

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 03 20 00 - Concrete Reinforcing.
- .2 Section 03 30 00 - Cast-In-Place Concrete.
- .3 Section 31 22 14 - Airfield Grading.
- .4 Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .5 Section 32 11 16.01 - Granular Sub-Base.
- .6 Section 32 11 23 - Aggregate Base Courses.

1.2 REFERENCES

- .1 Ontario Provincial Standard Specifications (OPSS).
 - .1 OPSS 407, November 2015, Construction Specification for Maintenance Hole, Catch Basin, Ditch Inlet and Valve Chamber Installation.
 - .2 OPSS 408, November 2014, Construction Specification for Adjusting or Rebuilding Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers.
- .2 Ontario Provincial Standard Drawings (OPSD)
 - .1 OPSD 701.021, November 2014, Maintenance Hole Benching and Pipe Opening Alternatives.
- .3 Ontario Regulation 332/12: Building Code

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit shop drawings in accordance with the Construction Contract.
- .2 Provide shop drawings for specified items as follows:
 - .1 Maintenance Holes, Trench Drains, and Catchbasins.
 - .2 Frames, Grates, and Covers.

1.4 QUALITY ASSURANCE

- .1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work with the Departmental Representative:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
- .2 The Contractor shall perform field tests for quality control of all maintenance holes. Specifically, the testing shall be completed in accordance with OPSS 407. The tests shall be performed in the presence of a certified professional engineer who shall submit a certified copy of the test results to the Contract Administrator.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Contractor shall provide materials to the following requirements and standards:
 - .1 Cast-in-place concrete: to Section 03 30 00 - Cast-In-Place Concrete.
 - .2 Concrete reinforcement: to Section 03 20 00 - Concrete Reinforcing.
- .2 Precast catch basins units to ASTM C478 and OPSD 705.010, complete with 600 mm deep sump. Precast catch basin maintenance hole units to ASTM C478 and OPSD 701.010 and OPSD 701.011.
 - .1 Adjusting rings: to ASTM C478 and OPSD 704.010 or 704.011.
 - .2 Frames, gratings, covers to dimensions as indicated and following requirements:
 - .3 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.
 - .4 Gray iron castings: to ASTM A48/A48M, strength class 30B.
 - .5 Castings coated with two applications of asphalt varnish.
 - .6 Catch basin frames and covers to OPSD 400.010.
 - .7 Catch basin maintenance hole frames and covers to OPSD 401.010 Type 'B'.
- .3 Joints: made watertight using Nitrile RFS Prelubricated rubber rings.
- .4 Components: to ASTM C478M and OPSS 1351.
- .5 Granular base bedding and backfill: in accordance with Section 32 11 23 - Aggregate Base Courses.
- .6 Granular subbase backfill: in accordance with Section 32 11 16.01 - Granular Sub-Base.
- .7 Unshrinkable fill: in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

PART 3 - EXECUTION

3.1 EXCAVATION AND BACKFILL

- .1 Contractor shall excavate and backfill in the apron in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling and as indicated in contract drawings.
- .2 Contractor shall excavate and backfill inside the terminal in accordance with the Ontario Building Code.
- .3 Contractor shall obtain approval of the Departmental Representative before installing manholes or catchbasins.

3.2 CONCRETE WORK

- .1 Contractor shall do concrete work in accordance with Section 03 30 00 - Cast-In-Place Concrete.
- .2 Contractor shall place concrete reinforcement in accordance with Section 03 20 00 - Concrete Reinforcing.

3.3 INSTALLATION

- .1 Maintenance hole and catch basin installation shall be in accordance with OPSS 407. Installation shall also follow the construction drawing set.
- .2 Install trench drain system in accordance with manufacturer's installation instruction and recommendations.
- .3 Backfill and compaction in the apron in compliance with Section 31 22 14 - Airfield Grading and Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .4 Backfill and compaction inside the terminal in compliance with the Ontario Building Code.

3.4 ADJUSTING TOPS OF EXISTING UNITS

- .1 Adjustment and/or rebuilding of maintenance holes and catch basins to suit final surface elevations shall be in accordance with OPSS 408.

3.5 REBENCHING EXISTING UNITS

- .1 Maintenance holes to be re-benched in accordance with OPSD 701.021.

3.6 RECORD DRAWINGS

- .1 Provide as-built plan(s) showing location, inverts and top of grate elevation of all manholes, trench drains, and catchbasins.

END OF SECTION

PART 1 – GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 33 05 16 – Maintenance Holes and Catch Basins Structures.

1.2 MEASUREMENT AND PAYMENT

- .1 Measure excavation and backfill under Section 31 23 33.01 - Excavating Trenching and Backfilling.
- .2 Measure supply and installation of sanitary sewer including testing and concrete bedding and surround and including excavation and backfilling horizontally from manhole face to manhole face in metres of each size pipe and depth class installed.

1.3 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C443M-07, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).
 - .2 ASTM D698-07e1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft⁴-lbf/ft³(600 kN-m/m³)).
 - .3 ASTM D1869-95 (2005)e1, Standard Specification for Rubber Rings for Asbestos Cement Pipe.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
 - .2 CAN/CGSB-34.9-M94, Pipe, Asbestos Cement, Sewer.
- .3 CSA International
 - .1 CSA A3000-08, Cementitious Materials Compendium.
 - .2 CSA A257 Series-09, Standards for Concrete Pipe and Manhole Sections.
 - .3 CAN/CSA-B70-06, Cast Iron Soil Pipe, Fittings, and Means of Joining.
- .4 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 407, November 2015, Construction Specification for Maintenance Holes, Catch Basin, Ditch Inlet, and Valve Chamber Installation.
 - .2 OPSS 409, November 2013, Construction Specification for Closed-Circuit Television (CCTV) Inspection of Pipelines.
 - .3 OPSS.PROV 410, November 2015, Construction Specification for Pipe Sewer Installation in Open Cut.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Scheduling:
 - .1 Schedule Work to minimize interruptions to existing services and maintain existing sewage flows during construction.
 - .2 Submit schedule of expected interruptions for approval and adhere to approved schedule.
 - .3 Notify Departmental Representative 48 hours minimum in advance of any interruption in service.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for pipes, and gaskets and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Ontario, Canada.
 - .2 Indicate on drawings proposed method for installing carrier pipe for under crossings.
- .4 Certificates:
 - .1 Certification to be marked on pipe.

1.6 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 PIPE

- .1 Reinforced circular concrete pipe and fittings: to CSA A257 600mm diameter, strength classification 140D, designed for flexible rubber gasket joints to CSA A257.
- .2 Lifting holes:
 - .1 Pipe 900 mm and less diameter - no lift holes.
 - .2 Pipe greater than 900 mm diameter - lift holes not to exceed two in a piece of pipe.
 - .3 Provide pre-fabricated plugs to seal lift holes water tight after installation of pipe.

2.2 CEMENT MORTAR

- .1 Portland cement: to CSA A3000, normal type 10.
- .2 Mix mortar 1 part by volume of cement to two parts of clean, sharp sand mixed dry.
 - .1 Add only sufficient water after mixing to give optimum consistency for placement.
 - .2 Do not use additives.

2.3 PIPE BEDDING AND SURROUND MATERIALS

- .1 150 mm 25 MPa concrete bedding.

2.4 BACKFILL MATERIAL

- .1 As indicated.

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 sewer pipe 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 Sedimentation Control:
 - .1 Provide temporary erosion and sedimentation 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 drawings.
 - .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.
- .2 Clean pipes and fittings of debris and water before installation, and remove defective materials from site to approval of Departmental Representative.
- .3 Clean and dry pipes and fittings before installation.
- .4 Obtain Departmental Representative's approval of pipes and fittings prior to installation.

3.3 TRENCHING

- .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Protect trench from contents of sewer or sewer connection.
- .3 Trench alignment and depth require approval of Departmental Representative prior to placing bedding material and pipe.

3.4 CONCRETE BEDDING AND ENCASEMENT

- .1 Do concrete Work in accordance with Section 03 30 00 - Cast-in-Place Concrete.
 - .1 Place concrete to details as indicated.
- .2 Position pipe on concrete blocks to facilitate placing of concrete.
 - .1 When necessary, rigidly anchor or weight pipe to prevent flotation when concrete is placed.
- .3 Do not backfill over concrete within 24 hours after placing.

3.5 INSTALLATION

- .1 Lay and join pipes to: ASTM C12.
- .2 Lay and join pipes in accordance with manufacturer's recommendations and to approval of Departmental Representative.
- .3 Handle pipe using methods approved by Departmental Representative.
 - .1 Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
- .4 Lay pipes on prepared bed, true to line and grade, with pipe invert smooth and free of sags or high points.
 - .1 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.
- .5 Begin laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
- .6 Joint deflection permitted within limits recommended by pipe manufacturer.
- .7 Water to flow through pipe during construction, only as permitted by Departmental Representative.
- .8 Whenever Work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
- .9 Install plastic pipe and fittings in accordance with CSA B182.11.
- .10 Pipe jointing:
 - .1 Install gaskets in accordance with manufacturer's written recommendations.
 - .2 Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
 - .3 Align pipes before joining.
 - .4 Maintain pipe joints free from mud, silt, gravel and foreign material.
 - .5 Avoid displacing gasket or contaminating with dirt or foreign material. Gaskets so disturbed to be removed, cleaned and lubricated and replaced before joining is attempted.
 - .6 Complete each joint before laying next length of pipe.
 - .7 Minimize joint deflection after joint has been made to avoid joint damage.
 - .8 At rigid structures, install pipe joints not more than 1.2 m from side of structure.
 - .9 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.
- .11 When stoppage of Work occurs, block pipes as directed by Departmental Representative to prevent creep during down time.
- .12 Plug lifting holes with pre-fabricated plugs approved by Departmental Representative, set in shrinkage compensating grout.
- .13 Cut pipes as required for special inserts, fittings or closure pieces as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
- .14 Make watertight connections to manholes.
 - .1 Use shrinkage compensating grout when suitable gaskets are not available.
- .15 Use prefabricated saddles or field connections approved by, for connecting pipes to existing sewer pipes.
 - .1 Joints to be structurally sound and watertight.

3.6 PIPE SURROUND

- .1 Place surround material in unfrozen condition.
- .2 Upon completion of pipe laying, and after Departmental Representative has inspected pipe joints, surround and cover pipes as indicated.
 - .1 Leave joints and fittings exposed until field testing is completed.
- .3 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.
- .4 Place layers uniformly and simultaneously on each side of pipe.
- .5 Compact each layer from pipe invert to underside of backfill to at least 95 % standard Proctor maximum dry density.
- .6 When field test results are acceptable to Departmental Representative, place surround material at pipe joints.

3.7 BACKFILL

- .1 Place backfill material in unfrozen condition.
- .2 Place backfill material, above pipe surround in uniform layers not exceeding 300 mm compacted thickness up to grades as indicated.
- .3 Under paving and walks, compact backfill to at least 95 % standard Proctor maximum dry density.
- .4 Place unshrinkable fill in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.8 FIELD TESTING

- .1 Repair or replace pipe, pipe joint or bedding found defective.
- .2 When directed by Departmental Representative, draw tapered wooden plug with diameter of 50 mm less than nominal pipe diameter through sewer to ensure that pipe is free of obstruction.
- .3 Remove foreign material from sewers and related appurtenances by flushing with water.
- .4 Perform infiltration and exfiltration testing as soon as practicable after jointing and bedding are complete, and service connections have been installed.
- .5 Do infiltration and exfiltration test to ASTM C828.
- .6 Do infiltration and exfiltration testing as specified herein and as directed by Departmental Representative.
 - .1 Perform tests in presence of Departmental Representative.
 - .2 Notify Departmental Representative 24 hours minimum in advance of proposed tests.
- .7 Carry out tests on each section of sewer between successive manholes including service connections.
- .8 Install watertight bulkheads in suitable manner to isolate test section from rest of pipeline.
- .9 Exfiltration test:
 - .1 Fill test section with water to displace air in line. Maintain under nominal head for 24 hours to ensure absorption in pipe wall is complete before test measurements are begun.

- .2 Immediately prior to test period add water to pipeline until there is head of 1 m over interior crown of pipe measured at highest point of test section or water in manhole is 1 m above static ground water level, whichever is greater.
 - .3 Duration of exfiltration test: 2 hours.
 - .4 Water loss at end of test period: not to exceed maximum allowable exfiltration over any section of pipe between manholes.
- .10 Infiltration test:
- .1 Conduct infiltration test in lieu of exfiltration test where static ground water level is 750 mm or more above top of pipe measured at highest point in line to be used.
 - .2 Do not interpolate a head greater than 750 mm to obtain an increase in allowable infiltration rate.
 - .3 Install watertight plug at upstream end of pipeline test section.
 - .4 Discontinue pumping operations for at least 3 days before test measurements are to begin and during this time, keep thoroughly wet at least one third of pipe invert perimeter.
 - .5 Prevent damage to pipe and bedding material due to flotation and erosion.
 - .6 Place 90 degrees V-notch weir, or other measuring device approved by Departmental Representative in invert of sewer at each manhole.
 - .7 Measure rate of flow over minimum of 1 hour, with recorded flows for each 5 min interval.
- .11 Infiltration and exfiltration: not to exceed following limits in L per hour per 100 m of pipe, equal to 0.075L/mm diameter/100meters of pipe sewer/hour, as determined in OPSS 410.
- .12 Repair and retest sewer line as required, until test results are within limits specified.
- .13 Repair visible leaks regardless of test results.
- .14 Television and photographic inspections:
- .1 Carry out inspection of installed sewers by video camera, digital camera or by other related means.
 - .2 Provide means of access to permit Departmental Representative to do inspections.
 - .3 Payment for inspection services in accordance with Measurement and Payment in PART 1.

3.9 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 03 30 00 - Cast-In-Place Concrete
- .2 Section 31 23 33.01 - Excavating, Trenching and Backfilling

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM D3034-15, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- .2 CSA International
 - .1 CAN/CSA-A3000-13, Cementitious Materials Compendium.
 - .2 CAN/CSA A257 Series-14, Standards for Concrete Pipe and Manhole Sections.
- .3 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 407, November 2015, Construction Specification for Maintenance Holes, Catch Basin, Ditch Inlet, and Valve Chamber Installation.
 - .2 OPSS 409, November 2013, Construction Specification for Closed-Circuit Television (CCTV) Inspection of Pipelines.
 - .3 OPSS.PROV 410, November 2015, Construction Specification for Pipe Sewer Installation in Open Cut.

1.3 SAMPLES

- .1 Contractor shall inform the Departmental Representative at least 2 weeks prior to commencing work, of proposed source of bedding and surround materials and provide access for sampling.

1.4 MATERIAL CERTIFICATION

- .1 Contractor shall submit manufacturer's test data and certification a minimum 2 weeks prior to commencing work.
- .2 Certification to be marked on each pipe.

1.5 SCHEDULING OF WORK

- .1 Contractor shall schedule work to minimize interruptions to existing services and to maintain existing flow during construction.
- .2 Contractor shall submit schedule of expected interruptions for approval and adhere to approved schedule.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide as-built plan(s) showing location, lengths, inverts and elevation of sewer installation.

PART 2 - PRODUCTS

2.1 CONCRETE PIPE

- .1 Contractor shall provide reinforced circular concrete pipes and fittings: to CAN/CSA A257.2, diameter, strength classification as indicated in Contract Drawings; designed with Nitrile flexible rubber gasket joints to CAN/CSA A257.3.

2.2 PLASTIC PIPE

- .1 TYPE PSM Poly Vinyl Chloride (PVC) to ASTM D 3034, Standard Dimensional Ratio (SDR): 35 or as otherwise indicated on Contract Drawings or directed by the Departmental Representative.
 - .1 Locked-in gasket and integral bell system.

2.3 PIPE BEDDING AND SURROUND MATERIAL

- .1 Bedding and surround material: in accordance to requirements in Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Concrete for bedding with minimum 25.0 MPa compressive strength: in accordance to Section 03 30 00 - Cast-In-Place Concrete.

2.4 BACKFILL MATERIAL

- .1 The contractor shall provide materials as indicated in Section 31 23 33.01 - Excavating, Trenching and Backfilling and in the Contract Drawings.

2.5 JOINT MORTAR

- .1 The contractor shall provide joint mortar to the following standards and requirements:
 - .1 Portland cement: to CAN/CSA A3000, normal type 10.
- .2 Mortar: one part Portland cement to two parts clean sharp sand mixed with minimum amount of water to obtain optimum consistency for use intended. Do not use additives.

PART 3 - EXECUTION

3.1 PREPARATION

- .1 Clean pipes and fittings of debris and water before installation, and remove defective materials from site to approval of the Departmental Representative.

3.2 TRENCHING AND BACKFILL

- .1 Do trenching and backfill Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Contractor shall not allow contents of any sewer or sewer connection to flow into trench.

- .3 Contractor shall trench alignment and depth to approval of the Departmental Representative prior to placing bedding material and pipe.

3.3 CONCRETE BEDDING

- .1 Do concrete work in accordance with Section 03 30 00 - Cast-In-Place Concrete.
- .2 Contractor shall position pipe on concrete blocks to facilitate placing of concrete. When necessary, rigidly anchor or weight pipe to prevent flotation when concrete is placed.
- .3 Contractor shall backfill over concrete after 24 hours from placing, unless previously approved by the Departmental Representative.
- .4 Contractor shall not use of dry pack for concrete bedding.

3.4 GRANULAR BEDDING

- .1 Contractor shall place granular bedding material as indicated on the Contract Drawings. Contractor shall place bedding in unfrozen condition.
- .2 Contractor shall place granular bedding material in uniform layer(s) not exceeding 150 mm compacted thickness to depth as indicated.
- .3 Contractor shall shape bed true to grade and to provide continuous, uniform bearing surface for pipe. Do not use blocks when bedding pipes.
- .4 Contractor shall shape transverse depressions as required to suit joints.
- .5 Contractor shall compact each layer full width of bed to at least 95 % corrected maximum dry density.
- .6 Contractor shall fill excavation below bottom of specified bedding adjacent to manholes or catch basins with compacted bedding material.

3.5 INSTALLATION

- .1 Installation shall be in accordance with OPSS.PROV 410. Installation shall also follow the Contract Drawings.
- .2 Connections in to existing structures to be in accordance with OPSS 407.

3.6 BACKFILL

- .1 Contractor shall place backfill material in unfrozen condition.
- .2 Contractor shall place backfill material, above pipe surround, in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.

3.7 FLUSHING

- .1 The Contractor shall flush and thoroughly clean all sewers. Remove solid or semisolid material at the downstream manhole and dispose of at an authorized site. Use high velocity truck mounted sewer flusher

completed with its own water tank. Obtain an Fire Hydrant Use Permit for filling for water tanks from the Departmental Representative.

- .2 The Contractor shall take precautions to ensure that flooding or damage does not occur due to water pressures or the debris build-up resultant from flushing operations.

3.8 DEFLECTION TESTING

- .1 In the presence of the Departmental Representative, the Contractor shall pull a suitably designed mandrell, as per following table, through all sewers constructed of plastic pipe to demonstrate that the pipe deflection does not exceed the allowable deflected pipe diameter. The device shall be pulled manually through the pipe not sooner than 30 days after the completion of backfilling and installation of service connections.

<u>Nominal pipe size</u>	<u>Mandrel Contact Length</u>
150 mm	100 mm
200 mm	150 mm
250 mm	200 mm
300 mm	250 mm
350 mm	300 mm
375 mm	300 mm
400 mm	300 mm
450 mm	350 mm
500 mm	400 mm
525 mm	450 mm
600 mm	500 mm
675 mm	575 mm
750 mm	675 mm
900 mm	750 mm
1050 mm	900 mm
1200 mm	1050 mm

- .2 The Contractor is advised that the allowable deflected pipe diameter shall not be greater than 7.5% of the Base Inside Diameter.
- .3 The Contractor is advised that any section of pipe that does not allow the mandrel to pass shall be considered to have failed the deflection test.
- .4 Contractor shall correct any deficiencies at the Contractors expense and shall re-test the sewer line.

3.9 FIELD TESTS AND INSPECTIONS

- .1 Repair or replace pipe, pipe joint or bedding found defective.
- .2 Closed Circuit Television (CCTV) inspection of all new storm sewers shall be performed in accordance with OPSS 409. Three (3) copies of the complete digital CCTV tapes and reports shall be submitted to the Departmental Representative.

END OF SECTION