainage layer aggregate.
- 2 Outlet pipe trench embedment material shall be wrapped with geotextile.
- 3 For catch basin connections, outlet pipe trenches backfilled with granular do not require geotextile wrap.
- 4 Install outlet pipe flush with inside face of catch basin.

- A This standard to be read in conjunction with OPSD 207.041.
- B Use compatible manufactured fittings for all connectors and couplings.
- C All dimensions are in millimetres unless otherwise shown.

SINGLE OUTLET PIPE TRENCH DETAIL



DUAL OUTLET PIPE TRENCH DETAIL

LEGEND:

- Open graded drainage layer
- Granular
- Concrete pavement

ONTARIO PROVINCIAL STANDARD DRAWING

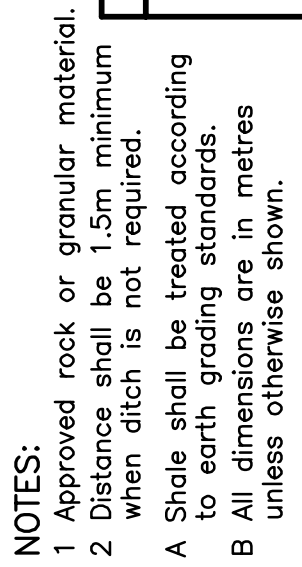
SUBDRAIN PIPE CONNECTION AND OUTLET OPEN GRADED DRAINAGE LAYER

Nov 2016

Rev 5



OPSD 207.044

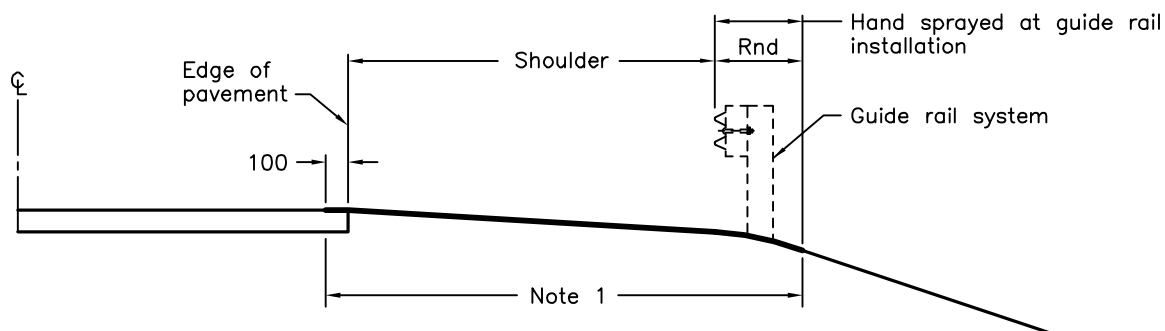


- 1 Approved rock or granular material.
- 2 Distance shall be 1.5m minimum when ditch is not required.

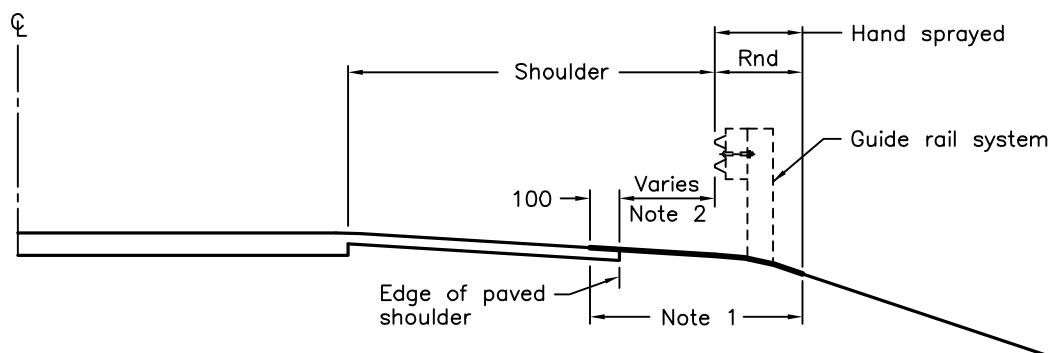
B All dimensions are in metres unless otherwise shown.

EXISTING ROCK CUT WITH GRADE RAISE

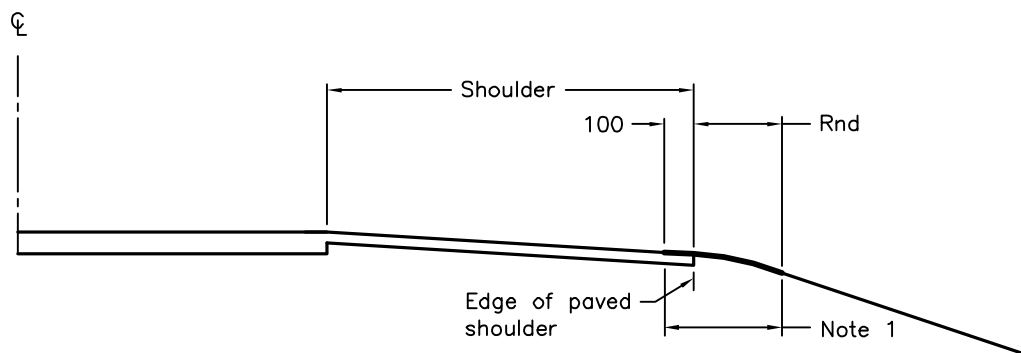




GRANULAR SHOULDER WITH OR WITHOUT GUIDE RAIL



PAVED SHOULDER WITH GUIDE RAIL



PAVED SHOULDER WITHOUT GUIDE RAIL

NOTES:

- 1 Extent of granular sealer.
 - 2 When the width of granular shoulder in front of the guide rail is 300mm or less, granular sealer may be applied by hand spraying for the full width of this application.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2016

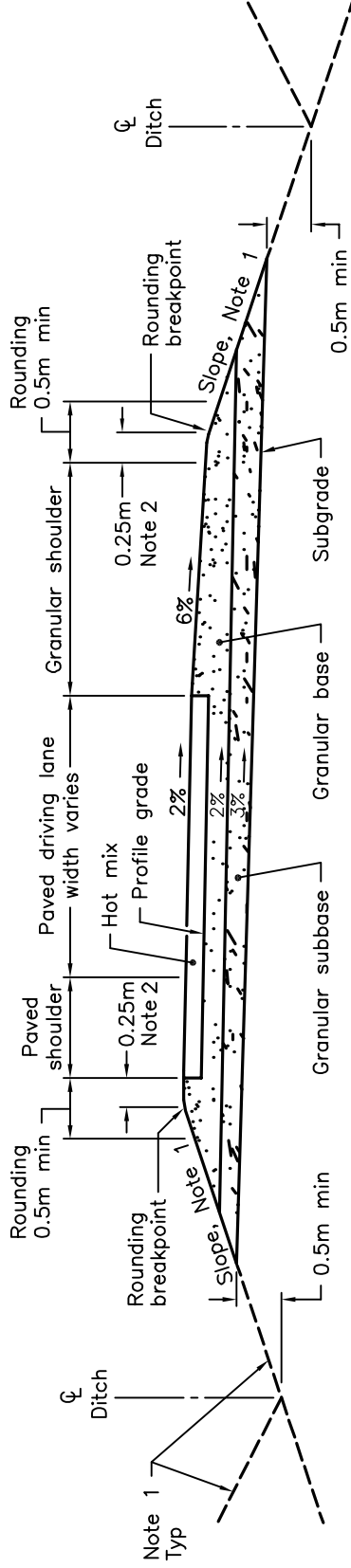
Rev

4

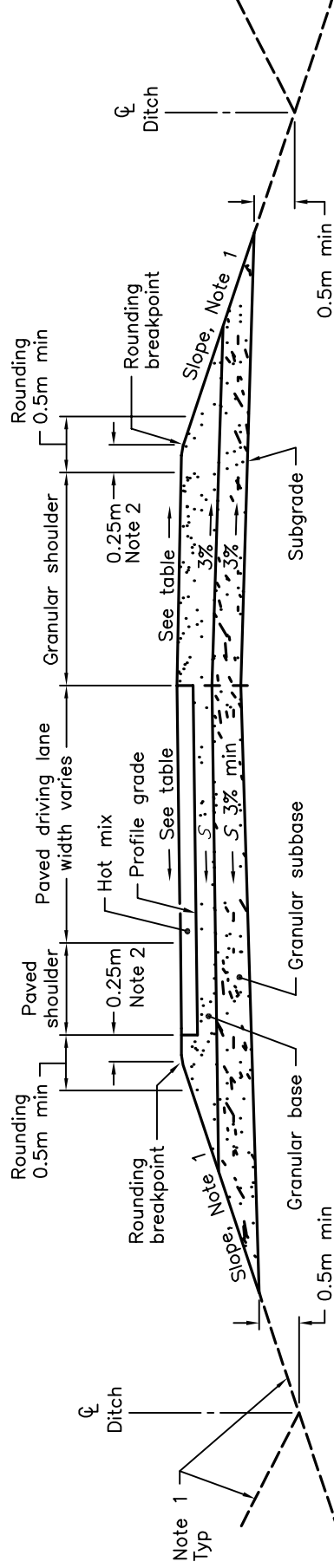
GRANULAR SEALING



OPSD 210.070



TANGENT SECTION



SUPERELEVATED SECTION

LEGEND:

S – rate of superelevation in %

NOTES:

- 1 Fill and cut slopes shall be 3H:1V or flatter when specified.
 - 2 Where steel beam guide rail is specified, the minimum rounding shall be 1.0m, with 0.5m specified from edge of shoulder to rounding breakpoint.
- A All dimensions are in metres unless otherwise shown.

TABLE
FOR SUPERELEVATED SECTION

CROSS FALL %										
Paved driving lane	+6	+5	+4	+3	+2	+1	0	-1	-2	-3
Granular shoulder	-2	-2	-2	-3	-3	-3	-4	-5	-6	-6

ONTARIO PROVINCIAL STANDARD DRAWING

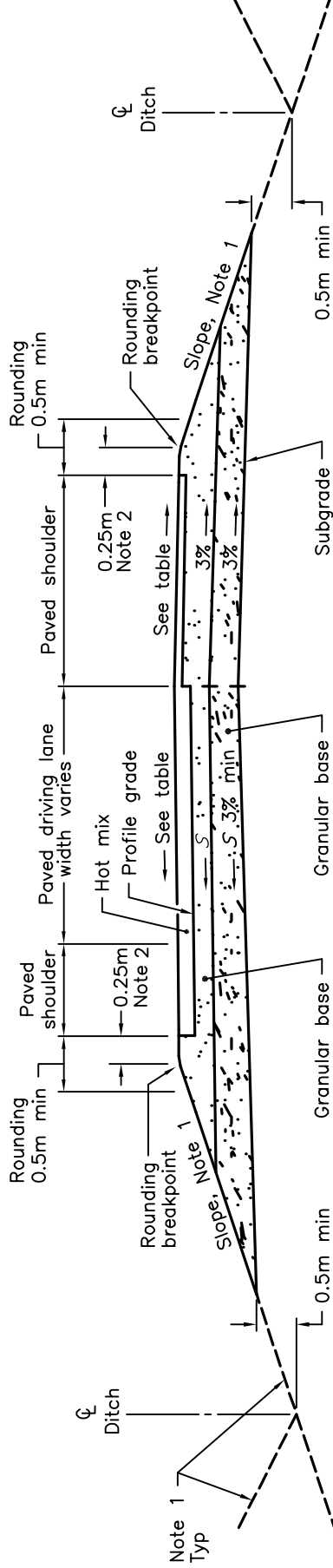
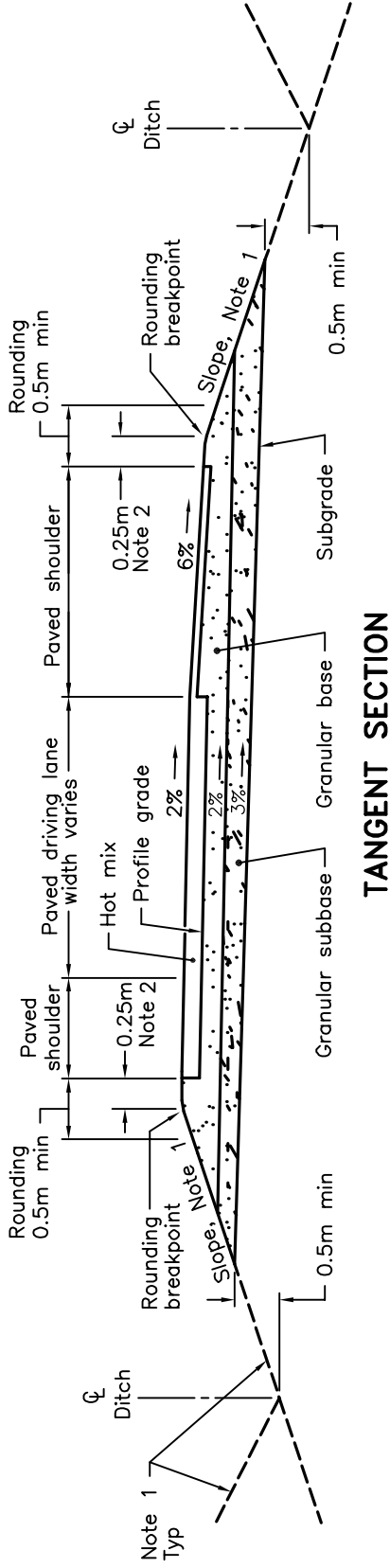
SINGLE LANE RAMP GRADING
FOR ASPHALT PAVEMENT WITH
GRANULAR BASE AND SHOULDER

Nov 2016

Rev 2



OPSD 214.010



LEGEND:

S – rate of superelevation in %

NOTES:

- 1 Fill and cut slopes shall be 3H:1V or flatter when specified.
- 2 Where steel beam guide rail is specified, the minimum rounding shall be 1.0m, with 0.5m specified from edge of paved shoulder to rounding breakpoint.

A All dimensions are in metres unless otherwise shown.

**TABLE
FOR SUPERELEVATED SECTION**

CROSS FALL %										
Paved driving lane	+6	+5	+4	+3	+2	+1	0	-1	-2	-3
Paved shoulder	-2	-2	-2	-3	-3	-3	-4	-5	-6	-6

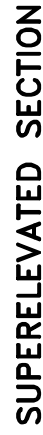
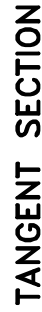
ONTARIO PROVINCIAL STANDARD DRAWING

**SINGLE LANE RAMP GRADING
FOR ASPHALT PAVEMENT WITH
GRANULAR BASE AND ASPHALT SHOULDER**

Nov 2016 Rev 2



OPSD 214.020



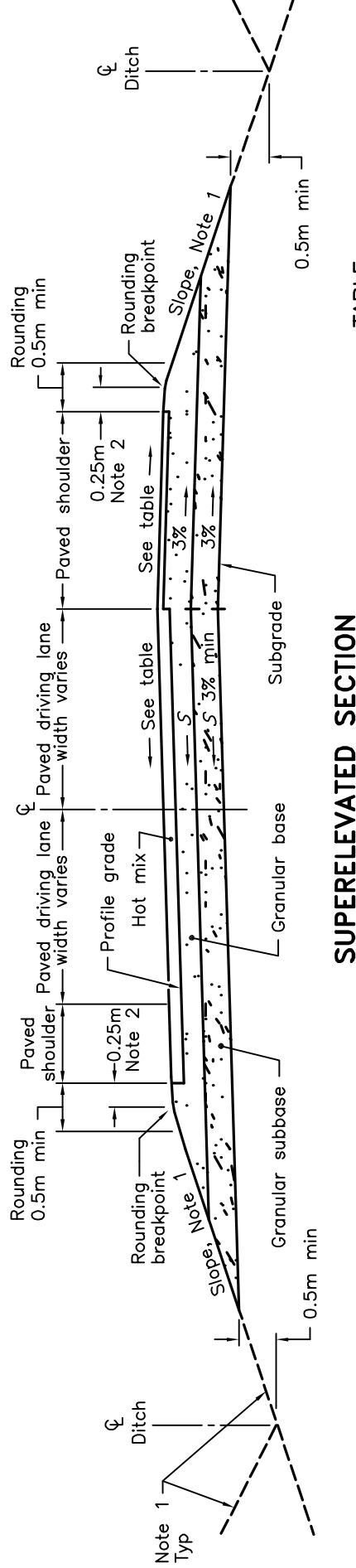
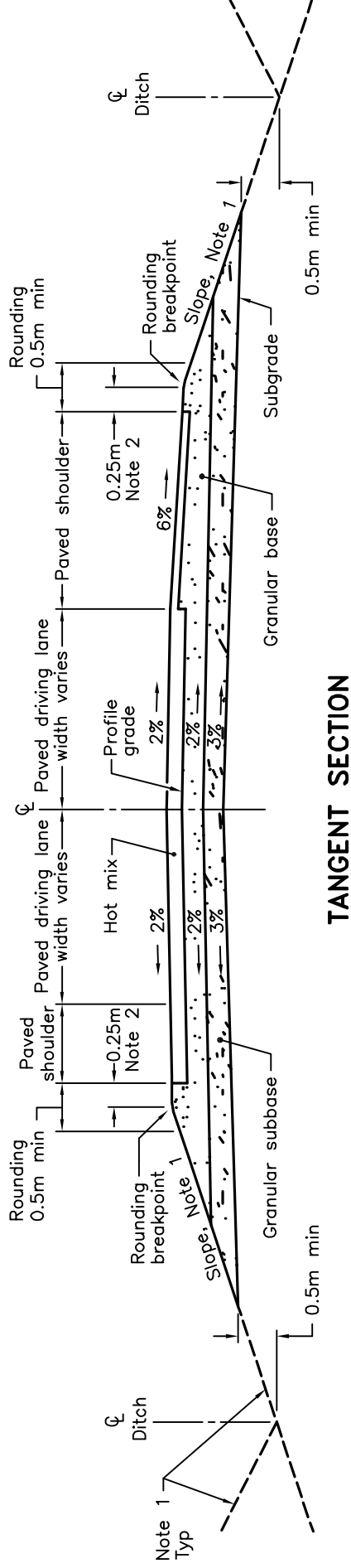


TABLE
FOR SUPERELEVATED SECTION

CROSS FALL %										
Paved driving lane	+6	+5	+4	+3	+2	+1	0	-1	-2	-3
Paved shoulder	-2	-2	-2	-3	-3	-3	-4	-5	-6	-6

- LEGEND:**
 S – rate of superelevation in %
- NOTES:**
- 1 Fill and cut slopes shall be 3H:1V or flatter when specified.
 - 2 Where steel beam guide rail is specified, the minimum rounding shall be 1.0m, with 0.5m specified from edge of shoulder to rounding breakpoint.
- A All dimensions are in metres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

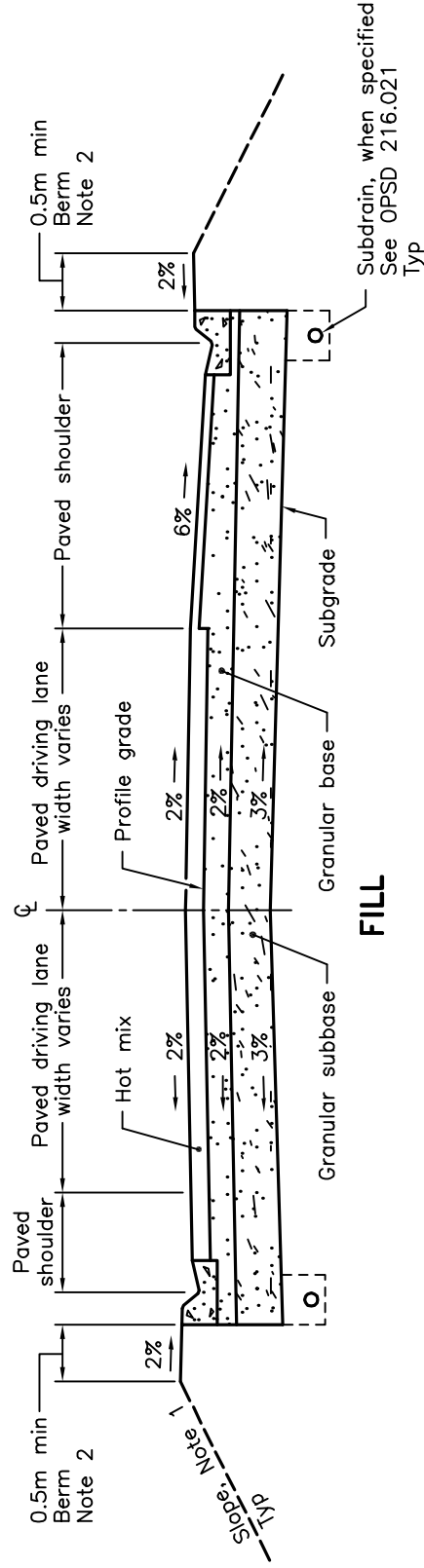
**TWO LANE RAMP GRADING
FOR ASPHALT PAVEMENT WITH
GRANULAR BASE AND ASPHALT SHOULDER**

Nov 2016

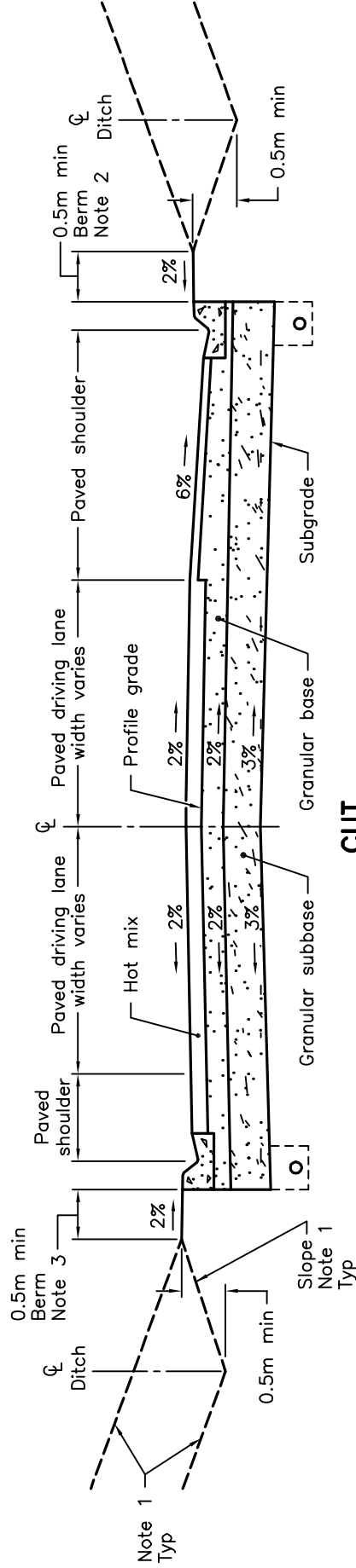
Rev 2



OPSD 215.010



FILL



CUT

NOTES:

- 1 Fill and cut slopes shall be 3H:1V or flatter when specified.
- 2 Where steel beam guide rail is specified, width of berm shall be 1.0m, with the face of guide rail installed 100mm beyond the gutter line.

A All dimensions are in metres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

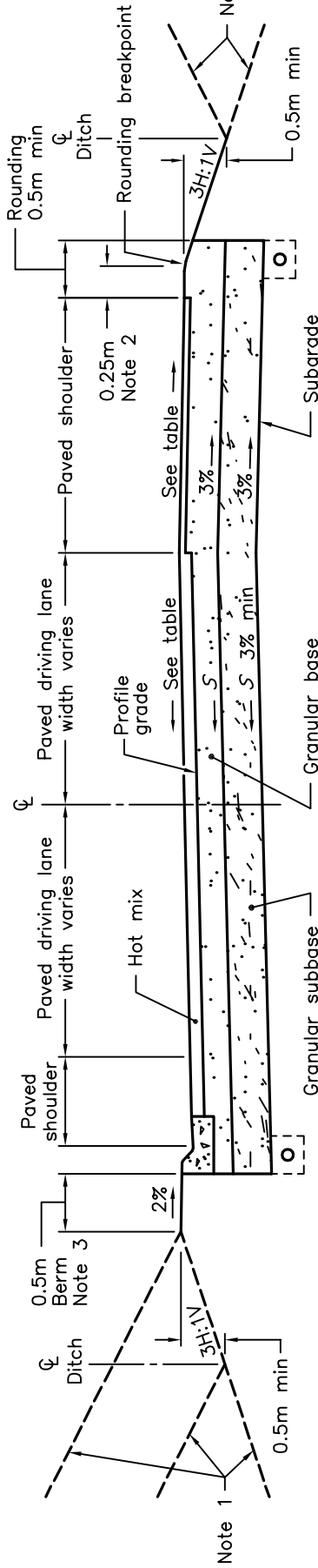
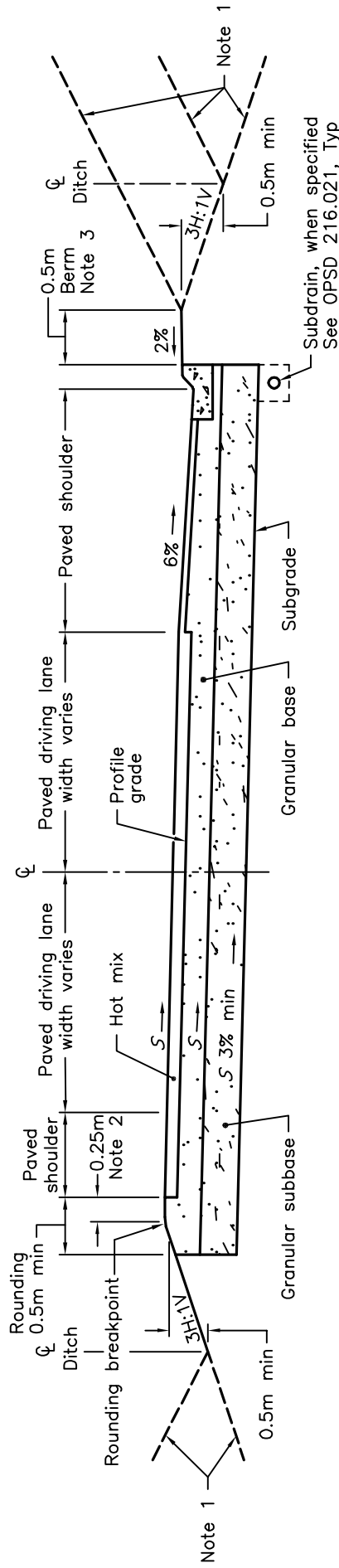
**TWO LANE RAMP GRADING
FOR ASPHALT PAVEMENT WITH GRANULAR BASE,
ASPHALT SHOULDER, AND CURB WITH GUTTER
FOR TANGENT SECTION**

Nov 2016

Rev 2



OPSD 215.020



LEGEND:

S – rate of superelevation in %

NOTES:

- 1 Fill and cut slopes shall be 3H:1V or flatter when specified.
- 2 Where steel beam guide rail is specified, the minimum rounding shall be 1.0m, with 0.5m specified from edge of paved shoulder to rounding breakpoint.
- 3 Where steel beam guide rail is specified, width of berm shall be 1.0m.
- A All dimensions are in metres unless otherwise shown.

TABLE
FOR SUPERELEVATED SECTION

CROSS FALL %										
Paved driving lane	+6	+5	+4	+3	+2	+1	0	-1	-2	-3
Paved shoulder	-2	-2	-2	-3	-3	-3	-4	-5	-6	-6

ONTARIO PROVINCIAL STANDARD DRAWING

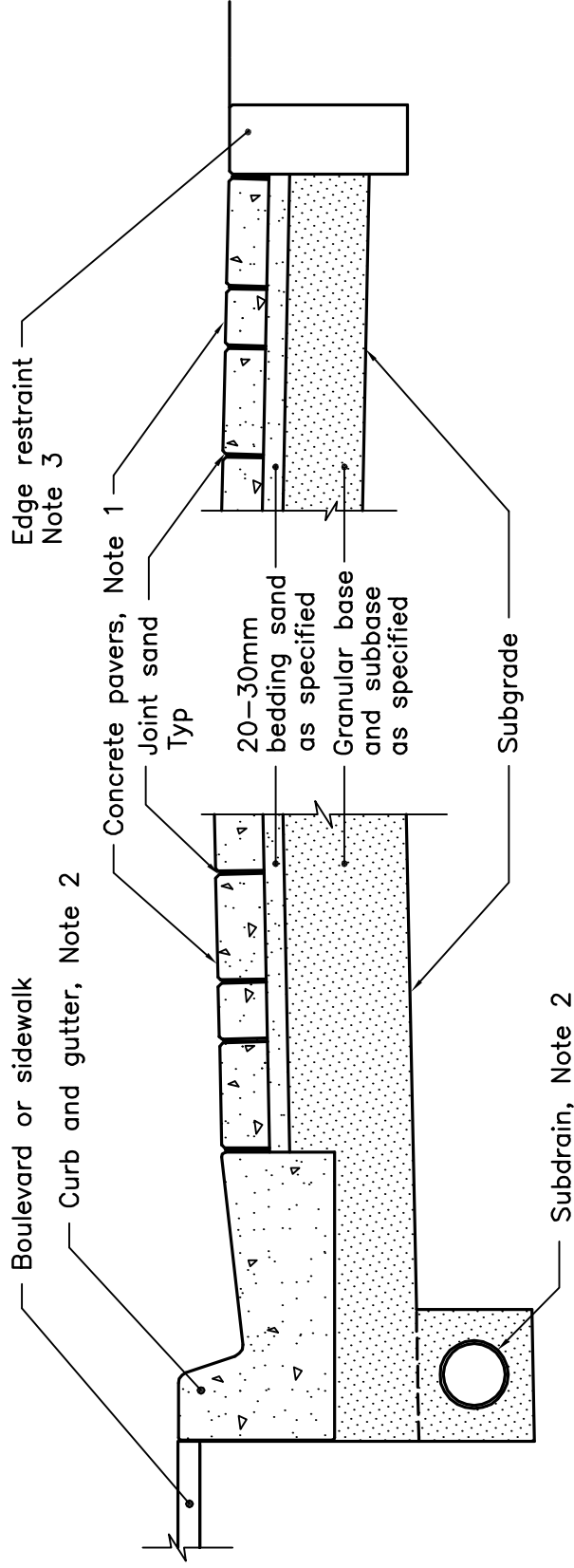
**TWO LANE RAMP GRADING
FOR ASPHALT PAVEMENT WITH GRANULAR BASE,
ASPHALT SHOULDER, AND CURB WITH GUTTER
FOR SUPERELEVATED SECTION**

Nov 2016

Rev 3



OPSD 215.030



VEHICULAR

NON-VEHICULAR

NOTES:

- 1 Concrete paver thickness:
 - for vehicular traffic – 80mm minimum.
 - for non-vehicular traffic – 60mm minimum.
- 2 This OPSD shall be read in conjunction with OPSD 200 and 600 series drawings.
- 3 Edge restraint according to manufacturer's requirements.
- A All dimensions are in millimetres unless otherwise shown.

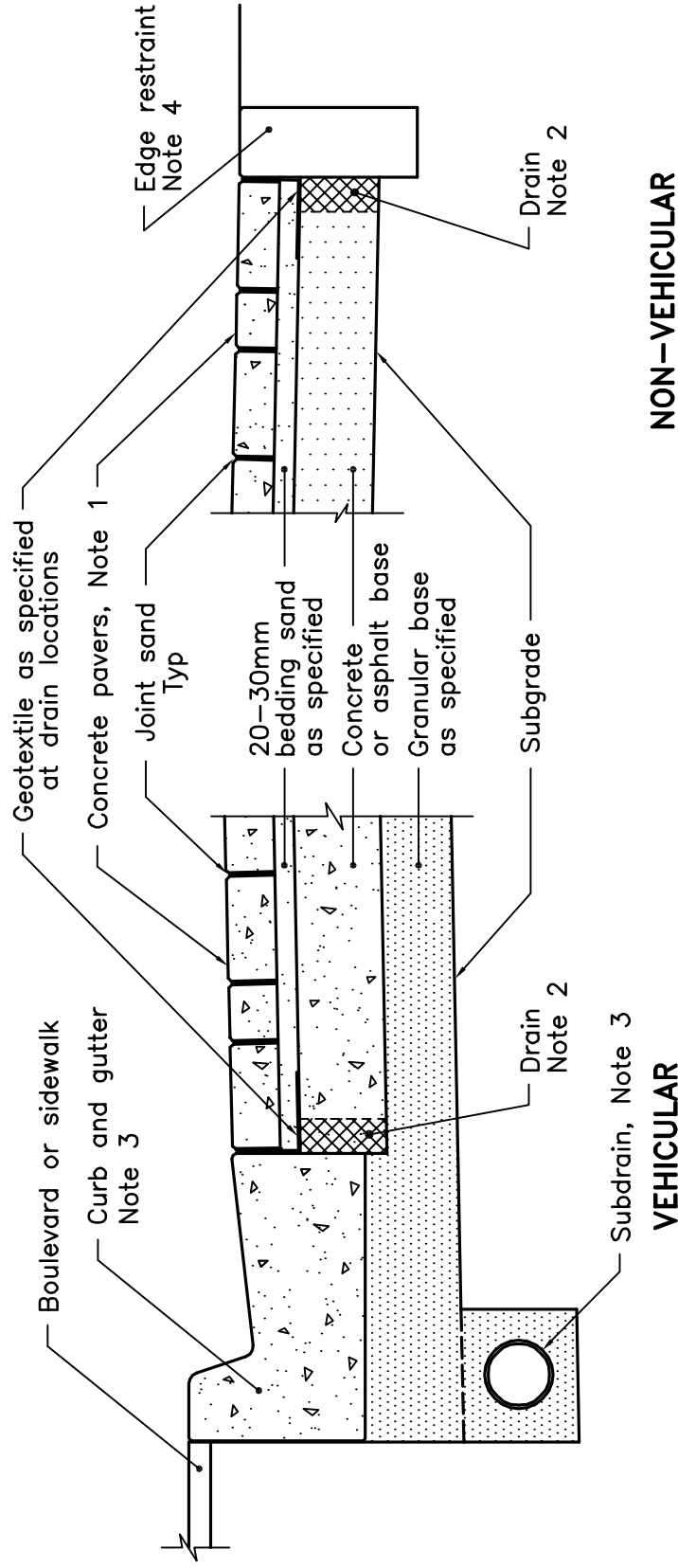
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2016 Rev 2



INTERLOCKING CONCRETE PAVERS ON GRANULAR BASE

OPSD 561.010



NOTES:

- 1 Concrete paver thickness:
 - for vehicular traffic – 80mm minimum.
 - for non-vehicular traffic – 60mm minimum.
 - 2 Drains shall be installed at low points and selected intervals through concrete or asphalt base to suit subgrade conditions.
 - 3 This OPSD shall be read in conjunction with OPSD 200 and 600 Series drawings.
 - 4 Edge restraint according to manufacturer's requirements.
- A All dimensions are in millimetres unless otherwise shown.

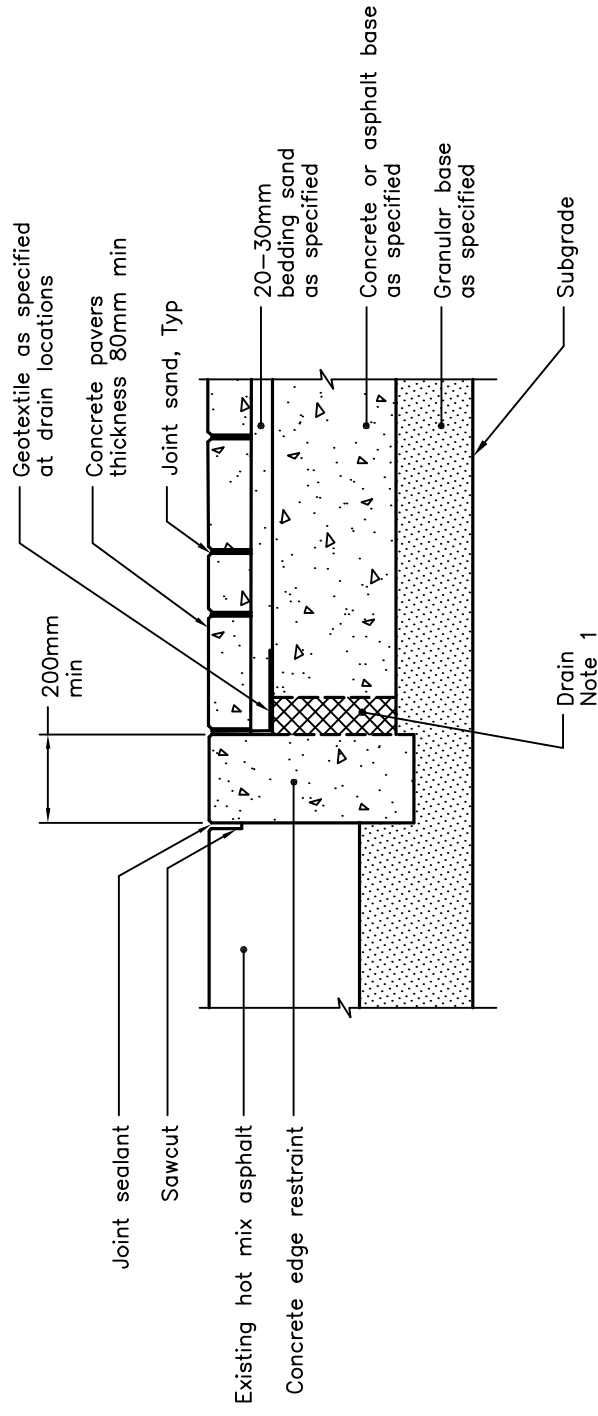
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2016 Rev 2



INTERLOCKING CONCRETE PAVERS ON CONCRETE OR ASPHALT BASE

OPSD 561.020



NOTES:

- 1 Drains shall be installed at low points and selected intervals through concrete or asphalt base to suit subgrade conditions.
- A All dimensions are in millimetres unless otherwise shown.

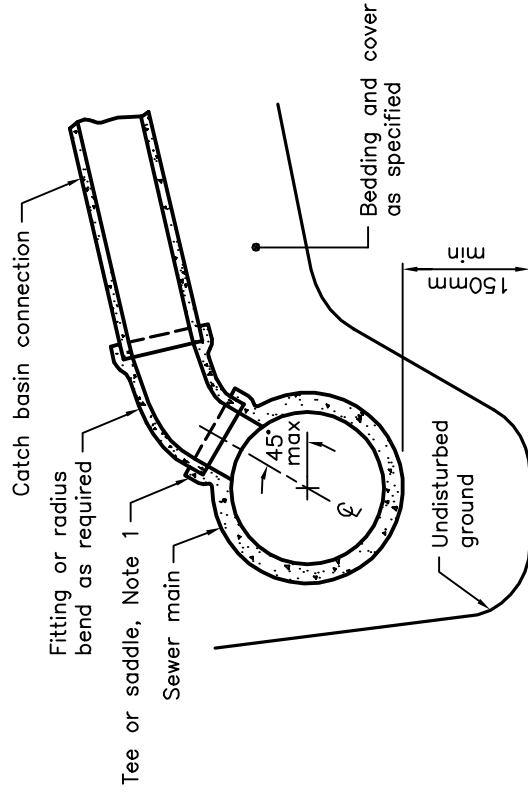
ONTARIO PROVINCIAL STANDARD DRAWING

INTERLOCKING CONCRETE PAVERS FOR RETROFIT CROSSWALK INSTALLATION

Nov 2016 Rev 2



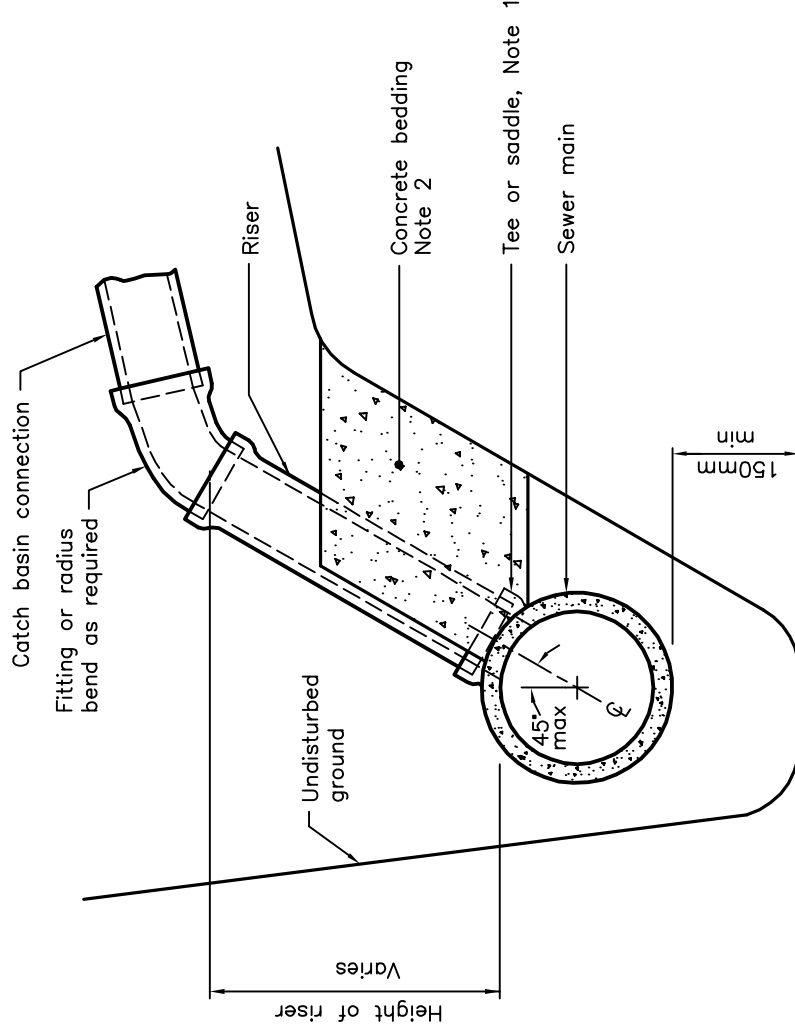
OPSD 561.030



CONNECTION WITHOUT RISER

NOTES:

- 1 For sewers smaller than 450mm dia, connections shall be made using approved factory made tees. For all other sizes, either factory made tees or approved saddles may be used.
- 2 Riser bedding shall have a minimum width of riser pipe outside diameter plus 600mm.
- A Approved cut-in tool shall be used for field installed tees and saddles.
- B Maintenance holes shall be used at the main sewer to connect catch basin connections greater than 300mm.
- C All dimensions are in millimetres unless otherwise shown.



CONNECTION WITH RISER

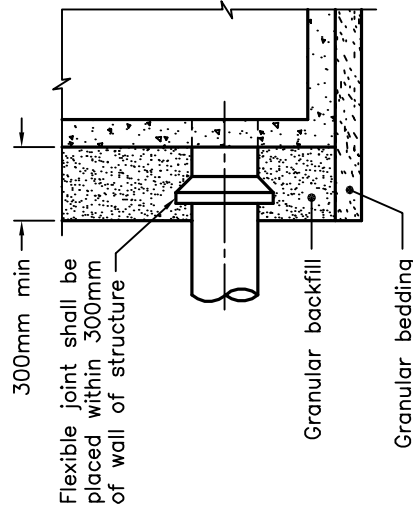
ONTARIO PROVINCIAL STANDARD DRAWING

CATCH BASIN CONNECTION FOR RIGID MAIN PIPE SEWER

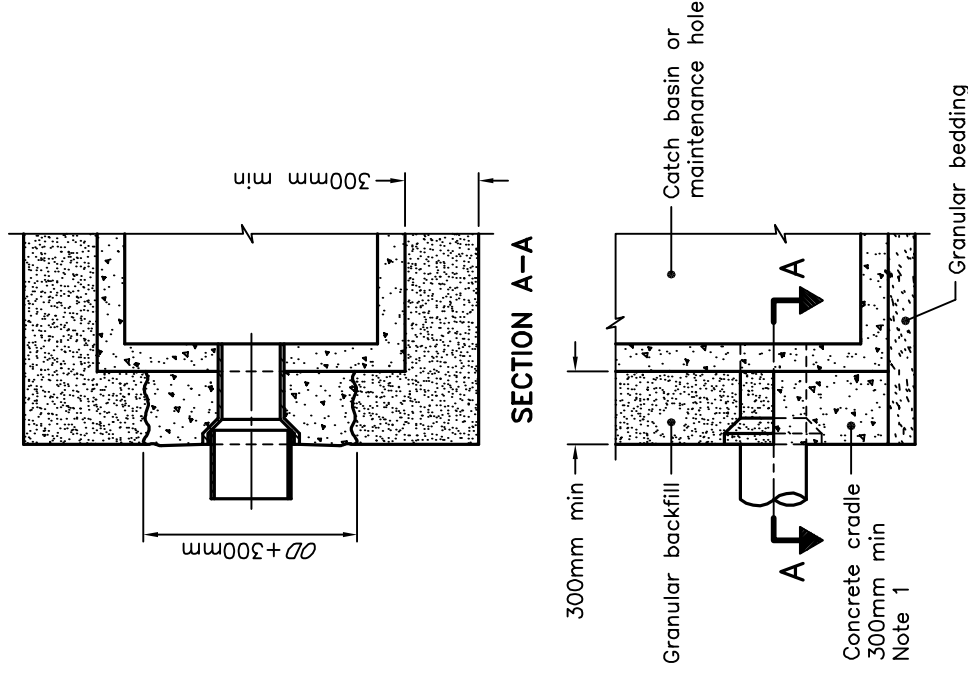
Nov 2016 Rev 3



OPSD 708.010



ELEVATION
FLEXIBLE JOINT
RIGID AND FLEXIBLE PIPE



ELEVATION
CONCRETE CRADLE
RIGID PIPE

For installation of these connectors refer to manufacturer's instructions.
 A full length of pipe may be used in conjunction with a flexible watertight connector.

NOTES:

- 1 Pipe shall be supported with concrete or unshrinkable fill to the first pipe joint.
- A All dimensions are in millimetres unless otherwise shown.

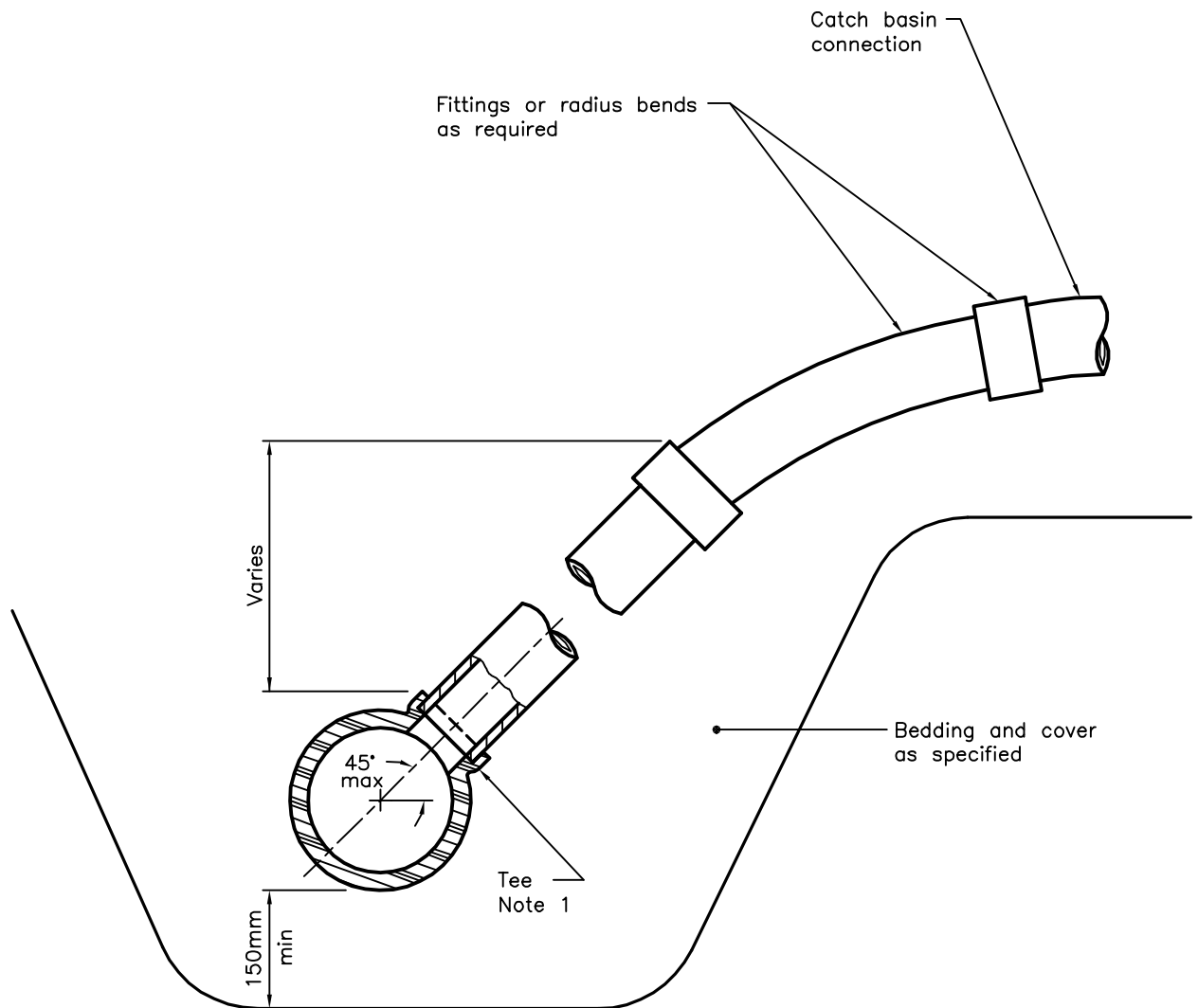
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2016 Rev 4



**SUPPORT FOR PIPE
 AT CATCH BASIN
 OR MAINTENANCE HOLE**

OPSD 708.020



NOTES:

1 For catch basin connections 300mm in diameter or less, factory made tees shall be used.

A For catch basin connections greater than 300mm in diameter, maintenance holes shall be used at the main sewer.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

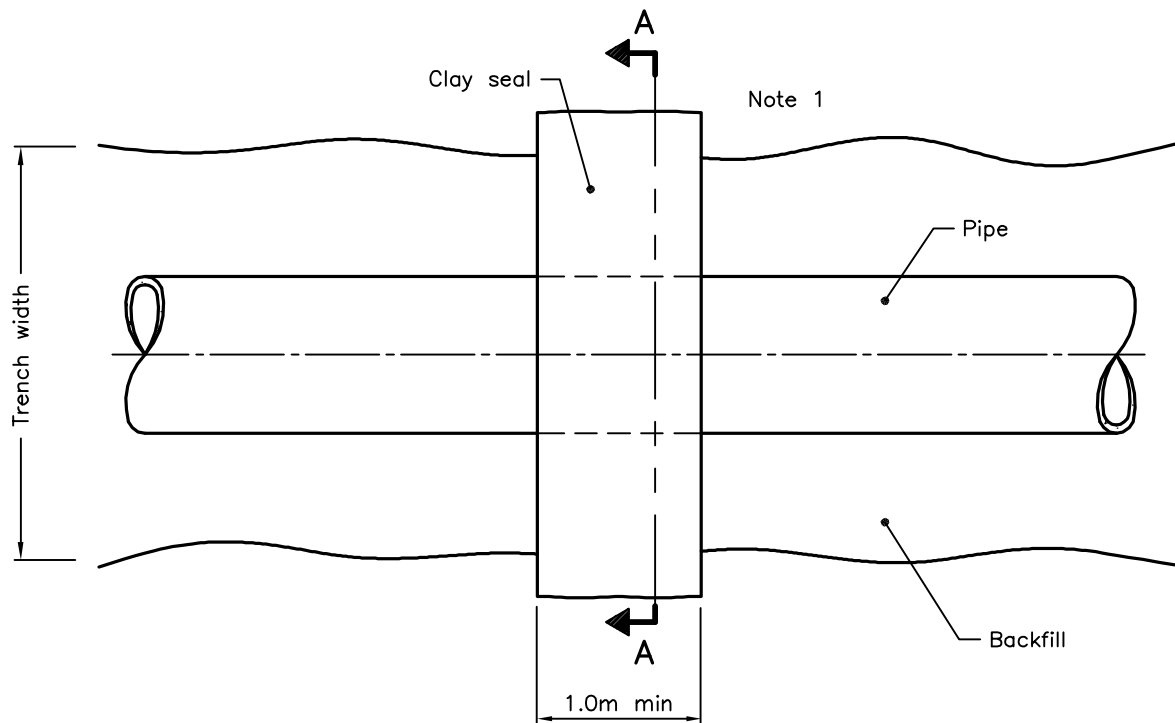
Nov 2016

Rev 3

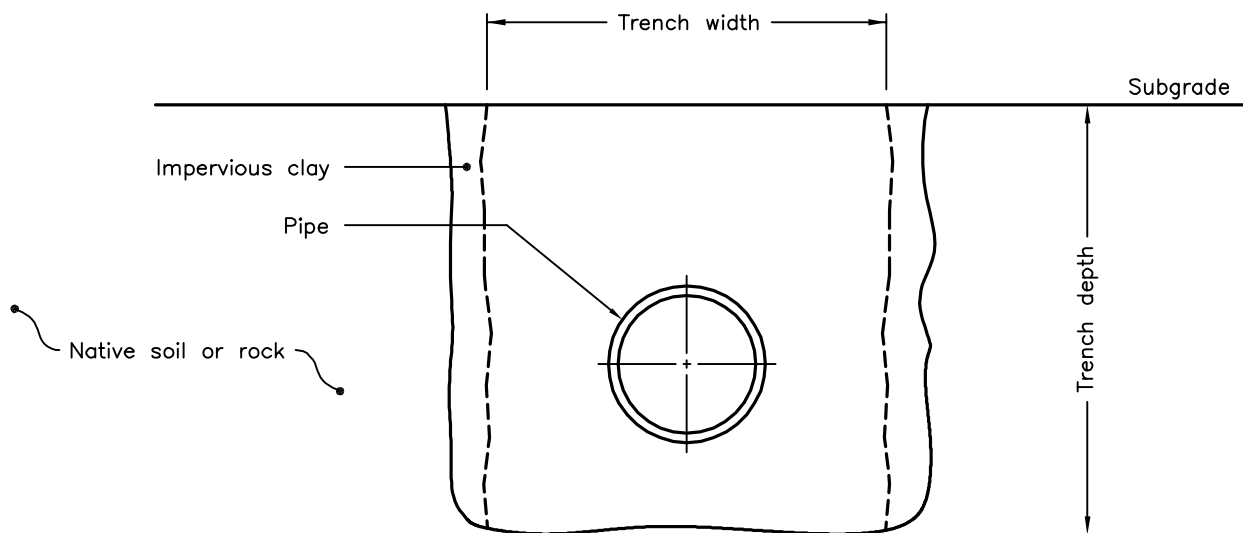
CATCH BASIN CONNECTION FOR FLEXIBLE MAIN PIPE SEWER

OPSD 708.030





PLAN



SECTION A-A

NOTES:

1. Key into undisturbed trench soil.

A Clay seal shall extend from bottom of trench excavation to the subgrade.

B Clay seal shall be located so that no pipe joints are within the clay seal material.

C All dimensions are in metres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

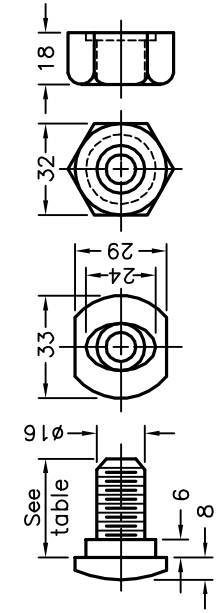
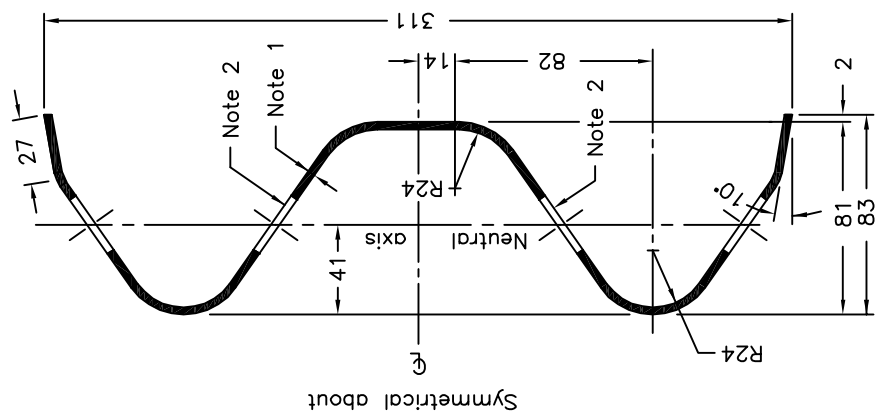
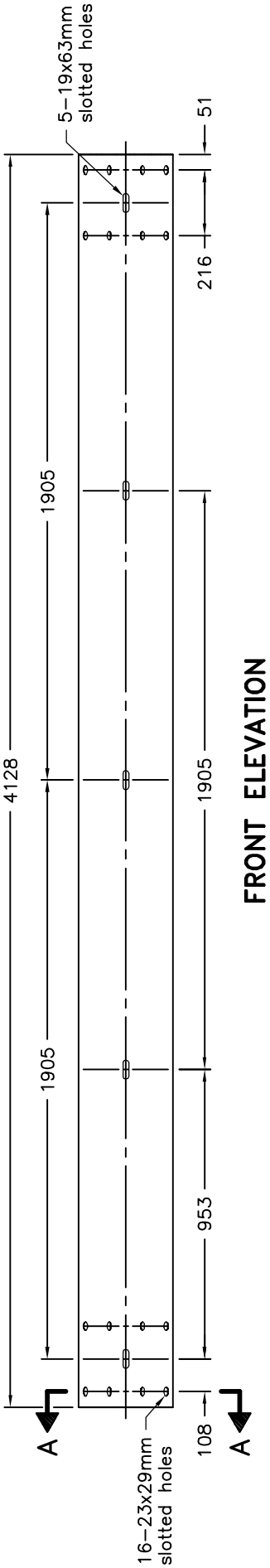
Nov 2016

Rev 2

CLAY SEAL FOR PIPE TRENCHES

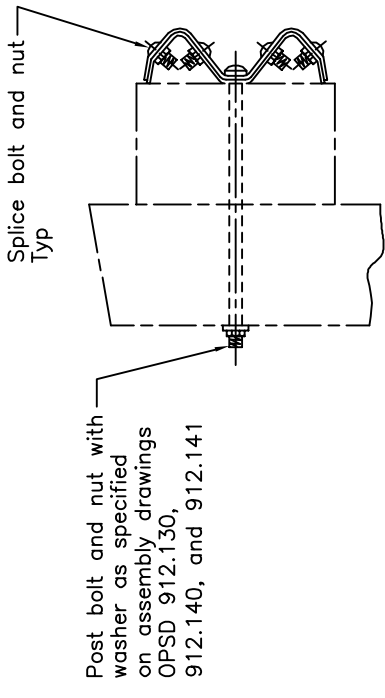
OPSD 802.095





SPLICE BOLT LENGTH	LOCATION	LENGTH
At posts	32	
At structure anchor	38	

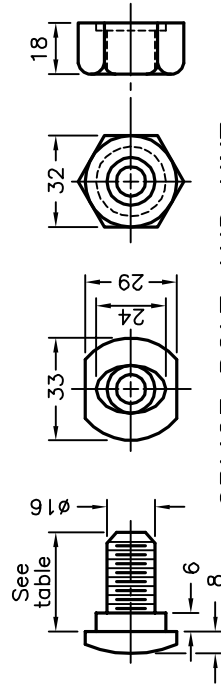
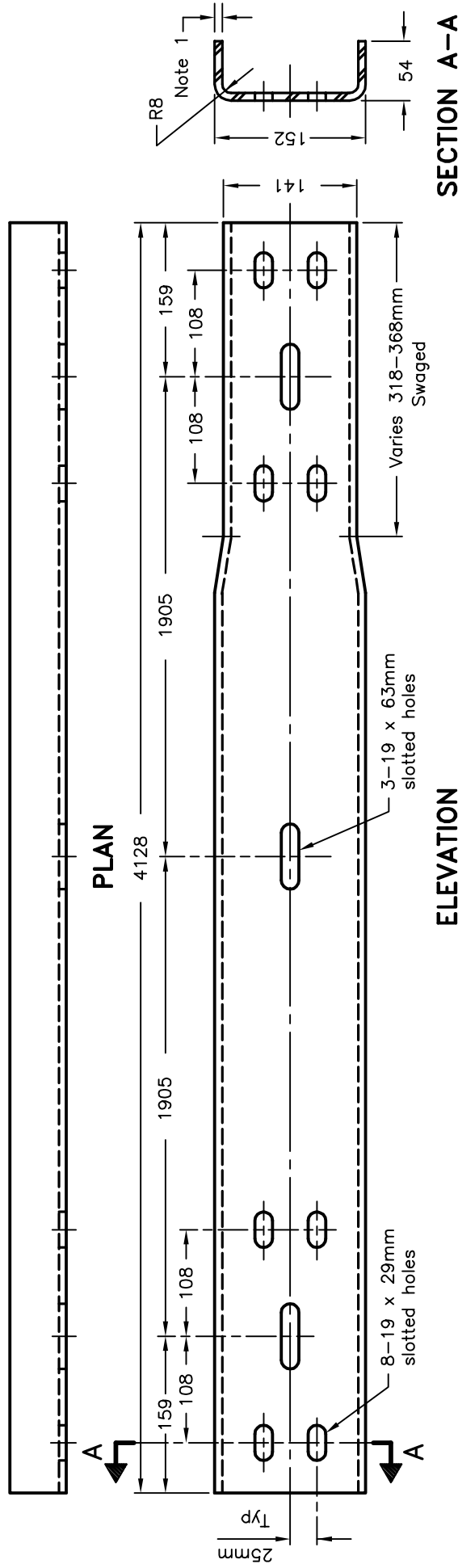
ARRANGEMENT AT POST
WOODEN POST SHOWN



NOTES:

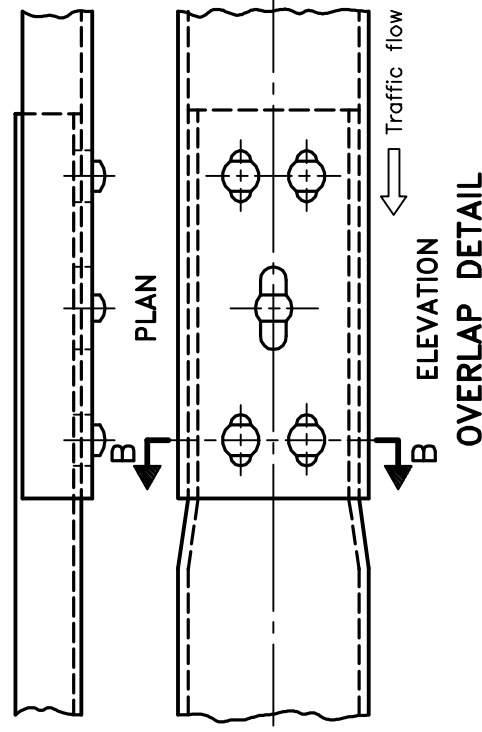
- 1 Base metal thickness of rail shall be 2.67mm nominal and 2.44mm minimum.
- 2 Holes only in rail.
- A All dimensions subject to manufacturing tolerances unless otherwise indicated.
- B All dimensions are in millimetres unless otherwise shown.

		Nov 2016	Rev 3
ONTARIO PROVINCIAL STANDARD DRAWING			
GUIDE RAIL SYSTEM, STEEL BEAM RAIL COMPONENT			
OPSD 912.101			



SPLICE BOLT AND NUT

SPLICE BOLT LENGTH	
LOCATION	LENGTH
At posts	32
At structures	64



NOTES:

- Base metal thickness of channel shall be 4.0mm nominal and 3.8mm minimum.
- All dimensions are in millimetres unless otherwise shown.

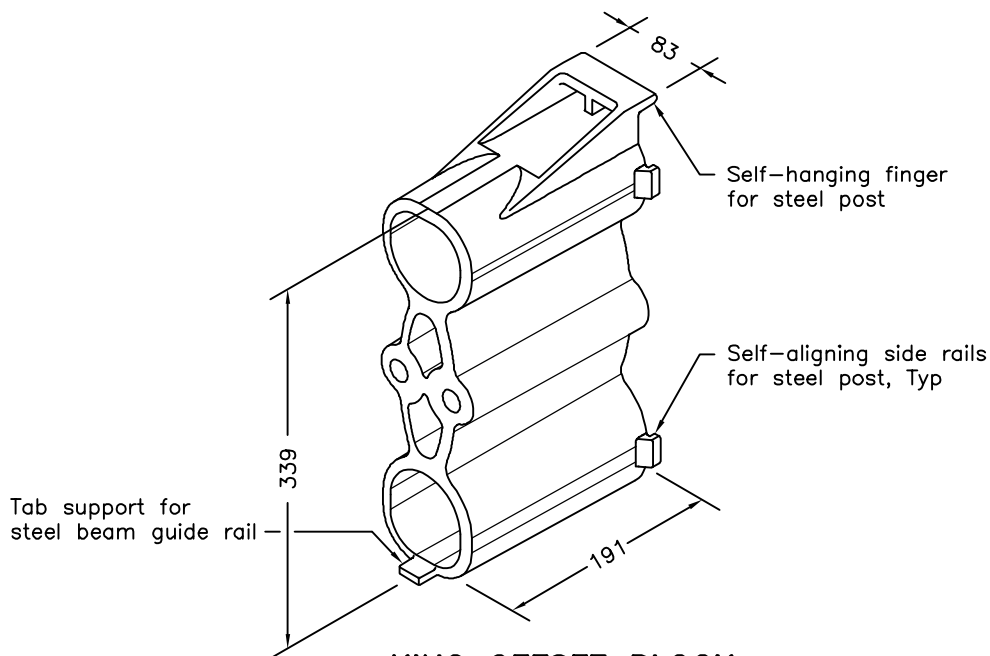
ONTARIO PROVINCIAL STANDARD DRAWING

GUIDE RAIL SYSTEM, STEEL BEAM
CHANNEL
COMPONENT

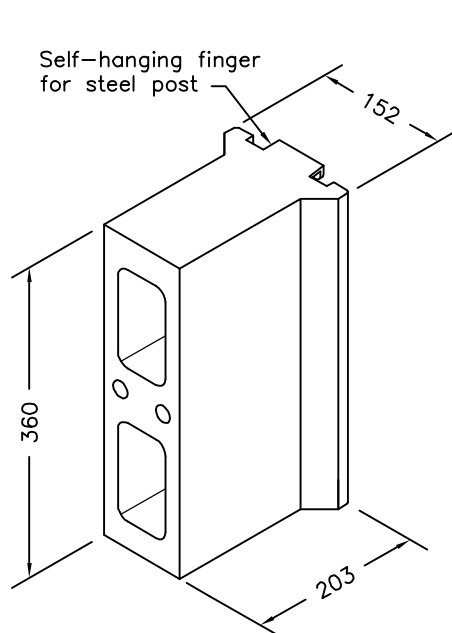
Nov 2016 Rev 2



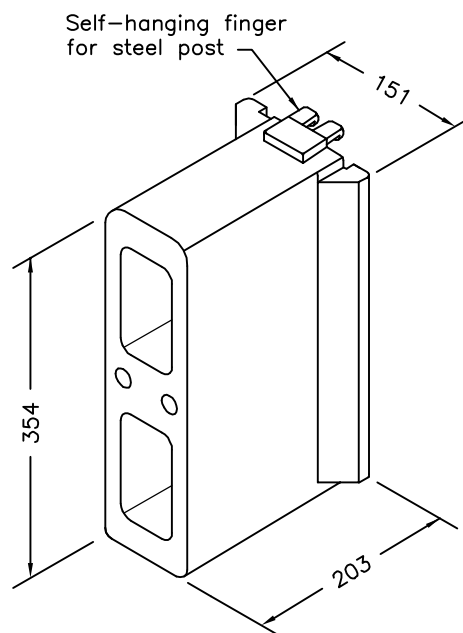
OPSD 912.102



KING OFFSET BLOCK
NOTE 1



MONDO OFFSET BLOCK
NOTE 2



P-BLOCK
NOTE 3

NOTES:

- 1 The component depicted is proprietary to Trinity Industries, Inc.
- 2 The component depicted is proprietary to Mondo Polymer Technologies.

- 3 The component depicted is proprietary to R.G. Steel Corp.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

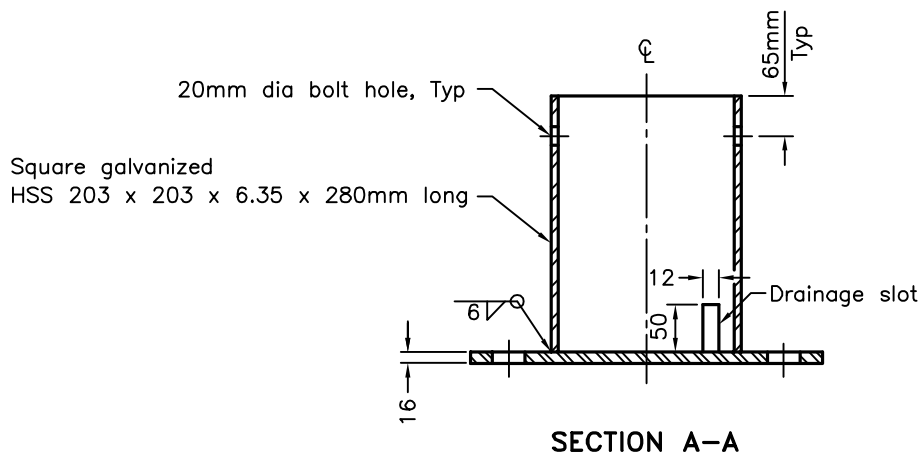
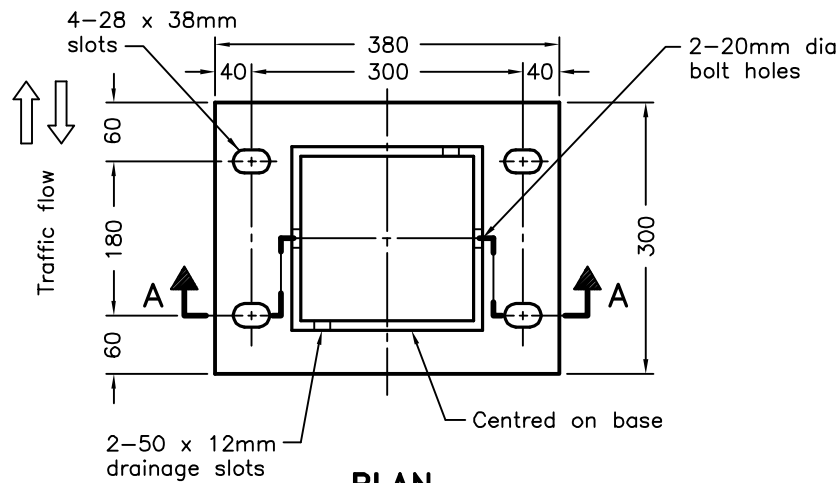
Nov 2016

Rev 2

**GUIDE RAIL SYSTEM, STEEL BEAM
PLASTIC OFFSET BLOCKS
COMPONENT**



OPSD 912.103



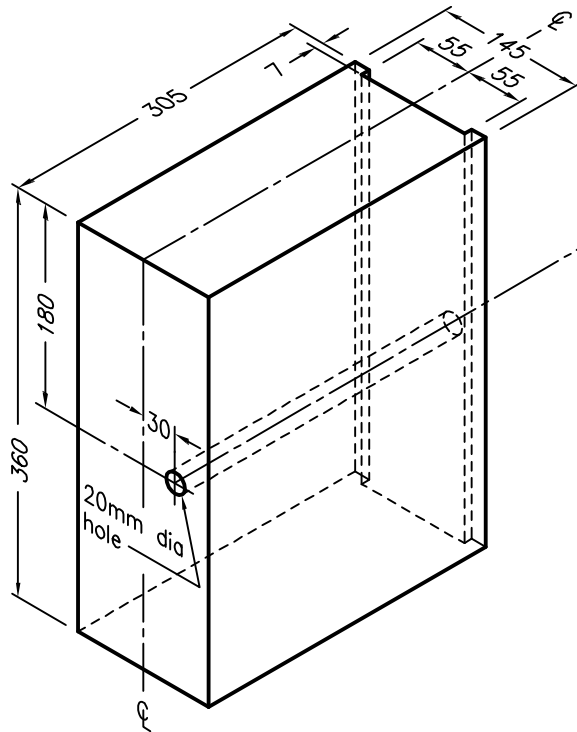
FOR SQUARE WOODEN POST FOR STEEL BEAM GUIDE RAIL

NOTES:

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2016	Rev	2	
GUIDE RAIL SYSTEM, STEEL BEAM BASE PLATE COMPONENT	-----			

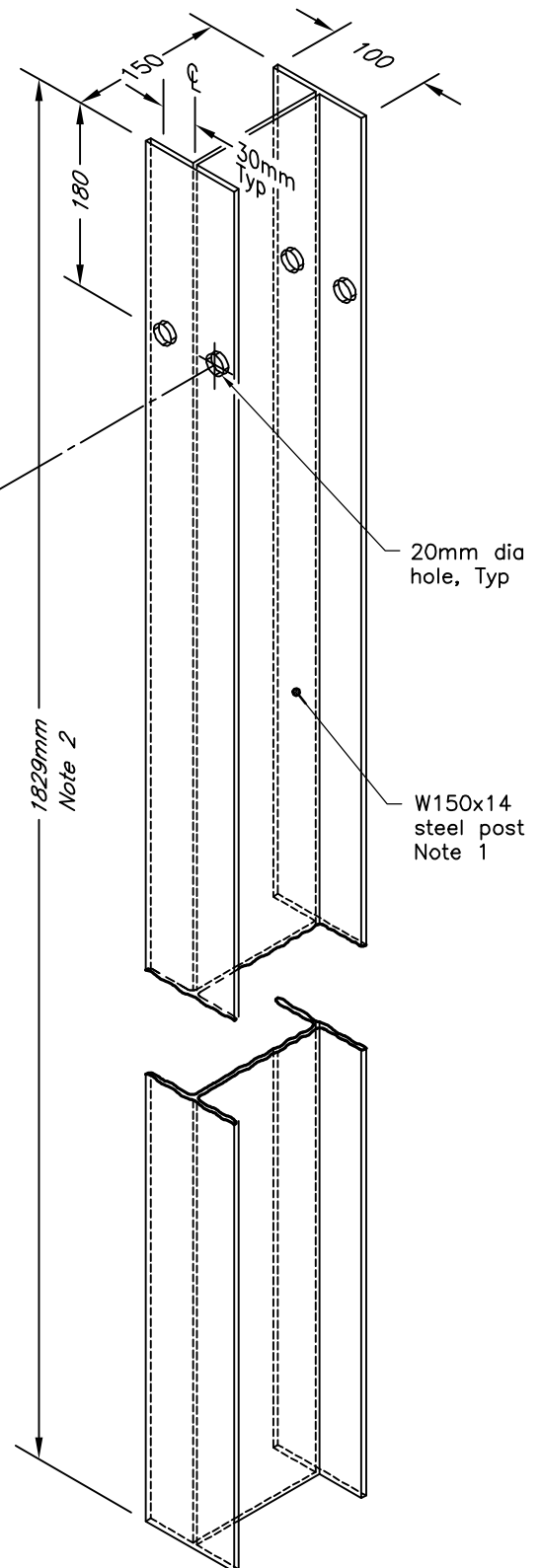
OPSD 912.105				



ROUTED WOODEN OFFSET BLOCK (SHOWN)
OR
PLASTIC OFFSET BLOCK
ACCORDING TO OPSD 912.129

NOTES:

- 1 Imperial size steel sections W6x9 or W6x8.5 are acceptable.
 - 2 Post length shall be 2438mm when specified and when 2438mm long shall be stamped with a 50mm high number "8" in center of web 50mm below top of post.
- A All dimensions are in millimetres unless otherwise shown.



POST DETAIL

ONTARIO PROVINCIAL STANDARD DRAWING

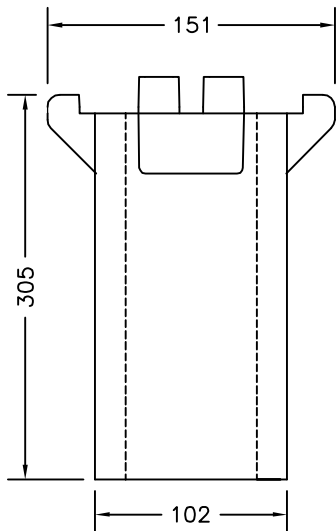
Nov 2016

Rev 0

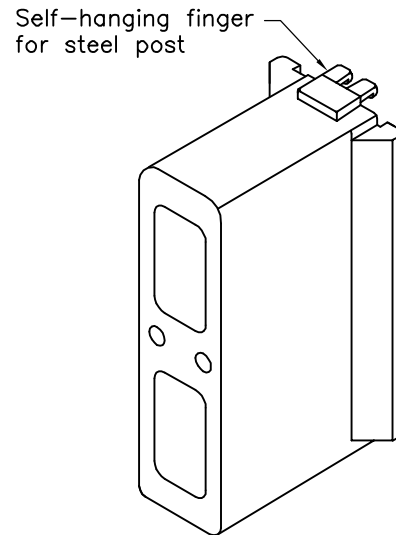
GUIDE RAIL SYSTEM, STEEL BEAM
TYPE M30 STEEL POST
WITH OFFSET BLOCK
COMPONENT



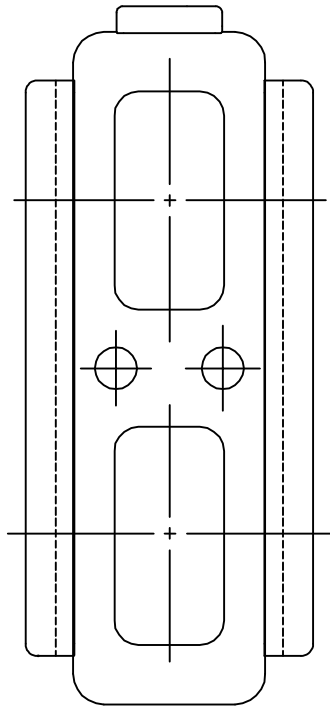
OPSD 912.128



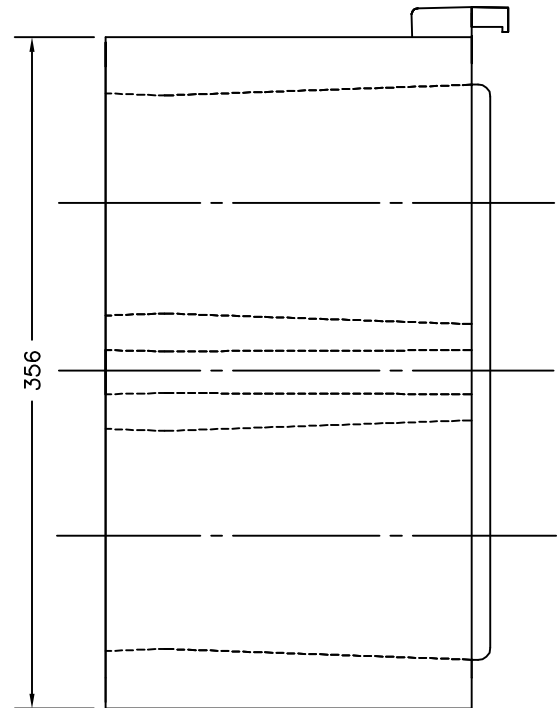
PLAN



ISOMETRIC



ELEVATION



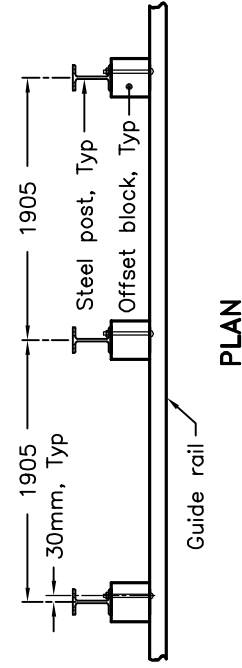
SECTION

NOTES:

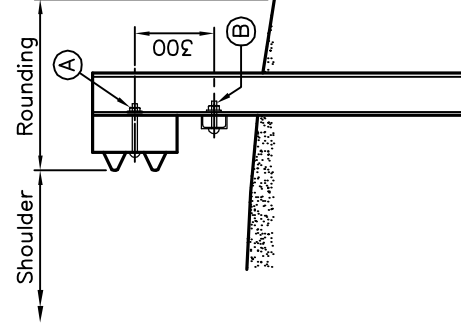
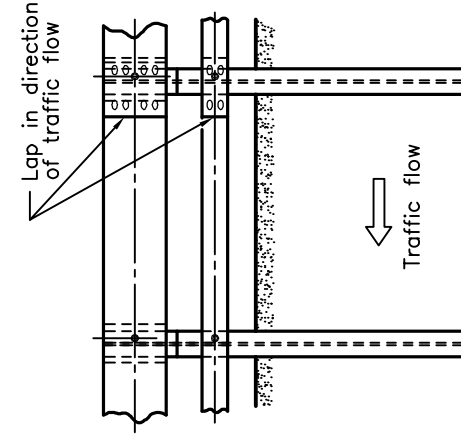
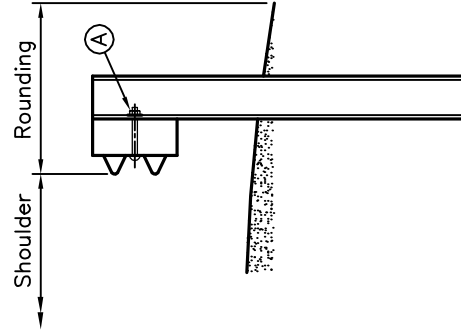
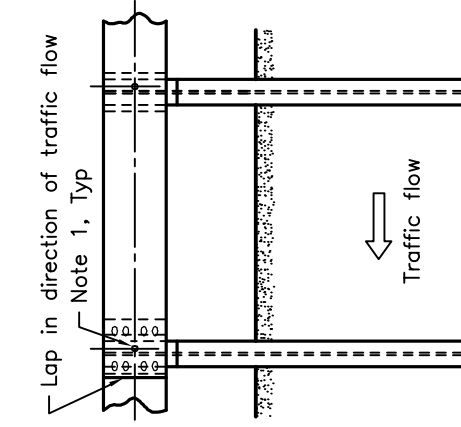
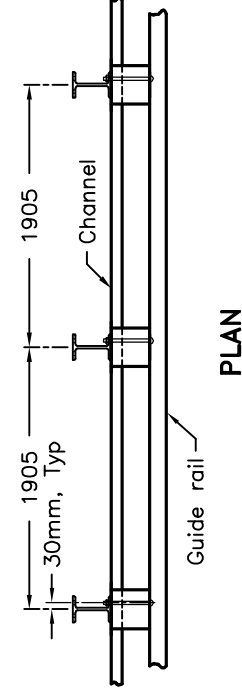
- A The component depicted is proprietary to Monroeville Industrial Molding.
 B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2016	Rev	0	
GUIDE RAIL SYSTEM, STEEL BEAM 30cm POLYMER OFFSET BLOCK – P-BLOCK COMPONENT		-----			

		OPSD 912.129			



POST BOLT		
Post Bolt Size and Type	Washer @ Nut	Plate
(A) 16x250 BH		Plate
(B) 16x100 CaB		Plate



ELEVATION

SINGLE RAIL

ELEVATION

SINGLE RAIL WITH CHANNEL

NOTES:

- 1 Washer shall not be installed at front face of rail. One bolt located at centre of steel beam guide rail.
- A This OPSP to be read in conjunction with OPSP 912.101, 912.102, 912.103, and 912.104.
- B Steel beam guide rail mounting heights shall be as specified.
- C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

**GUIDE RAIL SYSTEM, STEEL BEAM
STEEL POST WITH OFFSET
BLOCK ASSEMBLY
INSTALLATION – SINGLE RAIL**

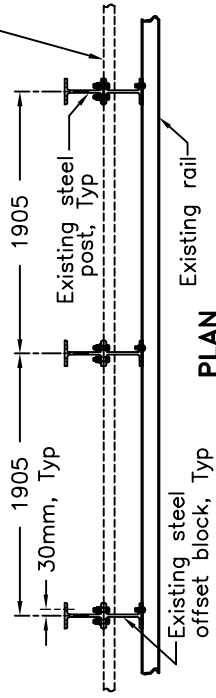
Nov 2016

Rev 3



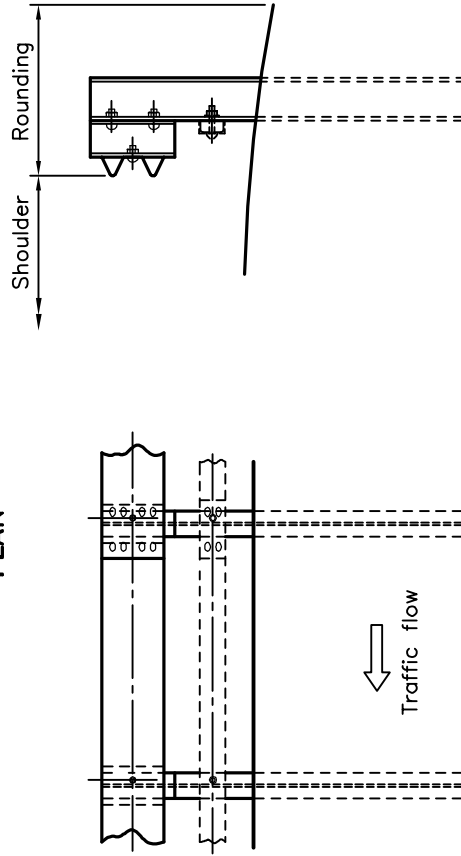
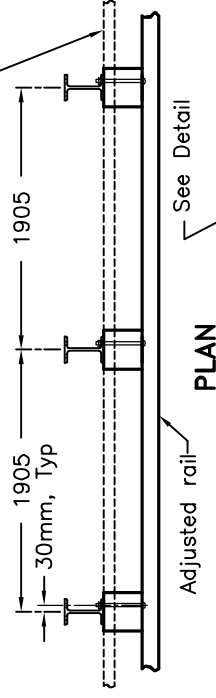
OPSP 912.130

Existing channel when present



NEW POST BOLTS			
Post Bolt Size and Type	Washer @ Nut	Plate	Plate
(A) 16x250 BH			
(B) 16x100 CaB			

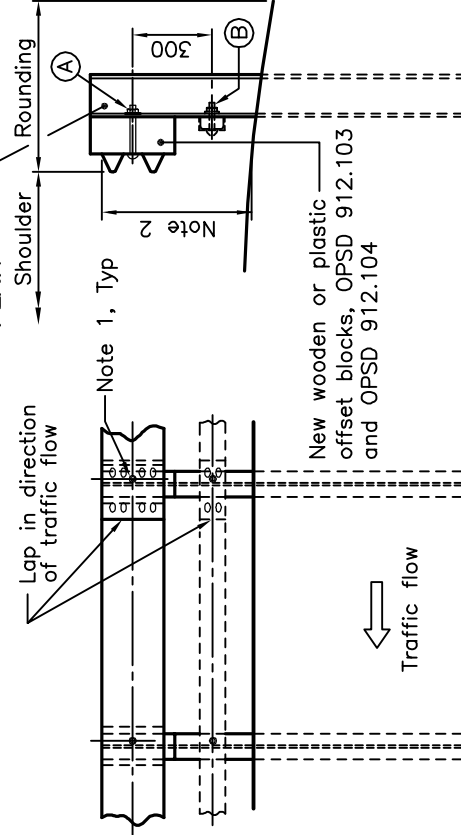
Adjusted channel when specified



ELEVATION

SIDE VIEW

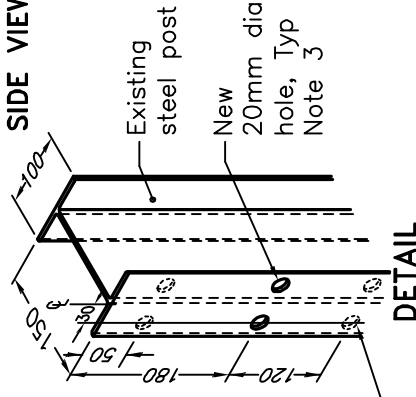
EXISTING SINGLE RAIL WITH STEEL OFFSET BLOCK



ELEVATION

SIDE VIEW

ADJUSTED SINGLE RAIL WITH NEW WOODEN OR PLASTIC OFFSET BLOCK



Existing holes, Typ

NOTES:

- 1 Washer shall not be installed at front face of rail. Type (A) bolt located at centre of steel beam guide rail.
 - 2 Steel beam guide rail mounting heights shall be as specified.
 - 3 One new hole shall be punched as required to attach new offset block. Punching of second new hole is acceptable. New holes shall be treated according to ASTM A780. New holes shall not be flame cut.
- A This OPSD shall be read in conjunction with OPSD 912.103 and 912.104.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

GUIDE RAIL SYSTEM, STEEL BEAM
STEEL POST WITH STEEL OFFSET
BLOCK ASSEMBLY
ADJUSTMENT – SINGLE RAIL

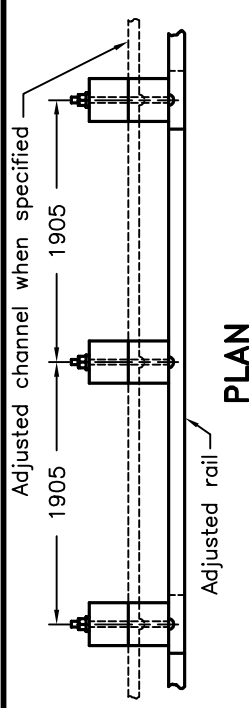
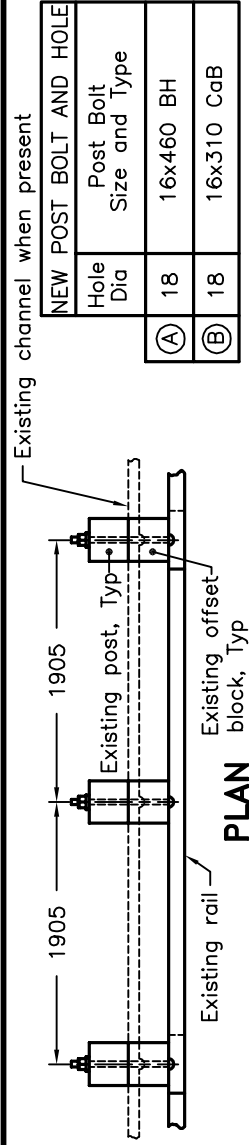
Nov 2016

Rev

1

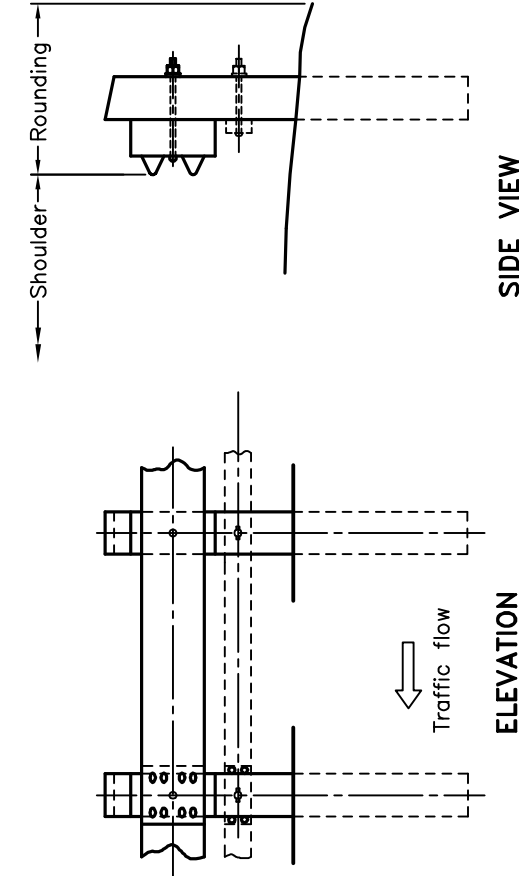


OPSD 912.135



PLAN

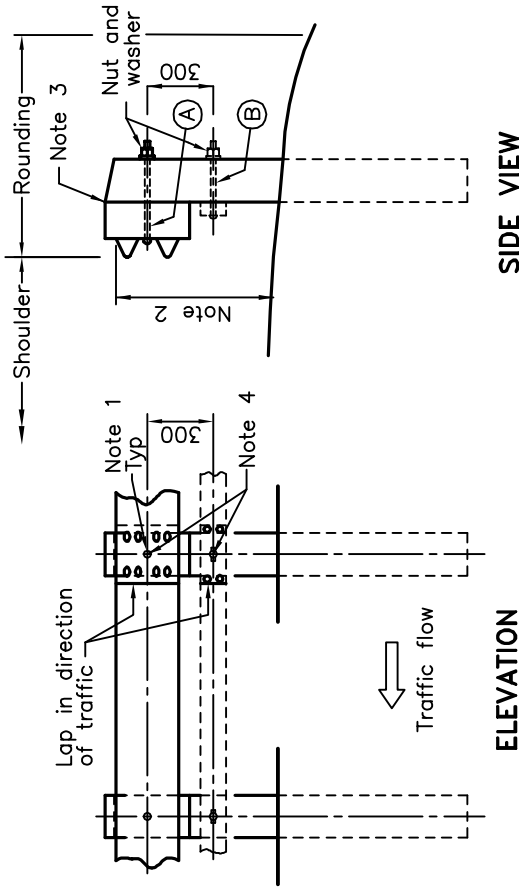
PLAN



ELEVATION

SIDE VIEW

EXISTING SINGLE RAIL



ELEVATION

SIDE VIEW

ADJUSTED SINGLE RAIL

NOTES:

- 1 Washer shall not be installed at front face of rail. Type (A) bolt located at centre of steel beam guide rail.
 - 2 Steel beam guide rail mounting heights shall be as specified.
 - 3 The top of the offset block shall not extend beyond the top of the existing post.
 - 4 One new hole shall be drilled as required to attach rail and new offset blocks. At locations where channel exists, an additional hole shall be drilled as required. Holes shall be treated with two applications of 2% copper naphthenate wood preservative.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

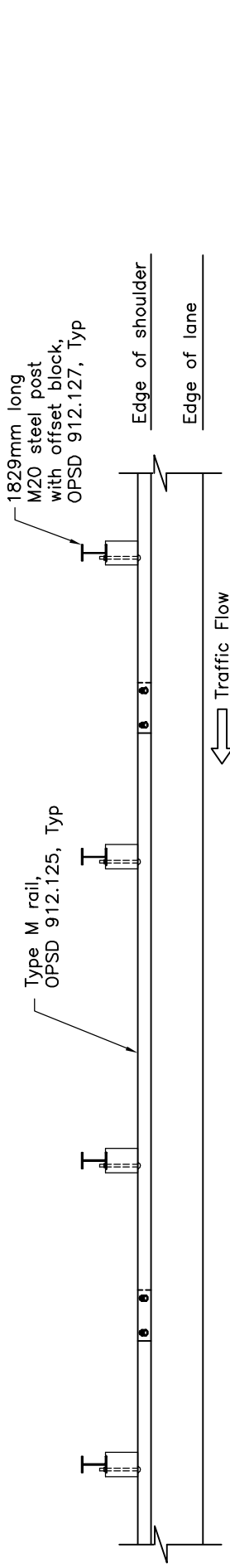
GUIDE RAIL SYSTEM, STEEL BEAM
WOODEN POST ASSEMBLY
ADJUSTMENT – SINGLE RAIL

Nov 2016

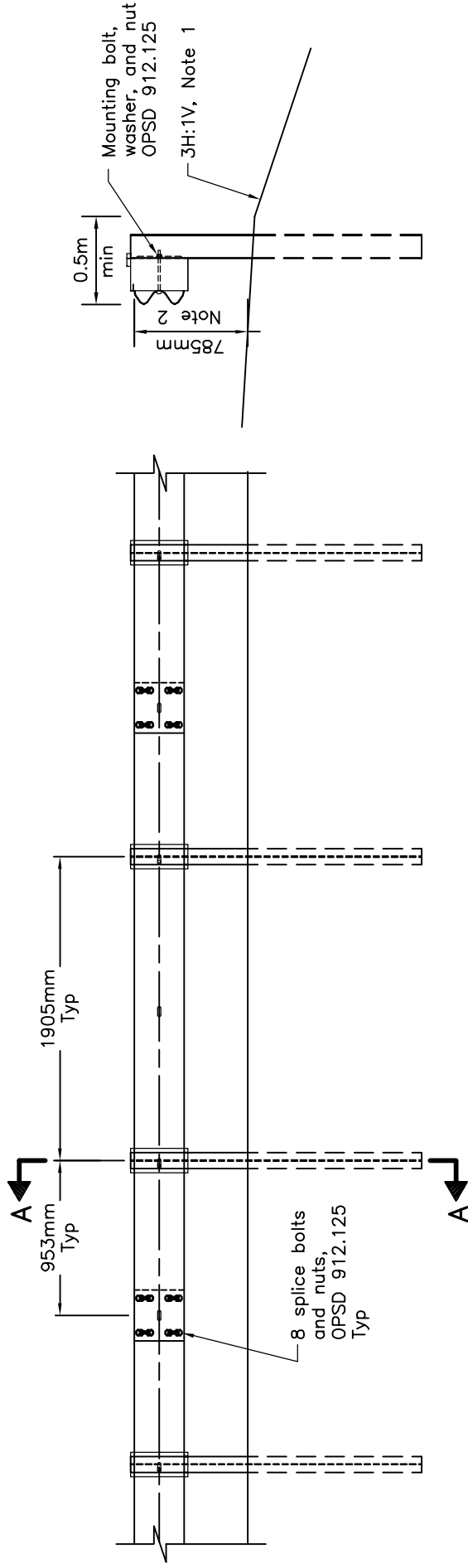
Rev 1



OPSD 912.145



PLAN



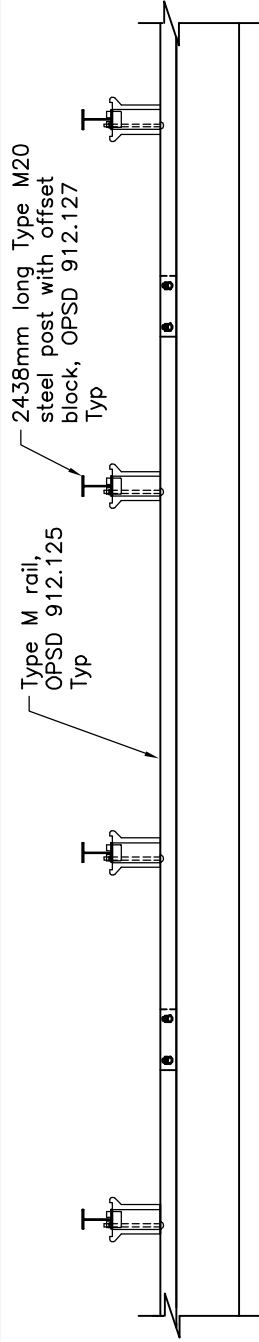
ELEVATION

SECTION A-A

- NOTES:**
- Slope shall be flatter when specified.
 - Mounting height to top of steel beam shall be measured vertically at face of rail.
 - System configuration meets AASHTO MASH TL-3.
 - All dimensions are in millimetres unless otherwise shown.

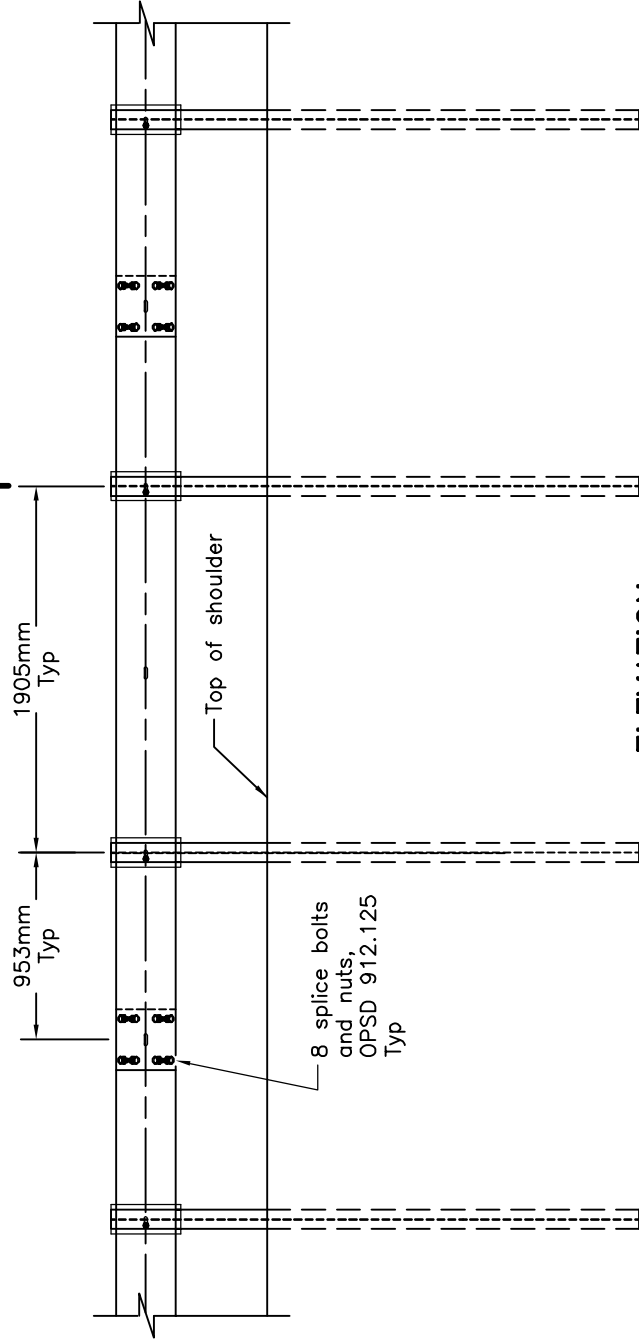
ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2016	Rev 0
GUIDE RAIL SYSTEM, STEEL BEAM TYPE M20 INSTALLATION		---	---
		OPSD 912.185	





PLAN

A



ELEVATION

NOTES:

- 1 Slope shall be flatter when specified.
- 2 Mounting height to top of steel beam rail shall be measured vertically at face of rail.
- 3 Offset from edge of shoulder to traffic side face of post shall be 280mm.
- A System configuration meets AASHTO MASH TL-3.
- B All dimensions are in millimetres unless otherwise shown.

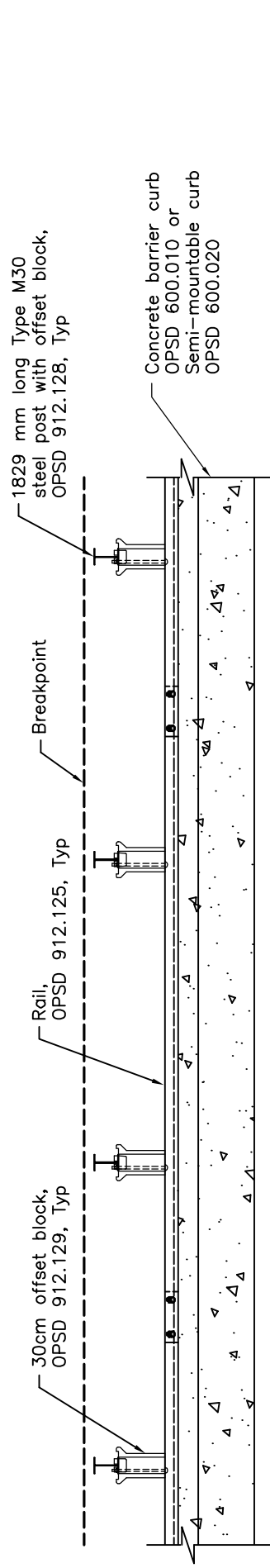
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2016 Rev 0

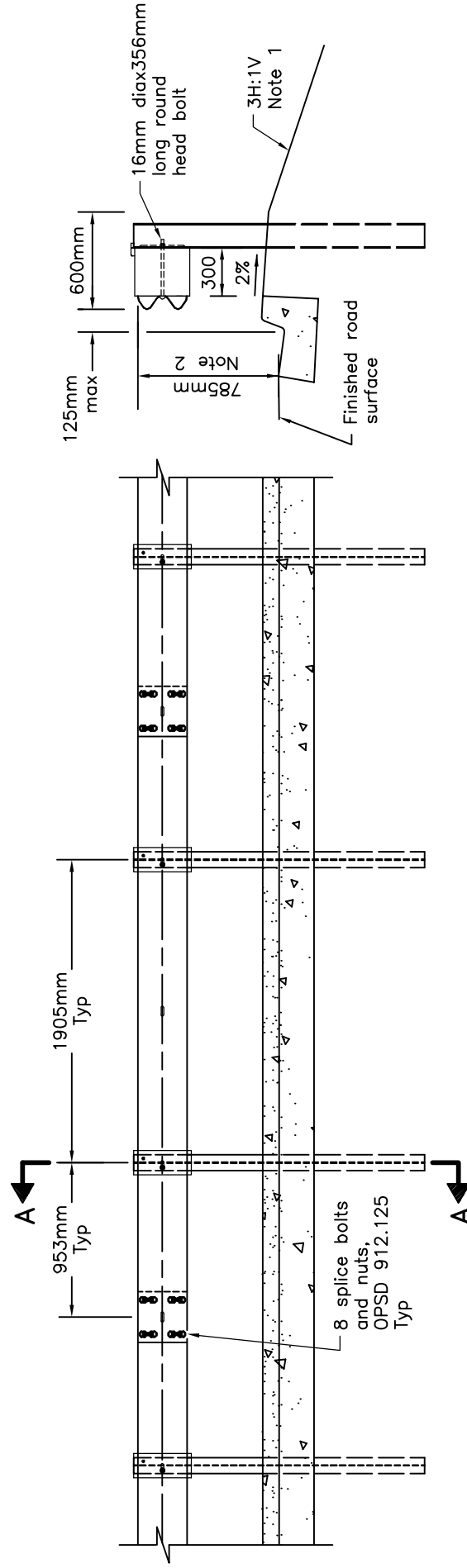


GUIDE RAIL SYSTEM, STEEL BEAM
TYPE M20 – ADJACENT TO 2H:1V SLOPE
INSTALLATION – RAIL AT SHOULDER

OPSD 912.186



PLAN



ELEVATION

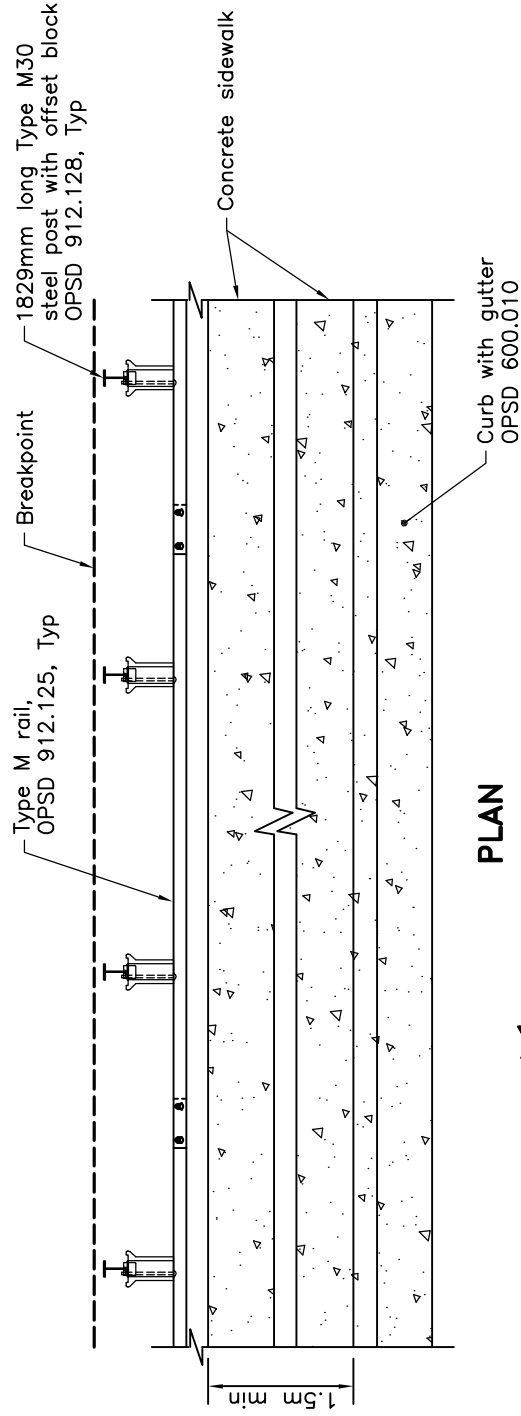
SECTION A-A

NOTES:

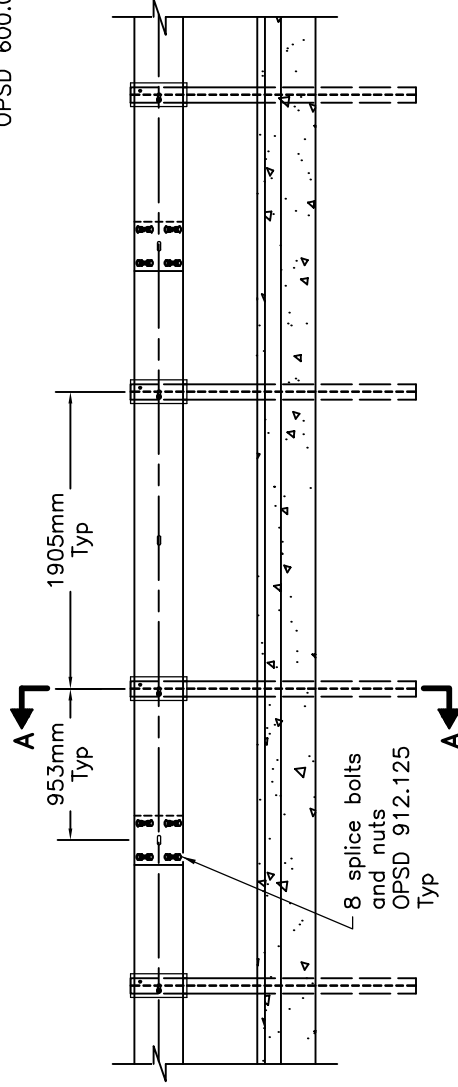
- 1 Slope shall be flatter when specified.
- 2 Mounting height to top of steel beam rail shall be measured vertically at the edge of pavement.
- A System configuration meets AASHTO MASH TL-3.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2016	Rev 0
GUIDE RAIL SYSTEM, STEEL BEAM TYPE M30 – ADJACENT TO CONCRETE CURB INSTALLATION		---	---
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		OPSD 912.188	





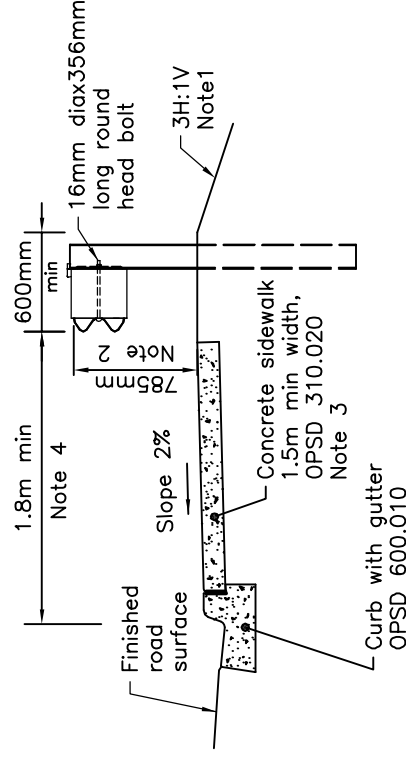
PLAN



ELEVATION

NOTES:

- 1 Slope shall be flatter when specified.
- 2 Mounting height to top of steel beam rail shall be measured vertically at the edge of pavement.
- 3 Wider sidewalk when specified.
- 4 2.1m minimum when 1.8m wide sidewalk specified, 2.3m when 2.0m wide sidewalk specified.
- A System configuration meets AASHTO MASH TL-2.
- B All dimensions are in millimetres unless otherwise shown.



SECTION A-A

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2016 Rev 0

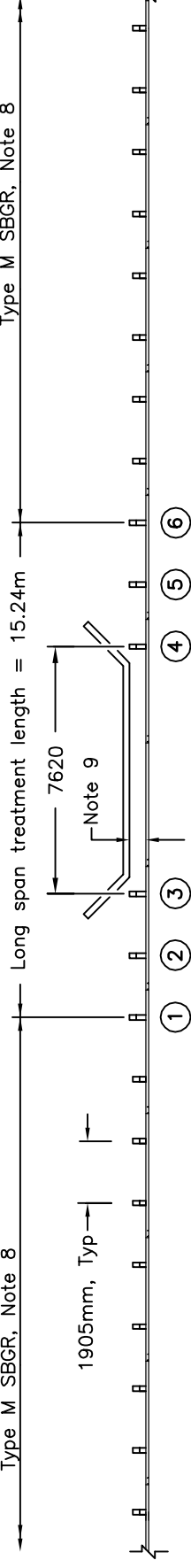


GUIDE RAIL SYSTEM, STEEL BEAM
TYPE M30 – ADJACENT TO SIDEWALK
INSTALLATION

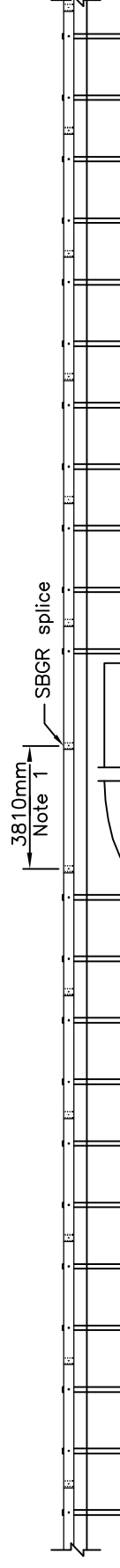
OPSD 912.189

Type M SBGR, Note 8

Type M SBGR, Note 8



PLAN

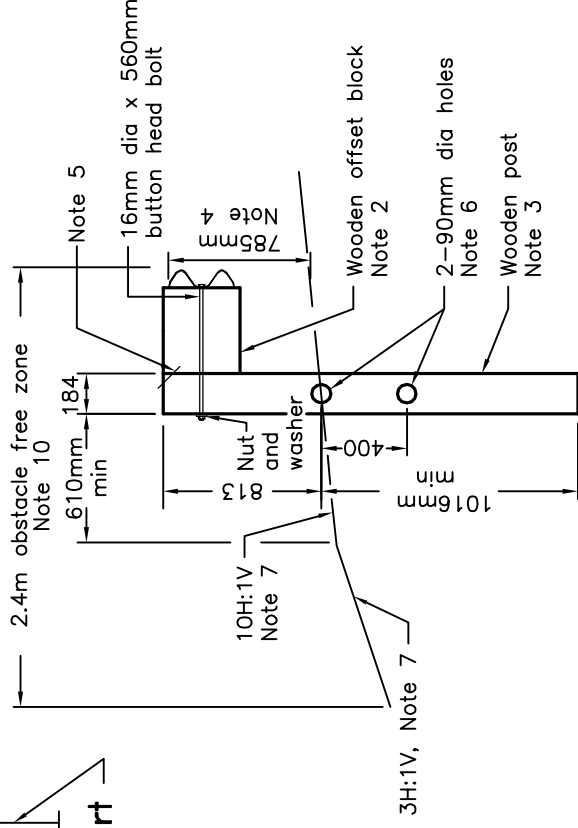


Outside of circular or elliptical culvert

Outside of rectangular culvert

NOTES:

- 1 Type M rail, mounting hardware, and splice hardware shall be according to OPSD 912.125.
 - 2 Wooden offset block dressed dimensions shall be 140mm wide x 360mm long x 305mm deep.
 - 3 Wooden posts dressed dimensions shall be 140mm wide x 1829mm long x 184mm deep.
 - 4 Mounting height to top of steel beam rail shall be measured vertically at face of rail.
 - 5 Drive 16D double head nail through post and offset block.
 - 6 The centre of the top hole shall be in line with the ground surface.
 - 7 Slope shall be flatter when specified.
 - 8 Type M SBGR includes Type M20 and Type M30. The minimum length of Type M SBGR to be installed upstream and downstream of the long span treatment shall be 19.05m.
 - 9 Distance from face of rail to inside face of culvert headwall shall not be less than 900mm.
 - 10 Obstacles shall not protrude more than 50mm above the finished grade.
- A System configuration meets AASHTO MASH TL-3.
- B All dimensions are in millimetres unless otherwise shown.



POSTS ① TO ⑥

ONTARIO PROVINCIAL STANDARD DRAWING

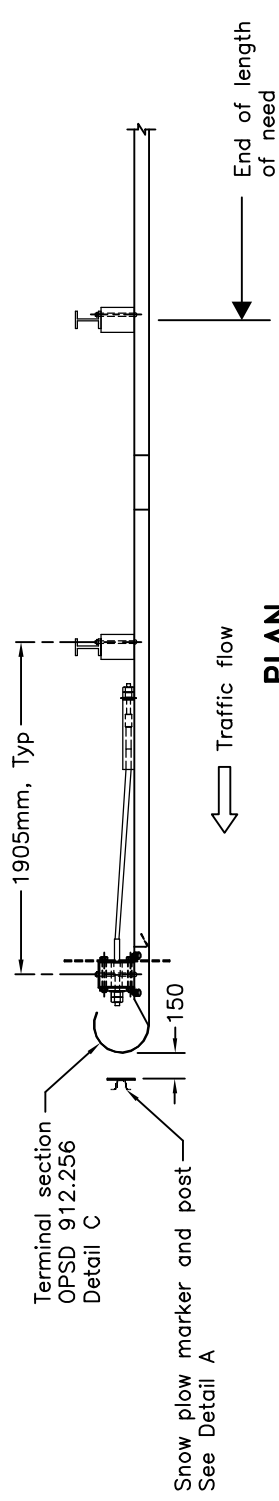
Nov 2016 Rev 0



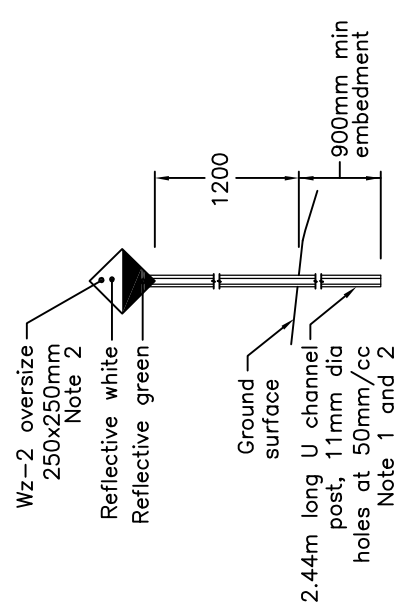
GUIDE RAIL SYSTEM, STEEL BEAM

TYPE M - 7.62m LONG SPAN TREATMENT
INSTALLATION

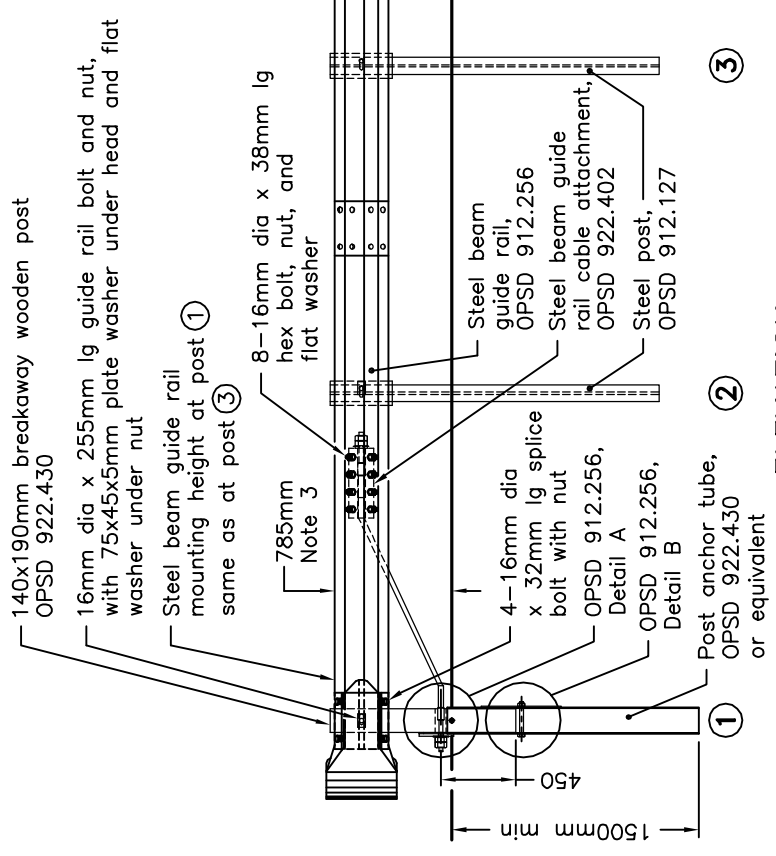
OPSD 912.245



PLAN



DETAIL A



ELEVATION

- NOTES:**
- 1 Minimum weight of post shall be 4.46kg/m.
 - 2 Post and mounting hardware shall be hot dip galvanized after fabrication according to ASTM A 123.
 - 3 Mounting height to top of steel beam shall be measured vertically at face of rail
 - A Splice and mounting hardware shall be according to OPSP 912.125.
 - B This OPSP shall be read in conjunction with OPSP 922.430, 912.127, and 912.256.
 - C Steel beam guide rail mounting heights shall be as specified.
 - D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

GUIDE RAIL SYSTEM, STEEL BEAM
TYPE M20 AND M30—LEAVING END
TREATMENT—INSTALLATION

Nov 2016	Rev	0
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OPSD 912.255

3176

1905

3 spaces at 102mm

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3176

1905

3 spaces at 102mm

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1905

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1905

3 spaces at 102mm

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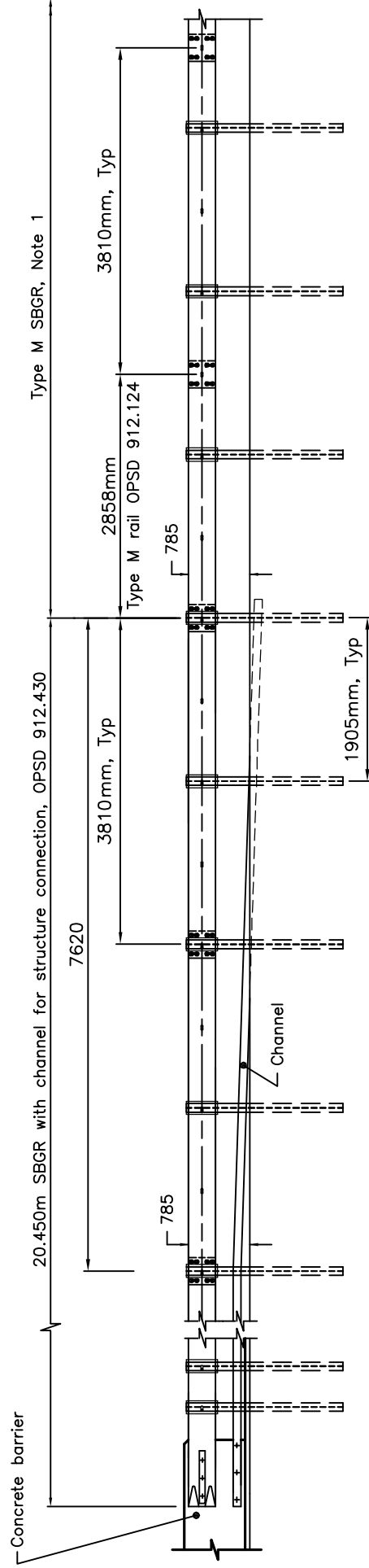
3 spaces at 102mm

953

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108



ELEVATION

NOTES:

- 1 Type M SBGR includes Type M20 and Type M30.
- A Mounting height to top of steel beam shall be measured vertically at face of rail.
- B All dimensions are in millimetres unless otherwise shown.

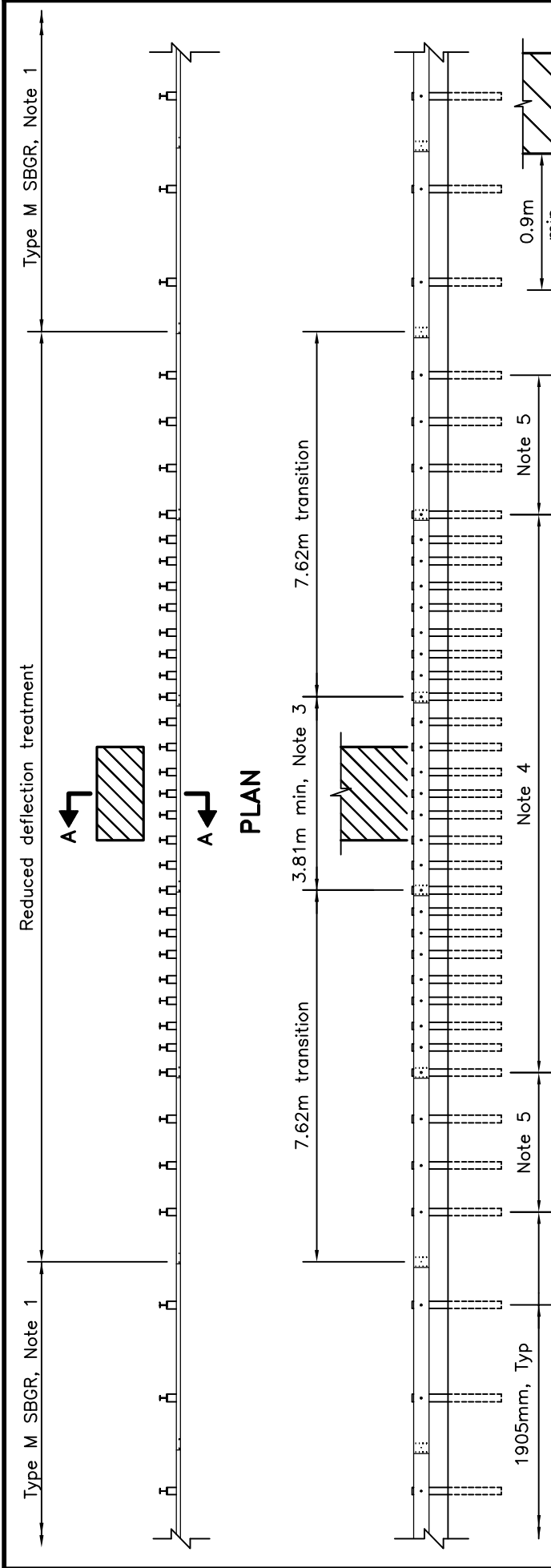
ONTARIO PROVINCIAL STANDARD DRAWING

GUIDE RAIL SYSTEM, STEEL BEAM
TRANSITION FROM TYPE M TO STEEL BEAM
GUIDE RAIL WITH CHANNEL FOR STRUCTURE
CONNECTION-INSTALLATION

Nov 2016 Rev 0



OPSD 912.315



NOTES:

- 1 Type M SBGR includes Type M20 and Type M30.
- 2 Mounting height to top of steel beam shall be measured vertically at face of rail.
- 3 When rigid obstacle extends beyond centre 3.81m length of rail, additional 3.81m lengths of rail with posts spaced at 476mm c/c shall be provided between 7.62m long transitions.
- 4 Post spacing at 476mm c/c.
- 5 Post spacing at 952mm c/c.
- 6 Slope shall be flatter when specified.

- A Mounting height to top of steel beam rail shall be measured vertically at face of rail.
- B System configuration meets AASHTO MASH TL-3.
- C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

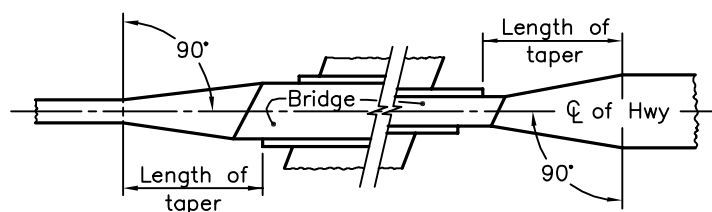
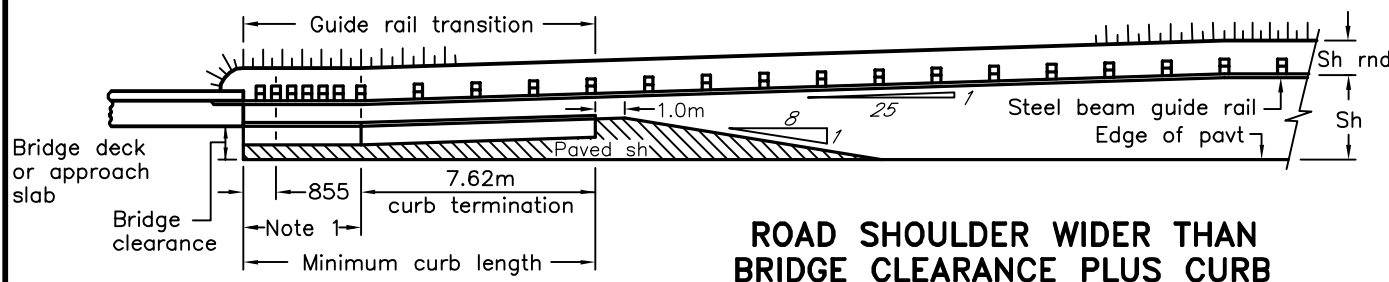
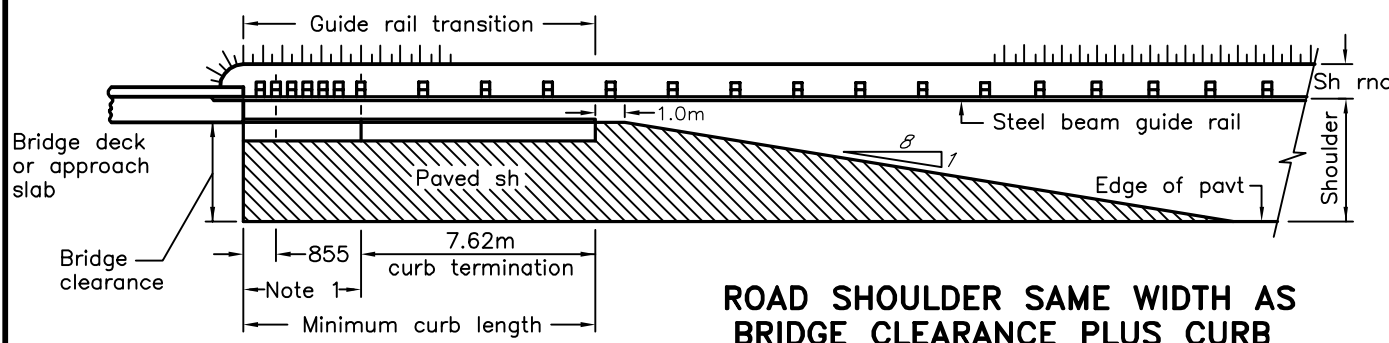
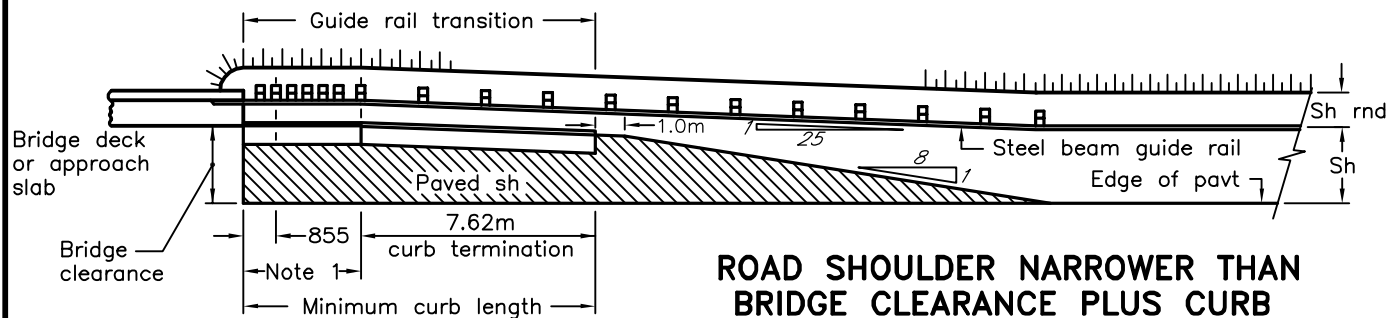
GUIDE RAIL SYSTEM, STEEL BEAM

TYPE M – REDUCED DEFLECTION TREATMENT
INSTALLATION

Nov 2016 Rev 0



OPSD 912.316



FOR SKEWED STRUCTURE:

The pavement taper is to end on a line at right angles to C of Hwy , length of taper shall be measured from bridge corner that allows greatest length of tapered section.

NOTES:

- 1 Tangent to structure shall be one standard rail length +855mm long minimum. If approach slab is more than one standard beam element +855mm beyond wing wall, then tangent section shall be taken to end of approach slab.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

**GUIDE RAIL SYSTEM, STEEL BEAM
STRUCTURE APPROACH TREATMENT
INSTALLATION – RURAL HIGHWAY**

Nov 2016

Rev 2



OPSD 912.530



SECTION B-B

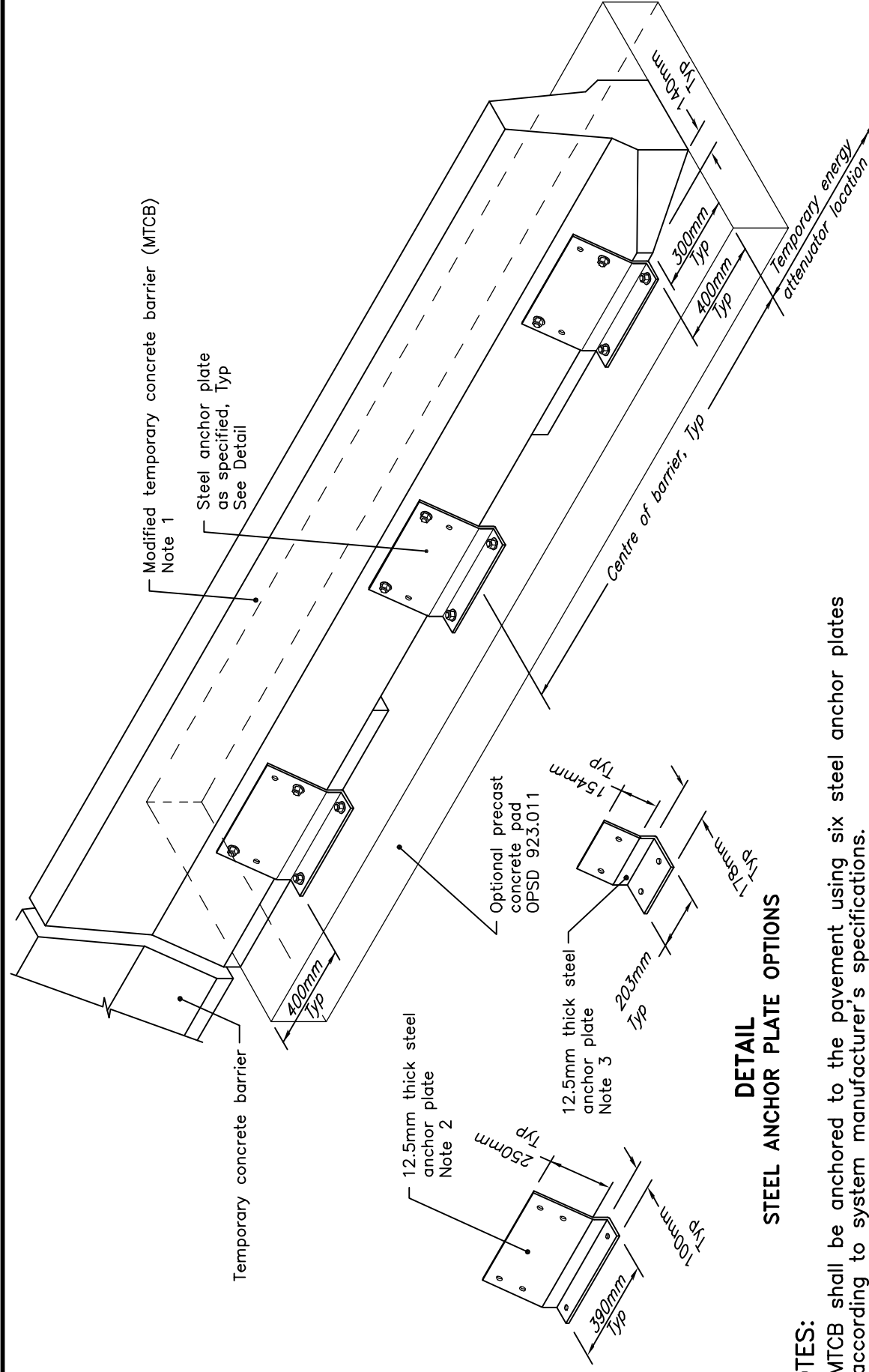
NOTES:

- 1 When concrete barrier is used around piers, a 1.0m wide paved area is required in front of barrier.
- 2 Length varies depending on the length of energy attenuator plus the length of barrier transition required to accommodate the width of hazard.
- 3 Traffic barriers as specified.
- 4 Delineators shall be installed at 1.5m intervals at the leaving end of the energy attenuator.

LEGEND:

- A Delineation shall be according to OPSD 984.101.
- B Drainage as required.
- C All dimensions are in millimetres unless otherwise shown.
- χ = distance from edge of driving lane to ϕ of energy attenuator

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2016	Rev 2	
ENERGY ATTENUATOR, GENERAL			
INSTALLATION—GRANULAR APPROACH PAD, MEDIAN			
			OPSD 921.101



DETAIL STEEL ANCHOR PLATE OPTIONS

NOTES:

1 MTCB shall be anchored to the pavement using six steel anchor plates according to system manufacturer's specifications.

2 Steel anchor plate is proprietary to Energy Absorption Systems Inc.

3 Steel anchor plate is proprietary to Barrier Systems Inc.

A All dimensions are in millimetres unless otherwise shown.

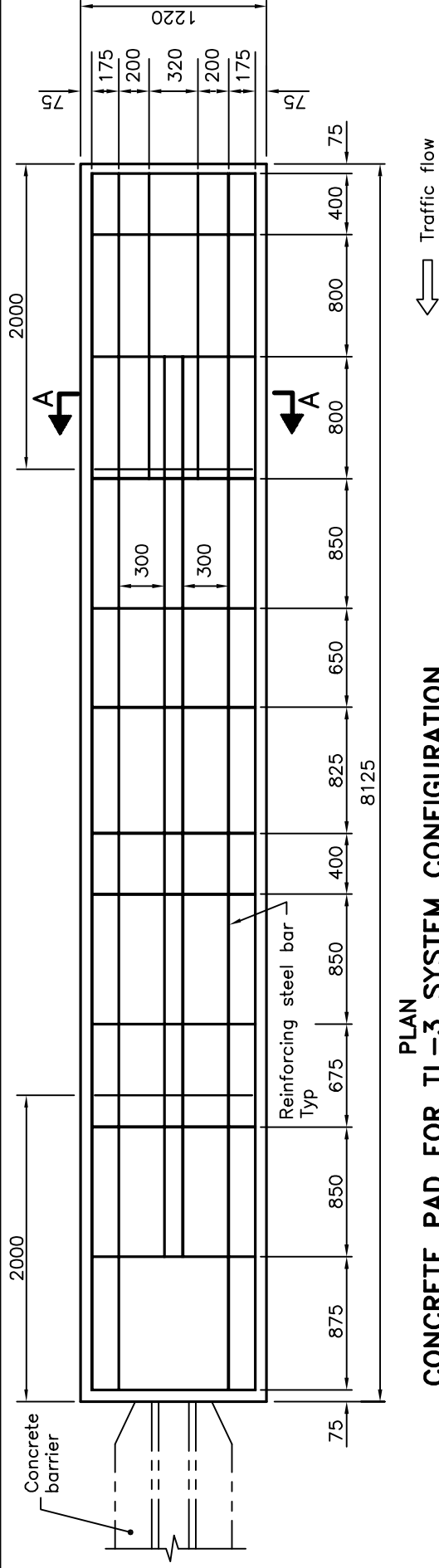
ONTARIO PROVINCIAL STANDARD DRAWING

ENERGY ATTENUATOR, CRASH CUSHION COMPONENT-ANCHOR ASSEMBLY

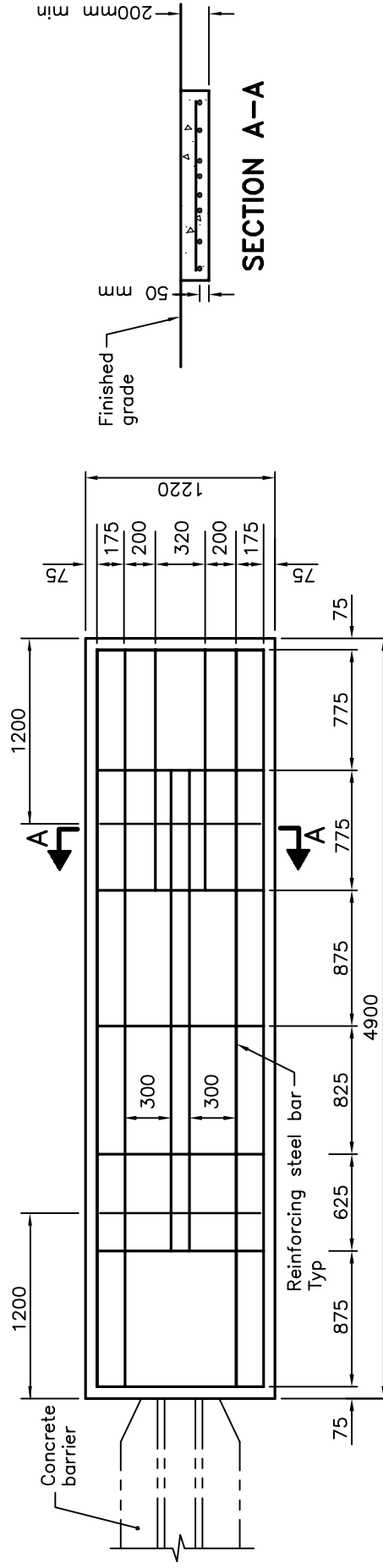
Nov 2016 Rev 1



OPSD 923.002



PLAN
CONCRETE PAD FOR TL-3 SYSTEM CONFIGURATION



PLAN
CONCRETE PAD FOR TL-2 SYSTEM CONFIGURATION

NOTES:

- A All reinforcing steel bar shall be 15M unless otherwise shown.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

**ENERGY ATTENUATOR, CRASH CUSHION
NARROW SYSTEMS**

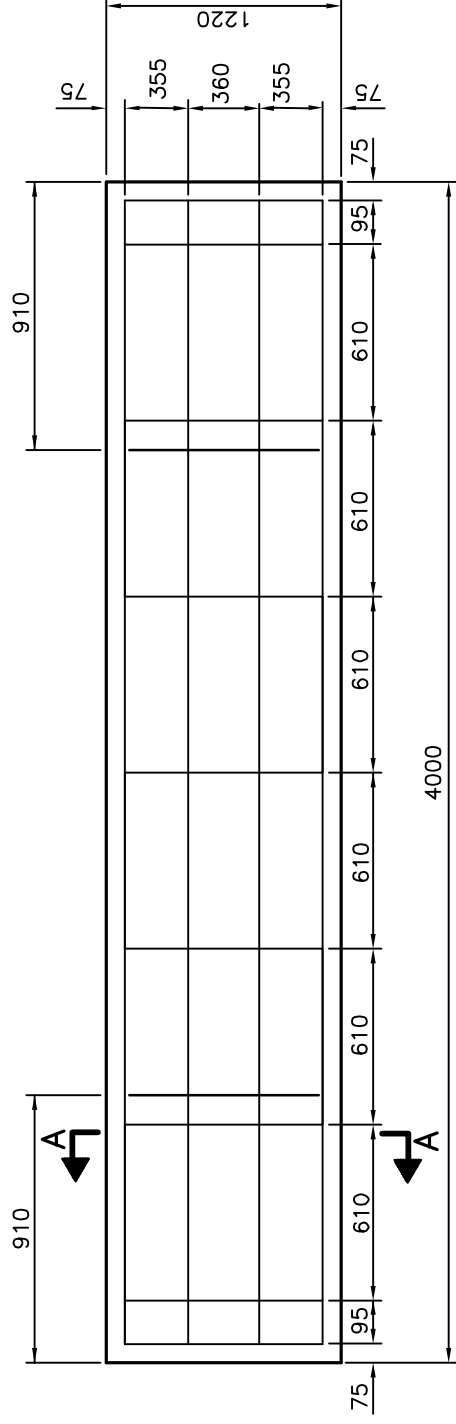
**COMPONENT-REINFORCED PRECAST CONCRETE PAD
FOR PERMANENT INSTALLATION**

Nov 2016

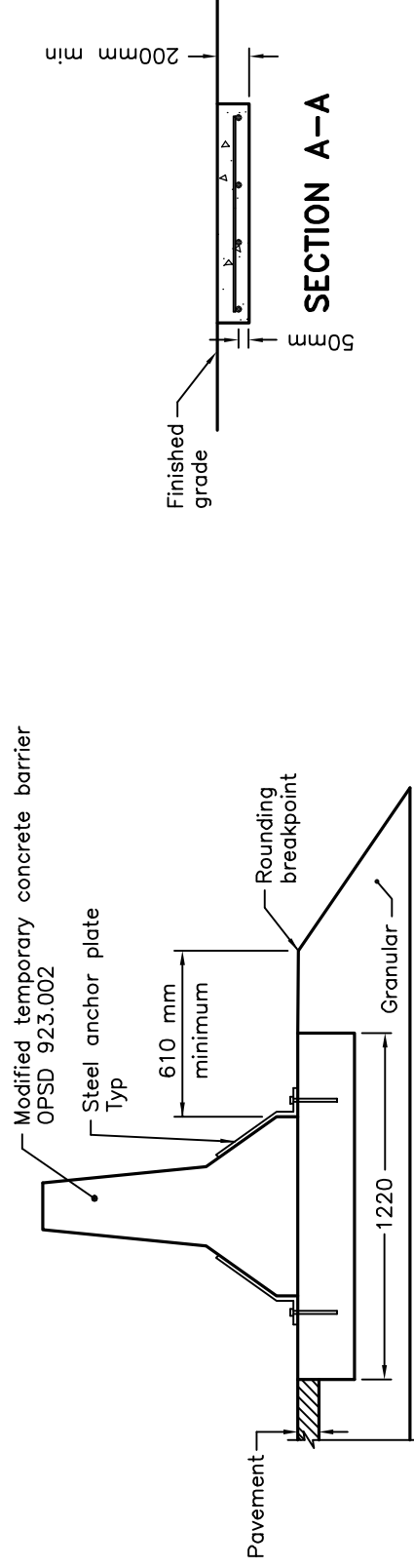
Rev 0



OPSD 923.010



PLAN



INSTALLATION

NOTES:

- A All reinforcing steel bar shall be 15M unless otherwise shown.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

**ENERGY ATTENUATOR, CRASH CUSHION
COMPONENT-REINFORCED PRECAST CONCRETE PAD
FOR MODIFIED TEMPORARY CONCRETE BARRIER**

Nov 2016 Rev 0



OPSD 923.011

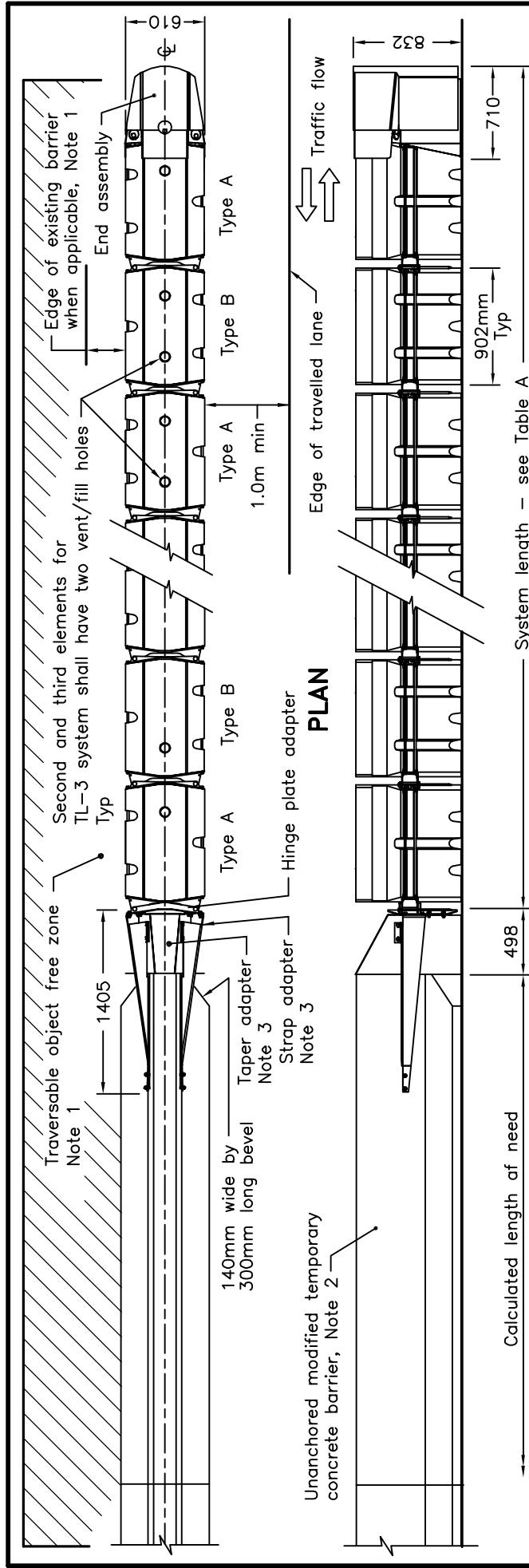
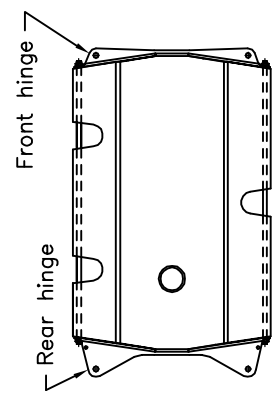


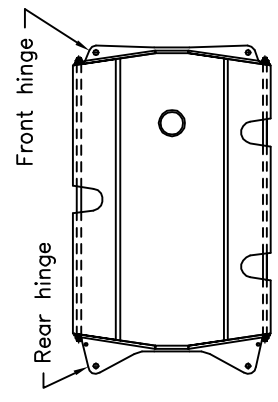
TABLE A

System Configuration	TL-2	TL-3
Elements	5	9
Configuration	A-B-A-B-A	A-B-A-B-A-B-A-B-A
System Length	4740	9379

ELEVATION



TYPE A ELEMENT

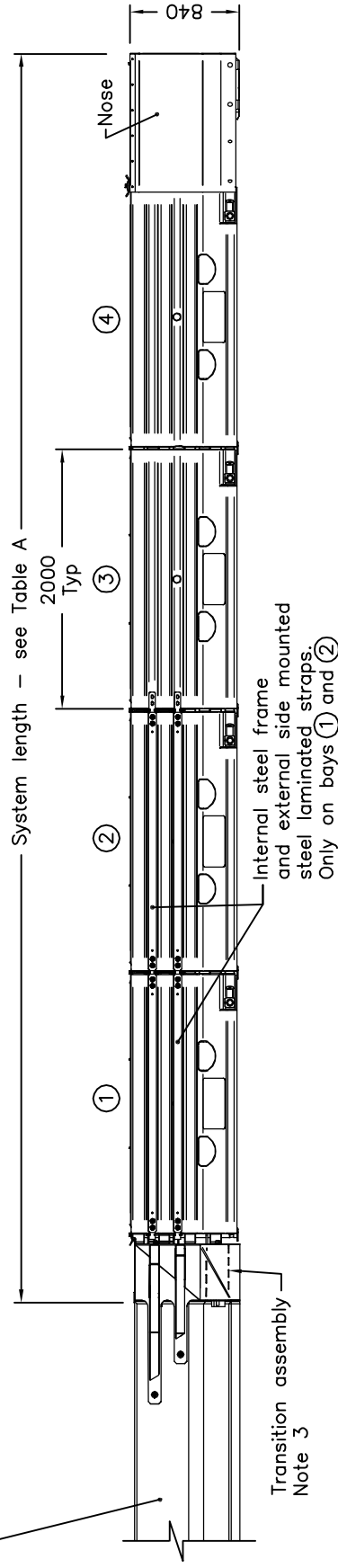
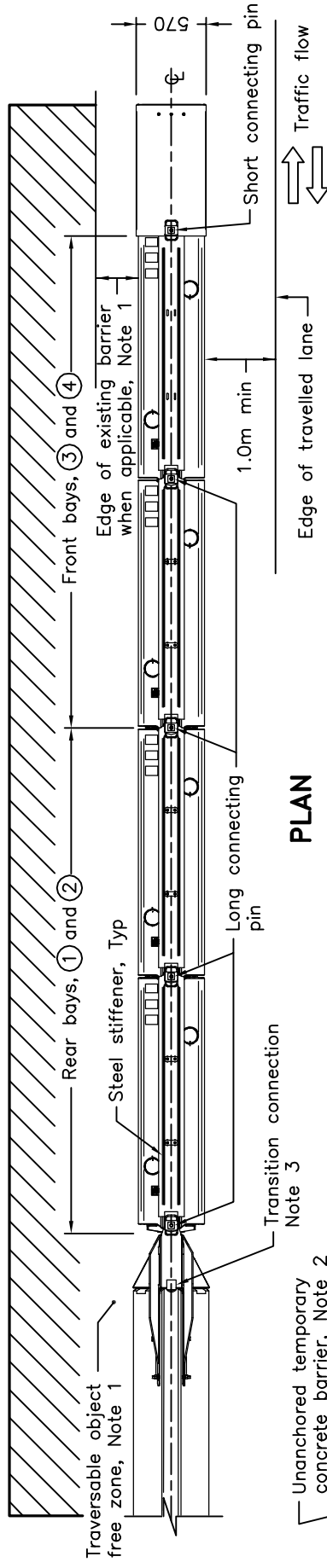


TYPE B ELEMENT

NOTES:

- 1 When placed adjacent to concrete barrier or steel beam guide rail, clearance shall be $\leq 0.3\text{m}$ or $\geq 3.0\text{m}$, otherwise minimum 6.0m wide traversable object free zone shall extend from end assembly for 22.0m minimum.
- 2 First 16m of TCB shall be placed tangential to ABSORB 350 system.
- 3 Taper and strap adapters shall be according to manufacturer's specifications for temporary concrete barrier type used.
- A Delineation shall be according to OPSD 984.203.
- B System configuration meets NCHRP Report 350 test level.
- C The system depicted here is a proprietary product.
- D All elements except the first element adjacent to end assembly shall be filled with water. When temperature is predicted to fall below freezing, antifreeze agents according to manufacturer recommendations shall be used.
- E All dimensions are in millimetres unless otherwise shown.

		Nov 2016	Rev 1
		ONTARIO PROVINCIAL STANDARD DRAWING	
ENERGY ATTENUATOR, CRASH CUSHION			
ABSORB 350 SYSTEM			
INSTALLATION-TEMPORARY CONCRETE BARRIER			
OPSD 924.131			



NOTES:

- 1 When placed adjacent to concrete barrier or steel beam guide rail, clearance shall be $\leq 0.3\text{m}$ or $\geq 3.0\text{m}$, otherwise minimum 6.0m wide traversable object free zone shall extend from nose for 22.0m minimum.
- 2 First 16m of TCB shall be placed tangential to ACZ-350 system.
- 3 Transition assembly and method of connection shall be according to manufacturer's specifications for temporary concrete barrier type used.
- A Delineation shall be according to OPSD 984.203.
- B System configuration meets NCHRP Report 350 test level.
- C The system depicted here is a proprietary product.
- D All elements shall be filled with water. When temperature is predicted to fall below freezing, antifreeze agents according to manufacturer recommendations shall be used.
- E All dimensions are in millimetres unless otherwise shown.

TABLE A		
System Configuration	TL-2	TL-3
Bays	① ②	① ② ③ ④
System Length	5620	9620

ONTARIO PROVINCIAL STANDARD DRAWING

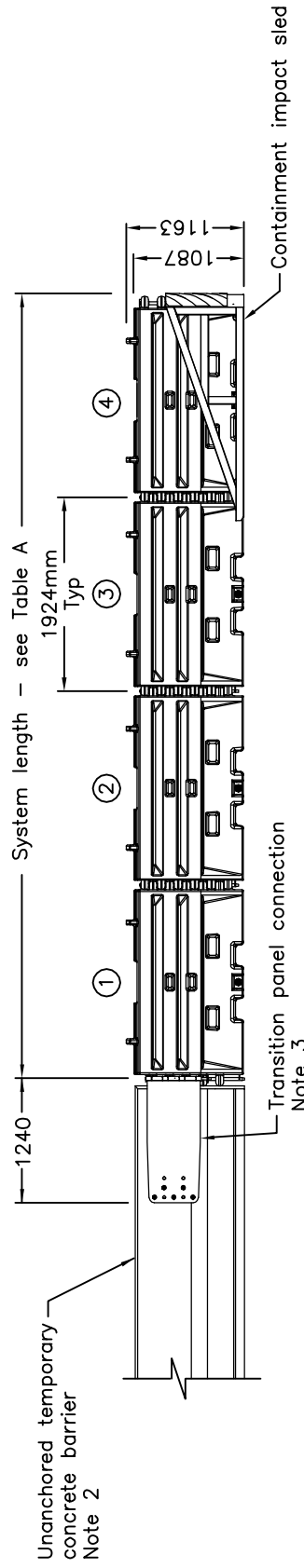
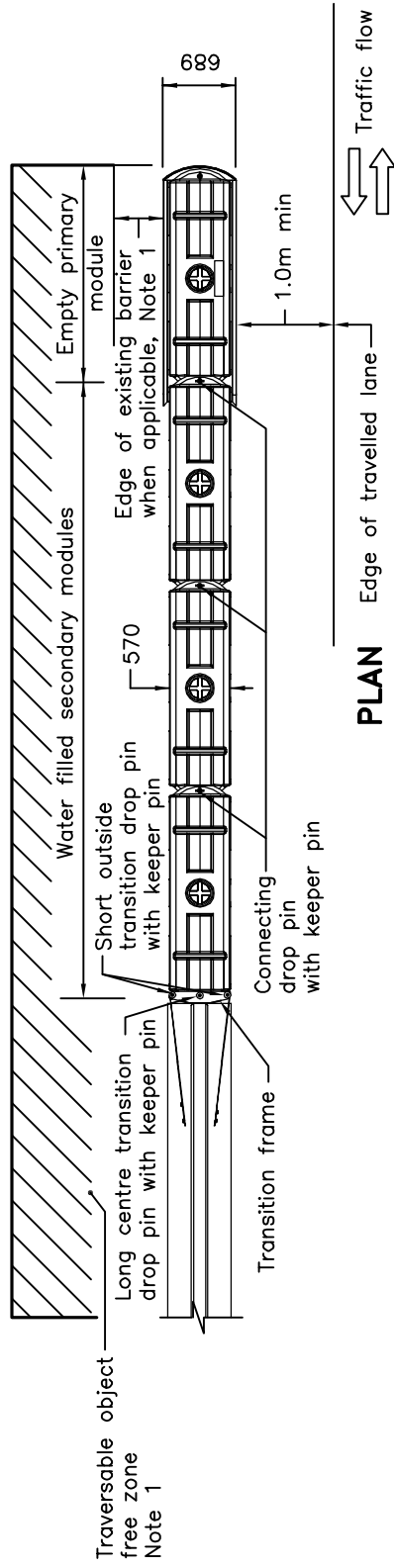
Nov 2016 Rev 2

ENERGY ATTENUATOR, CRASH CUSHION ACZ-350 SYSTEM

INSTALLATION-TEMPORARY CONCRETE BARRIER



OPSD 924.135



NOTES:

- 1 When placed adjacent to concrete barrier or steel beam guide rail, clearance shall be $\leq 0.3\text{m}$ or $\geq 3.0\text{m}$, otherwise minimum 6.0m wide traversable object free zone shall extend from nose for 22.0m minimum.
- 2 First 16m of TCB shall be placed tangential to SLED system.
- 3 Transition assembly and method of connection shall be according to manufacturer's specifications for temporary concrete barrier type used.
- A Delineation shall be according to OPSD 984.203.
- B System configuration meets NCHRP Report 350 test level.
- C The system depicted here is a proprietary product.
- D All modules (except Module 4) shall be filled with water. When temperature is predicted to fall below freezing, antifreeze agents according to manufacturer recommendations shall be used.
- E All dimensions are in millimetres unless otherwise shown.

TABLE A		
System Configuration	TL-2	TL-3
Modules	① ② ④	① ② ③ ④
System Length	5770	7930

ONTARIO PROVINCIAL STANDARD DRAWING

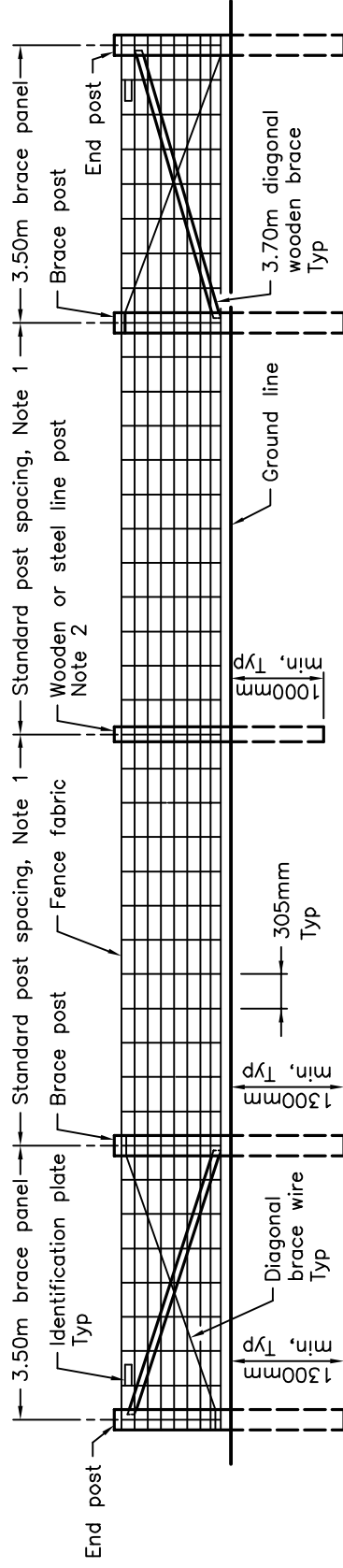
Nov 2016 Rev 0

ENERGY ATTENUATOR, CRASH CUSHION SLED SYSTEM

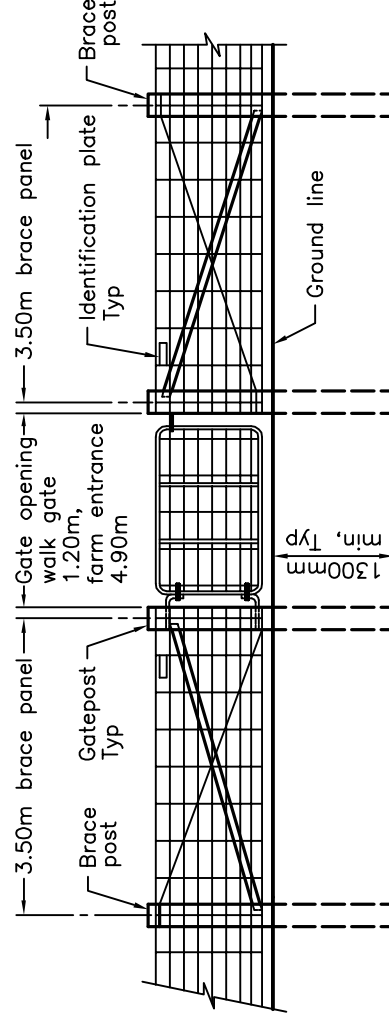
INSTALLATION—TEMPORARY CONCRETE BARRIER

OPSD 924.141





HIGHWAY FENCE **IN EARTH, SHALE, LOOSE ROCK, OR FRIABLE ROCK**



GATE DETAIL

NOTES:

- 1 Standard post spacing shall be 6.0m for wooden post to wooden post and 5.0m for steel post to steel or wooden post.
- 2 Ratio of steel posts to wooden posts shall be 3:1.
- A This OPSD shall be read in conjunction with OPSD 971.103.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

FENCE, HIGHWAY

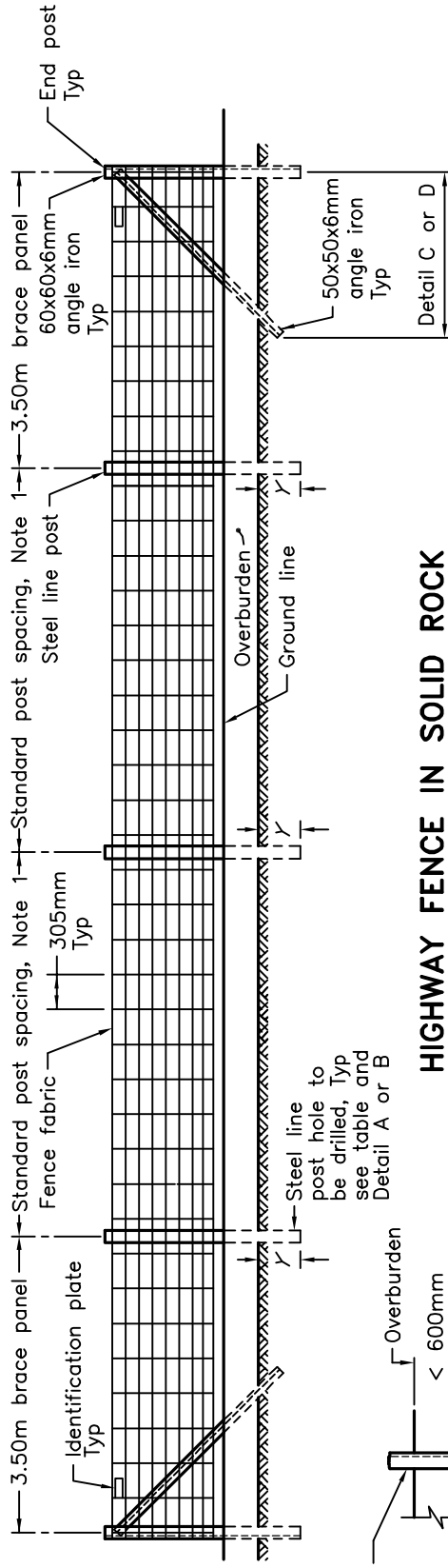
IN EARTH, SHALE, LOOSE ROCK, OR FRIABLE ROCK
 INSTALLATION

Nov 2016

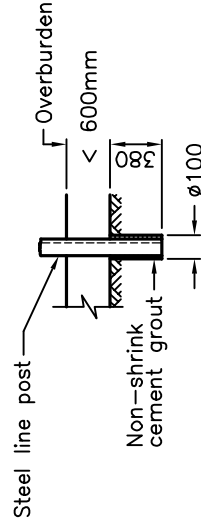
Rev 4



OPSD 971.101

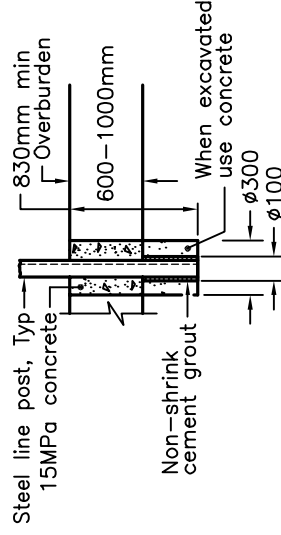


HIGHWAY FENCE IN SOLID ROCK



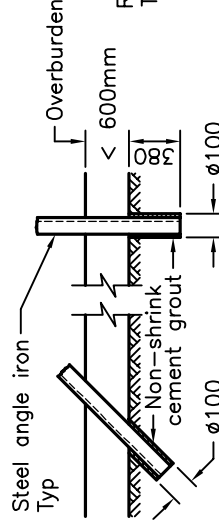
DETAIL A
STEEL LINE POST IN
OVERBURDEN LESS THAN 600mm

STEEL POST DEPTH IN ROCK	LINE
EARTH OVERBURDEN DEPTH	POST DEPTH Min
< 600	380
600-1000	230



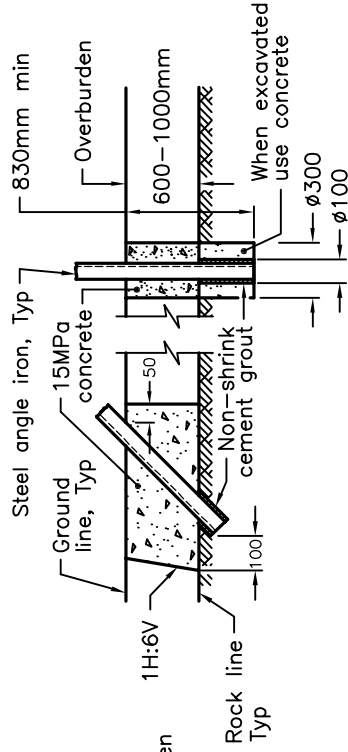
DETAIL B

STEEL LINE POST IN
OVERBURDEN BETWEEN 600mm - 1000mm



DETAIL C

BRACE PANEL IN
OVERBURDEN LESS THAN 600mm



DETAIL D

BRACE PANEL IN
OVERBURDEN BETWEEN 600mm - 1000mm

NOTES:

- 1 Standard line post spacing shall be 5.0m.
- A This OPSD shall be read in conjunction with OPSD 971.103.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

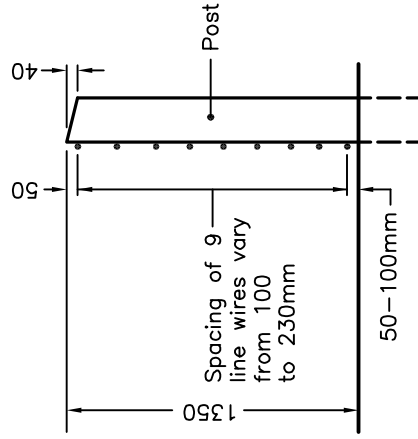
Nov 2016

Rev 2

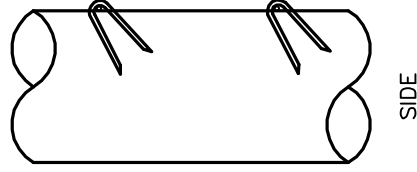


FENCE, HIGHWAY
IN SOLID ROCK
INSTALLATION

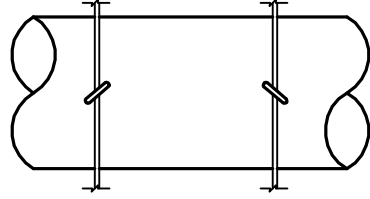
OPSD 971.102



**FENCE FABRIC
WIRE SPACING DETAIL**

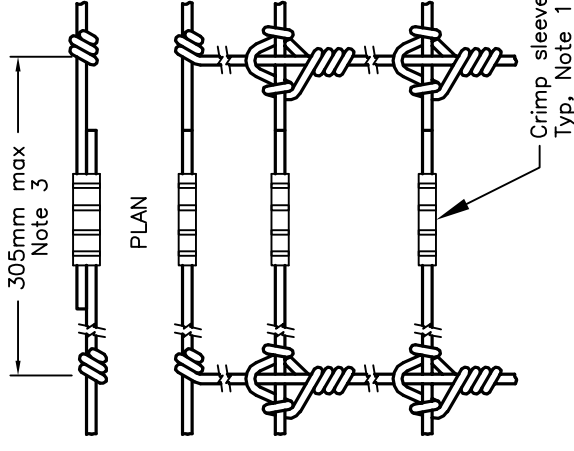


SIDE



FRONT

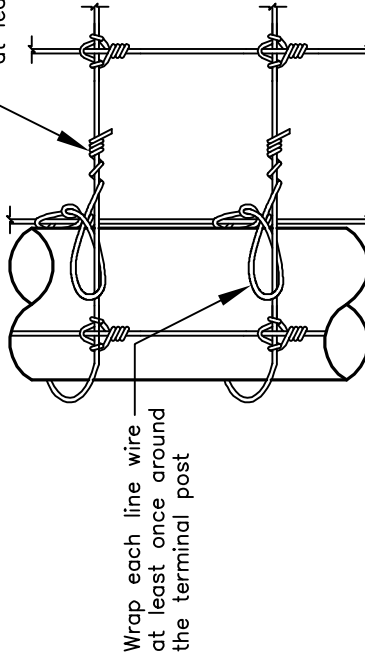
**LINE WIRE WRAPPING
SPlicing DETAIL**



ELEVATION

**CRIMP SLEEVE
SPlicing DETAIL**

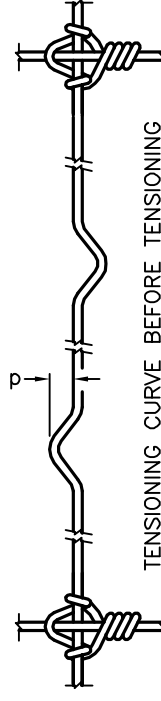
Wrap each line wire around itself
at least four complete turns



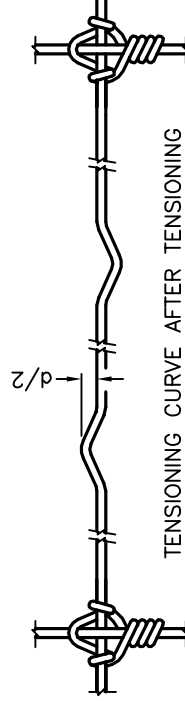
FENCE TERMINATION DETAIL

NOTES:

- 1 Each of the nine line wires shall be spliced with a crimp sleeve. Crimp sleeves shall be installed according to the manufacturer's instructions for the type of fence fabric installed.
- 2 The tensioned curves shall be one half the size of the untensioned curves.
- 3 Both fabric end vertical stay wires shall be within a maximum of 305mm centres.
- A All dimensions are in millimetres unless otherwise shown.



TENSIONING CURVE BEFORE TENSIONING



TENSIONING CURVE AFTER TENSIONING

TENSIONING DETAILS, Note 2

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2016

Rev 0

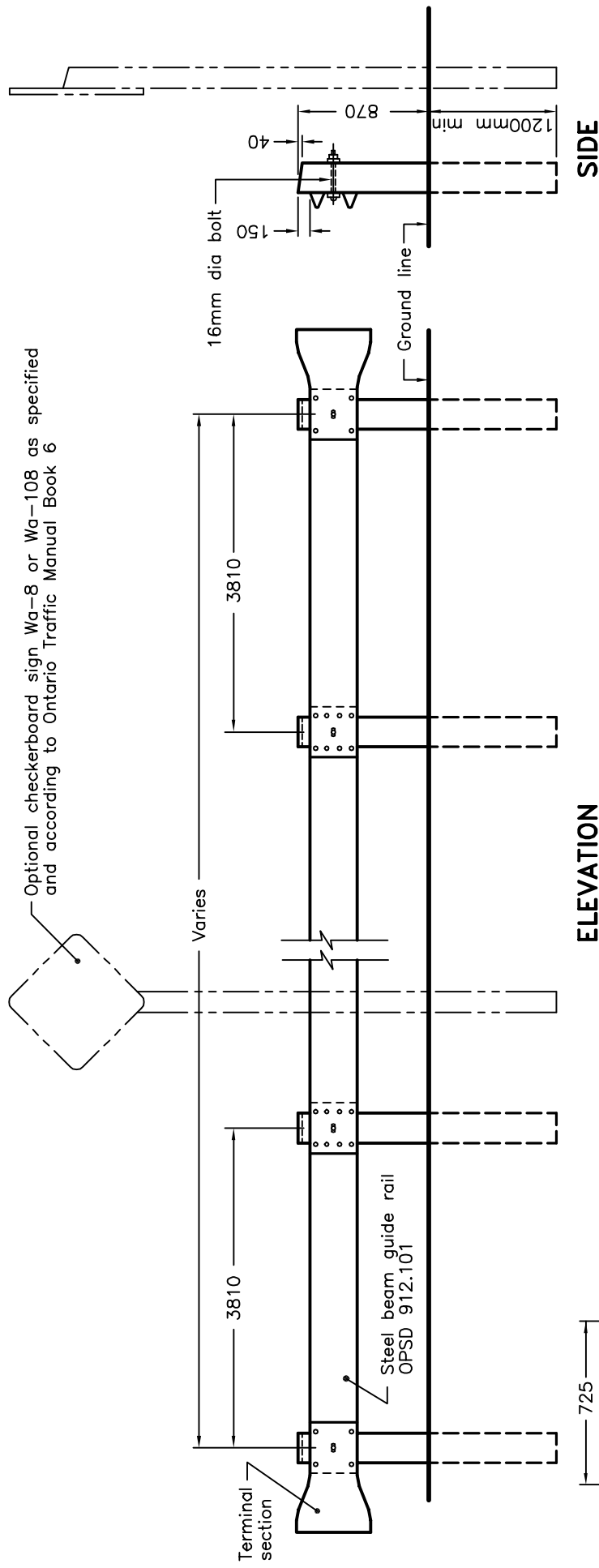
FENCE, HIGHWAY

INSTALLATION DETAILS



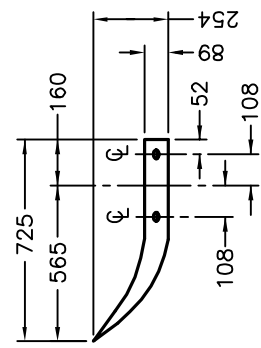
OPSD 971.103

Optional checkerboard sign Wa-8 or Wa-108 as specified and according to Ontario Traffic Manual Book 6



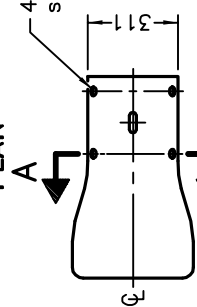
ELEVATION

SIDE



PLAN

4-23 x 29mm slotted holes

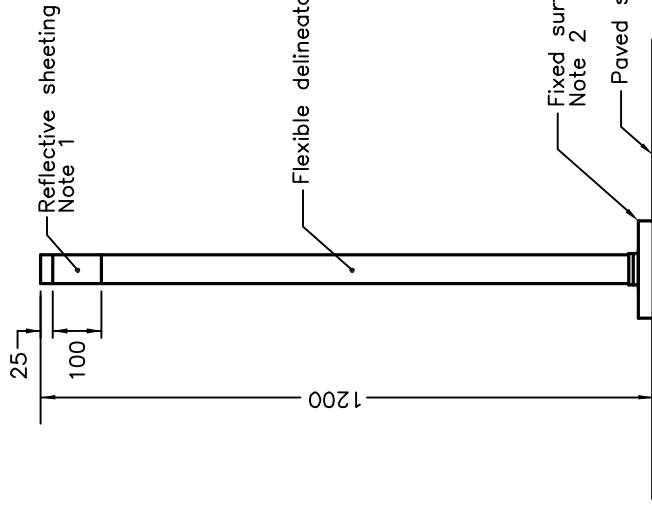


ELEVATION
TERMINAL SECTION

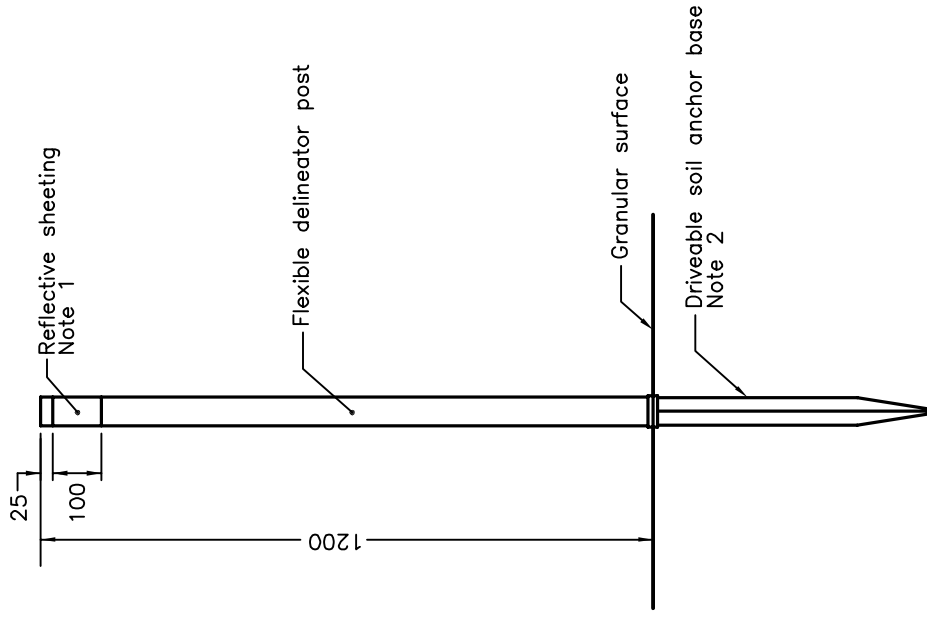
NOTES:

- A Steel beam guide rail mounting heights shall be as specified.
- B This OPSD shall be read in conjunction with OPSD 912.101.
- C Posts: Size 200x200mm nominal, 190x190mm ± 1.5 mm dressed, tops to have 25mm chamfer.
- D All dimensions are in millimetres unless otherwise shown.

		Nov 2016	Rev 0
ONTARIO PROVINCIAL STANDARD DRAWING			
FENCE, STEEL BEAM BARRICADE INSTALLATION		OPSD 973.130	



**PAVED SURFACE INSTALLATION
TYPE A**



**GRANULAR SURFACE INSTALLATION
TYPE B**

NOTES:

- 1 Reflective sheeting shall be wrapped fully around the post.
 - 2 Base shall be installed according to the manufacturer's specifications and installation instructions.
- A All dimensions are in millimetres unless otherwise shown.

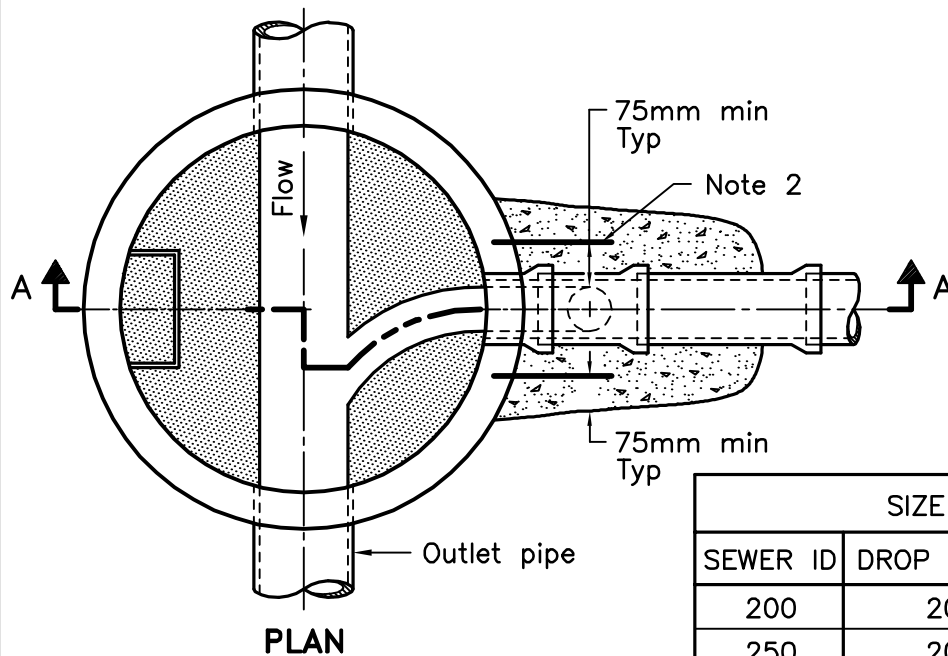
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2016 Rev 0

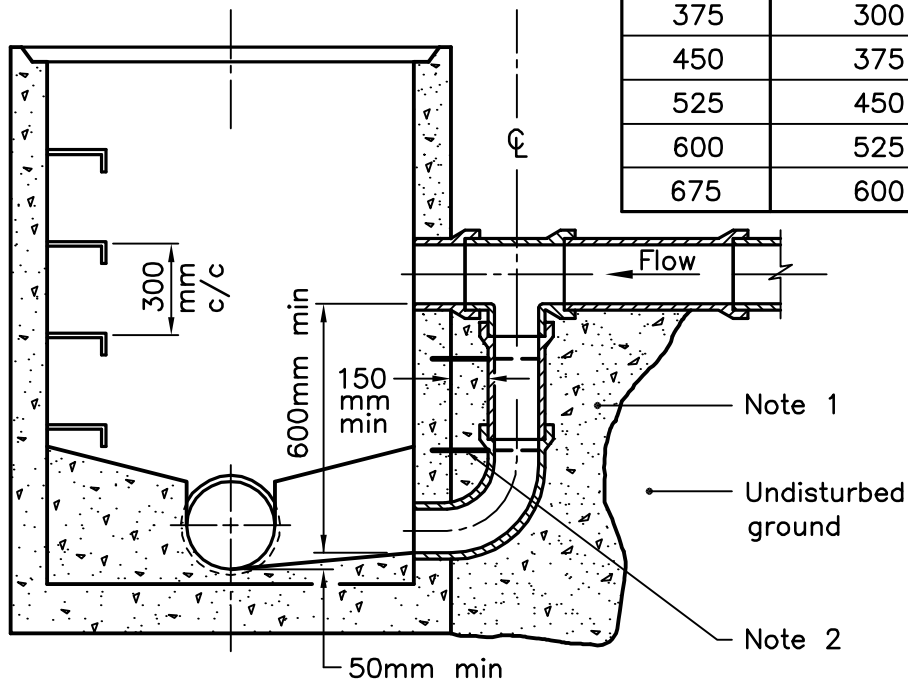


**FLEXIBLE DELINEATOR POST
INSTALLATION – TEMPORARY AND PERMANENT**

OPSD 984.105



SIZE OF DROP PIPE		
SEWER ID	DROP PIPE ID	APPLICATION
200	200	Storm and Sanitary
250	200	Storm and Sanitary
300	250	Storm and Sanitary
375	300	Storm and Sanitary
450	375	Storm
525	450	Storm
600	525	Storm
675	600	Storm



NOTES:

- 1 Concrete shall be placed to undisturbed ground and the outside face of the maintenance hole, but there shall be a minimum of 150mm of 15MPa concrete around the drop pipe.
- 2 Concrete shall be secured to the maintenance hole with 450mm long, 13mm diameter threaded rods and drilled expansion anchors down either side of the drop pipe at 300mm centres.

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

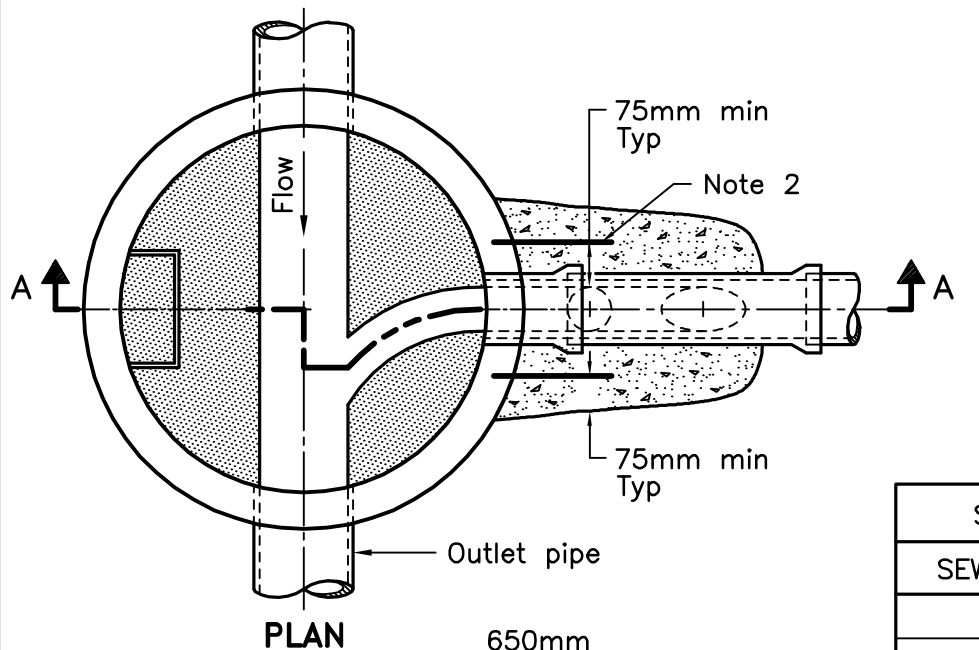
Nov 2016

Rev 3

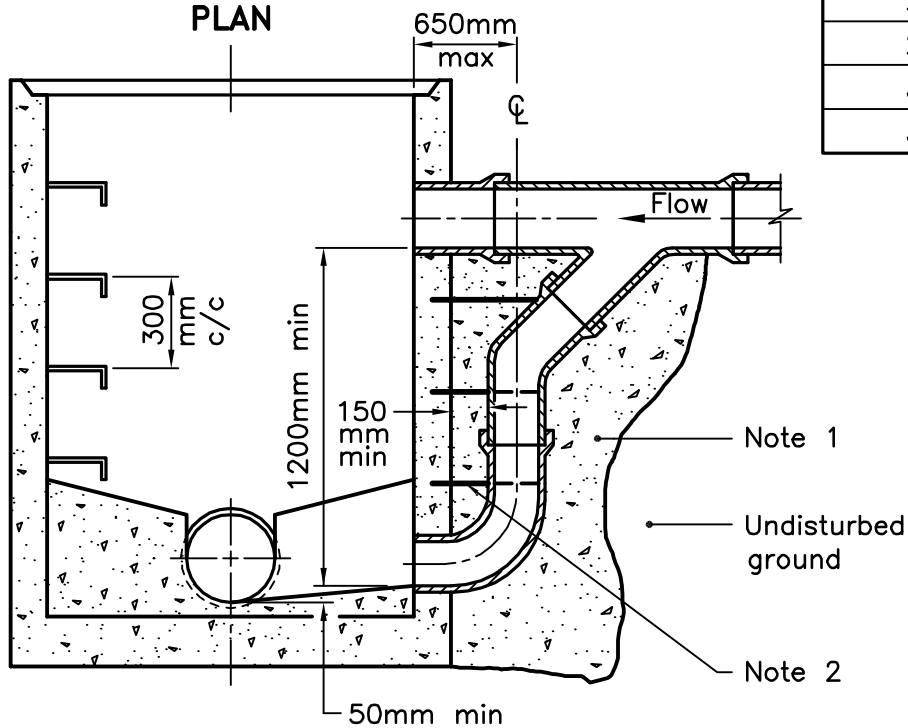
CAST-IN-PLACE
MAINTENANCE HOLE DROP STRUCTURE TEE



OPSD 1003.010



SIZE OF DROP PIPE	
SEWER ID	DROP PIPE ID
200	200
250	200
300	250
375	300



SECTION A-A

NOTES:

- 1 Concrete shall be placed to undisturbed ground and the outside face of the maintenance hole, but there shall be a minimum of 150mm of 15MPa concrete around the drop pipe.
- 2 Concrete shall be secured to the maintenance hole with 450mm long, 13mm diameter threaded rods and drilled expansion anchors down either side of the drop pipe at 300mm centres.

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

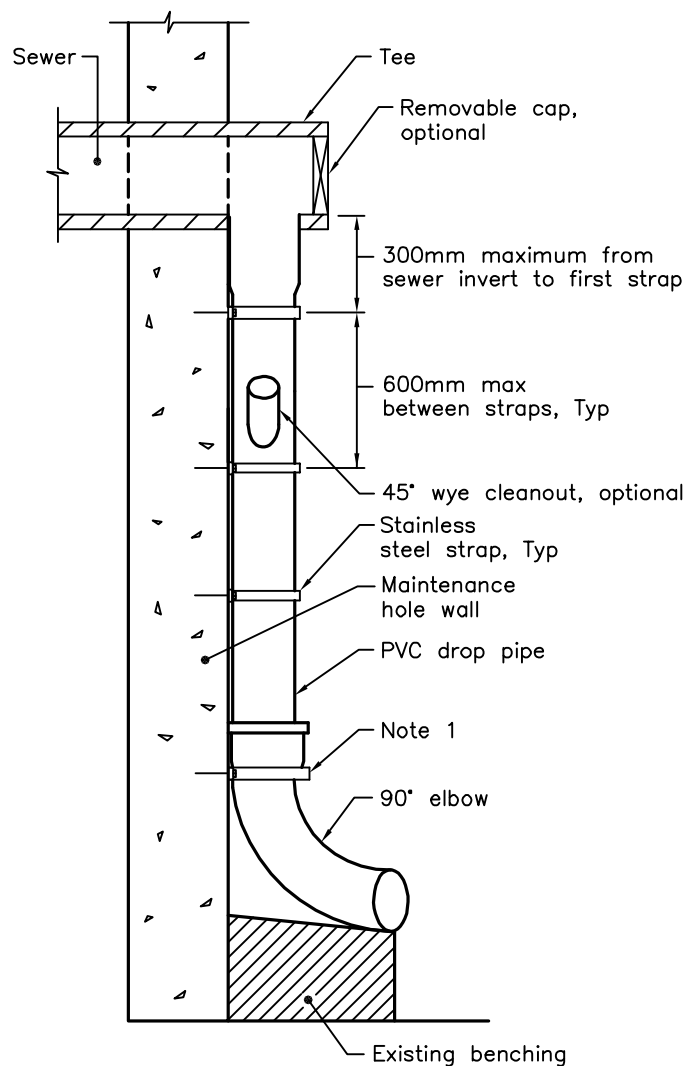
Nov 2016

Rev 3

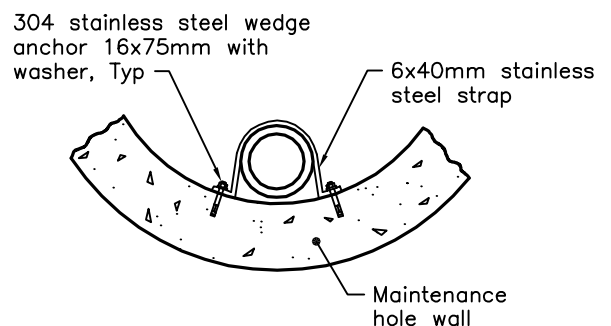
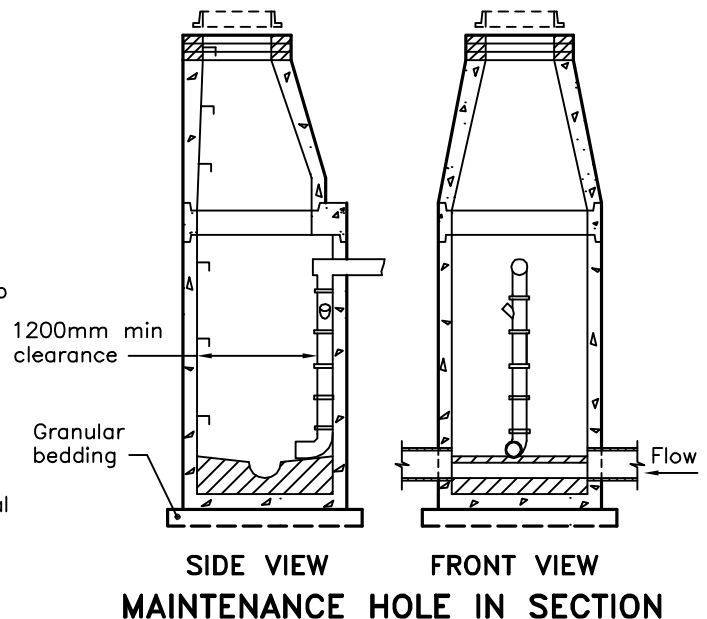
CAST-IN-PLACE
MAINTENANCE HOLE DROP STRUCTURE WYE



OPSD 1003.020



INTERNAL DROP STRUCTURE DETAIL

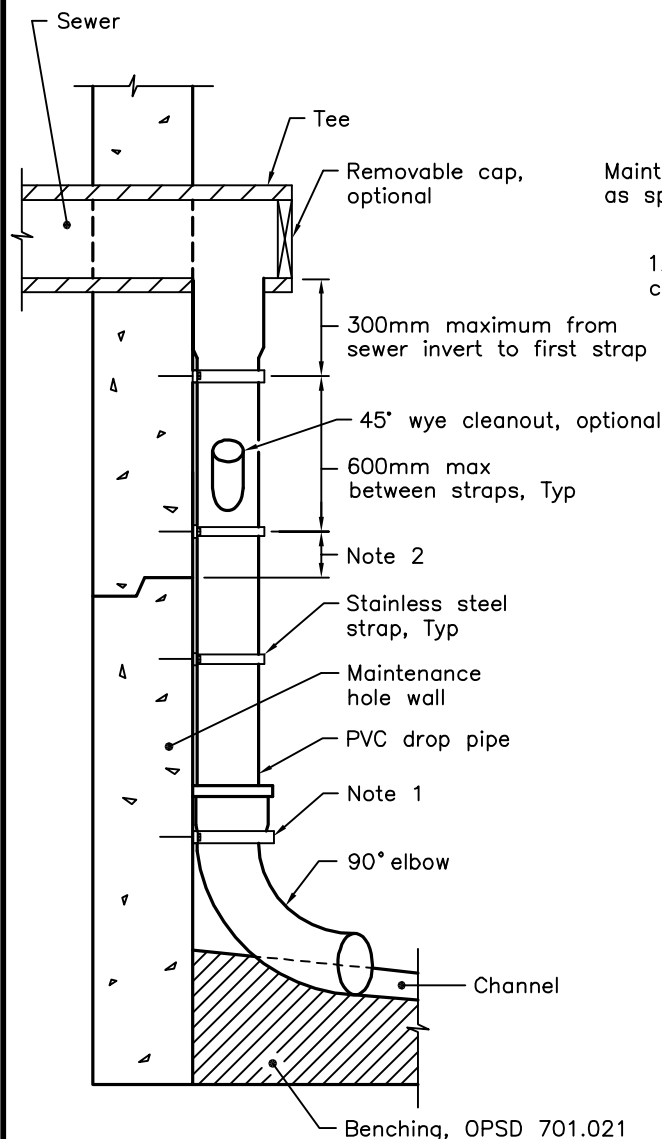


FASTENER DETAIL

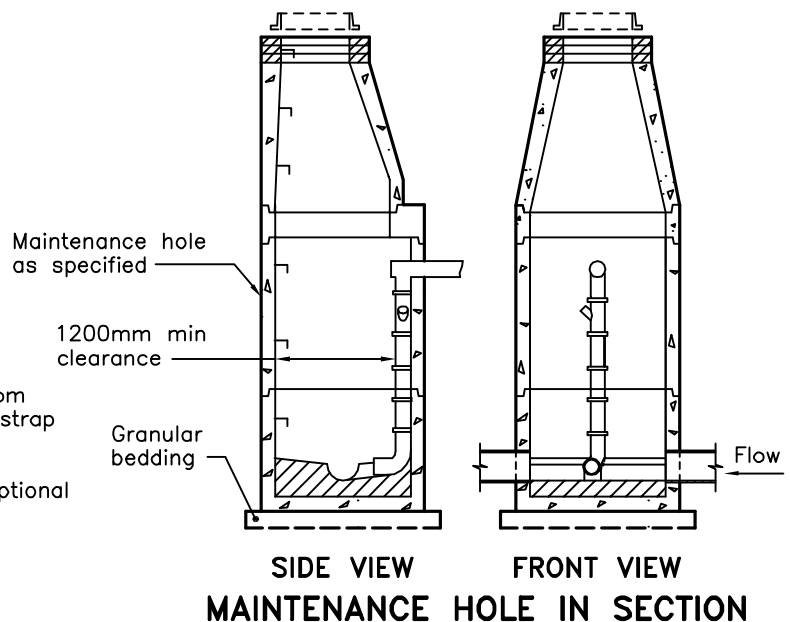
NOTES:

- 1 At the elbow, a stainless steel strap is required at bottom of bell.
- A Internal drop structure shall be used on existing maintenance holes 1500mm diameter and larger with a minimum height of 600mm from the inlet pipe invert to the top of benching. The existing benching shall be modified as required.
- B Drop pipe shall be one size smaller than the incoming sewer with a minimum 150mm diameter and maximum of 375mm diameter. A maximum of 300mm diameter for 1500mm maintenance holes.
- C Straps shall not be placed within 150mm of any maintenance hole section joint.
- D All dimensions are in millimetres unless otherwise shown.

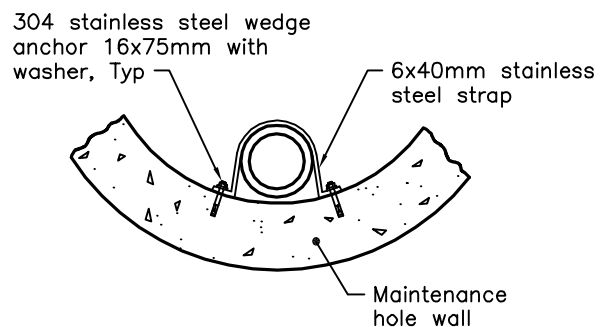
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2016	Rev	4	
INTERNAL DROP STRUCTURE FOR EXISTING MAINTENANCE HOLES	----- -----			
	OPSD 1003.030			



INTERNAL DROP STRUCTURE DETAIL



MAINTENANCE HOLE IN SECTION



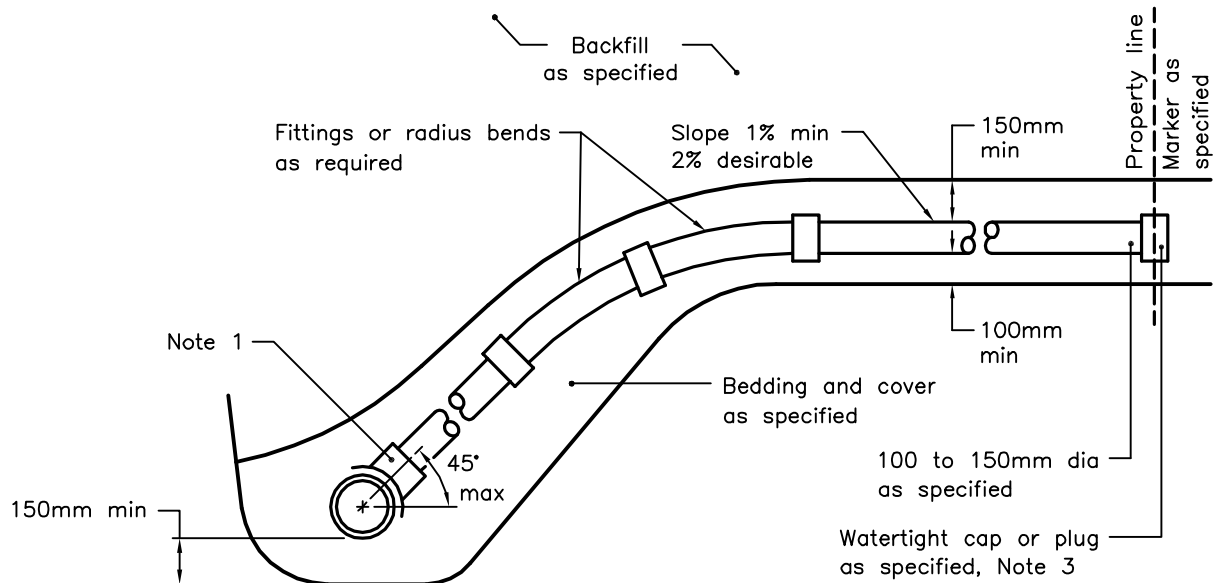
FASTENER DETAIL

NOTES:

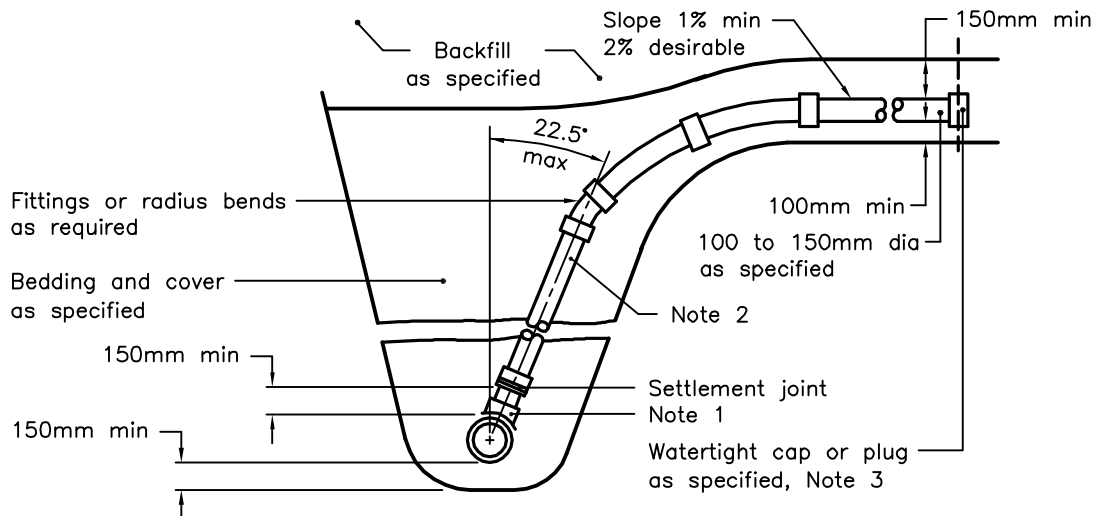
- 1 At the elbow, a stainless steel strap is required at bottom of bell.
 - 2 Straps shall not be placed within 150mm of any maintenance hole section joint.
- A Internal drop structure shall be used in maintenance holes 1500mm diameter and larger with a minimum height of 600mm from the inlet pipe invert to the bottom of channel.
- B Drop pipe shall be one size smaller than the incoming sewer with a minimum 150mm diameter and maximum of 375mm diameter. A maximum of 300mm diameter for 1500mm maintenance holes.
- C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2016	Rev	3	
INTERNAL DROP STRUCTURE FOR NEW MAINTENANCE HOLES	-----			

OPSD 1003.031				



CONNECTION WITHOUT VERTICAL RISER



CONNECTION WITH VERTICAL RISER

NOTES:

- 1 Sewer service connections to the main pipe sewer shall be made using factory made tees, strap-on-saddles, or other approved saddles.
 - 2 Vertical risers shall be as specified.
 - 3 Cap or plug at property line shall be adequately braced.
- A Maintenance holes shall be used at the main sewer to connect service connections greater than or equal to 200mm.
- B For new construction, saddles shall be installed on the main pipe before that pipe is laid.
- C Approved cut-in tool shall be used for field made connections.
- D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2016

Rev 3

SEWER SERVICE CONNECTIONS
FOR MAIN PIPE SEWER

OPSD 1006.010



