

STANDARD CONTRACT DOCUMENTS

SUPPLEMENTAL SPECIFICATIONS



THE CORPORATION OF THE CITY OF
ST. THOMAS

Corporation of the City of St. Thomas
Standard Contract Documents



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SUPPLEMENTAL SPECIFICATIONS GENERAL



THE CORPORATION OF THE CITY OF
ST. THOMAS





SUPPLEMENTAL SPECIFICATIONS - GENERAL

Part 1 **AMMENDMENTS TO ONTARIO PROVINCIAL STANDARDS FOR ROADS AND PUBLIC WORKS GENERAL CONDITIONS OF CONTRACT (OPSS.MUNI 100)**

The Ontario Provincial Standards for Roads and Public Works in effect immediately prior to the call for Tenders for this Contract shall apply for the duration of the Contract.

SECTION GC 1.0 - INTERPRETATION

GC 1.04 Definitions

Add the following definitions:

"City" shall mean The Corporation of the City of St. Thomas.

"Corporation" shall mean The Corporation of the City of St. Thomas.

"Council" means the Council of the Corporation.

"Engineer" means a professional engineer licensed in Ontario, appointed by Council to fill the office of the City Engineer of the Corporation of the City of St. Thomas, or the person acting as such.

"Inspector" means an inspector for the Corporation acting under the direction of the Contract Administrator.

"On-site materials"
 means materials located in the Working Area, including native materials and Base materials.

Amend the definition of "Contract Documents" as follows:

"Contract Documents"
 mean the executed Agreement between the Owner and the Contractor, the Tender, the Ontario Provincial Standards for Roads and Public Work, Volumes 1 - 4 inclusive and Volumes 7 and 8, Supplemental Specifications, Special Provisions, Contract Drawings, addenda incorporated in a Contract Document before the execution of the Agreement, such other documents as may be listed in the Agreement, and subsequent amendments to the Contract Document made pursuant to the provisions of the Agreement.



Amend the definition of "Owner" as follows:

"Owner" means the Corporation of the City of St. Thomas.

SECTION GC 2.0 - CONTRACT DOCUMENTS

GC 2.01 Reliance on Contract Documents

Delete paragraph a) of subsection GC 2.01.01 and replace with the following:

- a) The location of all mainline underground Utilities that may affect the Work shall be shown to a tolerance of:
 - i. 1 m horizontal, and
 - ii. 1 m vertical

GC 2.02 Order of Precedence

Delete Order of Precedence a) to k) as set out in paragraph .01 subsection GC 2.02 and replace with the following:

- a) Agreement
- b) Addenda
- c) Special Provisions
- d) Contract Drawings
- e) Supplemental Specifications
- f) Information for Tenderers
- g) Form of Tender
- h) Ontario Provincial Standards for Roads and Public Works, Volumes 1 – 4 inclusive and Volumes 7 and 8
- i) Ontario Traffic Manual
- j) Working Drawings

SECTION GC 3.0 - ADMINISTRATION OF CONTRACT

GC 3.01 Contract Administrator's Authority

Amend paragraph .12 subsection GC 3.01 by the addition of the following:



The whole cost of such removal, replacement or re-execution, including the cost of labour, materials, inspection and testing, shall be borne by the Contractor.

Amend subsection GC 3.01 by the addition of the following paragraphs .18 and .19.

- .18 Notwithstanding the Contract Administrator's Authority as set out in subsection GC 3.01, the Engineer has the authority to overrule any decision made by the Contract Administrator with respect to the Contract.
- .19 The Contract Administrator may appoint an Inspector to see that the provisions of the Contract are faithfully adhered to especially regarding the quality of workmanship and materials. An Inspector may stop the work entirely if there is not sufficient quantity of suitable and approved material on the ground to carry it on properly, or for any other good and sufficient cause including incompetence, drunkenness, negligence or disregard of order. Any work done in the absence of an Inspector or the Contract Administrator may be ordered in writing to be opened up for thorough examination, and must be rebuilt or replaced as directed, and at the Contractor's sole expense, but no approval by any Inspector shall be taken as or construed into, an acceptance of defective or improper work or material, which must, in every case be removed and properly replaced whenever discovered at any stage of the work. Orders given by Inspectors relating to the quality of material and workmanship, must be at once obeyed by the Contractor. Inspectors do not have the power to set out work or give any stakes, lines, gauges, levels, or grades.

GC 3.05 Layout

Delete paragraph .01 of subsection GC 3.05 and substitute the following:

- .01 The Contract Administrator shall provide the Contractor with benchmark information and the location of survey monuments, where applicable. The Contractor shall be responsible for all layout work associated with this Contract. The cost associated with the construction layout shall be included in the appropriate items in the Schedule of Items and Prices.

SECTION GC 4.0 OWNER RESPONSIBILITIES AND RIGHTS

GC 4.05 Default by the Contractor

Add paragraph .03 to Subsection GC 4.05 as follows:

- .03 If in the opinion of the Owner, or Owner's agent, the Contractor fails to satisfactorily carry out the obligations and duties of an employer and constructor under the Ontario Occupational Health and Safety Act and regulations in respect of the Work, the Owner may, without prejudice to any other right or remedy the Owner may have, provide immediate notice to the Contractor in writing that the



Contractor is in default of the Contractor's contractual obligations and instruct the Contractor to correct the default within a stipulated time.

GC 4.06 Contractor's Right to Correct a Default

Delete paragraph .01 of subsection GC 4.06 and substitute the following:

- .01 Except for alleged defaults under GC 4.05 (.03) the Contractor shall have the right within the 5 full Working Days following the receipt of a notice of default to correct the default and provide the Owner with satisfactory proof that appropriate corrective measures have been taken.

Delete paragraph .02 of subsection GC 4.06 and substitute the following:

- .02 Except for alleged defaults under GC 4.05 (.03), if the correction of the default cannot be completed within the 5 full Working Days following receipt of the notice, the Contractor shall not be in default if the Contractor
- a) commences the correction of the default within the 5 full Working Days following receipt of the notice;
 - b) provides the Owner with an acceptable schedule for the progress of such correction; and
 - c) completes the correction in accordance with such schedule.

Add paragraph .03 to subsection GC 4.06

- .03 In the case of an alleged default under GC 4.05 (.03), the Contractor shall take action forthwith to correct the default to the satisfaction of the Owner, within the time stipulated in the notice, and provide the Owner with satisfactory proof that appropriate corrective measures have been taken.

SECTION GC 5.0 - MATERIALS

GC 5.02 Quality of Materials

Amend paragraph .03 of subsection GC 5.02 by adding the following:

The Contractor shall supply to the Engineer such materials, labour and other assistance as may be required to procure, package and ship all test samples.

SECTION GC 6.0 - INSURANCE, PROTECTION AND DAMAGE

GC 6.01 Protection of Work, Persons and Property



Delete paragraph d) of subsection GC 6.01.04

GC 6.03.01 General

Delete paragraph .01 of subsection GC 6.03.01 and replace with the following:

.01 Without restricting the generality of subsection GC 6.02, Indemnification, the Contractor shall provide, maintain and pay for the insurance coverages listed in the General Condition under clauses GC 6.03.02, GC 6.03.03 and GC 6.03.06. In all cases where the work directly involves use of owned or non-owned watercraft and/or aircraft or construction or material alteration of a building or other structure or where installation of boilers and/or pressure vessels forms part of the work, the Contractor shall provide the applicable insurance coverage described in subsection GC 6.03.04 and GC 6.03.05.01 and .02.

GC 6.03.02 General Liability Insurance

Add subsection .08 and .09 to subsection GC 6.03.02 as follows:

.08 The IBC Form 2100 as required shall also contain the following policy endorsements:

- Cross liability,
- Contractual liability,
- Products and completed operations, and
- Employer's liability

.09 The policies provided shall not contain any exclusions or limitations in respect of shoring, underpinning, raising or demolition of any building or structure, pile driving, caisson work, collapse of any structure or subsidence of any property structure or land from any cause.

GC 6.05 Workplace Safety and Insurance Board

Amend subsection GC 6.05.01 by the addition of the following:

e) Prior to issue of all Payment Certificates

SECTION GC 7.0 CONTRACTOR'S RESPONSIBILITIES AND CONTROL OF WORK

GC 7.01 General



Amend paragraph .02 of subsection GC 7.01 by the addition of the following:

The Contractor shall, after receiving the written and signed order to commence work, immediately proceed with the Work with due diligence and expedition.

Delete paragraph .16 of subsection GC 7.01 and replace with the following:

.16 The Contractor shall arrange with the appropriate Utility authorities for the stake out of all underground Utilities and service connections that may be affected by the Work. The Contractor shall observe the location of the stake outs prior to commencing the Work. In the event that there is a discrepancy between the location of the stake outs and the locations shown on the Contract Documents that may affect the Work, the Contractor shall immediately notify the Contract Administrator and the affected Utility companies in order to resolve the discrepancy. The Contractor shall be responsible for any damage done to the underground Utilities and service connections by the Contractor's forces during construction.

Amend subsection GC 7.01 by the addition of the following paragraphs:

- .17 The Contractor shall provide the Owner or Contract Administrator immediate written correspondence of any verbal or written Accident Notices and Reports submitted to a "Director" of the Ministry of Labour required by Sections 51- 53 of the Occupational Health and Safety Act. Any response of follow up actions shall be provided to the Contract Administrator for all orders and notices.
- .18 The Contractor shall provide the Owner immediate written correspondence of any verbal or written reports from an Inspector or Director of the Ministry of Labour.
- .19 The Contractor shall ensure that safety inspections on the project are carried out on a regular basis. More frequent inspections will occur for larger scale, more complex, or more hazardous projects. Through regular inspections, the Contractor will record any findings and actions taken, and provide a report on the same to the Owner.

GC 7.02 Layout

Delete paragraph .03 of subsection GC 7.02 and replace with the following:

.03 At no extra cost to the Owner, the Contractor shall provide the Contract Administrator with such assistance, labour, materials and devices as may be necessary for the inspection of the Work.

GC 7.03 Working Areas

Amend paragraph .03 of subsection GC 7.03 by adding the following:

and has provided a copy of such to the Contract Administrator.



GC 7.07 Maintaining Roadways and Detours

Subsection GC 7.07 paragraph .01 is amended by adding the following:

A minimum of one lane of flagged traffic shall be provided during working hours. After working hours, a minimum of one lane of traffic in each direction shall be provided. The Contractor shall be responsible for all costs associated with providing the required traffic control and any traffic detour routes including, but not limited to, the erection and maintenance of all traffic control and detour signage.

Subsection GC 7.07 is amended by adding the following paragraphs:

- .12 The successful Contractor shall submit a traffic management plan showing a method of maintaining pedestrian and vehicular traffic, access to commercial and residential properties, detours, and construction signing in accordance with Contract Documents and the Ontario Traffic Manual – Book 7. The traffic management plan shall be provided by the Contractor to the Contract Administrator at least seven (7) days in advance of the commencement of work to be reviewed for compliance with the requirements of the Contract Document. Construction shall not be permitted to commence without traffic management plan approval. An approved copy of the traffic management plan shall be available for inspection at the project site at all times.
- .13 The Contractor shall give the Contract Administrator fourteen (14) days advance notice prior to any street closing, not including Saturdays, Sundays, or Statutory Holidays, to allow adequate public notification.
- .14 The Contractor shall notify all emergency services and bus services of all lane closures, detours and access restrictions due to construction prior to implementation of or changes to the same.

GC 7.09 Approvals and Permits

Amend subsection GC 7.09 with the addition of the following:

- .03 The Contractor shall give all necessary notices and pay all fees required by law and comply with all laws, orders of authorities, ordinances, codes, rules and regulations relating to the Work for the preservation of the public health, the environment, and for construction safety.

GC 7.13 Obstructions

Add paragraphs .04, .05 and .06 to subsection GC 7.13 as follows:



- .04 The work may be in close proximity to certain existing utilities such as streetlights, hydro poles, and underground hydro cables. Where utility poles are located at a distance of less than 1.5m from the edge of trenches, such poles must be supported in a manner satisfactory to the Contract Administrator and to the owner of the utility pole. Such support shall be carried out at the Contractor's expense and the cost of the work shall be included in the unit prices tendered for the Work.
- .05 Where existing utilities must be temporarily disturbed or removed in the course of construction of the works under this Contract, such utilities shall be restored as soon as possible to a condition equal to or better than its original condition and to the satisfaction of the owner of the utility and the Contract Administrator. Such restoration shall be carried out at the Contractor's expense and the cost of the work shall be included in the unit prices tendered for the Work.
- .06 Where the existing underground utilities are exposed during the course of the contract, such utilities shall be supported in place and protected from injury in a manner satisfactory to the owner of the utility and the Engineer. Such protection shall be carried out at the Contractor's expense and the cost of the work shall be included in the unit prices tendered for the Work.

GC 7.14 Limitations of Operations

Amend GC 7.14 paragraph .01 with the addition of the following:

Working hours for the Contract will be restricted to between 7:00 a.m. to 7:00 p.m. local time Monday to Friday except in the case of emergencies and as specifically approved in writing by the Contract Administrator. Requests for approval shall be provided by the Contractor to the Contract Administrator a minimum of 48 hours prior to the anticipated date for which approval is required.

GC 7.16 Warranty

Amend paragraph .02 of subsection GC 7.16 with the addition of the following:

Upon receipt of written notice, the Contractor shall resolve the observed defects or deficiencies within 30 calendar days to the satisfaction of the Contract Administrator. The Contractor's failure to resolve the defects or deficiencies detailed in the written notice shall permit the Owner to access the Contractor's performance bond or to deduct from monies owing to the Contractor to resolve the defects or deficiencies. The Contractor shall provide for, at no additional costs to the Owner, maintaining roads and detours and all necessary notices as specified under GC 7.07 and GC 7.12, respectively in their attempt to resolve the written notice.

GC 7.18 Drainage

Amend GC 7.18 paragraph .01 by adding the following:



The Contractor will be held responsible for all damage which may be caused or result from water backing up or flowing over, through, from, or along any part of the works, or which any of his operations may cause to flow elsewhere.

GC 8.0 MEASUREMENT AND PAYMENT

GC 8.01.02 Variation in Tender Quantities

Delete the last sentence in subsection GC 8.01.02.01 and replace with the following:

Written requests for compensation must be received within 45 days of the Certificate of Substantial Completion.

GC 8.02.02 Advance Payment for Material

Delete clause GC 8.02.02 in its entirety.

GC 8.02.03.01 Progress Payment Certificate

Amend paragraph .01 of subsection GC 8.02.03.01 as follows:

Delete the words "and material supplied".

Delete paragraph .02 c) of subsection GC 8.02.03.01

Delete paragraph .02 e) of subsection GC 8.02.03.01 and replace with the following:

e) The amount of HST, as applicable; and

Amend paragraph .04 of subsection GC 8.02.03.01 as follows:

04. Subject to receipt of all required documentation, payment shall be made within 20 Days of the Cut-Off Date.

Add paragraph .05 to subsection GC 8.02.03.01 as follows:

.05 All required documentation (measured Tender Quantities, Change Orders, Health & Safety Documentation, Clearance Certificate from the Workplace Safety and Insurance Board, and the signed Payment Certificate) shall form part of each Progress Payment Certificate.

GC 8.02.03.02 Certification of Subcontract Completion



Delete subsection GC 8.02.03.02

GC 8.02.03.03 Subcontract Statutory Holdback Release Certificate and Payment

Delete subsection GC 8.02.03.03

GC 8.02.03.04 Certificate of Substantial Performance

Add paragraph .06 to subsection GC 8.02.03.04 as follows:

.06 When Substantial Performance coincides with Completion, the 10% statutory holdback will be retained until 45 days from the date of publication.

GC 8.02.03.09 Interest for Late Payment

Delete clauses b) and c) of paragraph .01 to subsection GC 8.02.03.09

GC 8.02.08 Taxes

Add paragraph .05 and .06 to subsection GC 8.02.08 as follows:

.05 Taxes, custom duties and excise taxes on all fuels, materials and services, except for refundable taxes and duties, shall be included in the Contract price.

.06 The Contractor shall pay all taxes, custom duties, and excise taxes on all fuels and materials with respect to the Contract. Where applicable, the Contractor shall apply for any refund of taxes and duties to the appropriate tax levying authority.

GC 8.02.09 Liquidated Damages

Add paragraph .02 and .03 to subsection GC 8.02.09 as follows:

.02 The Contractor shall pay to the Corporation liquidated damages of One Thousand Dollars (\$1,000.00) for each and every calendar day that the work or works remains unfinished after the time or date specified to cover administrative costs.

.03 The Corporation may deduct Liquidated Damages from any monies that may be due or payable to the Contractor. The Liquidated Damages are payable in addition to and without limiting any other remedy, action or other alternative that may be available to the Corporation.



SUPPLEMENTAL SPECIFICATIONS – GENERAL

Part 2 CITY OF ST. THOMAS SUPPLEMENTAL GENERAL CONDITIONS

2.1 OWNER AS CONSTRUCTOR

In all cases the Contractor will fulfill his obligations as Constructor for the Work under their control in accordance with the Occupational Health and Safety Act and regulations. In situations where the Owner requires additional parties (utilities, City's own forces, others) to work within the Limits of Contract, the Owner may do the following:

- 1) enter into a contractual agreement with the Contractor to undertake the project including the work of the additional parties on behalf of Owner, whereby the Contractor assumes control over the project including the work of the additional parties, or
- 2) assume the responsibilities of the Constructor, as defined in the Occupational Health and Safety Act for the duration of the third party Work, or
- 3) where appropriate, may require partitioning of the project to segregate access points (entrances and exits) from other construction operations within the Limits of Contract, in order that the City may undertake works without conflicting with other construction operations, or
- 4) make arrangements for the Contractor to vacate the Limits of Contract for the duration of the third party Work in order to undertake works within the Limits of Contract without conflicting with other construction operations.

When the Owner as "Contractor" retains a third party to perform a portion of the Work, the Owner will notify the Contractor of its intention in writing.



SUPPLEMENTAL SPECIFICATIONS SEWERS



THE CORPORATION OF THE CITY OF
ST. THOMAS





SUPPLEMENTAL SPECIFICATIONS - SEWERS

Part 1 AMMENDMENTS TO ONTARIO PROVINCIAL STANDARDS FOR ROADS AND PUBLIC WORKS

OPSS.MUNI 401 CONSTRUCTION SPECIFICATION FOR TRENCHING, BACKFILLING AND COMPACTION

401.05 MATERIALS

401.05.01 Embedment Material

Subsection 401.05.01 is amended with the addition of the following:

Granular B, Type I, II, or III, with 100% passing the 26.5 mm sieve shall be used as embedment material unless otherwise specified in the Contract Documents.

401.05.02 Bedding Material

Subsection 401.05.02 is amended with the addition of the following:

Granular B, Type I, II, or III, with 100% passing the 26.5 mm sieve shall be used as bedding material unless otherwise specified in the Contract Documents.

401.05.03 Cover Material

Subsection 401.05.03 is amended with the addition of the following:

Granular B, Type I, II, or III, with 100% passing the 26.5 mm sieve shall be used as bedding material unless otherwise specified in the Contract Documents.

401.05.05 Backfill Material

401.05.05.01 General

Subsection 401.05.05.01 is amended with the addition of the following:

Granular B Type I, II or III or native granular material shall be used as trench backfill unless otherwise specified in the Contract Documents.



401.07 CONSTRUCTION

401.07.10 Backfilling and Compacting

401.07.10.03 Bedding

The first paragraph of subsection 401.07.10.03 is deleted and replaced with the following:

Pipe bedding shall be Bedding Class B unless otherwise specified in the Contract Documents.

Subsection 401.07.10.03 is amended by the addition of the following paragraph:

Where trench conditions exhibit seeping water in silt or fine sand, a change from specified bedding to non-woven Class 1 geotextile wrapped 19mm clear stone is required, as determined by the Contract Administrator. Once this change is made (mid run), this bedding system will be maintained until the next maintenance hole location regardless if the trench conditions improve. Trench conditions will be re-evaluated at the beginning of each run to determine if geotextile wrapped clear stone is warranted.

401.10 BASIS OF PAYMENT

401.10.01 Trenching, Backfilling, and Compacting

Paragraph 4 of Subsection 401.10.01 is deleted in its entirety.

OPSS 405 CONSTRUCTION SPECIFICATION FOR PIPE SUBDRAINS

405.05 MATERIALS

405.05.01 General

Paragraph 3 of Subsection 405.05.01 is deleted and replaced with the following:

All subdrains shall be 150 mm diameter unless otherwise specified in the Contract Documents.

Subdrain perforations in polyvinyl chloride (PVC) or corrugated steel pipe shall consist of 6mm holes in four rows positioned at 4, 5, 7 and 8 o'clock and 75mm apart longitudinally, or approved equivalent.

Outlets shall be constructed of non-perforated corrugated steel pipe, PVC pipe, or double-walled polyethylene having a CSA certified minimum pipe stiffness of 320 kPa.



Subdrains under all hard surfaced areas shall have a CSA certified minimum pipe stiffness of 320 kPa.

405.07 CONSTRUCTION

405.07.01 General

Subsection 405.07.01 is amended by the addition of the following:

Minimum grade for pipe subdrains shall be 0.25 %. Grades shall be set using a laser where the grades are less than 1 %.

Pipe subdrains shall be provided on both sides of all catch basins installed in hard surface areas. Pipe subdrains at catchbasins shall be a minimum of 1.5 meters long perforated pipe with knitted sock geotextile and 1.0 meters non-perforated pipe installed at a minimum grade of 0.5 % into the catch basin. Pipe subdrains at catch basins shall be capped at the upstream end with a pre-manufactured end cap.

405.07.06 Laying Subdrain and Outlet Pipe

405.07.06.03 Connections to Drainage Structures

All catchbasins to be installed in hard surface areas shall be provided with a 200mm knockout on both sides of the catchbasin at subgrade elevation for the connection of subdrains.

OPSS 407 CONSTRUCTION SPECIFICATION FOR MAINTENANCE HOLE, CATCH BASIN, DITCH INLET AND VALVE CHAMBER INSTALLATION

407.05 MATERIALS

407.05.07 Frames With Covers or Grates

Subsection 407.05.07 is amended by the addition of the following:

Frames and covers for sanitary sewer maintenance holes shall be in accordance with OPSD 401.010, Type A - Closed Cover unless otherwise specified in the Contract Documents.

Frames and covers for storm sewer maintenance holes shall be in accordance with OPSD 401.010, Type B - Open Cover, unless otherwise specified in the Contract Documents.



Frames and grates for catch basins and catch basin maintenance holes shall be in accordance with OPSD 400.100, unless otherwise specified in the Contract Documents.

Frames and grates for ditch inlet catch basins and ditch inlet catch basin maintenance holes shall be in accordance with OPSD 403.011, unless otherwise specified in the Contract Documents.

407.05.05 Adjustment Units

Paragraph 2 of Subsection 407.05.05 is deleted and replaced with the following:

Rubber adjustment units are not approved for use in the City of St. Thomas.

Subsection 407.05.05 is amended by the addition of the following:

All adjustment units installed in hard surfaced areas shall be HDPE.

407.07 CONSTRUCTION

407.07.01 General

Subsection 407.07.01 is amended by the addition of the following:

Where top asphalt is to be deferred over a winter season or longer, catch basin grates shall be constructed to base asphalt elevation, and an asphalt curb shall be installed around the grate. Prior to top asphalt being applied, catch basins shall be raised to finished grade and concrete curb installed.

407.07.13 Installation of Inlet and Outlet Pipes Into Concrete Structures

Subsection 407.07.13 is amended by the addition of the following:

All pipes shall be fully sealed into place with non-shrink grout and the inside of the structure finished to a smooth steel trowel finish.

407.07.14 Benching and Channeling

Subsection 407.07.14 is amended by the addition of the following:

All storm and sanitary maintenance holes shall be benched in accordance with OPSD 701.021.



Sanitary maintenance holes shall be benched to the full height of the inlet and outlet pipes (D).

407.07.15 Installation of Adjustment Units

407.07.15.01 Precast Concrete Adjustment Units

Subsection 407.07.16.01 is amended by the addition of the following:

Precast concrete adjustment units shall be fully parged with non-shrink grout complete with a smooth and neat steel trowel finish.

407.07.17 Installation of Aluminum Safety Platforms

Subsection 407.07.17 is amended by the addition of the following:

Aluminum safety platforms shall be provided on all maintenance holes where the total depth from top of the frame and cover to invert of the outlet exceeds 5.0 metres.

407.10 BASIS OF PAYMENT

Paragraph 2 of Subsection 407.10.01 is deleted and replaced with the following:

When the Owner raises or lowers a pipe invert in a maintenance hole by up to and including 300 mm, it shall not constitute a Change in the Work and no adjustment shall be made to the payment. Where a pipe invert in a maintenance hole is raised or lowered by more than 300 mm, then this shall constitute a Change in the Work for the full extent of the change from the original grade.

OPSS 409 CONSTRUCTION SPECIFICATION FOR CLOSED CIRCUIT TELEVISION INSPECTION OF PIPELINES

409.07 CONSTRUCTION

409.07.05 Final Documentation

409.07.05.01 Survey Reporting

Subsection 409.07.05.01 is amended by the addition of the following:



All interim reports and video records shall be made available to the Contract Administrator at any time during or after the video inspection process and cannot be withheld from the Contract Administrator for any period of time for any reason. The Contractor is required to surrender all videos or other video evidence of any kind at any time or at any stage of the videotaping process if requested by the Contract Administrator.

Provisions shall be made for the Contract Administrator to witness the pipeline video during the videoing process, if requested.

Final reports shall be submitted to the Contract Administrator within 10 working days of the completion of the field work and prior to placement to the pavement or base asphalt as a condition of authorization to pave base asphalt.

OPSS.MUNI 410 CONSTRUCTION SPECIFICATIONS FOR PIPE SEWER INSTALLATION IN OPEN CUT

410.05 MATERIALS

410.05.01 PIPE MATERIALS

410.05.01.01 General

Subsection 410.05.01.01, is amended by the addition of the following:

All polyvinyl chloride (PVC) and high-density polyethylene (HDPE) sewer pipe shall be CSA certified to have a minimum pipe stiffness of 320 kPa and water-tight joints to 100 kPa unless otherwise specified in the Contract Documents.

Ribbed PVC pipe shall not be used for storm or sanitary sewers.

HDPE pipe shall not be used for storm or sanitary sewers.

Reinforced concrete pipe shall be used for all storm and sanitary sewers 450mm in diameter and greater, unless otherwise specified in the Contract Documents.

Concrete pipe material must comply with the following CSA requirements:

1. Non-Reinforced - CAN/CSA257.1 100mm - 600mm
2. Reinforced - CAN/CSA257.2

All fabricated and moulded fittings shall be CSA certified.

410.07 CONSTRUCTION



410.07.12 Pipe Installation

410.07.12.01 General

Subsection 410.07.12.01, paragraph 5 is deleted in its entirety and replaced with the following:

When the Owner raises or lowers the invert of a pipe sewer by 300 mm or less, it shall not constitute a Change in the Work and no adjustment shall be made to the payment. When the invert of a pipe sewer is raised or lowered by more than 300 mm, it shall constitute a Change in the Work for the full extent of the change from the original grade.

410.07.13 Service Connections

Subsection 410.07.13 is deleted in its entirety, and replaced with the following:

Service connections to the main pipe sewer shall be made using factory tees, unless otherwise specified in the Contract Documents.

When existing service connections shall be connected to new pipe sewers or service connections, proper jointing procedures shall be used.

Factory tees for PVC service connections to concrete main pipe sewers shall be manufactured with a two-step/gasket system and grouted around the service connection on the outside of the tee after the connection is made.

Where horizontal or vertical bends are required in service connections, long radius sweeps shall be used. Short bends are not acceptable.

Service connections shall be plugged at the property line with watertight caps or plugs. Plugs or caps shall be braced sufficiently to withstand test pressures.

Service connections shall have a minimum grade of 2 % unless otherwise specified in the contract documents or approved by the Contract Administrator.

Service connections to the main pipe sewer shall be at a grade no greater than 100 % (45 degrees) unless otherwise specified in the contract documents or approved by the Contract Administrator.

Sanitary Sewer Service Connections

Service connections for sanitary private drain connections (PDCs) shall be 150 mm diameter PVC SDR 28 unless otherwise specified in the Contract Documents.

Sanitary PDCs pipe shall be white in color.

Sanitary PDCs shall not be connected to a maintenance hole.



Storm Sewer Service Connections

Service connections for storm PDCs shall be 100 mm diameter PVC SDR 28 unless otherwise specified in the Contract Documents

Storm PDCs pipe shall be green in color.

Connections for catch basin leads connected to a maintenance hole shall not exceed 1.80 m above the invert of the outlet sewer.

Catch basin leads for single catch basins shall be 250 mm diameter PVC SDR 35 unless otherwise specified in the Documents. Catch basin leads for maintenance hole catch basins, double catch basins or multiple catch basins shall be 300 mm diameter unless otherwise specified in the Contract Documents.

Service Connections to Existing Pipe Sewers

Where service connections are made to existing main pipe sewers, holes in the main pipe sewer shall be cut with approved cutters and shall be the minimum diameter required to accept the service connection saddle. If mortar-on saddles are used, the inside of the pipe shall be mortared at the connection.

Existing concrete main pipe sewers may be core drilled and fitted with a KOR-N-TEE Flexible Connector, a Core Bell Concrete Adaptor (for sizes 100mm – 250mm only) or approved equal.

Service connections to existing smooth-wall PVC main pipe sewers shall be core drilled and fitted with an “Inserta Tee” connector, or approved equal.

Service connections to existing ribbed PVC main pipe sewers shall be made with manufactured tees. When conditions do not permit, as determined by the Contract Administrator, an “Inserta Tee” or approved equal shall be used.

Manufactured tees shall be used for connections to HDPE annular profile pipe. When conditions do not permit, as determined by the Contract Administrator, an “Inserta T” connector shall be used.

Service connections to existing Vitrified Clay main pipe sewer shall be made using a manufactured boot and a fabricated PVC Tee.

Service connections to existing Asbestos Cement main pipe sewer shall be made with a cast iron saddle.

For service connections to Lined Vitrified Clay or Asbestos Cement main pipe sewer where an existing service connection is to be removed and replaced, the existing hole in the main sewer pipe is to be



trimmed smooth and a saddle tee (Fernco EZ Tap Sewer Saddle or approved equal), shall be used to make the connection for a new private drain connection. A sand/cement (250mm slump) mixture is to be placed around the void that was made to slip the strap around the main sewer pipe to mitigate settlement.

410.07.14 Marking and Recording Service Connections

Clause 410.07.14, second paragraph, is deleted in its entirety and replaced by the following:

Painted surface stakes 40mm X 90mm X 450mm (standard 2" X 4") long shall be placed after trench restoration to mark the termination of storm and sanitary services (PDCs) respectively.

Markers for Sanitary PDCs shall be painted white in color.

Markers for Storm PDCs shall be painted green in color.

410.07.16 Field Testing

410.07.16.01 General

Subsection 410.07.16.01 is amended with the addition of the following:

Leakage testing shall be carried out on all sanitary sewers installed in new development.

410.07.16.06 Closed-Circuit Television (CCTV) Inspection

Clause 410.07.16.06 is amended by the addition of the following:

The Contractor shall undertake a video inspection for all main pipe sewers installed, and of existing main pipe sewers following the connection of new or replacement service connections.

Digital media of video inspections shall be submitted to the Contract Administrator on Compact Disk (CD).

410.07.17 Cleaning and Flushing Pipe Sewers

Clause 410.07.17 is amended by the addition of the following:

The Contractor will not be permitted to flush the new sewer lengths into existing sewers. The Contractor shall provide and place temporary plugs where necessary to prevent silt and debris from entering existing sewers.



OPSS 412 CONSTRUCTION SPECIFICATIONS FOR SEWAGE FORCEMAIN INSTALLATION IN OPEN CUT

412.05 MATERIALS

412.05.01 General

Subsection 412.05.01 is amended by the addition of the following:

Corrosion protection shall be provided for sewage forcemains in accordance with OPSS.MUNI 442 and the City of St. Thomas Supplemental Specifications – Water, Section 2.2, Corrosion Protection.

Tracer wire shall be provided with all sewage forcemains in accordance with the City of St. Thomas Supplemental Specifications – Water, Section 2.4, Tracer Wire.

412.05.04 Polyvinyl Chloride Plastic Pressure Pipe Products

Subsection 412.05.04 is amended by the addition of the following:

All PVC pipe and fittings for sewage forcemain shall be white in colour.

412.05.05 Polyethylene Plastic Pressure Pipe Products

Subsection 412.05.05 is amended by the addition of the following:

All polyethylene plastic pipe and fittings for sewage forcemain shall be manufactured with green colour striped indicating it conveys sanitary sewage.

412.07 CONSTRUCTION

412.07.16 Thrust Restraints

Subsection 412.07.16 is deleted and replaced with the following:

Concrete thrust blocks shall not be used as thrust restraint unless otherwise specified in the Contract Documents. All thrust restraint shall be designed to adequately provide the minimum amount of pipe/joint restraint required by mechanical restraint device alone.

Thrust restraint shall be provided at all connections, caps, fittings, bends, valves, or reducers. Thrust restraints shall be shown on the shop drawings as recommended by the pipe manufacturer and approved by the Contract Administrator.



412.07.18 Cleaning and Flushing Force mains

Subsection 412.07.18 is amended by the addition of the following:

Sewage force mains shall be cleaned by use of a minimum of two (2) foam swabs in order to remove debris which may have entered the force main during construction. Cleaning shall be repeated until consecutive swabs are clean and the discharge water is clear.

Cleaning and flushing of sewage force mains shall follow the swabbing procedure identified in OPSS 441, as amended by the City of St. Thomas Standard Contract Documents Supplemental Specifications – Watermain

OPSS.MUNI 421 CONSTRUCTION SPECIFICATION FOR PIPE CULVERT INSTALLATION IN OPEN CUT

421.05 MATERIALS

421.05.01 Pipe Materials

421.05.01.01 General

Subsection 421.05.01.01 is amended by the addition of the following:

All pipe culverts shall be double-walled high-density polyethylene (HDPE) unless otherwise specified in the Contract Documents.

421.05.01.04 Polyethylene Pipe Products

Subsection 421.05.01.04 is amended by the addition of the following:

Polyethylene pipe culverts shall be double-walled high-density polyethylene (HDPE). HDPE pipe culverts shall be CSA certified to have a minimum pipe stiffness of 320 kPa, and shall have water-tight joints to 75 kPa.

421.07 CONSTRUCTION

421.07.12 Pipe Installation



421.07.12.01 General

Paragraph 5 of Subsection 421.07.12.01 is deleted and replaced with the following:

When the Owner raises or lowers the invert of a pipe culvert by up to 300 mm, it shall not constitute a Change in the Work and no adjustment shall be made to the payment. When the invert of a pipe culvert is raised or lowered by more than 300 mm, then this shall constitute a Change in the Work for the full extent of the change from the original grade.



SUPPLEMENTAL SPECIFICATIONS – SEWERS

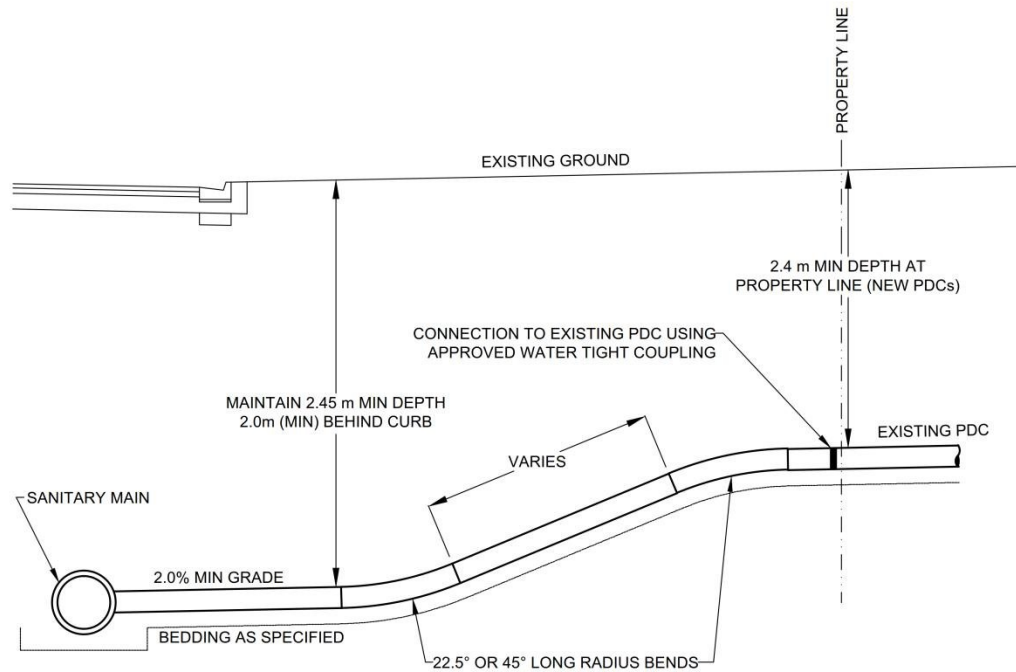
Part 2 CITY OF ST. THOMAS SUPPLEMENTAL SPECIFICATIONS FOR SEWERS

NO INFORMATION IN THIS SECTION



SUPPLEMENTAL SPECIFICATIONS – SEWERS

Part 3 CITY OF ST. THOMAS SUPPLEMENTAL STANDARD DRAWINGS FOR SEWERS



NOTES:

1. SANITARY SEWER SERVICE CONNECTIONS (PDC) SHALL BE 150mm DIAMETER MINIMUM.
2. SEWER SERVICE CONNECTIONS FOR RIGID PIPE - REFER TO OPS 1006.01.
3. SEWER SERVICE CONNECTIONS FOR FLEXIBLE PIPE - REFER TO OPS 1006.02.

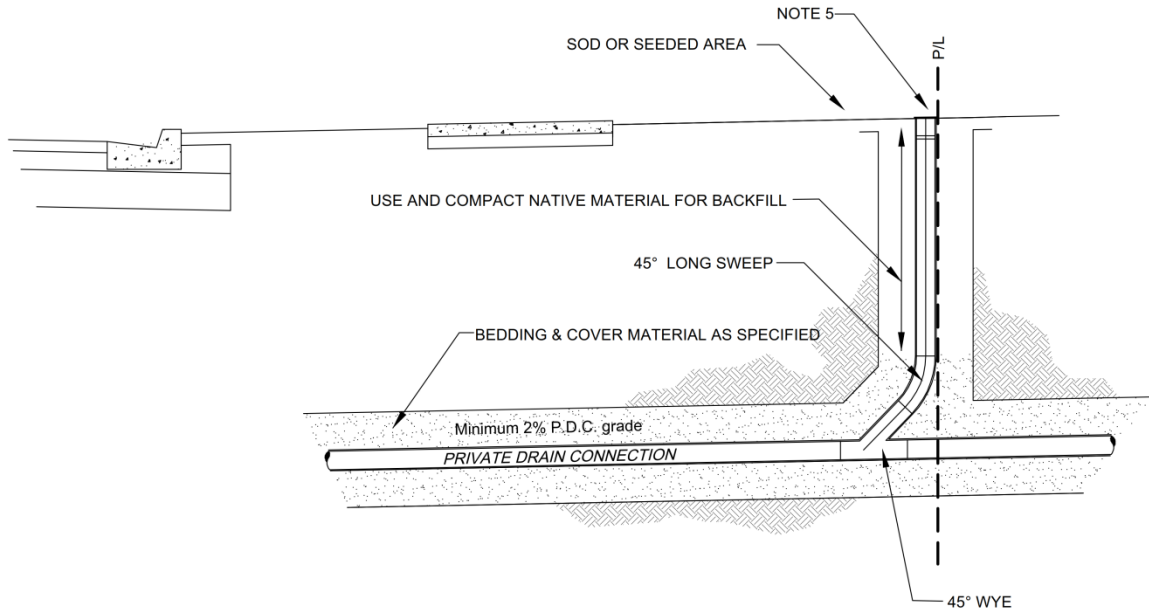
NOT TO SCALE
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

CITY OF ST. THOMAS STANDARD DRAWING

**TYPICAL SANITARY SEWER
SERVICE CONNECTION**

REVISION DATE: 5 NOV 2015

DRAWING #: **S-01**



NOTES

1. THE PIPE DIAMETER OF THE CLEANOUT PIPE SHALL EQUAL THE PIPE DIAMETER OF THE P.D.C.
2. THE MINIMUM INSIDE DIAMETER FOR SANITARY P.D.C. CLEANOUT IS 100mm.
3. APPROVED PREFABRICATED WYES AND LONG RADIUS SWEEPS SHALL BE USED FOR ALL P.D.C. CLEANOUT CONNECTIONS.
4. WHERE APPLICABLE, APPROVED END CAPS ARE REQUIRED AT PROPERTY LINE TO COMPLETE THE P.D.C. INSTALLATION. THEY SHALL BE BRACED TO WITHSTAND PRESSURE TESTING WHEN REQUIRED.
5. CLEANOUT COVERS:
 - a. CLEANOUT HARD (RIGID) SURFACE INSTALLATION: USE CAST IRON CAP AND INTALL FLUSH WITH SURFACE.
 - b. CLEANOUT GRAVEL SURFACE INSTALLATION: USE CAST IRON CAP PER A), INSTALL 75mm BELOW FINISHED GRADE.
 - c. CLEANOUT SOFT SURFACE (GRASS) INSTALLATION: USE STANDARD PLASTIC CAP, WITH PEAK FLUSH WITH GRASS SURFACE.

NOT TO SCALE
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

CITY OF ST. THOMAS STANDARD DRAWING

**PRIVATE DRAIN CONNECTION
CLEAN OUT**

REVISION DATE: 7 DEC 2016

DRAWING #: **S-02**



SUPPLEMENTAL SPECIFICATIONS WATER



THE CORPORATION OF THE CITY OF
ST. THOMAS





SUPPLEMENTAL SPECIFICATIONS - WATER

Part 1 AMMENDMENTS TO ONTARIO PROVINCIAL STANDARDS FOR ROADS AND PUBLIC WORKS

OPSS.MUNI 401 CONSTRUCTION SPECIFICATION FOR TRENCHING, BACKFILLING AND COMPACTION

401.05 MATERIALS

401.05.01 Embedment Material

Subsection 401.05.01 is amended with the addition of the following:

Granular B, Type I, II, or III, with 100% passing the 26.5 mm sieve shall be used as embedment material unless otherwise specified in the Contract Documents.

401.05.02 Bedding Material

Subsection 401.05.02 is amended with the addition of the following:

Granular B, Type I, II, or III, with 100% passing the 26.5 mm sieve shall be used as bedding material unless otherwise specified in the Contract Documents.

401.05.03 Cover Material

Subsection 401.05.03 is amended with the addition of the following:

Granular B, Type I, II, or III, with 100% passing the 26.5 mm sieve shall be used as bedding material unless otherwise specified in the Contract Documents.

401.05.05 Backfill Material

401.05.05.01 General

Subsection 401.05.05.01 is amended with the addition of the following:



Granular B Type I, II or III or native granular material shall be used as trench backfill unless otherwise specified in the Contract Documents.

401.07 CONSTRUCTION

401.07.10 Backfilling and Compacting

401.07.10.03 Bedding

The first paragraph of subsection 401.07.10.03 is deleted and replaced with the following:

Pipe bedding shall be Bedding Class B unless otherwise specified in the Contract Documents.

401.10 BASIS OF PAYMENT

401.10.01 Trenching, Backfilling, and Compacting

Paragraph 4 of Subsection 401.10.01 is deleted and replaced with the following:

When excavated on-site material is approved for use by the Contract Administrator for backfill, an adjustment in the Contract Price shall be made, in accordance with Subsection OPSS.MUNI 100, General Conditions of Contract, GC 5.04 - Substitutions. Payment for the volume of granular material substituted will be based on actual field measurements.

OPSS.MUNI 441 CONSTRUCTION SPECIFICATION FOR WATERMAIN INSTALLATION IN OPEN CUT

441.05 MATERIALS

441.05.01 General

Subsection 441.05.01 is amended by the addition of the following:

All watermain pipe shall be polyvinyl chloride (PVC) Class 235 DR 18 or molecularly oriented polyvinyl chloride (PVCO) Class 235 unless otherwise specified in the Contract Documents.

All potable water services shall be cross-linked polyethylene (PEX) unless otherwise specified in the Contract Documents.

441.05.02 Ductile Iron Pipe

Subsection 441.05.02 is amended by the addition of the following:



Ductile Iron (DI) pipe shall be thickness Class 52 and shall have cement mortar lining and polyethylene encasement unless otherwise specified in the Contract Documents. Polyethylene encasement shall conform to AWWA C105. Electrical continuity shall be provided by means of copper strips, wedges or other approved devices.

The working pressure rating for Ductile Iron pipe shall be 350 psi.

441.05.04 Polyvinyl Chloride Pipe

441.05.04.01 General

Subsection 441.05.04.01 is amended by the addition of the following:

All fittings on PVC pipe 200 mm diameter and smaller shall be polyvinyl chloride.

Ductile Iron push-on fittings are not approved for use with PVC pipe. Mechanical joint Ductile Iron fittings shall be used when they are an integral part of the restraining system.

441.05.04.02 Polyvinyl Chloride Pipe

Subsection 441.05.04.02 is amended by the addition of the following:

Polyvinyl chloride (PVC) pipe up to and including 300 mm diameter shall be Class 235 DR 18 and shall have Cast Iron O.D. dimensions.

441.05.04.03 Molecularly Oriented Polyvinyl Chloride Pipe (PVCO)

Subsection 441.05.04.03 is amended by the addition of the following:

Molecularly Oriented Polyvinyl Chloride Pipe (PVCO) pipe up to and including 300 mm diameter shall be CSA certified to B137.3.1 with a pressure class of 1620 kPa (235 psi) and shall have Cast Iron O.D. dimensions.

Molecularly Oriented Polyvinyl Chloride Pipe (PVCO) pipe is not approved for pipe sizes greater than 300mm diameter.

441.05.05 Polyethylene Pipe

Subsection 441.05.05 is amended by the addition of the following:

Polyethylene Pipe shall be Class 160 DR 11 unless otherwise specified in the Contract Documents.



Polyethylene Pipe shall be manufactured with blue colour stripes indicating potable water.

Cross-Linked Polyethylene (PEX) potable water service tubing for service connections shall be in accordance with ASTM F876-05, ASTM F877-05, CSA-B137.5 and NSF 61.

Minimum size for PEX potable water service tubing is 25mm diameter.

Cross-Linked Polyethylene PEX potable water service tubing is to be used with standard copper O.D. brass fittings. PEX tubing ends to be installed with stainless steel inserts and be installed with tracer wire for its entire length.

441.05.06 Steel Pipe

Subsection 441.05.02 is amended by the addition of the following:

Steel pipe shall be Grade 42 with a minimum wall thickness of 6.35 mm and shall have cement mortar lining and polyurethane surface exterior coating unless otherwise specified in the Contract Documents. Polyurethane surface exterior coating shall conform to AWWA C222.

441.05.07 Copper Pipe

Subsection 441.05.02 is deleted and replaced with the following:

Copper pipe is not approved for use in the City of St. Thomas

An anode shall be provided and installed in accordance with OPSS.MUNI 442 on all existing copper pipes encountered during construction.

441.05.08 Composite Pipe

Subsection 441.05.08 is deleted and replaced with the following.

Composite pipe is not approved for use in the City of St. Thomas

441.05.09 Valves

441.05.09.01 General

Paragraph 1 of Subsection 441.05.09.01 is deleted and replaced with the following:

All valves shall open by operating in a clockwise direction.



Paragraph 1 items a), b), c), and d) of Subsection 441.05.09.01 are deleted and replaced with the following:

- a) Valves less than 75 mm shall be brass or bronze ball valves.
- b) Valves greater than or equal to 75 mm shall be cast or ductile iron gate valves

Subsection 441.05.09.01 is amended by the addition of the following:

Valves for buried installation sizes 100mm to 200mm diameter shall have bell ends. Valves for buried installation sizes 250mm to 400mm diameter shall have mechanical joint ends to provide adequate mechanical thrust restraints.

Valves located in chambers must be flanged faced and supplied with Type 316 stainless steel nuts, bolts and washers.

All flanges, bonnet nuts, nuts, bolts and washers shall be protected from corrosion by using Denso paste, profiling mastic and petrolatum tape (or approved equal).

Shaft spindles shall have O-ring seals of resilient materials.

All valves must be supplied with Type 316 stainless steel nuts, bolts and washers on the bonnet.

All valves greater than 300mm located inside of a chamber must be supplied with a geared operator (spur or bevel) as required and operational from the surface. Geared operators shall consist of carburized alloy steel spiral bevel or spur gears with shafts operating in antifriction bearings. Geared operators are to be self-contained units, permanently lubricated and totally enclosed in an impact resistant cast iron housing.

All valves shall be supplied with a valve rod extension. Valve rod extensions shall be 25mm solid square rod manufactured with a bottom end to fit over 50mm square valve nut and top end consisting of a guide plate and 50mm square nut. Valve rod extension shall terminate within 150mm to 300mm of the top of the valve box.

Valves shall be supplied with a 130mm diameter screw type cast iron valve box, guide plate and deep style cover.

441.05.09.02 Service Line Valves

Subsection 441.05.09.02 is amended by the addition of the following:



Main stop service line valves shall be high pressure class brass ball valves with threaded inlet and compression outlet, unless otherwise specified in the Contract Documents.

Curb stop service line valves shall be brass ball valves with compression inlet and compression outlet, unless otherwise specified in the Contract Documents.

Service line valves for 38mm diameter and larger water services shall have a 50mm square operating nut.

All service line valves shall be equipped with a thaw nut connector for tracer wire connection.

441.05.09.03 Gate Valves

Subsection 441.05.09.03 is amended by the addition of the following:

All gate valves must be epoxy coated inside and out (minimum of 3 mm thickness) in accordance with AWWA C550.

441.05.10 Hydrants

Subsection 441.05.10 is amended by the addition of the following:

All hydrants shall open by operating in a clockwise direction.

Fire hydrant laterals shall be PVC DR 18 Class 235 or PVCO Class 235.

Fire hydrant extensions as required for deeper bury are to be obtained from the fire hydrant manufacturer. A maximum of one (1) 300mm extension is permitted per hydrant.

Fire hydrants shall have a chrome yellow high gloss exterior paint over quick dry red oxide primer.

Hydrants shall be installed a minimum of 1.5m from the edge of a driveway.

The hydrant shall have mechanical joints.

All hydrants shall be three-way with two (2) standard hose connections and one (1) STORZ connection. The STORZ nozzle shall be bronze according to ASTM B584 with a cast iron cap painted black.

Approved hydrants are:

Canada Valve	Century
McAvity	M-67 with break flange
AVK	27/00 or 27/80



441.05.12 Service Connection Fittings and Appurtenances

Subsection 441.05.12 is deleted in its entirety and replaced by the following:

Service Saddles

25 mm diameter services may be direct tapped into all sizes of DI and CI watermains except 100 mm diameter. A service saddle must be used for a 25 mm diameter service into a 100 mm diameter main.

Service saddles must be used for all sizes of service into PVC pipe and for 40 mm and 50 mm services into CI and DI pipe.

All saddles shall have AWWA thread outlet.

Saddles for DI and CI and Asbestos Cement pipe shall have ductile iron epoxy body with electro galvanized steel double straps and bolts and shall be installed as per the manufactures specifications using torque wrench.

Saddles for PVC pipe shall be full circumference wide band with stainless steel band, nuts, bolts and outlet. Band shall be Type 304 Stainless Steel of minimum 18 gauge thickness

Couplings

Couplings shall be brass with compression inlet and outlet in accordance to AWWA C800. Couplings shall be full bore.

Service Boxes and Rods

Service boxes for 25mm diameter water services shall be cast iron type to suit curb stop and shall have 25 mm hexagonal brass lid plug. Length shall be adjustable to suit depth of service.

Service boxes for 38mm diameter and larger water services shall be 130mm diameter cast iron screw type with a Bubba base and shall have rod extension. Length shall be adjustable to suit depth of service.

Service rods shall be Type 304 stainless steel of minimum 13 mm diameter including stainless steel cotter pins.

Curb stops shall be provided with a cedar bottom board constructed in accordance with the City of St. Thomas Standard Drawing W-18.

441.05.15 Straps, Tie-Rods, Angles, Nuts, and Bolts

Subsection 441.05.15 is deleted and replaced with the following:



All straps, tie-rods, angles, nuts, and bolts shall be according to ASTM A 276, Type 316 stainless steel.

441.07 CONSTRUCTION

441.07.07 Transporting, Unloading, Storing, and Handling Pipe

Subsection 441.07.07 is amended by the addition of the following:

Pipes shall be handled with special care during temperatures below freezing.

Pipe shall be lowered into the trench carefully. Under no circumstances are materials to be dropped. The lining and coatings of pipes shall not be damaged.

441.07.14 Installation of Pipes

Paragraph 3 of Subsection 441.07.14 is deleted and replaced with the following:

When the Owner raises or lowers the invert of a watermain by up to 300 mm, it shall not constitute a Change in the Work and no adjustment shall be made to the payment. When the invert of a watermain is raised or lowered by more than 300 mm, then this shall constitute a Change in the Work for the full extent of the change from the original grade.

Subsection 441.07.14 is amended by the addition of the following:

Pipes shall not be exposed to localized high temperatures except as required for the jointing process.

Pipes shall be laid on the prepared bed, true to the line and grade as shown on the contract drawings. The barrel of each pipe shall be in contact with the shaped bed throughout its full length. The ends of the pipe shall abut against each other so that there is no unevenness along the inside. Grades shall be maintained by laser beams.

Pipe shall be laid with the bell ends facing in the direction of laying. At grades above 10 percent for PVC and DI pipe and 5 percent for concrete pressure pipe and steel bell and spigot pipe, laying shall start at the bottom with the bell ends facing upgrade.

Pipe shall not be laid when, in the opinion of the Contract Administrator, trench conditions are unsuitable.

Use of watermain offsets must be indicated in the Contract Documents or in the case of unforeseen obstructions written approval of the Contract Administrator must be obtained.

Where a connection is being made between the existing watermain system and new watermain being constructed, the new watermain is to be commissioned fully before the connection is made. The



existing pipe is to be protected at all times from damage and from the potential of contamination to the system. Any opening made to the existing watermain system for a future connection is not to be made until such time as the connection can be made.

441.07.17 Change in Line and Grade

441.07.17.03 Polyvinyl Chloride Pressure Pipe - PVC and PVCO

Subsection 441.07.17.03 is deleted and replaced with the following:

Axial bending (bending of the pipe barrel) is prohibited.

For PVC pipe any change in direction of the watermain in excess of 50% of the pipes manufacturer's allowable joint deflection shall be made using an appropriate fitting.

441.07.18 Installation of Valves and Fittings

441.07.18.01 General

Subsection 441.07.18.01 is amended by the addition of the following:

Damage to Epoxy coating shall be repaired prior to installation, as per manufacturer's recommendations and shall be certified correct by the manufacturer.

441.07.19 Installation of Hydrant Sets

Subsection 441.07.19 is amended by the addition of the following:

Fire hydrants are to be installed at a grade, whereby the fire hydrant boot has a minimum bury of 1.7m to a maximum bury of 1.9m, measured from the base of the fire hydrant boot to finished grade. In cases where the depth of the watermain is greater than 1.9m, bends may be used to offset the hydrant lateral (past the gate valve) to achieve the standard fire hydrant boot depth. A 300mm (maximum) fire hydrant barrel extension may also be used. All offsets and extensions must be approved and inspected by the Contract Administrator.

Damage to the fire hydrant paint coating shall be repaired prior to installation, in accordance with the manufacturer's recommendations.

Hydrants shall be set at a grade whereby the final grading of the street or area shall be a minimum of 75mm to a maximum of 150mm from the break flange of the hydrant to the final grade. Grading which results in a depression or ponding at the hydrant will not be accepted.



441.07.20 Installation of Services Connections

Subsection 441.07.20 is amended by the addition of the following:

All Service connections shall be installed perpendicular to the watermain from the curb stop to the watermain unless otherwise specified by the Contract Documents or approved by the Contract Administrator.

No service connections to any users or use of the water from a main will be permitted until the main has been cleaned and passed pressure, leakage and disinfection tests.

All service boxes that fall within a concrete sidewalk or driveway, shall have a 100mm long piece of 10M reinforcing steel rod welded horizontally to the underside of the service box cover, approximately 40mm below the surface, to prevent frost heave.

A surface stake 40mm X 90mm X 450mm long and painted blue shall be placed after trench restoration to mark the termination of a water service.

441.07.21 Shutting Down or Charging Mains

Subsection 441.07.21 is deleted in its entirety and replaced with the following:

The Contractor shall at no time cause watermains that are in service be shut down or charged, or operate any valve or other control for any purpose.

Operation of valves, hydrants, blow-offs and curb stops shall be performed solely by a City of St. Thomas Water Operator.

At least 24 hour notice must be given to the Corporation when valves which will shut off services to consumers are required to be operated. The Contractor shall give written notice of interruption of service to all affected consumers at least 24 hours before the interruption occurs. The notice shall inform the affected consumer of the hour when the water service will be interrupted and the approximate hour that the water service will resume. The Contractor shall obtain notice cards from the City of St. Thomas and shall distribute them at no expense to the City of St. Thomas.

441.07.22 Connections to Existing Watermains

Subsection 441.07.22 is amended with the addition of the following:

All connections to existing watermains shall be made under the supervision of the City of St. Thomas Water Operator. At least 24 hour notice must be given to the City of St. Thomas prior to the connection.

The work of connecting to existing watermains shall include dewatering.



441.07.23 Thrust Restraints

Subsection 441.07.23 is deleted and replaced with the following:

Thrust restraint shall be provided at all fittings, bends, tees, valves, hydrants, crosses, reducers, and plugged or capped dead ends. All fittings and joints 300mm diameter and smaller shall be restrained in accordance with the City of St. Thomas Standard Drawing W-01. For watermains larger than 300mm diameter or installation situations not included in City of St. Thomas Standard Drawing W-01, the restrained length shall be shown on the shop drawings as recommended by the pipe manufacturer and approved by the Contract Administrator.

Shop drawings and calculations for thrust restraints for watermains larger than 300mm diameter shall be based upon the following criteria:

- Hydrostatic test pressure is 1035kpa (150psi)
- For poly wrapped DI pipe refer to AWWA C600
- For PVC pipe refer to AWWA C900, UNI-BELL and pipe suppliers manuals;
- Depth of bury is at a minimum of 1.7m (5.5ft)
- Stainless steel rods are to be a minimum of 20mm in diameter
- Trench type shall be Type 3 as per AWWA C150 Trench Conditions (Pipe bedded in 100mm minimum loose soil. Backfill lightly consolidated to top of pipe)
- Joints shall be designed for the same design test and surge pressure rating as the pipeline
- Factor of Safety shall be 2:1
- Soil type shall be CL as per "Unified Soils Classification Systems. ASTM Standard D248

Only restrained joint products specifically designed for use with the pipe material shall be used.

Concrete thrust blocks shall not be used as thrust restraint unless otherwise specified in the Contract Documents. All thrust restraint shall be designed to adequately provide the minimum amount of pipe/joint restraint required by mechanical restraint device alone.

All joint thrust restraint devices must meet or exceed the minimum requirements of ASTM F 1674-96 and shall be UL listed and FM approved.

Restraining glands 100mm diameter to 300mm diameter shall be manufactured of high strength ductile iron conforming to the requirements of ASTM A536, Grade 65 45 12 (minimum). Restraining glands 400mm diameter to 600 mm diameter shall be manufactured of structural steel conforming to the requirements of ASTM A36. Restrain devices shall incorporate a series of machine serrations on the inside diameter to provide 360 degree contact and support of the pipe wall.



Joints shall be designed for the same design, test and surge pressure ratings as the pipeline in accordance with AWWA-M23

All restraints are to be torqued to manufacturer's specifications using a calibrated torque wrench. If power equipment is used during installation, it is to be set as not to over tighten the bolts before they are properly torqued.

For installation of thrust restraints on DI pipe refer to AWWA C600. For installation of thrust restraints on PVC pipe refer to UNI-BELL, AWWA M-23 and ASTM F1674. Tie rods and clamp assemblies shall be wrapped in Denso paste and Tape (to manufacturer's specifications) or approved equal. Tie rods, washers and bolts are to be a minimum of 20mm (3/4") Type 304 stainless steel.

441.07.24 Hydrostatic Testing

441.07.24.01 General

Subsection 441.07.24.01 amended with the addition of the following:

Hydrostatic testing shall be conducted under the supervision of the City of St. Thomas Water Operator.

The Contractor shall assume all responsibility when testing against existing or new line valves. The Contractor is to provide all bulkheads, taps, fittings and pipe thrust restraint necessary to undertake pre-qualification or final testing.

The Contractor is to provide means of obtaining water. Test section shall be filled slowly with water making sure that all air is removed from pipeline.

441.07.25 Flushing and Disinfecting Watermains

Subsection 441.07.25 is deleted and replaced with the following:

Flushing and disinfecting watermains shall be conducted under the direction and supervision of the City of St. Thomas Water Operator and the Contract Administrator. The City of St. Thomas Water Operator and the Contract Administrator shall be notified at least four days in advance of the proposed date on which such operations are to commence.

The Contractor shall submit a written plan of the proposed cleaning, flushing and disinfection procedure to the Contract Administrator and the City of St. Thomas Water Operator for approval two (2) weeks prior to the operation.

Watermains shall be flushed and disinfected in a sequence approved by the Contract Administrator. The Contract Administrator may permit or require the flushing and disinfecting to be carried out in stages as sections of the system are completed. Flushed sections shall be protected from contamination.



Watermains shall be cleaned and flushed before hydrostatic testing and disinfection is done.

Location of discharge points for flushing and disinfection of watermains shall be approved by the City of St. Thomas Water Operator and the Contract Administrator prior to the work.

The Contractor shall supply all labour and materials necessary for the cleaning, flushing and disinfection of the pipe.

Cleaning and Flushing of Watermains

Watermains shall be cleaned and flushed in accordance with City of St. Thomas standard operating procedures.

All watermains shall be cleaned by the use of a minimum of four (4) swabs introduced at special entry sections or as directed by City of St. Thomas Water Operator and forced by water pressure through the main to exit points approved by the City of St. Thomas Water Operator and the Contract Administrator. Cleaning shall be repeated until 2 consecutive swabs exhibit no discoloration and the discharge water is clear and approved by the City of St. Thomas Water Operator.

All swabs must be open cell polyurethane foam, having a density of 24 kilograms per cubic meter. The diameter of the swab shall be 1.25 times the outside for pipe diameters up to and including 300mm and 1.50 times the outside for pipe diameters greater than 300mm. The length of the swab shall be 2 times the pipe diameter.

Disinfection of Watermains

The main shall be disinfected according to instructions listed in AWWA C651 and the "Procedure for Disinfection of Drinking Water in Ontario" as adopted by reference by Ontario Regulation 170/03 under the Safe Drinking Water Act.

AWWA C651 Sections 4.3.9 Backflow Protection and 4.6 Final Connections to Existing Mains are required and are not optional. The Contractor shall use a certified backflow device provided by The City of St. Thomas Water Operator.

After flushing is completed, water from the existing distribution system shall be allowed to flow at a controlled rate into the new pipeline. Liquid chlorine solution shall be introduced so that the chlorine is distributed throughout the section being disinfected. The chlorine shall be applied so that the chlorine concentration is 50 mg/litre minimum throughout the section. The system shall be left charged with the chlorine solution for 24 hours.

Sampling and testing for chlorine residual shall be carried out by the City of St. Thomas Water Operator. The chlorine residual shall be tested in the section after 24 hours. If tests indicate a chlorine residual of 25 mg/litre minimum, the section shall be flushed completely and recharged with water normal to the operation of the system. If the test does not meet the requirements, the chlorination procedure shall be repeated until satisfactory results are obtained.



At twenty-four hours and at forty-eight hours after the system has been recharged, the City of St. Thomas Water Operator shall take samples for bacteriological tests. Samples shall be collected from every 350 m of the new watermain plus one sample from the end of each of the line and at least one sample from each branch. If there is indication of contamination, the disinfection procedure shall be repeated.

The new watermain will not be connected to the City's distribution system until all samples show the absence of Total Coliform, E. Coli and Background. Once all sampling is to the satisfaction of the Operating Authority, clearance will be given to connect to the City's distribution system.

The system shall not be put into operation until approval has been given by the Contract Administrator.

The Contractor shall not make any claims for delays associated with awaiting test results.

441.07.27 Management of Excess Material

Subsection 441.07.27 is amended with the addition of the following:

Acceptable means of disposal are by discharge to storm sewer or open environment (drainage ditch or receiving water) with a free chlorine residual of 0.0 mg/L (i.e. no detectable level of chlorine).

Discharge of chlorinated water directly to sanitary sewer will not be permitted.

When discharging to the open environment or storm sewer, the contractor shall ensure the effectiveness of the dechlorination process. The Contractor shall provide a written plan for the dechlorination process which is to be submitted to the Contract Administrator and approved.

At a minimum the plan shall include:

- i) The chemical proposed to be used to dechlorinate, the proposed equipment and methodology for dechlorination, the proposed point of discharge and the receiving body (i.e. storm sewer, open environment, ditch, drain, water course).
- ii) The process proposed and how it will ensure adequate dosing and mixing of the dechlorination compound prior to discharge.
- iii) The measures in place to prevent erosion at the point of discharge and downstream.
- iv) The method and location of monitoring to ensure no chlorine residual remains downstream of the point of discharge.

Adequate mixing and dosage of the chemical with chlorinated water must be ensured.

The contractor shall document the dechlorination and monitoring process. These records shall be made available to the City of St. Thomas Water Operator upon request.





SUPPLEMENTAL SPECIFICATIONS – WATER

Part 2 CITY OF ST. THOMAS SUPPLEMENTAL SPECIFICATIONS FOR WATER

2.1 Tapping Sleeves and Valves

Tapping valves shall be according to AWWA C500.

Tapping sleeves and valves shall be supplied and installed by the Contractor. All tapping of commissioned watermains shall be completed by a City of St. Thomas Water Operator.

Tapping of watermain that has not been commissioned is permitted. All tapping must be undertaken by competent workmen equipped with tapping machines and other required equipment satisfactory to the Contract Administrator.

All tapping valves shall open by operating in a clockwise direction.

Size on size taps are not permitted unless otherwise specified in the Contract Documents. The diameter of the connection must be at least one size smaller than the diameter of the watermain to be tapped.

2.2 Corrosion Protection

Corrosion Protection shall be according to OPSS.MUNI 442.

All cast iron (CI) and ductile Iron (DI) fittings must be installed with a 14.5kg (32lbs) high purity magnesium anode. Anode must be attached to fitting using a CADWELD and coated with mastic (Handy Cap IP or approved equal).

Epoxy coated gate valves do not require anodes.

Following installation, anodes shall be saturated with water to ensure immediate operation.

Connections to steel mains shall be electrically insulated. Materials used to electrically insulate steel mains shall be installed in accordance with the manufacturer's recommendations.

All flanges, nuts, bolts and washers shall be protected from corrosion by using Denso paste, profiling mastic and petrolatum tape (or approved equal).



Petrolatum tape systems shall be comprised of three components; paste, mastic and tape and meet the requirements of AWWA C217. Mastic must contain polystyrene beads and paste and tape must be of the same manufacturer as mastic to ensure compatibility. The three components provided shall be manufactured under ISO 9001 standards to ensure consistency of quality of products and substantiating documentation is to be provided upon request.

2.3 Thermal Insulation

Thermal insulation for watermains shall be extruded expanded polystyrene boards according to the requirements of CAN/ULC S701 with a minimum compressive strength of 690 kPa. The minimum thickness for thermal insulation shall be 50 mm.

Thermal insulation shall be provided at all locations where the depth of cover over the watermain is less than 1.7 meters.

Thermal insulation shall be provided at all locations where the separation from the watermain to a sewer, sewer structure or culvert is less than 0.6 meters.

Thermal insulation shall extend a minimum of 0.6 meters on each side of the watermain.

Measurement and payment for Thermal Insulation shall be in square metres and shall be full compensation for all labour, equipment and materials required to carry out the work.

2.4 Tracer Wire

Tracer wire shall be installed on all non-metallic watermains, hydrants laterals and water services except where such water service pipe is of copper material. The wire shall be installed in such a manner as to be able to properly trace all watermains, hydrant laterals and water services without loss or deterioration of signal or without the transmitted signal migrating off the tracer wire.

Tracing wire for watermain installed by open cut method shall be #12 AWG single strand, high strength copper-clad steel with 30mil of blue HDPE insulation in accordance with ASTM-D-1248, specifically manufactured for direct burial applications and shall have a minimum break load tensile strength of at least 200 kg (450 lbs). Tracer wire for installation by directional drilling shall have a minimum break load tensile strength of at least 520 kg (1150 lbs).

Except for approved spliced in connections, tracer wire shall be continuous and without splices from valve to valve, valve to fire hydrant or fire hydrant to fire hydrant. Joints in the wire between valves and/or hydrants will not be permitted.

At each valve a loop of wire shall be brought up inside the valve box at the top of the box below the top of the valve cover in accordance with City of St. Thomas Supplemental Specifications – Water, Standard Drawing W-09.



At each hydrant, tracer wire shall be brought up into an above ground tracer wire access box attached to the hydrant flange by means of a HDPE bracket in accordance with City of St. Thomas Supplemental Specifications – Water, Standard Drawing W-03.

At each water service, tracer wire shall be connected to both the main stop and the curb stop with an approved electrical thaw nut connector.

All slices or repaired wire connections in the tracer wire system shall be made using waterproof connectors specifically rated for underground applications.

At the point of connection between cast iron or ductile iron watermains, with any non iron watermain, the tracer wire shall be properly connected to the iron pipe with a thermite weld or approved equivalent. All tracer wire welds onto existing cast or ductile iron pipe shall be completely sealed with the use of an approved mastic type sealer specifically manufactured for underground use and shall be protected from contamination by the backfill material with the use of a plastic membrane. As an alternative, approved equivalent prefabricated assemblies (Chace/Royston Handy Cap IP or approved equal) may be used. In all cases, the pipe is to be properly cleaned and material applications shall be according to the manufacturer's instructions.

For watermains, hydrant laterals and water services installed by horizontal directional drilling, two (2) tracer wires shall be installed simultaneously with the pipe.

Tracer wire shall be installed along the top of the pipe and securely affixed to the pipe at six (6) meter intervals. At water service saddles, the tracer wire shall not be allowed to be placed between the saddle and the watermain.

The wire shall be protected from damage during the execution of the work. No breaks or cuts in the tracer wire or tracer wire insulation shall be permitted. The City of St. Thomas shall test the tracer wire for conductivity immediately following installation and prior to final acceptance. If the tracer wire is not continuous from valve to valve, the Contractor shall, at his expense, replace or repair the wire.



SUPPLEMENTAL SPECIFICATIONS – WATER

Part 3 CITY OF ST. THOMAS STANDARD DRAWINGS FOR WATER

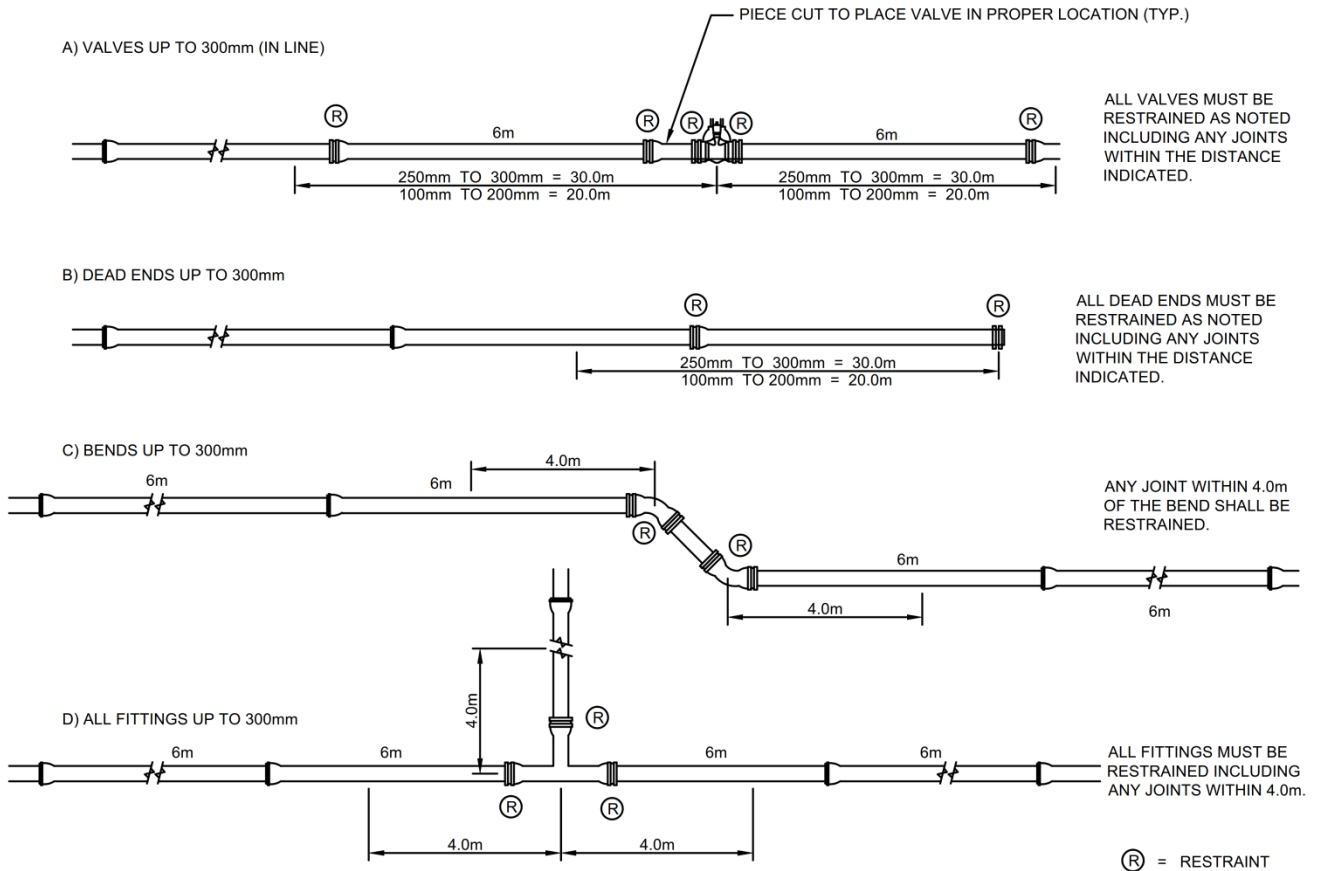


DIAMETER OF MAIN Ø (mm)	MINIMUM No. OF STEEL RODS	MINIMUM LENGTH TO BE RESTRAINED ON EACH SIDE OF FITTINGS (m)				
		11.25°	22.5°	45°	90°	DEAD END
100	2	4.0	4.0	4.0	4.0	20
150	2	4.0	4.0	4.0	5.5	20
200	2	4.0	4.0	4.0	7.0	20
250	4	4.0	4.0	4.0	8.5	30
300	4	4.0	4.0	4.0	10.0	30

THRUST RESTRAINT CHART

NOTES:

1. STEEL RODS ARE TO BE MINIMUM OF 20MM IN DIAMETER.
2. IF ANY JOINT IS ENCOUNTERED IN THE ABOVE RESTRAINED LENGTH IT MUST BE RESTRAINED.
3. 5° BENDS (BELL & SPIGOT FITTING) MUST BE RESTRAINED AT JOINTS.
4. ALL VALVES SHALL BE TREATED AS DEAD END WATERMAINS AND SHALL BE RESTRAINED ACCORDINGLY.
5. ALL RESTRAINT ASSEMBLIES SHALL BE PROTECTED WITH DENSO TAPE AND PASTE AND CATHODIC PROTECTION AS PER W-20
6. REDUCERS SHALL BE RESTRAINED ON BOTH SIDES FOR:
 $\frac{LARGE \phi^2 - SMALL \phi^2}{LARGE \phi^2}$ OF THE LENGTH REQUIREMENT FOR A LARGE Ø DEAD END.



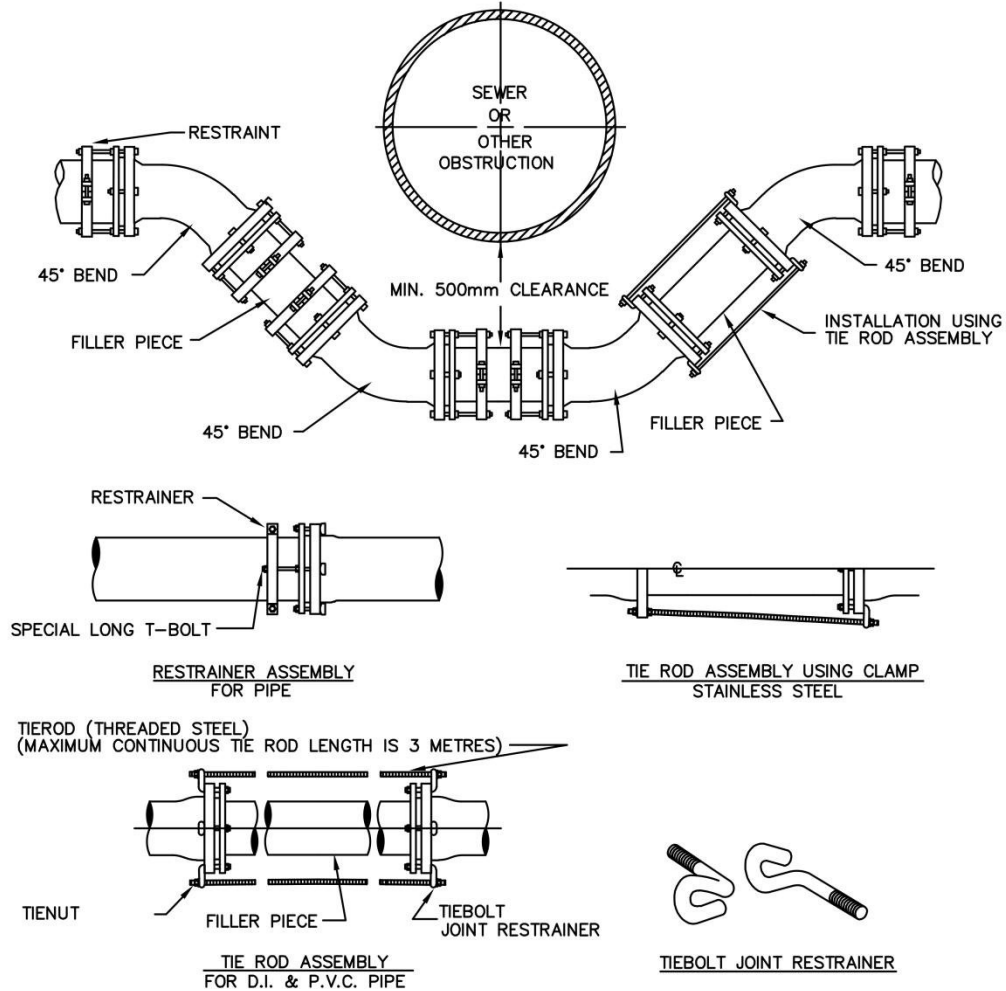
THRUST RESTRAINT DETAILS

NOT TO SCALE
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

CITY OF ST. THOMAS STANDARD DRAWING

**THRUST RESTRAINT FOR WATERMAIN
UP TO AND INCLUDING 300mm Ø**

REVISION DATE: 5 NOV 2015
DRAWING #: **W-01**



NOTES:

1. Grip Rings may be used for thrust restraint.
2. Cover tie bolt assembly with denso paste and denso tape.
3. Each restraint assembly is to be anode protected with a 7.7 kg magnesium anode.

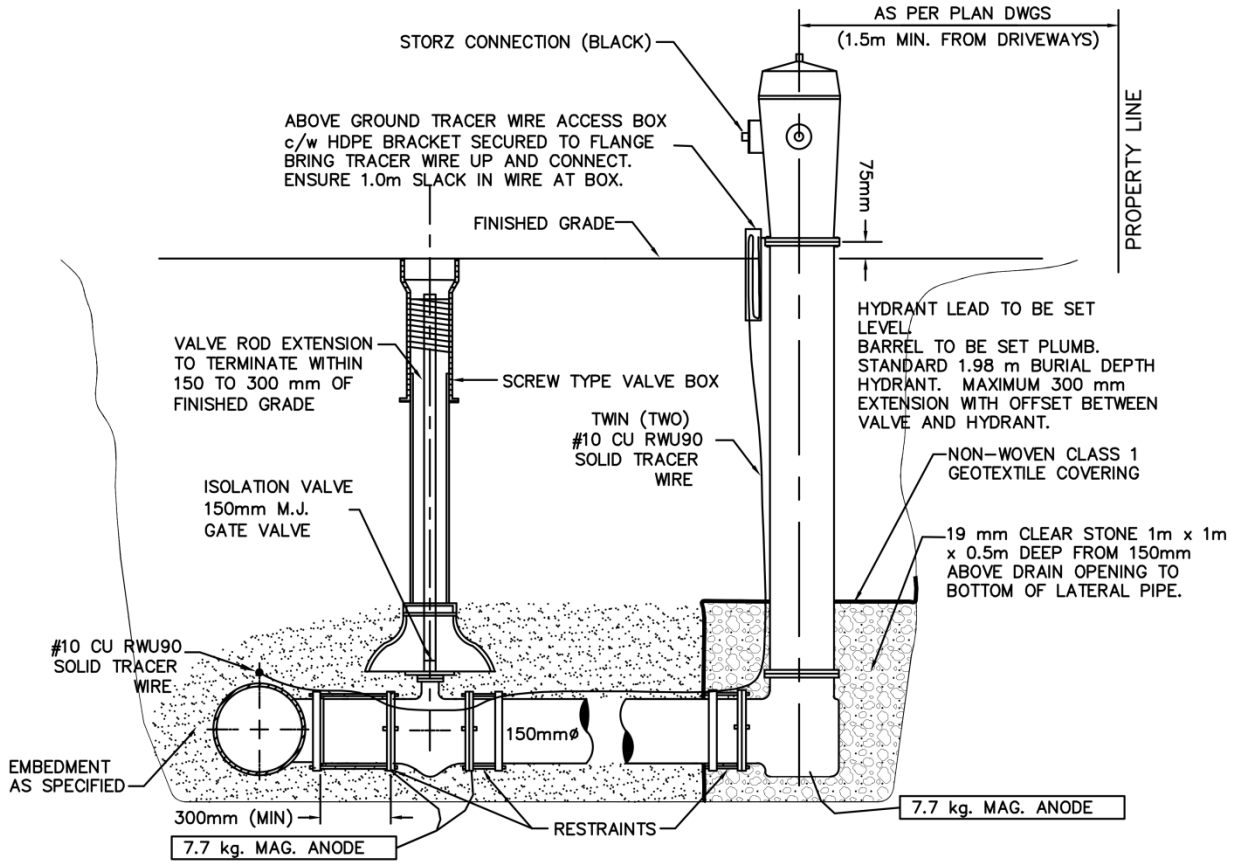
NOT TO SCALE
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

CITY OF ST. THOMAS STANDARD DRAWING

TYPICAL OFFSET WATERMAIN

REVISION DATE: 5 NOV 2015

DRAWING #: **W-02**



NOTES:

1. REFER TO SPECIFICATIONS REGARDING TRACER WIRE.
2. HYDRANT TO BE SELF DRAINING.
3. HYDRANT VALVE TO BE LOCATED AS REFERENCED ON CONTRACT DRAWINGS OR AS SPECIFIED IN FIELD.
4. ANODES SHALL BE APPLIED TO D.I. OR C.I. FITTINGS INCLUDING HYDRANT BOOT AND RESTRAINT DEVICES.

NOT TO SCALE
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

CITY OF ST. THOMAS STANDARD DRAWING

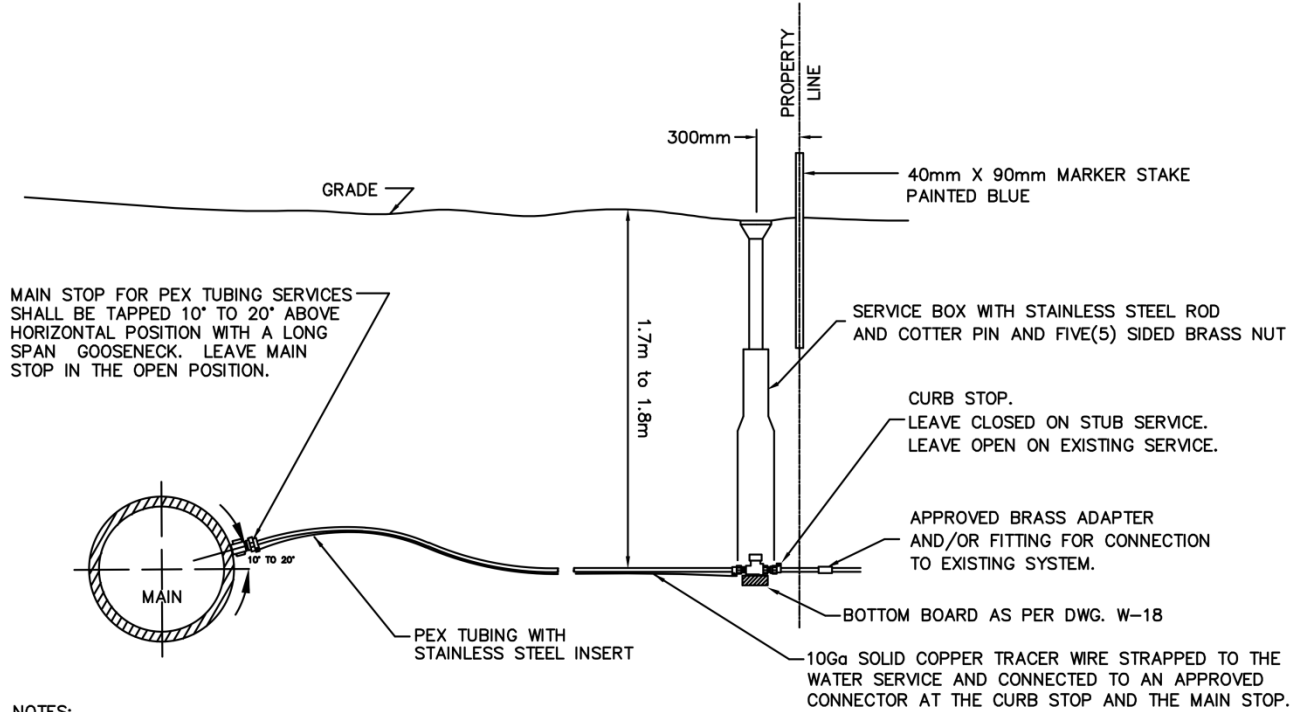
**FIRE HYDRANT
AND VALVE BOX DETAIL**

REVISION DATE: 5 NOV 2015

DRAWING #: **W-03**



EXISTING SERVICE NOMINAL SIZE	PEX TUBING SIZE EQUIVALENTS	
	PEX TUBING	SADDLE SIZE / MAIN STOP / CURB STOP
19 mm	25 mm	25 mm
25 mm	25 mm	25 mm
38 mm	50 mm	50 mm
50 mm	50 mm	50 mm



NOTES:

1. ALL SERVICES 38 mm Ø AND LARGER SHALL HAVE A 50 mm SQUARE NUT AND LARGE SCREW TYPE VALVE BOX WITH BUBBA BASE.
2. MINIMUM SIZE OF PEX TUBING IS 25 mm Ø.
3. ALL PVC WATERMAIN AND ANY 100 mm Ø METAL WATER MAIN SHALL HAVE A SERVICE SADDLE.
4. ANY METAL WATERMAIN 150 mm Ø AND LARGER MAY BE DIRECT TAPPED FOR 25 mm Ø WATER SERVICES .
5. ALL WATER SERVICES LARGER THAN 25 mm Ø REQUIRE A SERVICE SADDLE TO BE INSTALLED PRIOR TO TAPPING THE WATERMAIN.
6. NO COUPLING CONNECTIONS OF WATER SERVICE ARE PERMITTED WITHIN THE ROAD ALLOWANCE.
7. ANODES SHALL BE INSTALLED ON ALL EXISTING COPPER SERVICES ENCOUNTERED

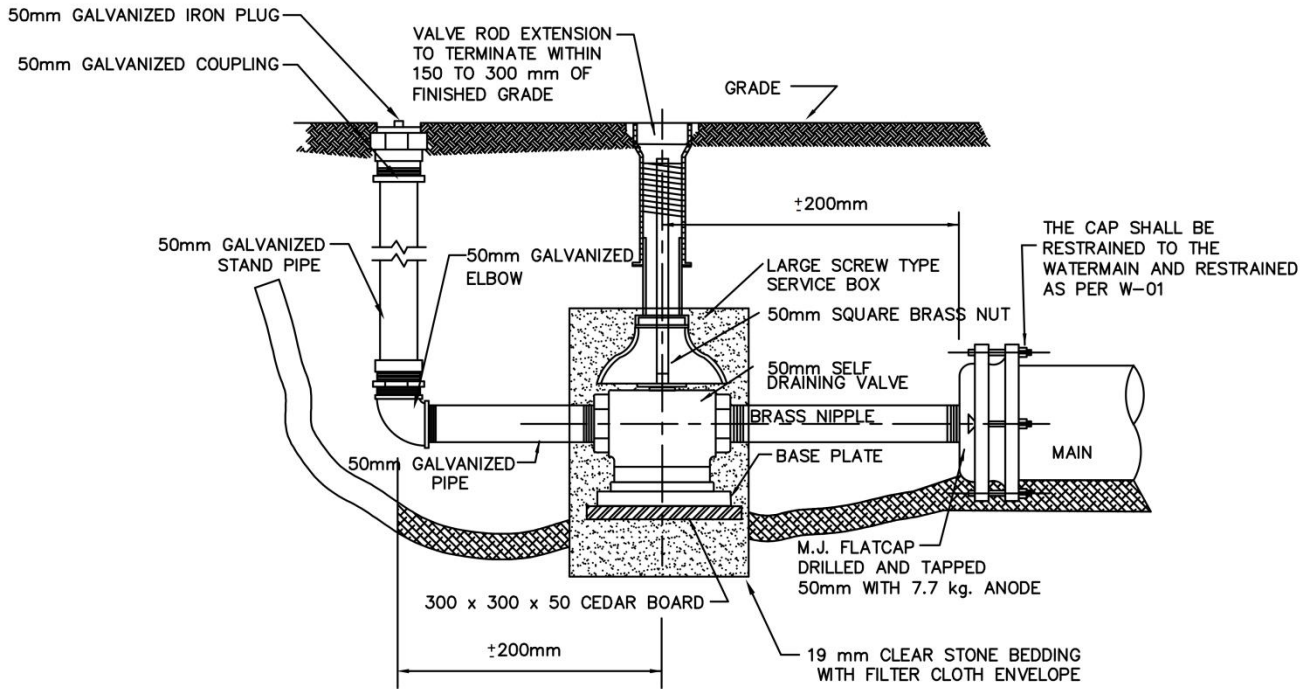
NOT TO SCALE
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

CITY OF ST. THOMAS STANDARD DRAWING

**WATERMAIN
SERVICE INSTALLATION**

REVISION DATE: 5 NOV 2015

DRAWING #: **W-04**



NOTE:
LOWER VALVE BOX BASE SHALL BE NOTCHED TO ACCOMMODATE
PIPE AND BOX SHALL BE SEATED ON BASE PLATE.

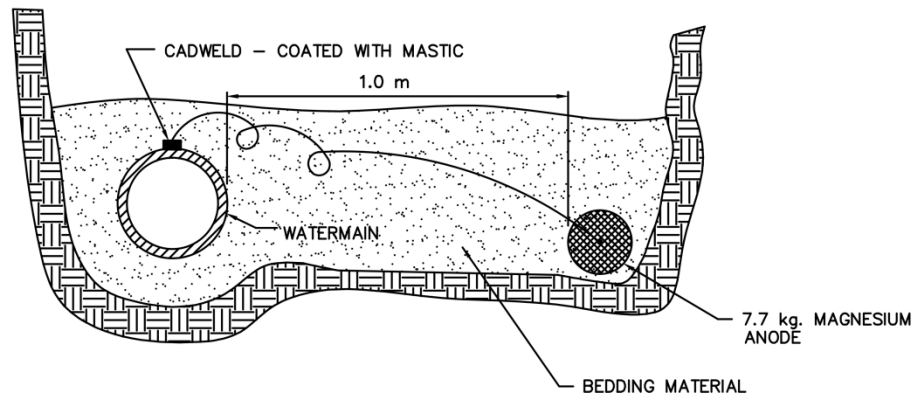
NOT TO SCALE
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

CITY OF ST. THOMAS STANDARD DRAWING

**STANDARD 50mm
BLOW - OFF**

REVISION DATE: 5 NOV 2015

DRAWING #: **W-06**



NOTES:

1. 7.7 kg. MAGNESIUM ANODES TO BE INSTALLED ON ALL METALLIC FITTINGS, RESTRAINTS AND FIRE HYDRANT BOOTS.
2. BEDDING MATERIAL IS TO BE AS SPECIFIED IN THE CONTRACT DOCUMENTS.
3. ANODES SHALL BE SATURATED WITH WATER PRIOR TO BACKFILL.

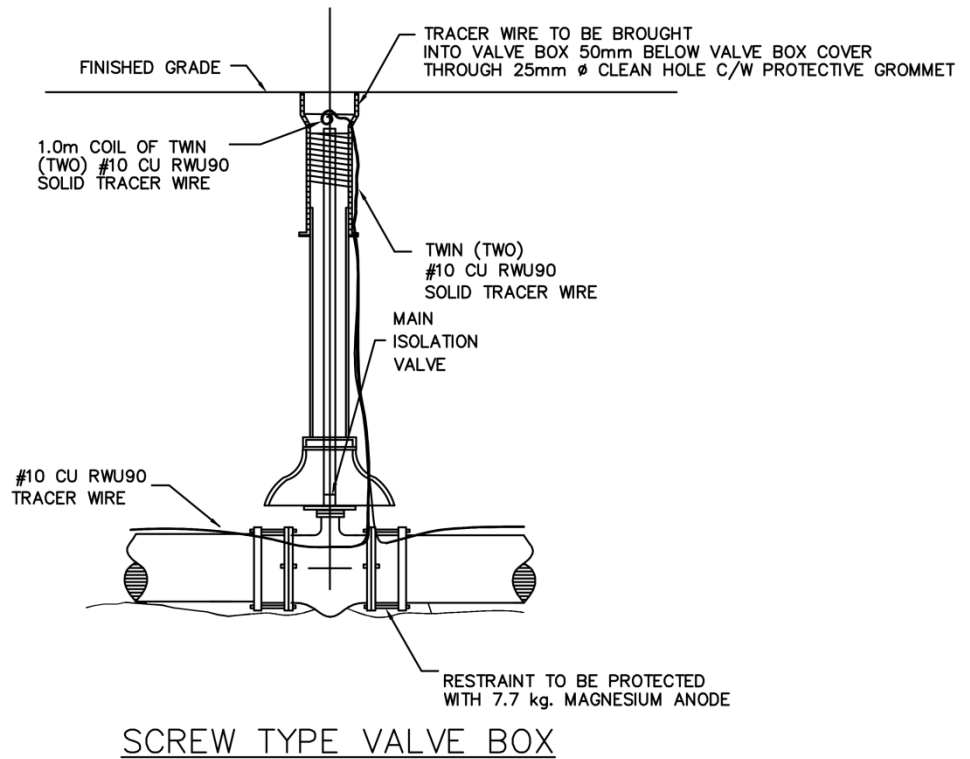
NOT TO SCALE
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

CITY OF ST. THOMAS STANDARD DRAWING

**MAGNESIUM ANODE
INSTALLATION**

REVISION DATE: 5 NOV 2015

DRAWING #: **W-07**



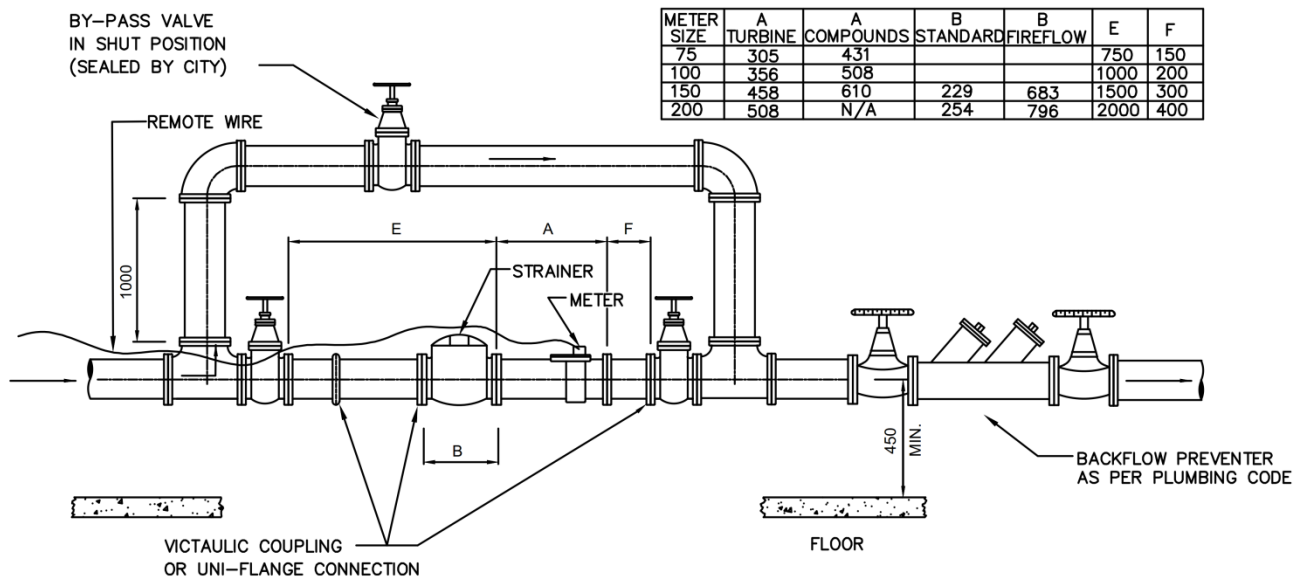
NOT TO SCALE
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

CITY OF ST. THOMAS STANDARD DRAWING

TRACER WIRE CONNECTION

REVISION DATE: 5 NOV 2015

DRAWING #: **W-09**



METER SIZE	A TURBINE	A COMPOUNDS	B STANDARD	B FIREFLOW	E	F
75	305	431			750	150
100	356	508			1000	200
150	458	610	229	683	1500	300
200	508	N/A	254	796	2000	400

NOTES:

1. All dimensions are in mm unless otherwise shown.
2. Flanged fittings are required for all meters.
3. Minimum size of valving and by-pass piping to be equal to meter size.
4. All check valves, back flow prevention, pressure reducing valves, etc. must be installed after the by-pass when fire flows are metered.
5. All meters are to be installed horizontally unless approved otherwise by the City.
6. Installation indicates the minimum space requirements in a mechanical or meter room. Minimum clearance from floor, wall or fixed equipment to be 450mm.

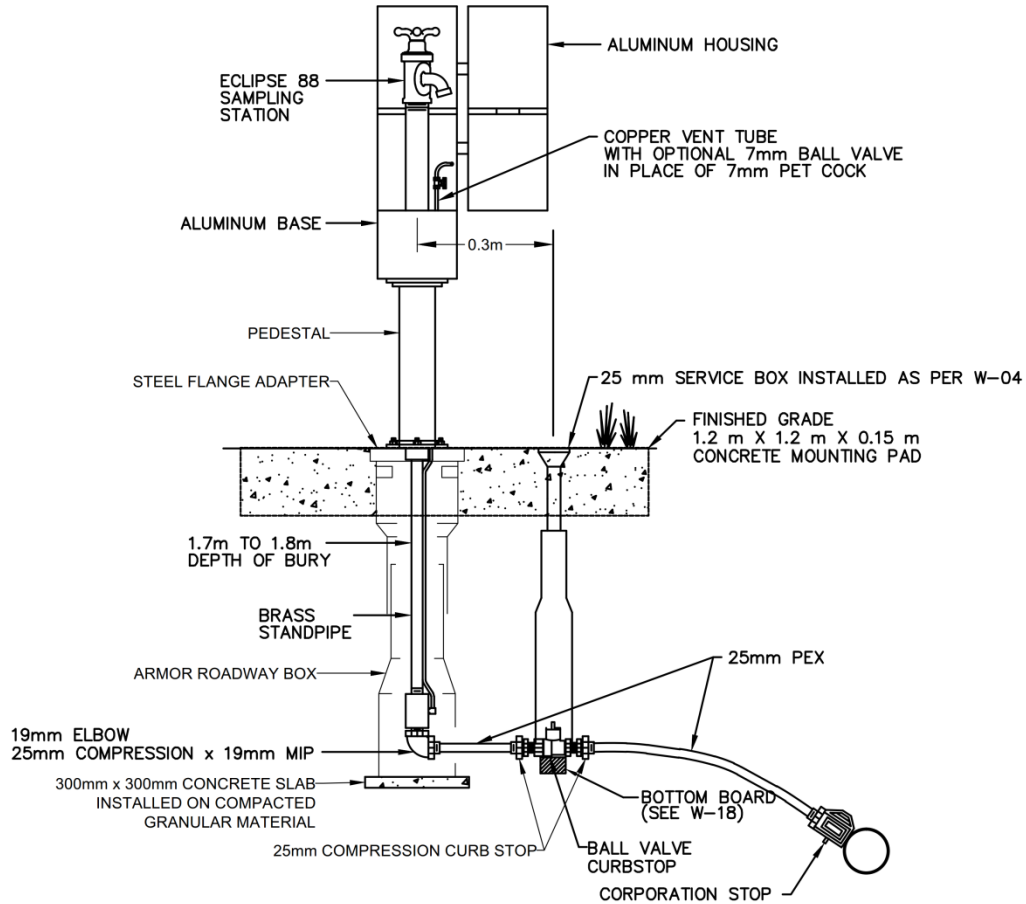
NOT TO SCALE
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

CITY OF ST. THOMAS STANDARD DRAWING

**TYPICAL TURBINE WATER METER
INSTALLATION FOR 75mm TO 200mm**

REVISION DATE: 5 NOV 2015

DRAWING #: **W-13**



NOTES:

1. SAMPLING STATIONS SHALL BE 1.70m MIN DEPTH, WITH A 19MM FIP INLET, AND A (19mm HOSE OR UNTHREADED) NOZZLE.
2. ALL STATIONS SHALL BE ENCLOSED IN A LOCKABLE, NON-REMOVABLE, ALUMINUM-CAST HOUSING.
3. WHEN OPENED, THE STATION SHALL REQUIRE NO KEY FOR OPERATION, AND THE WATER WILL FLOW IN AN ALL BRASS WATERWAY
4. ALL WORKING PARTS WILL ALSO BE OF BRASS AND BE REMOVABLE FROM ABOVE GROUND WITH NO DIGGING. EXTERIOR PIPING SHALL BE BRASS PIPE.
5. A COPPER VENT TUBE WILL ENABLE EACH STATION TO BE PUMPED FREE OF STANDING WATER TO PREVENT FREEZING AND TO MINIMIZE BACTERIA GROWTH.
6. ECLIPSE NO. 88 PEDESTAL TYPE SAMPLING STATION SHALL BE MANUFACTURED BY KUPFERLE FOUNDRY, ST. LOUIS, MO 63102

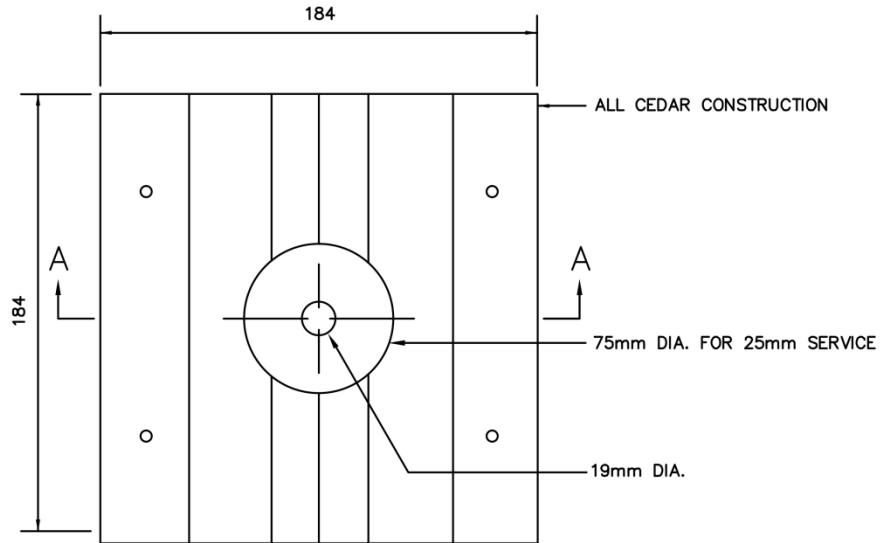
NOT TO SCALE
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

CITY OF ST. THOMAS STANDARD DRAWING

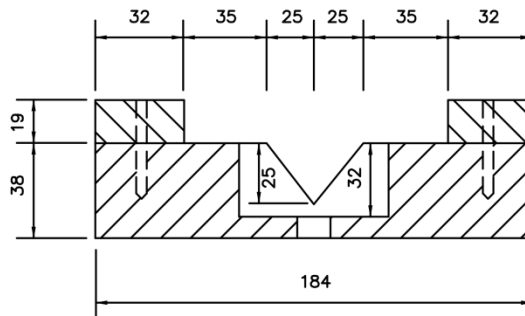
**WATER SAMPLING
STATION DETAIL**

REVISION DATE: 5 NOV 2015

DRAWING #: **W-17**



PLAN VIEW



SECTION "A-A"

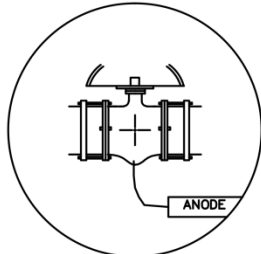
NOT TO SCALE
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

CITY OF ST. THOMAS STANDARD DRAWING

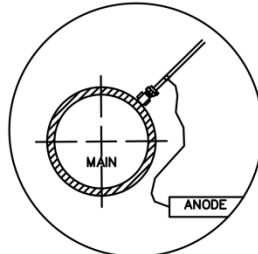
**BOTTOM BOARD
FOR STANDARD WATER SERVICES**

REVISION DATE: 5 NOV 2015

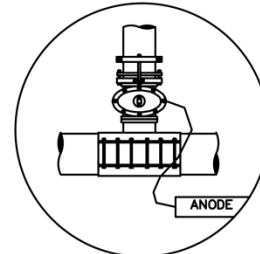
DRAWING #: **W-18**



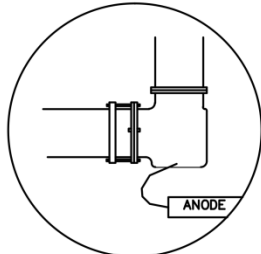
7.7 kg ANODE FOR EACH VALVE WITH RESTRAINT ASSEMBLY



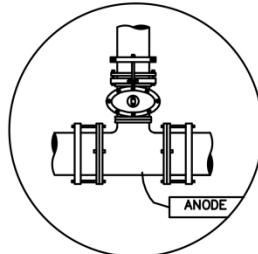
2.7 kg ANODE CLAMPED TO EACH COPPER WATER SERVICE



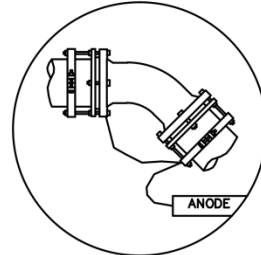
7.7 kg ANODE FOR EACH TAPPING SLEEVE AND VALVE WITH RESTRAINT ASSEMBLY OVER 50 mm Ø, ALL OTHERS TO BE PROTECTED WITH A 2.7 kg ANODE.



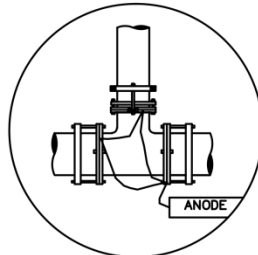
7.7 kg ANODE FOR EACH HYDRANT WITH RESTRAINT ASSEMBLY



7.7 kg ANODE FOR EACH ANCHOR TEE AND VALVE WITH RESTRAINT ASSEMBLY



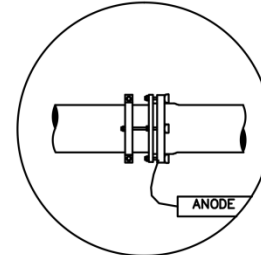
BENDS AND REDUCERS ARE TO BE PROTECTED WITH ONE (1) 7.7kg ANODE WITH JUMPER CABLE OR TWO (2) 2.7 kg ANODES CONNECTED INDIVIDUALLY. AN M.J. FITTING WITH RESTRAINTS REQUIRES ONE (1) 7.7 kg ANODE.



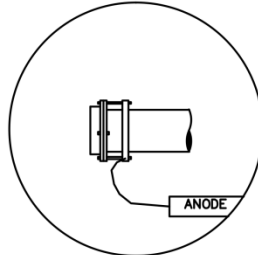
7.7 kg ANODE WITH JUMPER CONNECTIONS TO EACH OF THE THREE (3) RESTRAINTS ON THE PVC TEE OR CONNECTED DIRECTLY TO THE M.J. TEE. THE SAME APPLICATION APPLIES TO THE FOUR (4) RESTRAINTS ON A CROSS.

NOTES

- 1) ALL ANODE CONNECTIONS SHALL BE CADWELD CONNECTIONS UNLESS STATED OTHERWISE.
- 2) ALL JUMPER CONNECTIONS SHALL BE MADE WITH A MINIMUM #10 GAUGE RWU90 WIRE.
- 3) FOR UNUSUAL CONFIGURATIONS THE CITY ENGINEER OR HIS DESIGNATE SHALL DETERMINE THE CATHODIC PROTECTION REQUIREMENTS.



2.7 kg ANODE PER RESTRAINT OR ONE (1) 7.7 kg ANODE FOR THREE (3) RESTRAINTS IF WITHIN 3.0 m.



7.7 kg ANODE FOR A RESTRAINT ON A CAP OR A PLUG AT A DEAD END

NOT TO SCALE

ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

CITY OF ST. THOMAS STANDARD DRAWING

MAGNESIUM ANODE CONFIGURATION
FOR VARIOUS METALIC FITTINGS

REVISION DATE: 5 NOV 2015

DRAWING #: W-20



SUPPLEMENTAL SPECIFICATIONS ROADS



THE CORPORATION OF THE CITY OF
ST. THOMAS





SUPPLEMENTAL SPECIFICATIONS - ROADS

Part 1 AMMENDMENTS TO ONTARIO PROVINCIAL STANDARDS FOR ROADS AND PUBLIC WORKS

OPSS 102 GENERAL SPECIFICATION FOR MATERIAL WEIGHING

102.07 CONSTRUCTION – WEIGHING

102.07.01 Mass Measurement

Subsection 102.07.01 is deleted in its entirety and replaced by the following:

Mass measurements will be made at weigh scales equipped with an automatic printing device capable of producing tickets. Mass measurement of all granular and asphalt material shall be electronically transmitted from the platform weight sensing device to the computer, with a direct cable connection. Any form of manual override, except total transaction rejection, will not be allowed.

Tickets of laser quality type shall be produced electronically, using black print only, on a printing device connected by direct cable connection to the computer, capable of producing tickets conforming to the Owner's requirements. Tickets shall be supplied by the contractor and shall indicate the truck number, type of material, gross weight, net weight, tare weight and contract number.

Hand written tickets will not be accepted.

OPSS.MUNI 180 GENERAL SPECIFICATION FOR THE MANAGEMENT OF EXCESS MATERIAL

180.03 DEFINITIONS

Subsection 180.03 is amended by the addition of the following:

Contaminated Excavated Material means excavated material with elevated levels of contaminants listed in the Ministry of Environment's Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Table 1 - Full Depth Background Site Condition Standards, excluding elevated concentrations of Chloride, Sodium, values for Electrical Conductivity (EC) and Sodium Absorption Ratio (SAR).



180.04 DESIGN AND SUBMISSION REQUIREMENTS

180.04.01.01 Notification of Site Selection and Property Owner Release

Subsection 180.04.01.01 is amended by the addition of the following:

The Contractor is advised that certain areas of the City of St. Thomas and surrounding areas are regulated by Conservation Authorities, including Kettle Creek Conservation Authority (KCCA), and Catfish Creek Conservation Authority (CCCA). The placement of fill material in certain areas may not be acceptable or in accordance with Section 28 of the *Conservation Authorities Act*. The Contractor shall be required to provide evidence to the Contract Administrator of approvals and / or permits from the affected Conservation Authority, prior to the disposal of any fill material (including but not limited to topsoil, subsoil, concrete or dredged sediment, etc). If the Conservation Authority advises the Contractor that the site is not within a fill regulated area or flood plain and therefore does not need an approval or a permit from the Conservation Authority, the Contractor shall provide written evidence of this to the Contract Administrator.

180.07 CONSTRUCTION

180.07.01 Conditions on Management of Excess Material – General

Paragraph 3 of Subsection 180.07.01 is deleted and replaced with the following:

When excess material includes asbestos waste, the asbestos waste shall be managed in accordance to Section 17 of O. Reg. 347 under the Environmental Protection Act, O. Reg. 278/05, and City of St. Thomas Standard Operating Procedures.

The Contractor shall submit to the Contract Administrator prior to the work a plan in writing for the handling, management and disposal of asbestos waste.

Subsection 180.07.01 is amended by the addition of the following:

When excess material is contaminated excavated material from road, trenches for sewer, watermain and utilities, or anywhere within the project, the contaminated excavated material may be directed to be taken to a landfill by the Contract Administrator.

The Contractor shall note that excavated material from the construction project may contain elevated concentrations of chloride, sodium, values for Electrical Conductivity (EC) and Sodium Absorption Ratio (SAR). The Contractor shall notify the third party property owner of the receiving site of the potential for elevated concentrations of chloride, sodium, values for EC and SAR in the excess excavated material on Form OPSF 180-1, and Form OPSF 180-2, where applicable.

180.10 BASIS OF PAYMENT

Subsection 180.07.01 is amended by the addition of the following:



Payment for excavation and disposal of contaminated material shall be made under the tender item(s) for excavation of contaminated excavated material, and shall include all costs associated with this work including loading, hauling and tipping fees encountered. Where the Tender does not include a tender item for excavation of contaminated material, payment will be based on a receipt or invoice from the landfill provided to the Contract Administrator. Compensation will include costs for increased hauling and tipping fees encountered.

Excess excavated material with salt impacts and/or elevated values for EC / SAR is not considered to be contaminated and will be directed and paid for in the Tender item(s) for regular excavation.

OPSS 201 CONSTRUCTION SPECIFICATION FOR CLEARING, CLOSE CUT CLEARING, GRUBBING, AND REMOVAL OF SURFACE AND PILED BOULDERS

201.07 CONSTRUCTION

201.07.01 General

Subsection 201.07.01 is amended by the addition of following:

All tree removals shall be completed by a qualified Arborist or approved tree care professional and in accordance with good arboricultural practices.

OPSS.MUNI 206 CONSTRUCTION SPECIFICATION FOR GRADING

206.07 CONSTRUCTION

206.07.01.06 Tolerances - General

Subsection 206.07.01.06 is amended by the addition of following:

Finished graded surfaces shall not be uniformly high or uniformly low.

206.07.03.03 Excavation Below Subgrade

Subsection 206.07.03.03 is deleted in its entirety and replaced by the following:



Unsuitable materials, other than swamp material, shall be removed below the subgrade to the lengths, widths, and depths specified in the Contract Documents, or as directed by the Contract Administrator. The resulting excavation shall be backfilled with approved material and compacted.

OPSS 310 CONSTRUCTION SPECIFICATION FOR HOT MIX ASPHALT

310.07 CONSTRUCTION

310.07.03 Tack Coat

310.07.03.01 Application of Tack Coat

Clause 310.07.03.01 is amended by the addition of the following:

Application of Tack Coat shall be carried out on all milled surfaces and where the placement of asphalt lifts is separated by more than two weeks (14 days).

310.07.05.02 Hot Mix Asphalt

310.07.05.02.01 General

Subsection 310.07.05.02.01 is amended with the addition of the following:

Quality Assurance sampling and testing on behalf of the Owner will be performed by a qualified geotechnical consultant at a frequency determined by the Contract Administrator. The Contractor shall provide any assistance, materials, labour and equipment necessary to assist the geotechnical consultant in obtaining representative samples as required.

310.07.05.02.04 Cores

Subsection 310.07.05.02.04 is amended by the addition of the following:

The minimum thickness of the compacted hot mix layer(s) shall be as specified on the Contract Documents. The Owner may, at his option and expense, require the Contractor to obtain 100mm diameter cores of the compacted hot mix to verify the thickness of the asphalt layer(s). Holes made by the removal of such samples shall be filled with the specified hot mix and compacted.

If the average thickness of the base asphalt and/or surface asphalt varies by 15mm greater than or less than the specified hot mix thickness, the hot mix asphalt placed may be rejected. Rejected asphalt shall be removed and replaced as directed by the Contract Administrator.



310.07.08 Widening and Irregular Sections

Subsection 310.07.08 (a) is amended with the addition of the following:

Stepped joints are required unless otherwise specified in the Contract Documents.

310.07.11 Longitudinal and Transverse Joints

310.07.11.01 General

Subsection 310.07.11.01 is amended with the addition of the following:

Stepped joints are required for all full depth longitudinal and transverse joints in the roadway and at commercial and industrial driveways.

When matching new asphalt to existing asphalt, ensure that all joints will not be located in the vehicular running tracks and that any cut areas can be restored with conventional paving equipment and rollers. All cuts shall be squared off to avoid any hand placed areas.

310.07.14 Surface Appearance

Subsection 310.07.14 is amended by the addition of the following:

The repair to a defective surface course will be a minimum of at least one full lane width by a minimum length that is to be determined by the Contract Administrator.

310.08 QUALITY ASSURANCE

310.08.01 General

Subsection 310.08.01 is amended by the addition of the following:

Repairs to defective areas will be a minimum of at least one full lane width by a minimum length that is to be determined by the Contract Administrator.

310.10 BASIS OF PAYMENT

310.10.01 - Items

Sub-section 310.10.01 is amended by the addition of the following:

OPSS 310 Appendix 310-B, Supplemental Requirements for Using the MTO Performance Graded Asphalt Cement (PGAC) Price Index in Municipal Contracts shall apply.



OPSS.MUNI 331 CONSTRUCTION SPECIFICATION FOR FULL DEPTH RECLAMATION WITH EXPANDED ASPHALT STABILIZATION

331.10 BASIS OF PAYMENT

331.10.01 Full-Depth Reclamation with Expanded Asphalt Stabilization - Item

Subsection 331.10.01 is amended by the addition of the following:

OPSS 310 Appendix 310-B, Supplemental Requirements for Using the MTO Performance Graded Asphalt Cement (PGAC) Price Index in Municipal Contracts shall apply.

OPSS.MUNI 333 CONSTRUCTION SPECIFICATION FOR COLD IN-PLACE RECYCLING

333.10 BASIS OF PAYMENT

333.10.01 Cold In-Place Recycled Mix - Item

Subsection 333.10.01 is amended by the addition of the following:

OPSS 310 Appendix 310-B, Supplemental Requirements for Using the MTO Performance Graded Asphalt Cement (PGAC) Price Index in Municipal Contracts shall apply.

OPSS 350 CONSTRUCTION SPECIFICATION FOR CONCRETE PAVEMENT AND CONCRETE BASE

350.05 MATERIALS

350.05.01 Concrete

Paragraph a) of Subsection 350.05.01 is deleted in its entirety and replaced by the following:

- (a) The coarse aggregate for concrete pavement and concrete base shall have a gradation with a nominal maximum size of 19.0 mm aggregate and shall be according to the requirements of OPSS 1002.



350.07 CONSTRUCTION

350.07.02 Joints

350.07.02.01 General

Paragraph 1 of Subsection 350.07.02.01 is deleted and replaced with the following:

The Contractor shall submit a joint layout for approval prior to placing either curb and gutter or concrete pavement or both. Joints shall be of the type and at the location as specified in the Contract Documents.

Subsection 350.07.02.01 is amended by the addition of the following:

Transverse joint layouts shall begin by planning joints to intercept roundouts for CB's and MH's. The centre line of road distance between ends shall be divided into panels with a maximum length of either 30 times the pavement thickness or 4.5m, whichever is less.

Transverse joints shall have a depth not less than 1/4 the slab thickness and be continuous through the curb.

Longitudinal joint spacing shall not exceed 3.8m. Sawn longitudinal joints should be cut to 1/3 the pavement thickness.

350.07.02.04 Position and Alignment Tolerances

350.07.02.04.02 Joints

Subsection 350.07.02.04.02 Joints is deleted in its entirety and replaced by the following:

All joints shall be placed within a tolerance of +/-15mm from the design location shown on the saw cut construction drawing, or from some other location required by the Contract Administrator.

350.07.03.02 Finishing

Subsection 350.07.03.02 is amended by the addition of the following:

Following strike-off and consolidation, the concrete pavement shall be scraped with an aluminum or magnesium straight-edge, 3 meters wide, equipped with a handle to permit operation from the edge of pavement. Any excess water or latency shall be removed from the surface before scraping.

350.07.05 Joint Sealing



Subsection 350.07.05 is amended by the addition of the following:

Silicone sealant shall be used for joints in concrete pavement. Silicone shall be Dow Corning 888 or approved equivalent and shall be installed in accordance with the manufacturer's recommendations.

350.07.08 Sampling and/or Testing

350.07.08.01 Slump and Air Content

Subsection 350.07.08.01, first paragraph, is deleted in its entirety and replaced by the following:

Field sampling and testing of plastic concrete for conformance to surface tolerance, slump and air content shall be undertaken by the Owner.

350.07.08.02 Coring

Subsection 350.07.08.02 is deleted in its entirety and replaced by the following:

When required or directed by the Contract Administrator, coring shall be carried out when the concrete or lean concrete is 28 to 35 days old. The Contractor shall cut a core in the location(s) designated by the Contract Administrator. The core shall be 100 mm in diameter and shall be drilled through the complete depth of concrete pavement, concrete base or lean concrete base, perpendicular to the surface of the slab.

350.07.08.05 Transportation of Cores

Subsection 350.07.08.05 is deleted in its entirety and replaced with the following:

The concrete cores shall be delivered by the Contract Administrator to a laboratory designated by the Owner. The cores shall be delivered on the same day they were obtained.

350.08 QUALITY ASSURANCE

350.08.01 Acceptance Criteria for Strength and Thickness

Subsection 350.08.01.01 is deleted in its entirety and replaced by the following:

Slab thickness and core and/or cylinder compressive strength shall be the basis for acceptance of concrete pavement, concrete base and lean concrete bases.

When concrete cylinders are tested for compression, the compressive strengths will be calculated in accordance with CAN/CSA-A23.1-M90 Section 17.5.7 and CAN/CSA-A23.1-M90 section 17.5.7.1 and as follows:



- (1) With the standard deviation designated "s", these criteria can be expected to be met 99% of the time if the concrete is proportioned to produce an average strength as follows:
 - (a) 1.4 times the standard deviation (1.4 s) above the specified strength when the standard deviation (s) is not more than 3.5 MPa; and
 - (b) 2.4 times the standard deviation minus 3.5 MPa (2.5 - 3.5 MPa) above the specified strength when the standard deviation (s) is not more than 3.5 MPa.
- (2) The standard deviation used in Note 1 should be based on at least 30 consecutive strength tests, representing concrete whose design strength is within 7 MPa of that required for the work made with similar materials and under similar conditions to those expected.
- (3) Individual tests from concrete meeting these requirements can be expected to be below specified strength about 10% of the time.
- (4) For high-strength concrete different acceptance criteria will be specified by the Owner.

The strength level of each class of concrete shall be considered satisfactory if the averages of all sets of three consecutive strength tests for that class at one age equal or exceed the specified strength, and no individual strength test is more than 3.5 MPa below the specified strength. These requirements shall not apply to field-cured specimens.

350.08.01.03 Lot Size

350.08.01.03.01 Compressive Strength and Thickness

Paragraph 2 of Subsection 350.08.01.03.01 is deleted in its entirety and replaced with the following: Testing of compressive strength and thickness for each lot shall be conducted by the Owner at the locations and frequency as directed by the Contract Administrator.

350.08.01.05 Removal of Unacceptable Concrete

Subsection 350.08.01.05 is deleted and replaced with the following:

If the mean core compressive strength and/or deficiency in the thickness of the concrete pavement slab dictates removal or replacement, the Contractor will receive written instruction from the Contract Administrator to correct the deficient area(s).

The area to be removed shall be bounded by the nearest contraction joint and longitudinal joint or concrete pavement or concrete base edge outside the deficient area so that there shall be no additional joints.

350.09 MEASUREMENT FOR PAYMENT

**350.09.01 Actual Measurement****350.09.01.01 Concrete Pavement**

Subsection 350.09.01.01 is amended by the addition of the following:

If the concrete curb and gutter is poured monolithically (as part of the road slab), width measurements will be taken from back of curb to back of curb minus two times the width of the specified type curb and gutter. The curb and gutter will be measured in accordance with OPSS 353.09.01.01.

350.10 BASIS OF PAYMENT**350.10.01 Concrete Pavement - Item**

Subsection 350.10.01 is deleted in its entirety and replaced by the following:

Payment at the contract price for the above items shall be full compensation for all labor, equipment and material required to do the work.

350.10.01.01 Compressive Strength and Slab Thickness

Subsection 350.10.01.01 is deleted in its entirety.

OPSS 351 CONSTRUCTION SPECIFICATION FOR CONCRETE SIDEWALK**351.05 MATERIALS****351.05.06 Tactile Walking Surface Indicator Plates**

Subsection 351.05.06 is amended by the addition of the following:

Tactile walking surface indicators shall be according to CSA B651-2012.

Tactile walking surface indicators shall have ribs cast to the underside of the unit, have vent holes, and have a minimum plate thickness of 5 mm. The truncated domes shall be of uniform size and shape.

351.07 CONSTRUCTION**351.07.02.02 Granular Base**

Subsection 351.07.02.02 is amended by the addition of the following:



Granular Base for concrete sidewalks shall be Granular A and shall be a minimum thickness of 150 mm, unless otherwise specified in the Contract Documents.

351.07.06 Utility Adjustment

Paragraph 2 of Subsection 351.07.06 is deleted and replaced with the following:

Appurtenances maintained and owned by utility companies other than the Owner shall either be adjusted by the utility company concerned or by the Contractor (with approval from the applicable utility company). All arrangements to adjust the utility appurtenance shall be approved by the Contract Administrator. The Contractor shall excavate to the edge of the appurtenance and indicate the required grade of the new sidewalk.

351.07.09 Tactile Walking Surface Indicator Plate Installation

Subsection 351.07.09 is amended by the addition of the following:

Tactile walking surface indicators shall be installed in the concrete sidewalk at the back of the concrete curb across the full width of the dropped portion of the pedestrian ramp.

Any wet concrete on the tactile walking surface indicator plate surface shall be removed.

All vent and lifting holes shall be filled with non-shrink concrete grout flush with the surface of the tactile walking surface indicator plate base.

100mm wide drainage slots shall be provided at the low point(s) of the tactile walking surface indicator plate(s). Finished tactile walking surface indicators shall be free of standing water.

351.07.11 Joints

351.07.11.04 Expansion Joints

Subsection 351.07.10.04 is amended by the addition of the following:

Expansion joints shall be placed every fifth dummy joint.

351.07.17 Tactile Walking Surface Tolerances

Paragraph 2 of Subsection 351.07.17 is deleted and replaced with the following:

Tactile walking surface indicator plates shall be set in the concrete so that the top of the truncated domes are flush with the surface of the adjacent concrete sidewalk to a tolerance of ± 3 mm.



Where tactile walking surface indicators plates are rejected, the entire pedestrian ramp shall be removed and replaced at the expense of the Contractor, as directed by the Contract Administrator.

351.10.02 Tactile Walking Surface Indicators for Concrete Sidewalk Ramps – Item

Subsection 351.10.02 is amended by the addition of the following:

When there is not a separate Tender item for Tactile Walking Surface Indicators, payment at the Contract price for Concrete Sidewalk shall include full compensation for all labour, equipment, and material to do the work of Tactile Walking Surface Indicators.

OPSS 353 CONSTRUCTION SPECIFICATION FOR CONCRETE CURB AND GUTTER SYSTEMS

353.07 CONSTRUCTION

353.07.02 Foundation and Backfill

Subsection 353.07.02 is amended by the addition of the following:

Concrete curb and gutter shall have a Granular A base with a minimum thickness of 150 mm, except where concrete curb and gutter is installed on new full depth granular road base, where the thickness may be reduced to 50mm.

OPSS.MUNI 501 CONSTRUCTION SPECIFICATION FOR COMPACTING

501.07 CONSTRUCTION

501.07.01 General

Subsection 501.07.01 is amended by the addition of the following:

“Jetting” is not an approved method of compaction unless otherwise specified in the Contract Documents.

OPSS 706 CONSTRUCTION SPECIFICATION FOR TRAFFIC CONTROL SIGNING



706.07 Construction

706.07.02 Existing Signing

Subsection 706.07.02 is deleted in its entirety and replaced with the following:

Prior to commencement of construction, the Contractor must record the location and type of each sign within the limits of the construction. The Contractor is responsible for removal, storage and reinstallation of all signs within the construction zone including the cost of replacing missing signs as a result of construction or theft. The signs must be reinstalled conforming to the Ontario Traffic Manual, Highway Traffic Act, City of St. Thomas' Traffic and Parking By-Law and City of St. Thomas Standards. Final locations of all traffic signs must be approved by the City of St. Thomas Environmental Services Roads and Traffic Service Area prior to installation.

OPSS 710 CONSTRUCTION SPECIFICATION FOR PAVEMENT MARKING

710.02 REFERENCES

Subsection 710.02 is amended with the addition of the following:

Ontario Ministry of Transportation Publications

Ontario Traffic Manual (OTM) Book 11, Pavement, Hazard and Delineation Markings

The MUTCD has been superseded by the OTM. All references to MUTCD within this specification shall be referenced to the most current version of OTM Book 11.

710.04 DESIGN AND SUBMISSION

710.04.01 General

Subsection 710.04.01 is amended with the addition of the following:

At the request of the Contract Administrator, the Contractor shall supply and deliver a sample of the pavement marking material specified in the contract to a designated lab for testing.

710.05 MATERIALS

710.05.03 Thermoplastic Pavement Marking Materials



Subsection 710.05.03 is amended by the addition of the following:

Thermoplastic pavement marking shall also conform to the requirements of Lafrentz “System 300”.

710.05.04 Field Reacted Polymeric Pavement Marking Materials

Subsection 710.05.04 is amended by the addition of the following:

Field reacted polymeric pavement marking material shall also conform to the requirements of Lafrentz “System 400”.

710.05.05 Preformed Plastic Pavement Marking Tape

Subsection 710.05.05 is amended by the addition of the following:

Preformed plastic pavement marking tape shall also conform to the requirements of 3M Stamark Series “440, 5730 and 5731.”

710.07 CONSTRUCTION

710.07.03 Pavement Marking Obliterating

Subsection 710.07.03 is amended by the addition of the following:

Pavement markings shall be removed using approved abrasive blasting equipment and material in accordance with OPSS 128.

The depth of the removal shall be the minimum required to totally remove the existing pavement markings to a normal depth, typically averaging 3 mm. Pavement marking obliterating shall be carried out using a soft abrasive blast cleaning system at locations specified in the contract ensuring that the asphalt pavement is not damaged in any way and that no pavement markings remain visible upon completion.

710.07.07 Permanent Pavement Marking

Subsection 710.07.07 is amended by the addition of the following:

Permanent pavement markings shall be placed within 24 hours after the surface asphalt has been completed.



710.09 MEASUREMENT FOR PAYMENT

710.09.01 Actual Measurement

710.09.01.01 Pavement Marking

Subsection 710.09.01.01 is deleted in its entirety and replaced by the following:

Measurement for pavement markings is by the horizontal length in metres of the line excluding gaps. Width of the lines shall be as specified in the Contract Documents.

The unit of measurement for symbols to be obliterated is each.



SUPPLEMENTAL SPECIFICATIONS – ROADS

Part 2 CITY OF ST. THOMAS SUPPLEMENTAL SPECIFICATIONS FOR ROADS

2.1 Painting Edge of Concrete Curb and Gutter Reveal

On all projects where the surface asphalt is not expected to be placed immediately following the placement of base asphalt, and the concrete curb reveal is exposed for more than forty eight (48) hours, the contractor shall at his expense be responsible for supplying, placing and maintaining fluorescent orange spray paint on the exposed edge of the curb reveal.

At a minimum, the contractor shall apply paint to the curb reveal within forty eight (48) hours after the base asphalt has been placed, prior to snow accumulation and again in the spring immediately after the snow has melted or as directed by the Contract Administrator.

Where top asphalt placement is delayed beyond the next paving season, the Contractor is required to continue maintaining the painting of the curb reveal and will be reimbursed at time and materials.

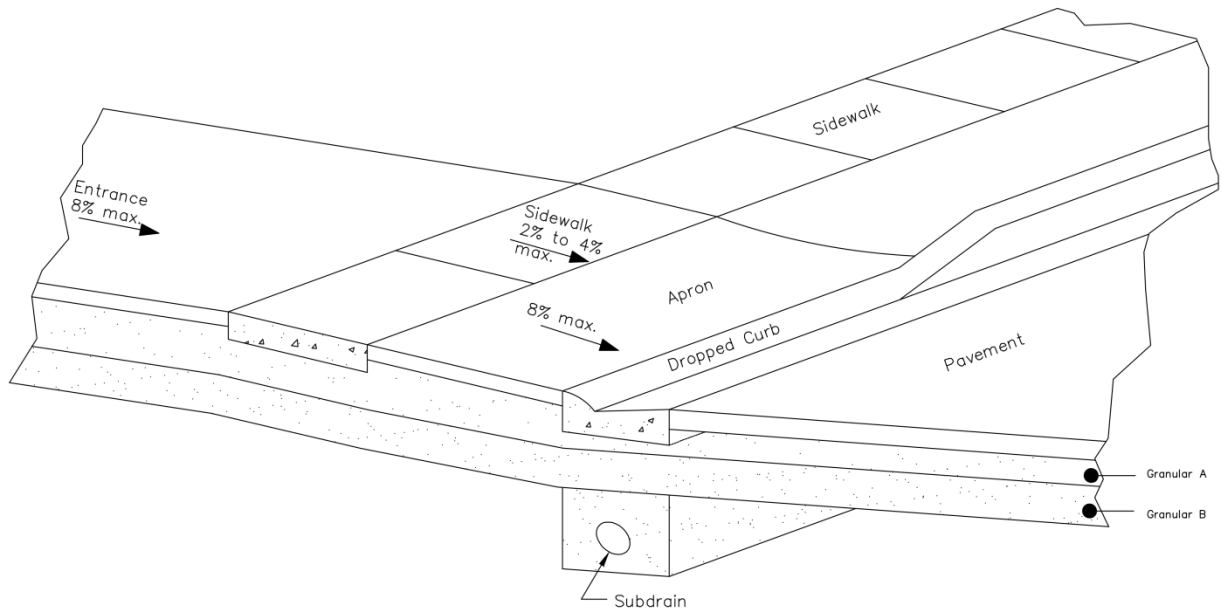
2.2 Asphalt Ramps

On all projects where the top asphalt is not expected to be placed within forty eight (48) hours of base asphalt, the Contractor shall supply, place and compact hot mix asphalt to provide asphalt ramps at all wheel chair ramps and intersecting side streets, and at all appurtenances in conjunction with the placement of base asphalt. The ramps shall not form part of the permanent asphalt pavement and shall be removed prior to continuing paving operations.



SUPPLEMENTAL SPECIFICATIONS – ROADS

Part 3 CITY OF ST. THOMAS SUPPLEMENTAL STANDARD DRAWINGS FOR ROADS



MINIMUM PAVEMENT STRUCTURE

RESIDENTIAL DRIVEWAYS:		
GRANULAR A		250mm
HL3 ASPHALT		75mm (TWO LIFTS)
INDUSTRIAL / COMMERCIAL / APARTMENT DRIVEWAYS:		
GRANULAR B		300mm
GRANULAR A		150mm
HL8 ASPHALT		50mm
HL3 ASPHALT		35mm

NOTES:

1. DRIVEWAY APRONS REPLACED DURING ROAD RECONSTRUCTION SHALL COMPRISE OF THE SAME DUST FREE MATERIALS AS THOSE PRESENT PRIOR TO THE INITIATION OF THE WORK TO THE MINIMUM OF THIS STANDARD. WHERE EXISTING DRIVEWAY APRON IS GRAVEL, OR OTHER NON-DUST FREE SURFACE, THE DRIVEWAY APRON SHALL BE REPLACED WITH ASPHALT TO THE PROPERTY LINE.
2. ALL NEW DRIVEWAY APRONS ARE TO BE CONSTRUCTED TO THIS STANDARD.
3. CONCRETE AT 150 mm (MIN) DEPTH MAY BE USED IN LIEU OF ASPHALT FOR RESIDENTIAL DRIVES. CONCRETE FOR COMMERCIAL/INDUSTRIAL/APARTMENT DRIVEWAYS SHALL BE 200mm (MIN) DEPTH.
4. RESIDENTIAL DRIVEWAYS SHALL CONFORM TO OPSD 351.010. MAXIMUM DRIVEWAY WIDTH SHALL NOT EXCEED 50% OF THE TOTAL LOT WIDTH.
5. INDUSTRIAL, COMMERCIAL, AND APARTMENT DRIVEWAYS SHALL CONFORM TO OPSD 350.010.

NOT TO SCALE
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

CITY OF ST. THOMAS STANDARD DRAWING

**DRIVEWAY APRON
TYPICAL SECTION**

REVISION DATE: 7 DEC 2016

DRAWING #: **R-01**



SUPPLEMENTAL SPECIFICATIONS LANDSCAPING



THE CORPORATION OF THE CITY OF
ST. THOMAS





SUPPLEMENTAL SPECIFICATIONS - LANDSCAPING

Part 1 AMMENDMENTS TO ONTARIO PROVINCIAL STANDARDS FOR ROADS AND PUBLIC WORKS

OPSS 801 CONSTRUCTION SPECIFICATION FOR THE PROTECTION OF TREES

801.03 DEFINITIONS

Subsection 801.03 is amended by the addition of the following:

Arborist means a person with a diploma or degree involving arboriculture from an accredited college or university, a registered professional forester, certified tree worker, an accredited certified arborist under the international society of arboriculture or with a demonstrated history of tree preservation experience or a registered consulting arborist with the American society of consulting arborists.

DBH means the diameter at breast height, measured on the stem 1.37 meters (4.5 feet) above the ground.

Destroy means to remove, cut down, or injure a tree in any way to such an extent that it has become a hazard or compromises its life processes in such a way that it cannot survive, and “Destruction” has a corresponding meaning.

Injury means any action causing harm, damage, or impairment, and includes, but is not limited to, the injury of trees by changing grades or compacting or excavating soils within the drip line of a tree, severing roots, the improper application of chemicals, improper pruning, attachments of any items, and the removal or slashing or defacing or girdling or burning of the bark.

Prune means the removal of a tree branch or branches from a tree.

Tree means any species of perennial woody plant that has reached or can reach a height of 4.5 meters at physiological maturity.

Tree Protection Zone (TPZ) means area within the minimum required distances in accordance with ISA Standards where no construction activity of any kind is permitted.

801.07 CONSTRUCTION

801.07.01 Operational Constraints



Subsection 801.07.01 is amended by the addition of the following:

A Tree Protection Zone (TPZ) barrier is to be constructed around all trees that are not subject to destruction within the construction area unless otherwise approved by the City Arborist.

Disposal of any liquids is not permitted within a TPZ.

Altering of grade by adding fill, excavating, trenching, scraping, dumping or disturbance of any kind is not permitted within a TPZ.

Directional micro-tunneling and boring may be permitted within the limits of the TPZ subject to approval by the City Arborist.

801.07.02 Barrier for Tree Protection

Paragraph 2 and Items a) and b) of Subsection 801.07.02 are deleted and replaced with the following:

The TPZ barriers shall be erected at the dripline of trees or woodlot edges not subject to destruction within the Working Area, prior to commencement of construction operations. Where a TPZ cannot be established at the dripline, the barrier may be placed within the dripline, subject to the approval of the City Arborist and the Contract Administrator. When the barrier is placed within the dripline,

- a) a minimum distance of 1.2 m shall be maintained between the trunk of the tree and the TPZ barrier, and
- b) the TPZ shall be a minimum of 0.3 meters of diameter from the trunk for every 25 mm in DBH

Subsection 801.07.02 is amended by the addition of the following:

The TPZ barrier shall be plywood or orange plastic snow fence or equivalent as approved by the City Arborist.

All TPZ barriers shall have signage affixed to the barrier at regular intervals clearly indicating "Tree Protection Zone."

801.07.03 Tree Repair

Subsection 801.07.03 is amended by the addition of the following:

All required tree trimming and root pruning must be completed by a qualified Arborist or approved tree care professional and in accordance with good arboricultural practices.



No root pruning closer than 300 mm for every 25 mm of trunk diameter will be permitted.

OPSS 802 CONSTRUCTION SPECIFICATION FOR TOPSOIL

802.07 CONSTRUCTION

802.07.02 Preparation for Topsoil

Paragraph 1 of Subsection 802.07.02 is deleted and replaced with the following:

Areas where topsoil is to be placed shall be compacted to 95% Standard Proctor Maximum Dry Density and shall be fine graded to a uniform surface according to OPSS 206. The surface shall be loosened to a depth of 25 mm. It shall be free of all vegetation, debris, and stones which would not be covered by the depth of topsoil specified in the Placement of Topsoil subsection.

802.07.03 Placement of Topsoil

Subsection 802.07.03 is deleted in its entirety and replaced by the following:

Topsoil shall be spread to a uniform depth of 100 mm on areas specified in the Contract Documents or as directed by the Contract Administrator.

802.09 MEASUREMENT FOR PAYMENT

802.09.01.01 Topsoil from Stockpiles

Subsection 802.09.01.01 is deleted in its entirety and replaced by the following:

Where topsoil is to be placed and drawn from stockpiles built by the Contractor or from existing stockpiles designated in the Contract, measurement will be made in square metres of topsoil placed.

802.09.01.02 Topsoil, Imported

Subsection 802.09.01.02 is deleted in its entirety and replaced by the following:

Where topsoil is to be imported and placed, measurement will be made in square metres of topsoil placed.



OPSS 803 CONSTRUCTION SPECIFICATION FOR SODDING

803.07 CONSTRUCTION

803.07.04 Placement of Sod

Subsection 803.07.04 is amended by the addition of the following:

Butt joints will be used where new sod blends with existing grass; lap joints will not be permitted.

803.07.05 Maintenance of Completed Sodding

Subsection 803.07.05 is deleted in its entirety and replaced by the following:

The Contractor shall apply maintenance watering and shall repair any break or displacement of sod, until 60 days after sod placement. At the end of the 60-day period, the sod shall be green and succulent, and show evidence of rooting into the underlying soil. Any area of sod which fails to meet these requirements shall be replaced by the Contractor, and shall be subject to a further extension of a sixty day maintenance period. The 60 day maintenance period shall exclude the winter dormant period, November 15 to April 15, inclusive.

803.08 QUALITY ASSURANCE

803.08.01 Performance Measure

Subsection 803.08.01 is deleted in its entirety and replaced by the following:

At the end of the 60 day maintenance period, an inspection of all the sod placed shall be made by the Contract Administrator. All placed sod shall be green and succulent, and show evidence of rooting into the underlying soil. All sod shall be in the same location as originally placed and shall not have moved, eroded, slipped or sloughed. Any areas which fail to meet these requirements shall be replaced by the Contractor at no cost to the Owner.

803.08.02 Acceptance

Paragraph 3 of Subsection 803.08.02 is deleted and replaced by the following:

Replaced sod shall be subject to the requirements specified herein and to a further maintenance period of 60 Days.



OPSS.MUNI 804 CONSTRUCTION SPECIFICATION FOR SEED AND COVER

804.05 MATERIALS

804.05.01 Seed

804.05.01.04 Permanent Seed Mixes

Subsection 804.05.01 is amended by the addition of the following:

Permanent Seed Mix shall be Standard Roadside Mix unless otherwise specified in the Contract Documents.



SUPPLEMENTAL SPECIFICATIONS – LANDSCAPING

Part 2 CITY OF ST. THOMAS SUPPLEMENTAL SPECIFICATIONS FOR LANDSCAPING

2.1 Tree Removals

Tree removals shall be completed in accordance with the Contract Documents. All trees not marked for removal on the Contract Documents shall be protected from damage or injury in accordance with OPSS 801 as amended by the City of St. Thomas Supplemental Specifications.

All tree removals must be completed by a qualified Arborist or approved tree care professional and in accordance with good arboricultural practices.

2.2 Tree Planting

General

Tree planting shall be completed in accordance with the Contract Documents. Final locations of trees shall be approved by the City Arborist prior to planting.

The City Arborist shall be notified at least 48 hours prior to planting to allow for proper inspection of tree planting including the monitoring of the size of excavation, backfill, watering, compaction, tree and planting quality.

Materials

All street trees are to be of the type and species noted on the Contract Documents, and shall conform to C.N.T.A (Canadian Nursery Trades Association) standards, unless otherwise specified in the Contract Documents.

All street trees shall have a caliper of at least 50mm measured at 15cm above the root collar and at least two or three meters minimum height when planted, unless otherwise approved by the City Arborist.

All trees shall have a single stem, comparatively straight trunks, well developed leaders and branches, a well developed root system characteristic of the species, cultivar, or variety, and show evidence of proper nursery pruning.

All trees must be free of insects, disease, nutrient deficiencies, mechanical injury, or defect at the time of planting.



All tree roots must be balled and burlapped or contained within a wire basket.

Construction

Tree planting is to be undertaken after final grading and sodding has been completed.

Tree planting shall be completed in the recommended planting season for the tree species. The tree planting seasons for Southern Ontario is generally spring before the leaves begin to bud (mid April to the end of May), or autumn, after the leaves have fallen (mid September to the end of October).

Pits dug for planting of balled and burlapped or wire basket trees shall be a minimum of sixty centimeters (60cm) larger than the root ball to allow for proper backfilling of the tree. Soil in the bottom of the planting pit shall be undisturbed, or firmly tampered to support the root ball and reduce settling.

Trees shall be planted so that the root flare is level with the finished grade of the surrounding soil. Where heavy clay exists, trees are to be planted so that the root flare is two to five centimeters higher than the surrounding soil.

All wire and burlap is to be cut and removed from the base of the trunk and the top 2/3 of the root ball. These items are to be removed after the tree has been placed in the hole.

Backfill shall be native topsoil excavated from the tree pit, compacted to support a free standing tree, or imported loam topsoil mixture with similar properties to the surrounding soil.

When planting is completed, the entire area shall be saturated with water.

Fertilizer is not required at the time of planting.

Pruning practices following transplanting shall consist of the removal of dead, broken or injured branches; the removal of crossing or rubbing branches, uneven growth and water sprouts. Trees with no leader or which have been “headed-back”, or where branches have been excessively tipped back to meet height requirements will not be approved. All required tree trimming must be completed by a qualified Arborist or approved tree care professional and in accordance with good arboricultural practices.

All trees shall be staked according to accepted arboriculture practices. Trees shall be double staked with either Bamboo poles or 50mm x 50mm (2”x 2”) wooden stakes, inserted outside the root ball. Tie the top of the stakes to prevent trunk from hitting the top of the stakes. Stakes are to be located opposite each other, parallel to the road or in the direction of the prevailing winds when the location is exposed to strong winds.

Guy attachments shall be biodegradable, non-abrasive ties or approved alternative. All guy supports shall be placed opposing each other, fastened in a manner so they will not girdle or abrade the tree, endanger public safety, and allow for some movement.



All trees shall be mulched with 100 mm of composted wood chips, shredded bark or similar organic mulch. Mulch area should include the root ball diameter plus one foot. The Contractor shall ensure mulch is not mounded around tree trunk, and all turf in mulched area is removed to the base of the tree.

All trees shall have an approved tree guard placed around the base of the tree of either a 6 inch Big O or ArborGard+ or approved equivalent.

Prior to the final acceptance the Contractor shall remove all stakes, ties, and tree guards.

Maintenance

The Contractor shall maintain the tree, mulch and stakes for the duration of the maintenance period

All maintenance practices shall follow ISA arboriculture practices and standards.

The Contractor shall thoroughly water all trees at time of planting and for the duration of the maintenance period, whenever there has been seven to ten days without rain, during the spring/summer season(s), to ensure good soil root contact and thereafter to maintain a healthy life.

All trees replaced during the maintenance period shall be guaranteed for one year from the date of the replacement planting.

Measurement and Payment

Payment for Trees shall be full compensation for all labor, equipment and materials required to carry out the work.

Payment shall be based on the actual number of trees planted.

2.3 Tree and Shrub Relocation

All required tree or shrub relocations must be completed by a qualified Arborist or qualified nursery professional and in accordance with good arboricultural practices.

Tree and shrub relocations shall be completed in accordance with the Contract Documents and the City of St. Thomas Supplemental Specification for Landscaping Section 2.2, Tree Planting. Final locations of trees and shrubs shall be approved by the City Arborist.

Payment for Tree or Shrub Relocation shall be full compensation for all labor, equipment and materials required to carry out the work.

Payment shall be based on the actual number of trees or shrubs relocated.



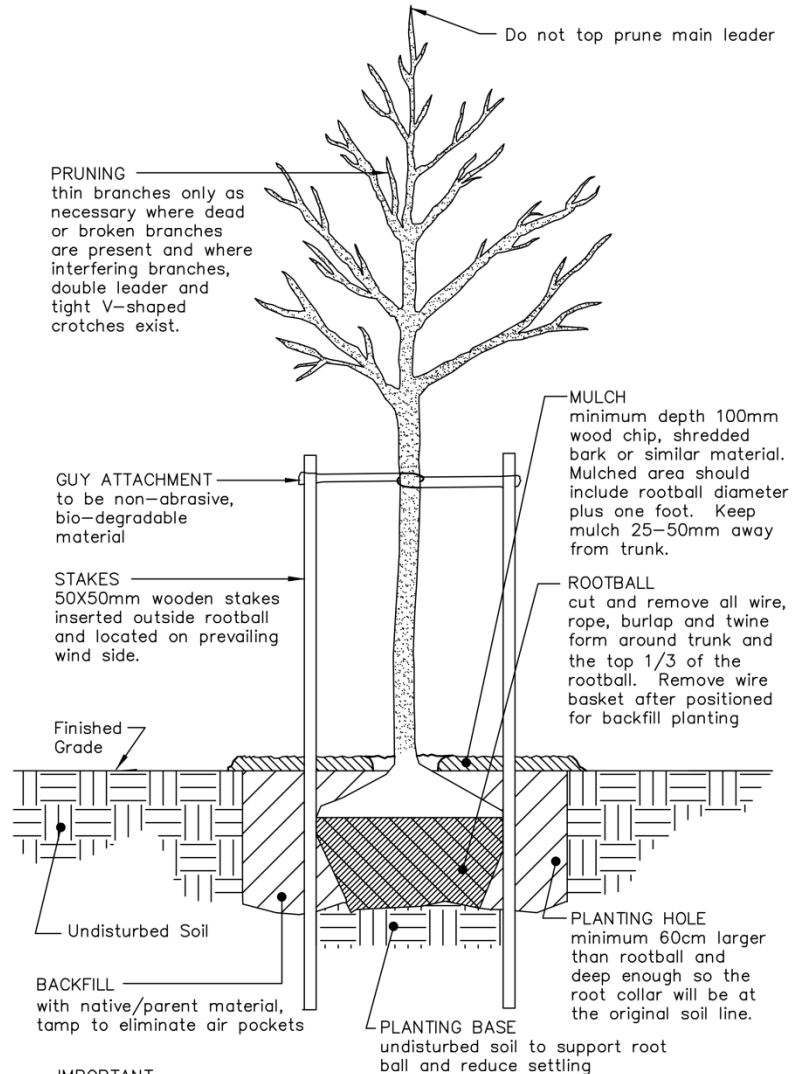
SUPPLEMENTAL SPECIFICATIONS – LANDSCAPING

Part 3 CITY OF ST. THOMAS SUPPLEMENTAL STANDARD DRAWINGS FOR LANDSCAPING



NOTES

1. THIS DETAIL DOES NOT REPRESENT ANY PARTICULAR SPECIES
2. TREES MUST BE AT LEAST 50mmØ UNLESS OTHERWISE APPROVED BY THE PARKS AND RECREATION DEPARTMENT
3. WILL NOT ACCEPT TREES WITH MORE THAN 1 LEADER, NO CENTRAL LEADER, TREES SHOWING SIGNS OF STRESS, NUTRIENT DEFICIENCIES, MECHANICAL INJURY, OR TREES THAT HAVE BEEN EXCESSIVELY PRUNED TO MEET HEIGHT/SIZE REQUIREMENTS
4. IF TREES HAVE A CENTRAL LEADER THAT HAS A DEFINED LEAN, DIRECT AWAY FROM ANY OVERHEAD OBSTRUCTIONS
5. CROWN THIN ONLY WHERE BRANCHES ARE DEAD, BROKEN, RUBBING, OR HAVE A TIGHT 'V' SHAPED BRANCH UNION
6. DO NOT PRUNE THE CENTRAL LEADER
7. ANY TREES PLANTED TOO DEEP OR TOO HIGH SHALL BE IMMEDIATELY RE-ADJUSTED.
8. TREES SHALL BE THOROUGHLY WATERED AT THE TIME OF PLANTING .
9. BACKFILL SHALL BE THE SOIL THAT WAS EXCAVATED FROM THE TREE PIT,COMPACTED ENOUGH TO SUPPORT A FREE STANDING TREE, BE FREE OF AIR POCKETS, AND OF A LOAM TOPSOIL MIXTURE EQUIVALENT TO THE ISA STANDARDS IF EXCESS SOIL IS REQUIRED
10. STAKES SHALL BE BAMBOO POLES OR 50mm X 50mm WOODEN STAKES, INSERTED OUTSIDE THE ROOT BALL AND LOCATED OPPOSITE EACH OTHER PARALLEL TO THE ROAD OR IN THE DIRECTION OF THE PREVAILING WIND WHEN LOCATION IS EXPOSED TO STRONG WINDS
11. TIES SHALL BE BIODEGRADABLE, NON-ABRASIVE, PLACED OPPOSING EACH OTHER, AND ALLOW FOR SOME MOVEMENT
12. TREE GUARD (NOT SHOWN) SHALL EITHER BE BIG O OR ARBORGARD+,UNLESS OTHERWISE APPROVED BY THE PARKS AND RECREATION DEPARTMENT.
13. FERTILIZING IS NOT PERMITTED
14. PLANTING HOLE SHALL BE A MINIMUM OF 60CM LARGER THAN THE ROOT BALL, AND DEEP ENOUGH SO THE ROOT FLARE IS LEVEL WITH THE FINAL GRADE.
15. BASE OF THE PLANTING HOLE SHALL BE UNDISTURBED OR FIRMLY TAMPERED ENOUGH TO NOT ALLOW THE ROOT BALL TO SETTLE
16. CUT AND REMOVE ALL WIRE, BURLAP, AND TWINE FROM AROUND THE BASE OF THE TRUNK, AND THE TOP 2/3 OF THE ROOT BALL. REMOVE THESE ITEMS AFTER THE TREE HAS BEEN PLACED IN THE HOLE
17. ROOT FLARE SHALL BE LEVEL WITH THE FINAL GRADE OF THE SURROUNDING SOIL, WHERE CLAY EXISTS PLANT 2-5 CENTIMETERS HIGH
18. MULCH SHALL BE 100mm DEEP AND SHOULD CONSIST OF COMPOSTED WOOD CHIPS OR ORGANIC MATERIAL, AT A DIAMETER TO BE THE SIZE OF ROOT BALL PLUS 0.3m.
19. KEEP MULCH 25 mm TO 50 mm AWAY FROM THE BASE OF TREE
20. DRAINAGE SHALL COMPLY WITH ROAD SPECIFICATIONS



IMPORTANT

1. Remove all grass and weeds from base of tree.
2. Tree to be thoroughly watered immediately following planting.
3. Ensure mulch begins 15-20mm from tree trunk, do not mound mulch or soil around tree trunk.
4. Remove all nursery tabs, plastic, cardboard, or metal.

DECIDUOUS STREET TREE PLANTING

NOT TO SCALE
ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED

CITY OF ST. THOMAS STANDARD DRAWING

**TREE PLANTING
DETAIL**

REVISION DATE: 5 NOV 2015

DRAWING #: **L-01**