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## PART 1 - GENERAL

1.1 SECTION <u>INCLUDES</u>	.1	This Section specifies requirements for constructing new precast outfall structures, maintenance holes and catch basins, and the extended detention outlet structures for the stormwater management facilities.
1.2 RELATED <u>SECTIONS</u>	.1	Section 03 20 00: Concrete Reinforcing.
	.2	Section 31 05 17: Aggregate Materials.
	.3	Section 31 23 33.01: Excavation, Trenching and Backfilling.
	.4	Section 33 44 00: Storm Utility Drains.
	.5	Section 33 46 16: Sub-drainage.
	.6	Section 31 23 33.01: Excavate and backfill.
1.3 MEASUREMENT <u>AND PAYMENT</u>	.1	Measure maintenance holes and catch basins in units including frames, gratings and covers for the types/sizes indicated on the Unit Price Table. .1 OPSD 701.010 Depth 3.5-4.0 m. .2 OPSD 701.011 Depth 0.0-2.0 m. .3 OPSD 701.011 Depth 2.0-2.5 m. .4 OPSD 701.011 Depth 3.5-4.0 m. .5 OPSD 701.011 Depth 4.0-4.5 c/w Drop Structure OPSD 1003.031.
	.2	Measure adjusting tops of existing maintenance holes or catch basins in units.
	.3	Measure outfall structures in units, including chain link fence and grating. .1 OPSD 804.040, OPSD 804.050, OPSD 972.131.
	.4	Measure slide gate valves in units, including all required appurtenances.
	.5	Measure orifice plates in units.
	.6	Measure the extended detention outlet structures for the stormwater management facilities in units, including all materials indicated in article 2.1.10

of Section 33 05 14.

- .1 North Pond.
- .2 South Pond.

#### 1.4 REFERENCES

- .1 Ontario Provincial Standard Specifications (OPSS)
  - .1 OPSS 407, Nov 2007, Construction Specification for Maintenance Hole, Catchbasin, Ditch Inlet and Valve Chamber Installation.
  - .2 OPSS 408, Nov 2007, Construction Specification for adjusting or rebuilding maintenance holes, catchbasins, ditch inlets and valve chambers.
  - .3 OPSS 501, Nov 2010, Construction Specification for Compacting.
  - .4 OPSS 1351, Apr 2010, Material Specification for precast reinforced concrete components for maintenance holes, catchbasins, ditch inlets and valve chambers.
- .2 Ontario Provincial Standard Drawings (OPSD):
  - .1 OPSD 400.010, Nov 2007, Cast Iron, Square Frame with Square Overflow Type Dished Grate for Catchbasins, Herring Bone Openings.
  - .2 OPSD 401.010, Nov 2007, Cast Iron, Square Frame with Circular Closed or Open Cover for Maintenance Holes.
  - .3 OPSD 405.020, Nov 2008, Maintenance Hole Steps, Hollow.
  - .4 OPSD 701.010, Nov 2009, Precast Concrete Maintenance Hole, 1200mm Diameter.
  - .5 OPSD 701.011, Nov 2009, Precast Concrete Maintenance Hole, 1500mm Diameter.
  - .6 OPSD 701.021, Nov 2009, Maintenance Hole benching and pipe Opening Alternatives.
  - .7 OPSD 804.040, Nov 2006, Concrete Headwall, For Sewer or Culvert Pipe Outlet.
  - .8 OPSD 1003.031, Nov 2005, Internal Drop Structure for Existing Maintenance Holes.
- .3 Canadian Standards Association (CSA International):
  - .1 CSA-A23.1-09/A23.2-09, Concrete materials and methods of concrete construction/Test methods and standard practices for concrete.
  - .2 CAN/CSA-A3000-08, Cementitious Materials Compendium.
  - .3 CAN/CSA-A179-04 (R2009), Mortar and grout for unit masonry - Third Edition; Update No 1.
- .4 American Society for Testing and Materials International (ASTM):
  - .1 ASTM C478-09, Standard Specification for Precast Reinforced Concrete Maintenance Holes Sections.
  - .2 ASTM A276-10, Standard Specification for Stainless Steel Bars and Shapes.
  - .3 ASTM B36/B36M-08 (Rev A), Standard Specification

for Brass Plate, Sheet, Strip, And Rolled Bar.  
.4 ASTM F593-08, Standard Specification for  
Stainless Steel Bolts, Hex Cap Screws, and Studs.  
.5 ASTM F594-09, Standard Specification for  
Stainless Steel Nuts.  
.6 ASTM A582-05, Standard Specification for  
Free-Machining Stainless Steel Bars.  
.7 ASTM A26-09, Standard Specifications for Steel  
Tires.  
.8 ASTM D698-07, Standard Test Methods for  
Laboratory Compaction Characteristics of Soil Using  
Standard Effort (12 400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).

## 1.5 QUALITY CONTROL

- .1 Departmental Representative will inspect material at construction site.
- .2 Minimum testing requirements for Contractor:
  - .1 Provide quality control for compaction of various materials in accordance with OPSS 501 Table 1.

## 1.6 SUBMITTALS

- .1 Submittals shall be made in accordance with Section 01 33 00.
- .2 Submit shop drawings and product data for slide gate valves, in accordance with Section 01 33 00.
- .3 Submit maintenance data for slide gate valves for incorporation into manual specified in Section 01 78 00.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Cement: to CAN/CSA-A3001, Type GU.
- .2 Water, aggregates, admixtures: to CSA-A23.1/A23.2.
- .3 Frames, gratings, covers: to following requirements for designated materials:
  - .1 Metal gratings and covers to bear evenly on frames. A frame with grating or cover to constitute one unit. Assemble and mark unit components before shipment.
  - .2 Maintenance hole frames and covers: cover cast without perforations and complete with two 25 mm square

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- lifting holes to OPSD 401.010, Type A.
- .3 Catchbasin frames and grates to OPSD 400.010.
- .4 Precast maintenance holes: to ASTM C478M.
- .5 Ladder rungs: to OPSD 405.020.
- .6 Mortar:
  - .1 Aggregate: to CSA A179.
  - .2 Cement: to CAN/CSA-A3002.
- .7 Adjustment units: precast concrete to OPSS 1351.
- .8 Slide Gate Valves: to following requirements for designated materials:
  - .1 Seat, lift housing, and slide, crossbar and wedges shall be cast iron A48 class 30.
  - .2 Frame shall be stainless steel type 304 or 304L to ASTM A276.
  - .3 Seating faces shall be aluminum bronze to ASTM B36, C26000.
  - .4 Assembly fasteners shall be stainless steel type 304 to ASTM F593 (bolts) and ASTM F594 (nuts).
  - .5 Mounting gaskets shall be butyl joint sealer (12 mm square). Hamilton-Kent - Kent Seal or approved equivalent.
  - .6 Anchor bolts shall be stainless steel type 304 to ASTM F593/F594.
  - .7 Stem shall be stainless steel type 303 to ASTM A582, with an aluminum stem cover.
  - .8 Lift nut shall be cast zinc aluminum ZA12.
  - .9 T-wrench handles shall be made of steel pipe and tubing furnished with sockets to suite the operating nut.
- .9 Orifice plates shall be galvanized stainless steel to ASTM A26, with 12.7 mm x 63.5 mm stainless steel type 304 wedge anchor bolts to ASTM A2765 and nuts and washers to ASTM F593.
- .10 The extended detention outlet structures for the stormwater management facilities shall include the following:
  - .1 2400 mm diameter corrugated steel riser pipe (HEL-COR or equivalent), including a galvanized aluminum lid with 675 mm diameter hinged access and lock and galvanized steel anchor brackets shown on Drawings.
  - .2 200 mm thick 2.8 m diameter concrete slab on a minimum 150 mm depth of compacted granular A material.
  - .3 Aluminum ladder as per OPSD 406.010.
  - .4 53 mm clear stone jacket to dimension shown on Drawings.
  - .5 All internal pipe work within the structure; including perforated PVC Riser Pipe, PVC End Cap, Tee and Tee Anchors, as shown on Drawings.

### PART 3 - EXECUTION

#### 3.1 EXCAVATION AND BACKFILL

- .1 Obtain approval of Departmental Representative before installing outfall structures, maintenance holes or catch basins.

#### 3.2 CONCRETE WORK

- .1 Do concrete work to CSA-A23.1/A23.2.
- .2 Position metal inserts to dimensions and details shown or required.

#### 3.3 INSTALLATION

- .1 Construct units to details indicated, plumb and true to alignment and grade.
- .2 Complete maintenance holes as pipe laying progresses. Maximum of 3 maintenance holes behind point of pipe laying will be allowed.
- .3 Dewater maintenance hole excavation and remove soft and foreign material before placing granular bedding material, if required.
- .4 Set precast concrete slab on 75 mm minimum of well compacted granular A material.
- .5 Set bottom section of precast unit in place. Make each successive joint watertight with approved rubber ring gaskets, mastic joint filler, cement mortar, or combination thereof.
- .6 Clean surplus mortar and joint compounds from interior surface of unit as work progresses.
- .7 Plug lifting holes with precast concrete plugs set in cement mortar or compound.
- .8 Benching:
  - .1 Place stub outlets and bulkheads at elevations and in positions indicated.
  - .2 Bench to provide a smooth U-shaped channel in accordance with OPSD 701.021.

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- .9 Set frame and cover to required elevation on at least 1 and not more than 3 precast concrete adjustment units.
- .10 Clean units of debris and foreign materials; remove fins or sharp protuberances.
- .11 Compact granular 'B' backfill to 95% maximum density to ASTM D698.
- .12 Place unshrinkable backfill in accordance with Section 31 23 33.01 where directed by the Departmental Representative.
- .13 Installing units in existing systems:
  - .1 Where new unit is to be installed in existing run of pipe, ensure full support of existing pipe during installation, and carefully remove that portion of existing pipe to dimensions required and install new unit as specified.
  - .2 Make joints watertight between new unit and existing pipe.
  - .3 Where deemed expedient to maintain service around existing pipes and when systems constructed under this Project are ready to be put in operation, complete installation with appropriate break-outs, removals, redirection of flows, blocking unused pipes or other necessary work.
- .14 Install safety platforms to OPSD 404.020 in maintenance holes having depth of 5 m or greater, as indicated.
- .15 All slide gate valves to be installed in accordance with manufacturer's specifications.
- .16 Orifice plates to be anchored to concrete using stainless steel wedge anchor bolts, with a minimum 10 mm bead of silicone caulk along perimeter of plate.