

PWGSC	PIPE CULVERTS	Section 33 42 13
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Replacement		
Job No. R.072239.001		2016-03-18

PART 1 - GENERAL

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| <u>1.1 RELATED SECTIONS</u> | .1 | Section 01 33 00 - Submittal Procedures |
| | .2 | Section 01 74 21 - Construction/Demolition Waste Management and Disposal |
| | .3 | Section 31 05 16 - Aggregate Materials |
| | .4 | Section 31 23 33.01 - Excavating, Trenching and Backfilling |
| <u>1.2 REFERENCES</u> | .1 | Canadian General Standards Board (CGSB)
.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric. |
| | .2 | CSA International
.1 CSA A3000-08, Cementitious Materials Compendium (Consists of A5-98, A8- 98, A23.5-98, A362-98, A363-98, A456.1-98, A456.2-98, A456.3-98).
.1 CAN/CSA-A5-98, Portland Cement.
.2 CSA A257 Series-09, Standards for Concrete Pipe and Manhole Sections. |
| <u>1.3 ACTION AND INFORMATIONAL SUBMITTALS</u> | .1 | Submit in accordance with Section 01 33 00 - Submittal Procedures. |
| | .2 | Submit list of all pipe, indicating location, type, diameter, length and invert elevations for Departmental Representative review, at least 4 weeks prior to ordering of pipe. |
| | .3 | Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for pipes and backfill and include product characteristics, performance criteria, physical size, finish and limitations. |
| | .4 | Samples:
.1 Inform Departmental Representative at least 4 weeks before beginning Work, of proposed source of bedding materials and provide access for sampling. |
| | .5 | Certification: to be marked on pipe. |

- .6 Test and Evaluation Reports:
 - .1 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations.
 - .2 Store and protect pipes from damage.
 - .3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 CONCRETE

- .1 Concrete: to CAN/CSA A257 Series-14.

2.2 GRANULAR BEDDING AND BACKFILLING

- .1 Granular bedding and backfill material to Section 32 11 23 - Aggregate Base Courses.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for pipe culvert installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

- .1 Temporary Erosion and Sediment Control:
 - .1 Provide temporary erosion and sedimentation
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control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control plan, specific to site, that complies with requirements of authorities having jurisdiction.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TRENCHING

- .1 Do trenching work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Obtain Departmental Representative's approval of trench line and depth prior to placing bedding material or pipe.

3.4 BEDDING

- .1 Dewater excavation, as necessary, to allow placement of culvert bedding in dry condition. Bedding in accordance with Class B Bedding as indicated on NSTIR Standard Drawing HS506 bedding for Concrete. Pipe in Appendix C.
- .2 Place 200 mm minimum thickness of approved granular material on bottom of excavation and compact to 95% minimum of corrected maximum dry density.
- .3 Shape bedding to fit lower segment of pipe exterior so that width of at least 50% of pipe diameter is in close contact with bedding and to camber as indicated or as directed by Departmental Representative, free from sags or high points.
- .4 Place bedding in unfrozen condition.

3.5 JOINTS: CONCRETE PIPE CULVERTS

- .1 Joints may be made with rubber gaskets, bituminous jointing compound or Portland cement mortar.
 - .1 Rubber gasket joints:
 - .1 Install in accordance with manufacturer's written recommendations.
 - .2 Ensure that tapered ends are fully

- entered into flanged ends.
- .2 Bituminous filled joint:
 - .1 Make joint with excess of filler to form continuous bead around outside of pipe and finish smooth on inside.
- .3 Mortar joints:
 - .1 Prepare mortar as specified herein.
 - .2 Clean pipe ends and wet with water before joint is made.
 - .3 Place mortar in lower half of flanged end of pipe section in place.
 - .4 Apply mortar to upper half of tapered end of pipe section being installed.
 - .5 Join pipe ends and force joint up tight, taking care to ensure inner surfaces of abutting pipe sections are flush and even.
 - .6 Clean inside of pipe and annular space between ends of pipes after each joint is made.
 - .7 Fill joint with mortar and finish smooth and even.
 - .8 For pipes 800 mm or less diameter, fill joints before mortar in joints has set.
 - .9 For pipes over 800 mm diameter, postpone filling joint until backfilling has been completed. Re-clean joints before applying mortar.

3.6 BACKFILLING

- .1 Place and compact granular material for bedding and backfilling in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling.

END SECTION

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PART 1 - GENERAL

<u>1.1 RELATED REQUIREMENTS</u>	.1	Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.
<u>1.2 REFERENCES</u>	.1	CSA C22.2 No. 211.2-06(R2011), Rigid PVC (Unplasticized) Conduit.
<u>1.3 ACTION AND INFORMATIONAL SUBMITTALS</u>	.1	Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
	.2	Product Data:
	.1	Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
<u>1.4 QUALITY ASSURANCE</u>	.1	Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
	.1	Certificates: signed by manufacturer certifying materials comply with specified performance characteristics and physical properties.
	.2	Manufacturer's Instructions: for installation and special handling criteria, installation sequence and cleaning procedures.
<u>1.5 DELIVERY, STORAGE AND HANDLING</u>	.1	Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
	.2	Delivery and Acceptance Requirements:
	.1	Deliver materials to site in original factory packaging, labeled with manufacturer's name, address.
	.3	Packaging Waste Management: remove for reuse and return packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

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| <u>2.1 RIGID PVC CONDUITS</u> | .1 | Rigid PVC conduits to CSA C22.2 No. 211.2. |
| | .2 | Rigid PVC couplings, reducers, plugs, caps, adaptors, and supports to make a complete installation. |
| | .3 | Expansion joints as recommended by manufacturer and as required. |
| <u>2.2 CABLE PULLING EQUIPMENT</u> | .1 | 6 mm stranded nylon pull rope tensile strength 5 kN. |
| <u>2.3 MARKERS</u> | .1 | Concrete type cable markers: as indicated, with words: "Cable", "Joint" or "Conduit" impressed in top surface, with arrows to indicate change in direction of duct runs. |
| <u>2.4 WARNING TAPE</u> | .1 | Standard 4-mil polyethylene 76 mm wide tape, yellow with black letters, imprinted with "CAUTION BURIED ELECTRIC CABLE BELOW". |

PART 3 - EXECUTION

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| <u>3.1 MANUFACTURER'S INSTRUCTIONS</u> | .1 | Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets. |
| <u>3.2 INSTALLATION</u> | .1 | Install duct pipe in accordance with manufacturer's instructions and at elevations as indicated. |
| | .2 | Clean inside of ducts before laying. |
| | .3 | Install plastic duct spacers and ensure full, even support every 1.5 m and smooth transition throughout duct length. |
| | .4 | Slope ducts with 1 to 400 minimum slope. |
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- .5 Install plugs and cap both ends of ducts to prevent entrance of foreign materials during and after construction.
- .6 Pull through each duct steel wooden mandrel not less than 300 mm long and of diameter 6 mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign material.
 - .1 Pull stiff bristle brush through each duct immediately before pulling-in cables.
- .7 Install a pull rope continuous throughout each duct run with 3 m spare rope at each end.
- .8 Place continuous strip of warning tape 1/2 way between installation and grade level before backfilling trenches.
- .9 Install markers as required.
- .10 Notify the Departmental Representative for field review upon completion of direct buried ducts and obtain acceptance prior to backfill.

3.3 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION