



**Engineering
and Parks
Standards
Manual**

Part 7

2024 - September

Standard Specifications

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Note: This Part is generally intended for use in capital projects. Sections that are applicable for use in private development projects can be found at the beginning of Section 2.1.

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7.1 Special Provisions (General)

7.1.1 SPG1 - Standard Special Provisions General Work

These Special Provisions are based on the Ontario Provincial Standard Specifications (OPSS) and Ontario Provincial Standard Drawings (OPSD) in effect at the Official Tender Closing Time. OPSS and OPSD apply to all facets of the Work, however, should conflicts arise, these Special Provisions shall take precedence. Where an OPSS is referenced in these documents, it shall mean the 'MUNI' version of that OPSS where one exists. The following Special Provisions apply to either the project as a whole (general work) or specifically to the individual items of work listed in the Schedule of Items and Unit Prices. The purpose of these Special Provisions is to clarify the work which shall be performed, or to infer beyond reasonable doubt the work which is required under an item in the Form of Tender for the contract price.

The work under this Contract shall include all work within the limits shown on the Contract Drawings. In addition, the work may include work on private property where required to grade, pave, or reinstate the property. Where work extends into private property the Contract Administrator, on behalf of the Town, shall obtain permission to enter such properties.

The quantities shown in the Schedule of Items and Unit Prices are the Contract Administrator's best estimate; the Contractor must satisfy himself by their own inspection of the site and take-off of the drawings that the estimated quantities are reasonable.

The prices bid for all work included in the Tender Form, unless otherwise directed in the following specifications, shall be compensation in full for the complete supply of all labour, equipment and materials necessary to construct the work as specified in, shown on, or is reasonably inferred from, the Contract Drawings and Contract Specifications.

Should access to local residences, businesses or properties or any utility or service to the properties be affected by the work, the notification of emergency agencies, utilities and/or affected homeowners shall be the responsibility of the Contractor.

All dust control and clean-up of mud tracking on existing roads shall be deemed to be included in the Total Tender Price.

The Contractor shall be responsible for any theft or damage to the works until the date of Substantial Performance.

Where these special provisions read that notice is to be provided to the Contract Administrator, this shall be deemed to read Contract Administrator and the Town.

7.1.2 SPG2 - Normal Work Week, Sunday, and Holidays

If the Contractor chooses to work beyond the normal work week, Monday to Friday, excluding holidays, 7:00 a.m. to 6:00 p.m., then the Contractor will be responsible for the inspection costs that are carried out by the Town on weekdays after six o'clock (6:00) p.m. or on Saturdays, Sundays and holidays. The charges for Town inspection costs will be based on the fees charged by the Consulting Engineer and shall include their vehicle charges, overtime premium and fringe benefits.

No Sunday work will be permitted except in the case of emergency, and then only with the written permission of the Contract Administrator and to such extent as it may judge to be necessary.

The Contractor shall refrain from work on days which are legal holidays in Ontario. In case it desires to work on any such holiday, it shall notify the Contract Administrator in writing at least four (4) days in advance of such holiday that it desires to work, stating those places where said Work will be conducted. If the Contractor fails to give such notice in advance of any holiday, such failure shall be considered as an indication that no work requiring the presence of a Contract Administrator or Inspector is to be done by the Contractor on such a holiday.

The Contract Administrator may, in writing, require the Contractor to cease or limit its operations under the Contract, on any day or days if the operations are of such a nature, or if the work is so located, or if the traffic is of such a volume that the Contract Administrator deems it necessary or expedient so to do.

7.1.3 SPG3 - Rectification of Deficiencies

Notwithstanding the Maintenance Security clause, the Contractor shall rectify all deficiencies noted at the end of the final inspection at the end of the Site Finishing Works and at the end of the guaranteed maintenance period, within seven working days following the notification from the Contract Administrator.

7.1.4 SPG4 - Deletion of Work

The Town of Milton reserves the right to delete any items in this Contract due to budget constraints or other factors. In the event of any deletions, no adjustment or compensation will be awarded to the Contractor by the Town for loss of revenues or for any other reason.

7.1.5 SPG5 - Payment

Payment for Work as shown or detailed in the contract documents not specifically detailed as part of any one item and without specified details of payment shall be deemed to be included in the item with which it is associated.

7.1.6 SPG6 - Provisional Items

All items in the Form of Tender marked “Provisional Items” shall be used only where specifically ordered by the Contract Administrator. In the event of any deletions, no adjustment or compensation will be awarded to the Contractor by the Town for loss of revenue or for any other reason.

7.1.7 SPG7 - Permits and Approvals

Commencement of work by the Contractor shall be subject to the receipt of all the necessary permits by the Town including Ministry of Environment, Conservation and Parks (sewage works) and Conservation Halton.

The Contractor may be required to schedule their work until one or more permits have been obtained. No extra payment will be made for any delay in obtaining the necessary permits.

Commencement of work by the Contractor shall be subject to the receipt of all the necessary approvals by the Engineer including Ministry of Environment, Conservation and Parks (MECP) permits (EASR and sewage works), Conservation Halton and Department of Fisheries and Oceans (DFO).

The Contractor may be required to schedule their work until one or more approvals have been obtained. No extra payment will be made for any delay in obtaining the necessary approvals.

7.1.7.1 Permit to Take Water/Environmental Activity Sector Registry

A Permit to Take Water (PTTW)/Environmental Activity Sector Registry (EASR) is required for this Contract under Section 34 of the Ontario Water Resources Act. The PTTW/EASR application is based upon available geotechnical borehole information.

7.1.8 SPG8 - Garbage Collection

The Contractor will be responsible for ensuring that garbage collection, including recyclables, yard waste, green bin waste and special collection, is maintained and when necessary, the Contractor shall make arrangements directly with the collecting agency, to permit and coordinate pick-up.

The Contractor shall provide access to garbage and recyclable collection vehicles within the closed portions of [Street Name]. Should any portion of the street be inaccessible, the Contractor shall provide a labourer and truck to move garbage and recyclables from the affected properties to a location where the collection vehicle can collect the material. This is not a separate pay item.

7.1.9 SPG9 - Contractor's Work Schedule

Within seven (7) working days after award of the contract, the Contractor shall submit, for the approval of the Contract Administrator, an official detailed schedule showing the starting and completion dates for the following major items. They shall include as a minimum:

- a. Mobilization and preparation of the site
- b. Installation of erosion and sediment control measures and fencing
- c. General removals
- d. Dewatering
- e. Earth excavation
- f. Staging
- g. Road Closures
- h. Granular base
- i. Granular sub-base
- j. Hot mix paving
- k. Concrete curb and gutter
- l. Storm sewers
- m. Traffic signals
- n. Permanent illumination
- o. Landscaping
- p. Topsoiling, seeding, and sodding
- q. Demobilization

[Revise as required]

The Contractor shall consult their sub-contractors to obtain realistic data for the preparation of their schedules.

The Contractor shall be required to provide the Contract Administrator with written

schedule updates weekly outlining the proposed works for the upcoming two weeks and overall schedule updates monthly for the duration of the contract. Site meetings shall be scheduled every two weeks.

The Contractor shall prepare construction schedules using one of the following programs:

- Microsoft Project
- Primavera
- SureTrac

Schedules prepared by Excel, free hand, marker, or crayons will not be accepted.

The Contractor shall provide weekend or night work as required and make every effort to complete the project by the date specified. There will be no separate payment for weekend or night work. The Contractor shall allow for any of these additional costs in their unit prices bid in order to meet the specified completion date.

The Contractor, in their schedule, should allow for a standard number of days lost due to weather. There will be no extension to the contract completion date due to weather unless the Contractor provides proof that weather related delays were in excess of what is standard for the period shown through historical weather data.

7.1.9.1 Progress Reports

Monthly progress reports shall be submitted by the Contractor with each payment certificate in a format acceptable to the Contract Administrator and include, but not be limited to, the following information:

- a. Work progress in the form of a Gantt Chart or similar showing the baseline schedule and the percentage completion to date of each task/activity and the overall percentage progress of the contract.
- b. Areas where progress is on or ahead of schedule and areas where progress is behind schedule.
- c. Measures taken/proposed to be taken, where necessary, to bring the Work progress back on schedule.
- d. Any claims for extensions of time due to unforeseen circumstances or extra payment due to changes in contractual obligations during the previous payment period.

Payments may be deferred, at the Contract Administrator's option until the progress reports are submitted to the Contract Administrator.

7.1.9.2 Builterra

The Town will be using the Builterra software program for this project. Builterra is a web based contract administration tool that includes daily input of inspection reports and quantity records. These records directly provide input to the monthly progress payments which the contractor can review. The goal for using the Builterra program is to expedite progress payment, minimize disputes and provide prompt payment.

7.1.9.3 Operational Constraints

The Contractor is advised that numerous businesses will remain open for business for the duration of the work, including, but not limited to:

- [List as required]

The Contractor shall make every effort to minimize disruptions to these businesses, pedestrian and vehicular traffic. Access shall be provided to the businesses at all times. The Contractor shall coordinate with the Contract Administrator and the Town of Milton should the Contractor require to restrict access to facilitate construction activities. The Contractor shall provide 48 hours advance notification prior to proceeding with construction fronting any property.

7.1.10 SPG10 - Work Performed for Residents

For the duration of the contract, the Contractor shall not complete any private work for residents living within the limits of the contract. Any such work may be completed after the contract with the Town is complete including warranty.

7.1.11 SPG11 - Insurance

The policy shall include the Corporation of the Town of Milton, Regional Municipality of Halton, [others as required], and [the consultant] as an additional named insured but only in respect of, and during, operations performed by or on behalf of the Contractor and not in respect to any act or omission of the Town or any of its servants. In addition, the policy shall contain a cross liability clause endorsement.

7.1.12 SPG12 - Mud Control

The Contractor shall be responsible for the removal of all dirt and mud that is tracked onto the roadways from vehicles entering or leaving the job site. It shall, upon request from the Contract Administrator, immediately proceed with clean-up operation at their expense. If after repeated requests, or if in the opinion of the Contract Administrator, the Contractor has not or cannot sufficiently remove the mud from the road, the Contract

Administrator will proceed with necessary clean up with all costs being charged to the Contractor.

7.1.13 SPG13 - Other Contractors Within and Adjacent to the Limits of the Contract

The Contractor is advised that, as other work may be in progress within and adjacent to the limits of this contract, it shall co-operate with other contractors, utility companies, subdivision development contractors and the Town of Milton and they shall be allowed free access to their work at all times. The Contract Administrator reserves the right to alter the method of operations on this contract to avoid interference with other work. Among the items of work which will be in progress are:

- [List as required]

7.1.14 SPG14 - Rock or Shale Excavation

This Contract does not contain separate items for excavation of shale or rock. Wherever encountered in road excavation, pole excavation, or trench excavation, no separate payment will be made for the excavation of shale or rock. These materials will not be classified, and no extra payment will be considered regardless of the method used for excavation.

7.1.15 SPG15 - Blasting and Use of Explosives

Blasting will not be permitted as part of this Contract.

7.1.16 SPG16 - Compaction Requirements

All granular material placed under this contract, whether used as backfill in trench excavations or backfill to structure excavation shall be compacted to 100% standard proctor density unless otherwise noted.

All select native material placed under this contract shall be compacted to 95% standard proctor density. The Contractor is to ensure that native material to be reused as backfill is protected from contamination with organics, shale and rubble and is reused as quickly as possible to prevent saturation.

7.1.17 SPG17 - Excess Excavation

Where the Contract Administrator instructs the Contractor in writing to carry the depth of excavations below the depth shown on the drawings or specified herein to obtain a sound and satisfactory foundation, the extra volume of material excavated, and the extra

volume of crushed stone or concrete fill subsequently necessary to fill the void, will be computed and extra payments will be made according to the terms of the General Conditions or Tender Items.

This shall not include extra excavation ordered by the Contract Administrator because a sound foundation has become unacceptable after excavation.

7.1.18 SPG18 - Extra Granular Materials

All extra granular material used on the construction site must be fully authorized by the Contract Administrator. Under no circumstances will the Town accept for payment any granular material bill that does not contain the signature of the Contract Administrator, if the granular material is to be paid for on a unit price.

7.1.19 SPG19 - Removal of Abandoned Utilities

The Contractor shall, as directed by the Contract Administrator, remove abandoned underground utilities which have not been removed by their owners and which interfere with the construction operations. It is the Contractor's responsibility to contact the Municipal Authorities or Utility Companies to verify that the underground utilities are, in fact, abandoned.

All abandoned underground utilities removed by the Contractor shall become the property of the Contractor and shall be disposed of in locations arranged for by the Contractor outside of the right-of-way. No separate payment for removal or disposal of abandoned utilities shall be made, as compensation for such work shall be included in the contract prices for the appropriate tender items.

7.1.20 SPG20 - Organization of Work and Working Restrictions

Before work commences, the Contractor shall expedite the ordering and delivery of all materials and special equipment required and shall co-ordinate the sequence of the work. No claim shall be allowed for delays and/or additional expense resulting from failure to accept the delivery of materials from suppliers in a timely manner and subsequent failure to maintain the contract schedule.

The Contractor shall commence work immediately following award of the contract and work in a continuous manner with sufficient intensity of effort and labour to the completion of the project by the date specified.

7.1.21 SPG21 - Provision for Traffic Controls

7.1.21.1 [Road Name]

The Contractor shall maintain all lanes of traffic on [Road Name] ([Limits]) during peak hours (before 9:00 am and after 4:00 pm). Single lane closure will only be permitted during non-peak hours (9:00 am to 4:00 pm Monday through Friday) with proper flagging control unless specified elsewhere in the Contract documents.

7.1.21.2 Staging of Traffic - [Road Name] ([Limits])

[Provide description of staging for the project, as required (i.e., construct east side of road while maintaining traffic on west side, then flip traffic).]

7.1.21.3 Construction Signs

The Contractor shall supply, place and maintain all barricades, warning signs, delineators and flashing lights necessary for the protection of the public and the work, including warning signs of construction operations maintained at both ends of the Contract, for the duration of the Contract, in accordance with the Ontario Traffic Manual, Book 7, Temporary Conditions, for all Temporary Traffic Control issues for both short and long term durations.

All signs, flashers, barricades and delineators shall be cleaned and maintained for the duration of the Contract. For delineation, the Contractor shall use flexible drums (TC-54) only. No other material will be accepted.

The maintenance of all signs, barricades, etc. is a continuous 24-hour a day obligation. The Contractor must provide a contact that will be available at all hours, throughout the duration of the project.

For failure to adequately protect all phases of their operation without delay, and to the satisfaction of the Contract Administrator, the Contractor will in the first instance be warned, in writing, about such failure. For subsequent failure by the Contractor to comply, remedial measures will be adopted by the Town of Milton, with the deduction from the final payment to the Contractor of all cost incurred by the Town to perform and carry out this work, including overhead and office costs.

7.1.21.4 Quality Assurance and Traffic Conditions

The Contract Administrator will make inspections, as required, and the Contractor will be notified of any deficiency in writing. Repairs shall be carried out in conformance with this specification.

7.1.21.5 Access Signage and Traffic Control

The Contractor shall be responsible for the supply, installation, maintenance and removal of all site access signs required for entrance and exit from work area, including exit only signs, entrance only signs, barricades including temporary concrete barrier and construction fencing.

7.1.21.6 Reflectivity Requirements

The Contractor's attention is drawn to the requirements of OHS Reg. 213/91 Sections 67, 68, and 69 regarding Traffic Control Measures, TC-22 Stop/Slow paddles, Traffic Control Persons, and Worker Clothing requirements. Nylon vests must have front and side tear away feature. Night-time retro-reflective silver stripes around each arm and leg shall be used if required.

7.1.21.7 Traffic Protection Plan

Prior to commencement of the work, the Contractor shall provide to the Project Supervisor written Traffic Protection Plan, including the identification of all hazards and all measures necessary to adequately protect the workers on site. The Plan shall protect all agents of the Town of Milton, including but not limited to the Inspectors, Supervisors, Surveyors, Traffic Services personnel and the Project Supervisor. The work zone design must be consistent, uniform and predictable. Traffic safety must be designed into work zones and provide for safety, mobility, advanced warning and positive guidance. The Traffic Protection Plan must be kept on site at all times for inspection by the Ministry of Labour.

7.1.21.8 Traffic Control Plan

The Contractor shall provide to the Project Supervisor a written Traffic Control Plan for motorist safety and motorist mobility.

It will be the Contractors responsibility to determine the Duration of the Work as described in the OTM.

The Contractor will provide written and oral instructions to all workers setting up and removing traffic control on the roadway or shoulder. The Contractor will provide a copy of the written instructions to the Contract Administrator prior to commencement of the work.

7.1.21.9 Daily Record and Audits

The Contractor is advised that the Contract Administrator may conduct regular inspections and photo recording of the Contractor's traffic and pedestrian control

activities. It will be the Contractor's responsibility to audit and maintain a daily record of the application of the Traffic Protection Plan and the Traffic Control Plan, and these records shall be made available to the Contract Administrator immediately upon request.

The Contract administration will share the regular inspections and photo recording with the Contractor which can be reviewed using the Builterra program.

7.1.21.10 Emergency Vehicles

The Contractor shall comply with Municipal, Fire, Ambulance and Police regulations relating to notification for lane closures that may be used by emergency vehicles.

7.1.21.11 Open Excavations

The Contractor shall schedule their work so that there will be no open excavation adjacent to a lane carrying traffic overnight and on non-working days including where new sewers or watermain are being installed. Excavations within 4.0 metres of lanes carrying traffic shall be backfilled with the specified material up to profile grade and compacted prior to closing down operations.

All other excavations are to be properly fenced during non-working hours.

7.1.21.12 Delivery and Trucking

The Contractor shall plan and schedule the routes of vehicles transporting all materials to, from, or within the job, so that vehicular movements are accomplished with minimum interference and interruptions to traffic. This will necessitate vehicles to 'slip-offs' or 'slip-ons'. The Contract Administrator reserves the right to alter, reject, or close same as considered necessary. Materials shall not be stored within 4.0 metres of the travelled portion of any roadway.

Parking, waiting, loading, or unloading of construction vehicles within the travelled lanes will not be permitted.

The cost of all signs, marking material, barricades, flashers, safety fencing, flag persons, and traffic control shall be at no additional cost to the Contract unless otherwise noted in the Form of Tender.

7.1.22 SPG22 - Trench Protection

The Contractor shall provide, at all times, sheeting, shoring, bracing, draining, pumping and dewatering equipment as required for maintaining the trench in dry, straight and stable condition. Unless specifically included in the Form of Tender, the cost for the above shall be included in the tendered unit price for pipe laying and no separate

payment shall be made for the equipment, labour and materials necessary to perform this work.

7.1.23 SPG23 - Water from Fire Hydrants

Under no circumstances will the contractor be allowed to use fire hydrants at site as a source of water for this contract.

7.1.24 SPG24 - Winter Construction

The Contractor shall schedule their work to avoid placing concrete and asphalt in Winter Conditions and to avoid freezing of granular material during the operations employing these materials.

There will be no additional payment for winter construction of any kind or additional payment to accelerate the project to meet the completion date. Contractor shall include these costs as part of their unit prices bid.

7.1.25 SPG25 - Supply of Materials

The Contractor shall be responsible for the supply of all materials required to complete the work in accordance with the plans and specifications, except as may be otherwise stipulated herein. The source of supply and quality of all materials supplied by the Contractor must be approved by the Town.

7.1.26 SPG26 - Granular 'B' Backfill

Granular 'B' Type I shall meet the gradation requirements in Table 7.1.

Table 7.1 Granular 'B' Type I Gradation Requirements

Granular 'B' Type I Sieve Analysis, Percent Passing (MTO Test LS-602)											
150 mm	106 mm	37.5 mm	26.5 mm	19.0 mm	13.2 mm	9.5 mm	4.75 mm	1.18 mm	300 µm	150 µm	75 µm
100	-	-	50.0 - 100	-	-	32.0 - 100	20.0 - 90	10.0 - 60.0	2.0 - 35.0	-	0 - 8.0

Where Granular 'B' Type I is used as granular backfill for sewers, watermains, and utilities, 100% of the material shall pass the 37.00 mm sieve.

7.1.27 SPG27 - Migratory Birds Convention Act

The Contractor shall:

- a. Prior to construction, inspect the construction area for nests and eggs and advise the Project Supervisor of any locations of nests and eggs immediately.
- b. Prior to the removal of the nests, notify the Project Supervisor who shall contact the Environmental Office and the environmental Contract Administrator responsible for birds.
- c. Monitor the area daily for the recurrence of nesting activity upon removal of nests and notify the Contract Administrator immediately if a nest reappears.
- d. Not destroy nests and/or eggs of protected migratory birds during migratory bird nesting seasons.

The Contractor shall remove nests only during specific situations as noted below:

In Durham, York, Peel, Halton, and Niagara Regions, and in the Cities of Hamilton and Toronto - Bird Conservation Area 13 (Lower Great Lakes/St. Lawrence Plain):

- The Contractor shall not destroy nests during the migratory bird nesting season (April 1 to August 31)
- The Contractor shall remove nests only outside the migratory bird nesting season (September 1 to March 31)

In certain circumstances a Canadian Wildlife Services (CWS) permit may be obtained for the removal of nest and eggs of migratory birds. The Contractor shall notify the CA, the Contract Administrator and the environmental office if a CWS permit is required.

If the Contractor proposes to clear vegetation during breeding season, a nest survey shall be conducted by a qualified avian biologist to identify and locate nests of species covered by the Migratory Birds Convention Act, 1994. A migration plan would then be developed to address potential impacts on migratory birds or active nests and the plan reviewed by Environment Canada prior to implementation.

7.1.28 SPG28 - Environmental Considerations

7.1.28.1 Species at Risk (SAR)

In the event that a SAR or possible SAR is found in the construction area, all construction that could potentially harm the animal will cease immediately and the

Contract Administrator will be notified.

Confirm species identity (using a qualified ecologist if required) and notify MECP if the animal is a SAR or potential SAR.

Allow the animal to move away on its own.

Use a trained individual to move species that are not specifically protected under the ESA using accepted handling and relocation procedures.

The Contract Administrator will contact the MECP SAR Biologist for direction on relocation of SAR protected under the ESA (2007).

7.1.28.2 Refueling and Maintenance Areas

The Contractor shall undertake a detailed review of the proposed route of construction to plan access routes and fuelling areas. Suitable fuelling and maintenance areas shall be established and approved by the Contract Administrator. Refuelling and maintenance of equipment shall not be undertaken in or adjacent to water courses.

The exception to this fuelling location requirement shall be diesel generators, cranes or backhoes which may be fuelled at other than the designated fuelling areas. However, no fuelling of backhoes shall be carried out within thirty metres (30 m) of any water course. This requirement may be relaxed at the discretion of the Contract Administrator if non-spill fuelling equipment is used.

The Contractor shall prepare a contingency plan and have available the means for the interception and rapid clean-up and disposal of any spillage to land and/or water. Any spill causing impairment to the natural environment, as defined by current legislation, must be reported immediately by the Contractor to the Halton Region Emergency Spill Response Team at (905) 825-6000 during business hours, and at 1-866-4HALTON (1-866-442-5866) after hours. The Halton Region Emergency Spill Response Team will then inform the Ministry of Environment as required.

7.1.28.3 Sediment Basins and Settling Ponds

This specification covers the requirements for the control of water during construction of works and shall be carried out in accordance with OPSS 518. Consideration shall be given to the document entitled "Erosion and Sediment Control Guidelines for Urban Construction" which can be found on the "Sustainable Technologies Evaluation Program (STEP) website www.sustainabletechnologies.ca.

7.1.29 SPG29 - Erosion and Sediment Control

Erosion and sediment control shall be completed in accordance with the construction drawings.

Should the Contract Administrator determine that additional control measures are needed after construction begins, they shall be installed and maintained as detailed in the document “Erosion and Sediment Control Guidelines for Urban Construction” which can be found on the “Sustainable Technologies Evaluation Program (STEP) website www.sustainabletechnologies.ca.

7.1.30 SPG30 - Shop Drawings and Working Drawings

For the portion of the work to be done under this contract where detail drawings are to be supplied by the Contractor, six (6) copies of same, together with specifications, plus such additional copies as the Contractor and their Subcontractors may require, plus design calculations where specified, shall be submitted to the Engineer for review.

The Contractor or their Subcontractor shall check and initial all shop drawings before submission to the Engineer as to intercept and correct any major errors or omissions. Shop drawings will not be reviewed by the Engineer unless they have been previously checked by the Contractor.

The review of the Engineer is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that the Engineer approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of their responsibility for error or omissions in the shop drawings or of their responsibility for meeting all requirements of the Contract Documents.

The Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for coordination of the work of all subtrades.

Work which relates to the shop drawings shall not be carried out before the Engineer’s review of the shop drawings is complete. Unless otherwise specified, the Contractor shall submit shop drawings at least fourteen (14) days in advance of work.

7.1.31 SPG31 - Topsoil

The requirements of OPSS 802 Topsoil shall apply, with the following modifications and additions:

7.1.31.1 Testing

When imported or on-site soil is used, it shall be tested and modified as recommended by the testing facility by the admixture of other components and amendments to bring the properties within ranges appropriate to support plant growth. Testing may also include particle size distribution (i.e., % sand, silt, and clay size particles), the soil texture classification, bulk density for confirming the need to compost amendment rate, organic matter content (by dry weight) and soil PH.

7.1.31.2 Submission of Soil Analysis Report

A soil analysis report shall be submitted to the Contract Administrator at least twenty-four (24) hours prior to use of existing amended topsoil and/or horticultural soil. A soil analysis report shall be submitted for each distinct source and type of material intended for use as planting soil. A soil sample submission form shall be completed in full for each soil sample submitted.

The soil analysis report shall include:

- Texture analysis or particle size analysis, percent composition by mass of sand, silt and clay;
- Level of soluble salts;
- Organic matter percent composition;
- Acidity or alkalinity (pH); and
- Phosphorus (P), Potassium (K), Magnesium (Mg), Chloride (Cl) and Sodium (Na) nutrient levels.

The soil analysis report shall include the soil science laboratory recommendations for improving any of the tested soil values for the following indicators, in support of plant growth:

- Organic matter;
- Acidity (pH);
- Phosphorus (P), Potassium (K) and Magnesium (Mg).

All testing shall only be performed by an OMAFRA accredited commercial lab or approved equivalent. The Contractor shall guarantee that the soil submitted for laboratory testing is a representative sample taken (according to the lab recommendations) from the soil that will be delivered to the site. Test results of amended soils (horticultural soil) will be provided to the Contract Administrator in advance of use on site. Failure to test and provide appropriate documentation of test results may be considered grounds for rejection of a proposed soil and removal and replacement of such material at the contractor's expense.

When imported growing medium is to be used, the bidding contractor shall have tested the proposed soil and include the required modifications in the price for work.

7.1.31.3 Soil Properties

The use of on-site native topsoil is encouraged, provided it meets the guideline for imported growing medium and can be modified to meet the requirements set out or specified for growing medium.

Amended topsoil for use in planting shall be fertile, friable, natural sandy loam containing 5% to 15% organic materials, with an acidity range from pH 6.0 to 7.5. Amended topsoil shall be virtually free from subsoil, wood including woody plant parts, weed or reproductive parts of weeds, plant pathogenic organisms, vegetation, debris, organic or other deleterious contaminants and fragments larger than 50 mm in size, stones over 30 mm, and foreign objects.

Amended topsoil will be mixed with well-composted manure and peat-free compost at a rate of 3:1:1 to produce Horticultural Soil to be installed per the planting details.

Particle size distribution of topsoil will consist of a variable mixture of sand, silt, and clay that falls within the following ranges:

- 45% to 70% sand
- 1% to 35% silt
- 14% to 20% clay

Soil quality must meet Environmental Protection Act O. Reg. 153/04 full depth generic site condition standards applicable to the land use.

Only screened soil is permitted to be used unless otherwise noted. Soil thickness shall be as shown on the Contract Drawings.

7.1.32 SPG32 - Relocation of Utilities

The Town will be responsible for relocation of permanent utilities.

[Describe as required]

7.1.33 SPG33 - Work Adjacent to or Crossing an Enbridge Gas Main

[Delete if not applicable. Requirements to be confirmed with Enbridge Gas/Other Pipelines on a project by project basis]

Work adjacent to or crossing the Enbridge Gas Main shall be subject to the following conditions:

1. It is entirely the responsibility of the Contractor to arrange for an inspector of the pipeline company to be on site and it is entirely the responsibility of the Contractor to follow the instructions of the pipeline company's inspectors.

The Town will bear the cost of the inspector on site but the Town does not accept any responsibility for the Contractor's activities in contravention of the pipeline company's directions. Should the Contractor be delayed for any reason by the pipeline companies, no extra payment will be made by the Town for these delays.

2. For inspection and stakeouts, three working days notice must be given by the Contractor to the pipeline company prior to commencement of excavation or crossing.
3. No excavation, grading, or operating of heavy equipment is allowed within 30 metres of the pipeline without an Inspector on site.
4. If excavation is necessary over, under, near or parallel to the underground pipeline, extreme caution must be observed.
5. It will be the Contractor's responsibility to provide all labour required to expose the pipeline by hand digging from existing grade, prior to use of power excavating equipment. Pipeline inspectors will assist in this work with the use of electronic equipment and a probing bar.
6. Equipment moving across or along pipeline:
 - a. Crossing locations for heavy equipment are to be kept to a minimum.
 - b. The crossing locations shall be determined between the company's inspector and the Contractor after reviewing the nature of the construction operations, the types and number of equipment involved, as well as the line and depth of the existing gas main.
 - c. Once the crossing locations have been established, heavy equipment shall be restricted to crossing at these locations only. The Contractor shall ensure that their personnel and all sub-contractors are made aware of these restrictions.
 - d. Pipelines shall be protected from possible damage at crossing locations by constructing berms over the staked line unless a minimum cover of twice the pipe diameter or 1.0 m (whichever is greater) has been verified. When

required, berms for pipe sizes less than NPS 12 shall have a minimum depth of 0.5 m. NPS 12 and larger lines require a minimum berm depth of 1.5 m.

- e. Equipment shall be operated at “dead-slow” speeds when crossing pipelines in order to minimize impact loadings.
 - f. Heavy equipment may be operated parallel to existing pipelines provided that a minimum offset of 1.0 m is maintained on sizes less than NPS 12, and 2.0 m on NPS 12 and larger lines.
 - g. Only lightweight rubber-tired equipment shall be operated directly over existing gas pipelines unless a minimum pipe cover of twice the pipe diameter or 1.0 m (whichever is greater) can be verified.
 - h. When working directly over existing gas pipelines all equipment movements shall be transverse to the staked location rather than parallel to it.
 - i. Hand held compaction equipment shall be used within 1.0 m of the sides or top of all gas pipelines.
 - j. Heavier compaction equipment may be used once pipe cover equals the greater of twice the diameter or 1.0 m.
7. The Contractor will be responsible for all damages to the pipeline and easements arising in any manner from work performed in connection with the installation.
 8. The Contractor shall comply with the instructions of an authorized field representative regarding the procedures to be followed while working in the vicinity of the pipes.
 9. The Contractor shall notify the pipeline representative of any contact with the pipeline or its coating.
 10. The Contractor is to advise the pipeline company at least 24 hours prior to backfilling.
 11. Where permission is suspended by the pipeline company in accordance with subsection 19(1) of the National Energy Board Pipeline Crossing Regulations Part II, the Contractor shall cease work.
 12. The successful Contractor, as a condition of entering into a contract for this project with the Town of Milton will be required to save harmless the Town from any damages caused by the Contractor’s work in and around the pipeline along [Road name].

13. The successful bidder awarded this contract shall obtain from the Engineer applications for “Permits to Cross” to be completed and returned to Enbridge Gas [or other pipeline]. Along with the permit, the Contractor is required to submit with each partner “Proof of Comprehension General Liability Insurance”.

7.1.34 SPG34 - Work Adjacent to or Within a Hydro One Corridor

[Delete if not applicable. Requirements to be confirmed with Hydro One on a project by project basis]

Work within or adjacent to the Hydro One Corridor shall be subject to the following conditions:

1. All work must comply with the safety and clearance regulations as stated in the Occupational Health and Safety Act (OHSA). Erect signage in accordance with the Occupational Health and Safety Act. The Hydro One Transmission conductors are operating at 230kV and 500kv and the required clearance must be maintained at all times. It should be noted that due to factors such as changing electrical loads and ambient temperatures, the conductors can lower / rise significantly over short periods of time. It is the Contractor’s responsibility to monitor/manage these changes and adjust their work methods accordingly in order to adhere to OHSA.
2. Prior to the commencement of Construction HONI’s requires a minimum of 72 hours of notice so that HONI’s may have its representative present to ensure conformity with terms of the construction agreement.
3. Prior to the commencement of Construction Hydro One Networks Inc. requires all poles and guy wires on their property to have bright markers, such as yellow plastic guards on the guy wires, and either red or yellow tape or paint on the poles at eye level and lower.
4. In the case of Hydro One Network’s (HONI’s) emergency work, the Contractor may be required to suspend operations without notice until Hydro One crews have completed the emergency work.
5. Ensure that access to HONI’s structures and works is maintained at all times. The Contractor shall not obstruct HONI’s facilities at any time.
6. No material may be stockpiled between Sta. [] and [].
7. Temporary structures, site trailers or parking tractor trailers will not be permitted

between Sta. [] and [].

8. Storage or garbage dumpsters will not be permitted between Sta. [] and [].
9. Storage or dispensing of gasoline or other flammable substances will not be permitted between Sta. [] and [].
10. Install temporary fencing around all of Hydro One Networks Inc's transmission line structures and associated equipment. The temporary fencing must be at a minimum a 1.22 metres high orange nylon snow fence. Fencing must be installed at a minimum of 3.0 m away from all Hydro One Networks Inc's owned structures and equipment.
11. Ensure no grading and/or excavation work is carried out using heavy machinery within 10 m of the tower footings.

7.1.35 SPG35 - Canadian Pacific Railway Constraints and Specifications

[Delete if not applicable. Requirements to be confirmed with CP Rail on a project by project basis]

[Revise as required for CN Rail]

This project is located on Canadian Pacific Railway's Galt Subdivision which passes through the project site. This line is CP's mainline which moves traffic 24 hours a day and 7 days a week to and from Montreal-Toronto-Windsor-Chicago connecting traffic to and from the US. This line is critical to CP's business interests and therefore, rail operations on this line must be maintained without interruption, throughout construction, unless specific exception(s) are permitted. Any such exception(s) shall be at the sole discretion of CP.

The Contractor shall not enter onto CP's right-of-way except under the guidance of a CP flagman unless otherwise agreed to by CP. All work undertaken by the Contractor within the CP right-of-way shall conform to CP's requirements as spelt out in the following documents included in the appendices:

- Operational Constraint For Work On, Above Or Below Railway Right-Of-Way" issued By C.P. Rail Dated May 1, 2009;
- CP's Flagging Protection Protocol dated Mississauga 2013
- Clearance Diagram - Structure Over or Beside Railway Tracks, issued by CP dated 2008; and
- Minimum Safety Requirements for Contractors Working on CP Property in Canada, issued by CP dated September 15, 2010.

The Contractor before being allowed onto CP property will need to have initialled and returned a copy of the Minimum Safety Requirements for Contractors to CP.

7.1.36 SPG36 - Coordination with Canadian Pacific Railway

[Delete if not applicable. Requirements to be confirmed with CP Rail on a project by project basis]

[Revise as required for CN Rail]

The Contractor is hereby advised that coordination of services to be provided by CP is a **high priority** and the availability of CP resources may impact the Contractor's schedule.

The requirements for staging of the various removals and installations will require liaison through the Contract Administrator with CP's representative. CP work forces do not construct track in 'freezing' weather, when track and ballast are frozen.

CP forces shall undertake the following work:

- Supply flagperson(s) (payment by Town of Milton);
- Removal of rail signals at the existing Fifth Line crossing;
- Installation of new at-grade rail signals with gates and cantilevers; and
- Removal and restoration of the CP at-grade rail crossing including remove existing track, install new ballast, ties, rail track, rubber seals and/or surface.

7.1.36.1 CP Rail Flagging

Under this item, the Town of Milton shall be responsible for the cost of flagging provided by Canadian Pacific Railway for the duration of the contract. The Contractor shall arrange with the Contract Administrator for rail flagging service and flagperson's to be provided by CP.

The Contractor shall schedule construction to optimize the flagging service and the need and supply of flagperson(s). The Contractor shall be required to submit a schedule of when flagging services are anticipated. This schedule will be reviewed by CP and the Contract Administrator, and if accepted, will be used as a 'baseline' to schedule flagging services. The Contractor, in conjunction with the approved schedule, will need to request of CP, at least two (2) weeks in advance, that flagperson's are not to be supplied for a period of activity for which CP protection is not required. Should the Contractor schedule flagging, and not utilize the service, the Contractor shall reimburse the Town of Milton for the cost of any unused service.

Flagging shall commence on a date mutually agreed to by CP, the Contract Administrator and the Contractor and will continue without interruption until the Contractor, Contract Administrator and CP mutually agree that flagging is not required. During periods of interruption in the flagging service, CP or the Contract Administrator will monitor the Contractor's activities. The Contractor will be ordered to stop work or a flagperson's will be reinstated should CP or the Contract Administrator identify operations by the Contractor for which a flagperson is required.

The Contractor shall provide the required notice to the Contract Administrator for the requirements of a flagperson. The Contract Administrator shall liaise with CP.

The Contractor shall assume that Railway flagging will be typically available on site approximately 7 hours maximum per flagman, per day Monday through Friday.

The Town of Milton or their representatives will neither be responsible for delays or extra costs nor entertain an extension of time beyond the contract completion date due to a shortage of flagperson(s).

7.1.37 SPG37 - Fibre Optic Cables (Lumen)

[Delete if not applicable. Requirements to be confirmed with CP on a project by project basis]

Utilities on CP property must be protected at all times; this includes fibre optic cable along the CP's right-of-way. The Contractor shall contact the CP's "Call Before You Dig" number (1-888-248-4410) for all utility locates prior to undertaking any work on CP property.

There are Lumen fibre optic cables within the railway right-of-way. These cables are conveyors of high technology information. Disruption of this service is costly to repair and most importantly, causes severe loss of revenue and inconvenience to Lumen and its customers. Therefore, it is important that Contractors use extreme caution when working in the vicinity of Lumen cable.

The Contractor shall supply and maintain the required protection and support all communications cables within the working limits until relocated by Lumen.

The Contractor shall take every conceivable precaution to ensure that the cables are not damaged.

For all underground cables, the Contractor shall adhere to the following specific procedures:

1. Prior to mobilization on railway property, the Contractor will be required to make a

joint inspection with the Contract Administrator, CP staff and Lumen, while CPR / Lumen representatives stakes out their underground cables by means of markers and/or fluorescent paint.

- The Contractor shall ensure that prior to any excavation on railway property, locate sheet is current. If the locate sheet is more than 30 days old, the Contractor shall be responsible to arrange for CP cable locates.
2. Prior to commencing any excavation Work or any Work near and around the fibre optic cables, the Contractor shall receive authorization from Century Link.

The Contractor shall be held liable for any costs for repairs and loss of revenue resulting from any disruption to the cable network caused by the Contractor's operations.

3. The Contractor shall carry out their excavation operations in accordance with the following procedures:
- Do not operate any heavy equipment nor excavate mechanically within 3 feet (0.9 metres) of the cable until arrangements for protecting the cable have been made with the Contract Administrator.
 - When working within one (1) metre of underground cables, the Contractor will be required to expose the underground cables using an approved Hydrovac service only. The Contractor may also be required to provide Hydrovac services for the purpose of positive identification of cables. All Hydrovac work shall be done in the presence of the Railway site supervisor, Lumen representative and/or Signals and Communications maintainer.
 - When it is necessary to cross over the cable with heavy equipment, the Contractor shall protect the cable with 3 feet (0.9 metres) of cover or greater depth, as dictated by ground conditions and determined by the Contract Administrator. Material used for cover shall be approved fill and separated from the ballast shoulder by means of a heavy filter fabric. The Railway roadbed shall be restored to its original elevations.
 - Any damage to signals or communications cables shall be reported promptly to the Contract Administrator and Signals and Communications maintainer. The Contractor shall make no attempt to repair damaged cables.
 - When tunnelling under or over the Lumen cable, the cable shall be exposed and casing pipe shall be exposed at the crossing.

7.1.38 SPG38 - Environmental Supervisor

[Delete if not applicable - project specific / Conservation Halton]

The Contractor shall retain an Environmental Supervisor with at least three years of experience working in and around sensitive watercourse, inspecting ESC measures. This individual shall possess a Certified Inspector of Sediment and Erosion Control (CISEC) or Certified Professional in Erosion and Sediment Control (CPESC) certificate. The Contractor's Environmental Supervisor will inspect all new protection measures / controls and existing protection measures / controls following rain / snow melt events, monitor all works and in particular works related to erosion and sediment controls, dewatering or unwatering, restoration and in-or near-water works. All damaged erosion and sediment control measure shall be repaired and / or replaced within 24 hours of inspection.

All supervisory staff employed by the General Contractor and Sub-Contractors will be required to take an online course on ESC measures available via the following link:

<http://www.sustainabletechnologies.ca/wp/events/introduction-to-erosion-sedimentcontrol-e-learning-course>

7.1.39 SPG39 - Clean Equipment Protocol

[Delete if not applicable - project specific / Conservation Halton]

Inspection and cleaning of all machinery and equipment shall be performed in accordance with the procedures, checklists and diagrams provided in the "Clean Equipment Protocol for Industry" which can be found on the Ontario Invasive Plant Council website,

http://www.ontarioinvasiveplants.ca/files/CleanEquipmentProtocol_Mar152013_D3.pdf

and the following requirements:

7.1.39.1 Inspection of Equipment

Inspection should be done before:

- Moving vehicles out of a local area of operation
- Moving machinery between properties or sites within the same property where invasive species may be present in one area, and not in another
- Using machinery along roadsides, in ditches, and along watercourses
- Vehicles using unformed dirt roads, trails or off road conditions
- Using machinery to transport soil and quarry materials
- Visiting remote areas where access by vehicles is limited

- Inspection should be done after:
- Operating in areas known to have terrestrial invasive plants or are in high risk areas (i.e. recently disturbed areas near known invaded areas)
- Transporting material (i.e. soil) that is known to contain, or has the potential to contain, invasive species
- Operating in an area or transporting material that you are uncertain contain invasive species
- In the event of rain. If mud contains seeds, they can travel indefinitely until it rains or the road surface is wet, allowing for long distance transport. This may result in transporting seeds to areas where those species did not previously exist.

Inspect the vehicle thoroughly inside and out for where dirt, plant material and seeds may be lodged or adhering to interior and exterior surfaces. Remove any guards, covers or plates that are easy to remove. Attention should be paid to the underside of the vehicle, radiators, spare tires, foot wells and bumper bars. If clods of dirt, seed or other plant material are found, removal should take place immediately, using the techniques outlined.

7.1.39.2 Cleaning of Equipment

Vehicles and heavy equipment that stay on formed and sealed roads have a low risk of spreading invasive species. Cleaning is only required when inspection identifies visible dirt clods and plant material or when moving from one area to another.

Depending on the invasive species present, vehicles may need to be cleaned even when deep snow is present. Phragmites, for example, can still be spread, even in packed snow because the seed heads are usually above the surface of the snow. Other plants, such as Dog-strangling vine, will be contained beneath deep snow.

Clean the vehicle/equipment in an area where contamination and seed spread is not possible (or limited). The site should be:

- Ideally, mud free, gravel covered or a hard surface. If this option is not available, choose a well maintained (i.e., regularly mowed) grassy area.
- Gently sloping to assist in draining water and material away from the vehicle or equipment. Care should be taken to ensure that localized erosion will not be created, and that water runs back into the area where contamination occurred.
- At least 30 m away from any watercourse, water body and natural vegetation.
- Large enough to allow for adequate movement of larger vehicles and equipment.

Clean the interior of the vehicle by sweeping, vacuuming or using a compressed air device. Particular attention should be paid to the floor, foot wells, pedals, seats and under the seats.

Knock off all large clods of dirt. Identify areas that may require cleaning with compressed air rather than water such as radiators and grills. Clean these areas first prior to using water.

Clean the vehicle with a high pressure hose in combination with a stiff brush and/or pry bar to further assist the removal of dirt clods. Clean from the top and work down to the bottom. Emphasis should be placed on the undersides, wheels, wheel arches, guards, chassis, engine bays, radiator, grills and other attachments.

When the cleaning is finished avoid driving through the waste water when removing the vehicle or equipment from the cleaning site. For equipment such as water trucks that may be exposed to aquatic invasive species, trucks should be disinfected with bleach solution before conducting work in a new area.

7.1.39.3 Final Inspection and Checklist

Conduct a final inspection to ensure the following general clean standard has been achieved:

- No clods of dirt should be visible after wash down.
- Radiators, grills and the interiors of vehicles should be free of accumulations of seed, soil, mud, and plant material parts including seeds, roots, flowers, fruit, and/or stems.

Checklists and diagrams are provided in the “Clean Equipment Protocol for Industry” to assist in quickly identifying key areas to inspect and clean on a variety of vehicles and equipment. These shall be used to ensure all areas of the vehicles/equipment have been inspected and cleaned.

7.1.39.4 Reporting

The Contractor shall provide to the Contract Administrator a written report summarizing the performance of all inspections and all cleaning of equipment at the bi-weekly progress meetings. When requested by the Contract Administrator, the Contractor shall also provide copies of the completed checklists.

7.1.40 SPG40 - COVID-19 Global Pandemic

The COVID-19 global pandemic presents significant challenges to all municipalities, including the Town of Milton, and to all workers and personnel working on construction projects for municipalities. The health and safety of employees and personnel of suppliers and contractors of the Corporation is of paramount importance to the

Corporation. It is the expectation that the Contractor will uphold the Health and Safety Protocols set forth by the Ontario Government and Canadian Construction Association standards (as amended) on their site.

The Corporation is continuously monitoring the rapidly evolving pandemic, the escalating responses of governmental authorities, and impacts on our projects. At this time, the Corporation does not have any plans to amend the proposed commencement date or the construction schedule as per Section 3, 3.65, of the tender document.

7.1.41 SPG41 - Damage by Vehicles and Other Equipment

If at any time, in the opinion of the Contract Administrator, damage is being, or is likely to be, done to any highway or any improvement thereon, other than such portions as are part of the work by the Contractor's vehicles or other equipment, whether licensed or unlicensed, the Contractor shall, at the direction of the Contract Administrator and at the Contractor's own expense, make changes in or substitutions for such vehicles or other equipment or shall alter loading or shall in some manner remove the cause of such damage to the satisfaction of the Contract Administrator.

7.1.42 SPG42 - Housekeeping

The Contractor is advised that site cleanliness is of paramount importance for the duration of the contract. As such the Contractor shall ensure the following:

- All garbage or other debris is promptly removed and disposed of.
- No construction materials are to be stockpiled in front of private property.
- All construction materials and equipment are to be secured within approved laydown areas when not in use.

Should any issue affecting the general cleanliness of the site arise, the Contractor shall rectify the issue to the satisfaction of the Contract Administrator within 24 hours.

7.1.43 SPG43 - Complaint Resolution

The Contractor is advised that all complaints from the Public or the Town shall be rectified by the Contractor to the satisfaction of the Contract Administrator within 24hrs of written notification of the complaint from the Contract Administrator to the Contractor. The Contractor is not to engage the public directly. In the event that it is proven that the Contractor's personnel interacted with the public in inappropriate manner, the Town and/or Contract Administrator has the right to direct the contractor to remove the individual from the site.

7.1.44 SPG44 - Paid Duty Police

When a cash allowance has been included in the Form of Tender for paid duty police officers, the Contractor shall arrange for paid duty police officers for direction of traffic within intersections when authorized by the Contract Administrator.

The Contract Administrator shall determine the need for any paid duty offices in consultation with the Contractor.

Paid duty officers may be required:

- During construction operations within 15 m of a signalized intersection.
- In signalized intersections when turning movements cannot be made in a safe manor.

Payment for this item shall be made in the amount of the actual invoices received plus 5% mark-up on the cost to arrange and schedule the off-duty police.

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7.2 Special Provisions (Item Specific)

7.2.1 SP1 - Hot Mix Asphalt

Hot Mix Asphalt shall be placed in accordance with OPSS.MUNI 310 (Hot Mix Asphalt), OPSS.MUNI 1101 (Material Specification For Performance Graded Asphalt Cement) and SSP111F09 (Amendment to OPSS 1101, November 2014, Additional Test Results and Samples for Performance Graded Asphalt Cement (PGAC)) are applicable to this contract except as modified below.

These provisions and also Ontario Specifications OPSS.MUNI 1101 (Material Specification for Performance Graded Asphalt Cement) is applicable to this contract.

Definitions:

- Virgin AC (defined as Asphalt Binder in OPSS.MUNI 1101) is asphalt cement manufactured from crude oil (excluding the addition of Refined Engine Oil Bottoms, REOBs), which can be modified by polymers to achieve the required PGAC grade.
- AC (defined as Performance Graded Asphalt Cement in OPSS.MUNI 1101) is a general term that can define binder in asphalt mixture made from virgin AC.

The Contractor shall, for the unit price bid under this item, supply all materials, labour and equipment (including Virgin AC) required to produce and place Hot Mix Asphalt (HMA) in accordance with OPSS.MUNI 310 and OPSS.MUNI 1150. Hot Mix Asphalt shall be produced using PGAC 58-28 for HL-3, HL-8 and HDBC and PGAC 64-28 for HL-1 in accordance with the contract documents and the geotechnical investigation report (included in these tender documents).

All PGAC shall comply with OPSS MUNI 1101. The use of Asphalt cement that has been modified with certain additives such as Refined Engine Oil Bottoms (REOB), also known as a Vacuum Tower Asphalt Extenders (VTAE) shall not be used to produce any HMA. The contractor, as a part of their asphalt mix design submission, shall submit documentation as outlined in OPSS MUNI 1101.04 Design Submission Requirements and a formal letter from the AC supplier that certifies that AC provided for this project has not been modified with VTAEs. Contractor shall provide the letter and the asphalt mix design at the Pre-Construction meeting.

All other parts of OPSS 1101 remain unchanged and are applicable to this contract.

To avoid delays during construction the AC sample has to be taken and tested prior to asphalt placement. The contractor will have to provide the asphalt mix design with the

letter from the AC supplier at the pre-construction meeting.

Two additional 4 Litre AC samples will be taken during construction in case further investigations and or testing is required. The Town may perform the following tests on asphalt cement tank samples supplied or recovered asphalt cement cores, which will be used to determine the presence of VTAE's:

1. Ash Test
2. Infrared Spectroscopy
3. X-Ray Fluorescence

If the testing results, either from advanced testing or testing of placed materials, identify the presence of VTAE's in AC the asphalt will be deemed as unacceptable by the Contract Administrator and may be rejected at the sole discretion of the Contract Administrator.

The pavement shall be removed and replaced with acceptable HMA pavement, at the sole cost of the contractor.

The Town may perform the tests outlined in Table 1 of OPSS.MUNI 1101 as part of PG Verification Testing at the discretion of the Contract Administrator. The Contract Administrator will notify the Contractor if PG Verification Testing will be carried out at least (1) week prior to sample collection. The Contractor can elect to carry out their own independent PG Verification Testing and shall collect samples at the same time as the Contract Administrator.

The PGAC used on the contract shall also meet the following additional requirements:

4. Ash Test LS-227
5. Verification of PGAC (sample and cores) during or after placement as per AASHTO R29 for compliance to specifications requirements.
6. Extended Bending Beam Rheometer (BBR) testing LS-308 during placement.

Hot Mix asphalt produced with Asphalt Cement that fails any of the test parameters outlined in Table 1 of OPSS.MUNI 1101 shall be disposed as outlined in, Clause 1101.08.05. Should this occur, then the remaining roads will also be tested and, if they fail to meet the test parameters, will be repaved (at the sole cost of the Contractor). The Contractor is to provide a minimum one (1) week notice to the Contract Administrator prior to batch preparation.

The use of Reclaimed Asphalt Pavement (RAP) is not permitted in any HMA.

In addition to the applicable Ontario Provincial Specifications in this contract, the unit price bid for these items shall include the following:

- Any padding required to correct crossfall or depressions in the existing hot mix asphalt; areas requiring padding will be identified by the Engineer;
- The adjustment of all valve boxes, catchbasin and manholes to finished grade;
- Planing existing asphalt 600 mm wide by 40 mm deep at all locations where the new hot mix asphalt meets the existing hot mix asphalt;
- Providing 2.0% crossfall from the centerline to the edge of pavement;
- All handwork required to place the hot mix asphalt;
- Grading and compaction of the existing granular prior to placing the new hot mix asphalt
- Removal, storage and reinstallation of flexible posts.

The Contractor shall pave all milled roads within ten (10) working days after removing the asphalt and pave base asphalt on all roads with full asphalt removal within five (5) working days after removing the asphalt. Top asphalt shall be placed within five (5) working days after it has been confirmed that all asphalt tests have passed.

At the discretion of the Contract Administrator, the contractor should supply warm mix asphalt for any day on which the temperature falls below 7° Celsius for top course asphalt and 2° Celsius for base course asphalt. Any additional costs associated with placing warm mix asphalt will be the Contractor's responsibility.

7.2.2 SP2 - Warm Mix Asphalt

At the discretion of the Contract Administrator, and where it is anticipated that it may not be possible for the temperature criteria for hot mix asphalt to be met, the contractor shall supply warm mix asphalt in accordance with OPSS.PROV 1151.

7.2.2.1 Submittals

For warm mix asphalt, the following information shall be submitted to the Contract Administrator in writing with the mix design:

- a. The warm mix asphalt technology to be used
- b. The complete name and address of the warm mix asphalt supplier
- c. The type and dosage of warm mix asphalt additives, if applicable, and how the additives are incorporated to produce the warm mix asphalt

- d. The warm mix asphalt technology supplier's established recommendations for usage.
- e. Detailed information required for the mix temperature and the compaction temperature necessary on site and for laboratory testing

All information required for the proper preparation, handling, storage, and use of the warm mix asphalt materials should be obtained from the warm mix asphalt technology supplier.

7.2.2.2 Materials

The permitted warm mix asphalt technologies are listed below:

- Chemical additives: Evotherm M1, WarmGrip N1, and Zycotherm SP2
- Foaming process: CWM and Rediset LQ-1200A

Any WMA technology not listed above shall be subject to review and approval by the Town of Milton.

The use of waxed-based or sulfur-based warm mix asphalt technologies shall not be permitted.

7.2.2.3 Temperatures

Warm mix asphalt may be used below an ambient air temperature of 7° C for top course asphalt and below 2° C for base course asphalt. However, there is no specific ambient air temperature for warm mix asphalt. Warm mix asphalt shall not be laid in rain or on snow or on frozen ground or in high winds that can reduce asphalt mix temperatures regardless of the air temperature.

Mix temperature on site can range from 99° C to 122° C or as specified by the supplier for each warm mix asphalt type.

Compaction shall be achieved in accordance with OPSS.MUNI 310 (Table 4). Compaction temperature for the vibratory breakdown roller shall be approximately 90° C or as specified by the supplier for each warm mix asphalt type. The mat temperature after the pneumatic tire and finish rollers shall not be less than 75° C or as specified by the supplier for each warm mix asphalt type.

7.2.2.4 Installation

The Contractor shall use a material transfer vehicle that is self-propelled, has on-board mixing capabilities and a minimum storage capacity of 25 tonnes. A material transfer

system such as a shuttle buggy (Roadtec SB-2500 Shuttle Buggy or approved equivalent) shall be used for the surface course. There shall be no additional payment for this transfer system and any and all costs associated with the use of the material transfer system shall be included in the unit price for all asphalt placed.

Echelon paving shall be used for paving the top lift of asphalt (surface course) on all multi-lane roadways. Where echelon paving is not practical, heater or joint cut back shall be considered

7.2.2.5 Infrared Pavement Repair (Roads)

Where, during the paving operations a cold joint is created, the Contractor shall have the joint infrared heated prior to paving the next section. This requirement applies to the top lift of asphalt only. No extra payment will be allowed for this work.

At the discretion of the Engineer, infrared heating will be applied to joints where the new asphalt abuts the existing asphalt. Infrared heaters shall be used to heat the asphalt at the cold joint to 135°C prior to paving the adjacent lane. Over-heating of asphalt is not permitted. Where echelon paving or the use of infrared heaters for the construction of longitudinal joints is not practical, with the approval of the contract administrator the contractor can elect to over-pave the first paving lane by a minimum of 100mm and trim the cold contact edge back to provide a clean, vertical face, that should have tack coat applied prior to paving the new asphalt.

At the discretion for the Engineer, where echelon paving is not practical, heater or joint cut back shall be considered approval from the Contract

7.2.2.6 Quantity and Pricing

On streets requiring partial depth asphalt removal and reinstatement with both base and top courses of asphalt, the price bid for the base course asphalt shall include restoration of areas requiring full depth asphalt removal because of remaining deficiencies identified following the milling.

The Contractor shall confirm approximate asphalt quantities prior to ordering any material. Compensation will not be provided for differences between estimated and actual quantities.

7.2.2.7 Measurement for Payment

Payment at 100% of the contract price, will only be issued once all required material testing has been completed with results received and deemed satisfactory by the Contract Administrator.

The measurement for payment for item Surface Paving Course (HL1, HL3 HS or HL3) and Binder Course (HL8 or HDBC) will be based on the actual tonnage of pavement placed. Asphalt cores on the (HL8 or HDBC) binder surface may be taken by the Contract Administrator prior to placing the (HL1, HL3 or HL3 HS) surface course. If it is found that the binder course depth is less than specified, the Contractor will make up the difference with HL1, HL3 or HL3 HS at no cost to the Town.

Only materials delivered at the site and substantiated by weigh tickets collected at the site and initiated by the Contract Administrator will be included for payment. The Contract Administrator reserves the right to spot-check the tare weights and loaded weights for trucks being used for this Contract and no extra payment will be made for this checking, if the weight of the loaded truck is found to be under the weight indicated by the ticket. The percentage difference of the weights shall be calculated and deducted by each load carried by the truck during that date.

No additional payment will be made for hand work.

7.2.2.8 Payment

Any additional costs associated with placing warm mix asphalt shall be included in the unit price bid.

7.2.3 SP3 - In-Depth Preservative Asphalt Sealant

The application of in-depth preservative asphalt sealant (Reclamite Rejuvenating Agent) is required with the construction of Town roads. The sealant shall be applied 3 years after placement of top course asphalt and after all asphalt testing has been completed and accepted.

7.2.3.1 Scope

This work shall consist of furnishing all labour, equipment and material needed to perform all operations necessary for the rejuvenation and in-depth sealing of a 'hot mix' asphalt surface course by spray application of an engineered, cold, cationic, rejuvenating agent composed of petroleum oils and resins emulsified with water.

This proposed improvement would be constructed at the existing profile and grade. The contractor is responsible to sweep all the adjacent roads that are affected by the sealant operation.

Asphalt sealing shall be included in the construction schedule. Any notice of change in schedule shall be provided in writing 5 days prior to the operation.

Whenever the term Public Works Manager, Engineer, or Highway Maintenance

Superintendent are used in specifications for this work, they shall apply equally to the duly authorized representatives of each.

7.2.3.2 Materials

The asphalt rejuvenating agent shall be composed of a petroleum resin maltene oil base uniformly emulsified with water. The rejuvenating agent shall have a record of at least 10 years of satisfactory service in Ontario, as an in-depth asphalt rejuvenating agent and in-depth sealer on municipal roadways. Products which result in coating the insitu asphalt with asphalt emulsion or coal tar, etc. are not acceptable for this project.

Emulsions that utilize volatile organic compounds as the method of achieving penetration into the asphalt surface are not acceptable. Acceptable emulsions must contain the maltene elements structured in such a manner, and in sufficient quantity, to manipulate the chemical composition of the various maltene elements of the asphalt cement. The maltenes parameter is $(PC+A1)/(S+A2)$.

Each submission shall include a certified statement from the asphalt rejuvenator manufacturer showing that the asphalt rejuvenating emulsion conforms to all of the specifications included in this document as well as all listed physical and chemical requirements. The material must be an approved product of the Ontario Provincial Standards Product Management Committee and must be listed as an approved product on The Road Authority.

7.2.3.3 Specifications

Table 7.2 Asphalt Testing

Test	Test Method		Requirements	
	ASTM	AASHTO	Minimum	Maximum
Tests on Emulsion				
Viscosity @ 25° C, SFS	D-244	T-59	15	40
Residue, % W ⁽ⁱ⁾	D-244 (Mod)	T-50 (Mod)	60	65
Miscibility Test ⁽ⁱⁱ⁾	D-244 (Mod)	T-59 (Mod)	No Coagulation	
Sieve Test, % W ⁽ⁱⁱⁱ⁾	D-244 (Mod)	T-59 (Mod)	-	0.10
Particle Charge Test	D-244	T-59	Positive	-
Percent Light Transmittance	GB	GB	-	30
Tests on Residue from Distillation				
Flash Point, COC C	D-92	T-48	196	-
Viscosity @ 60° C, Cst	D-445	-	100	200
Asphaltenes, % W	D-2006-70	-	-	1.00
Maltene Dist. Ratio	D-2006-70	-	0.30	0.60
PC + A (first) ^(iv)	D-2006-70	-	0.50	-
P + A (second) ^(iv)				
Saturated Hydrocarbons				
S ^(iv)	D-2006-70	-	21	28

Notes for Table 7.2:

- i. ASTM D-244 Modified Evaporation Test for percent of residue is made by heating a 50 gram sample to 149° C (300° F) until foaming ceases, then cool immediately and calculate results.
- ii. Test procedure identical with ASTM D-244 60 except that .02 Normal Calcium Chloride solution shall be used in place of distilled water.
- iii. Test procedure identical with ASTM D-244 except that distilled water shall be used in place of two percent sodium oleate solution.

iv. Chemical composition by ASTM Method D-2006-70:

PC = Polar Compounds

A (first) = First Acidaffins

A (second) = Second Acidaffins

S = Saturated Hydrocarbons

The product Reclamite is acceptable for these requirements and may be sourced in Ontario from Superior Road Products (1-866-772-2224). Alternative products will be required to meet all specifications and a 5-liter container of product must be provided to the municipality for testing and approval. All testing costs will be borne by the supplier.

7.2.3.4 Application Temperature

The temperature of the emulsion at the time of application shall be as recommended by the manufacturer.

7.2.3.5 Handling of Asphalt Rejuvenating Agent

Contents in tank cars or storage tanks shall be circulated at least ten minutes before withdrawing any material for application. When loading the distributor, the asphalt rejuvenating agent concentrate shall be loaded first and then the required amount of water shall be added. The water shall be introduced into the distributor with enough force to cause agitation and thorough mixing of the two materials. To prevent foaming, the discharge end of the water hose or pipe shall be kept below the surface of the material in the distributor which shall be used as a spreader. The distributor tank will be cleaned of all of its asphalt materials, and washed out to the extent that no colouration of the emulsion may be perceptible. Cleanliness of the spreading equipment shall be subject to the approval and satisfaction of the Engineer.

The distributor for spreading the emulsion shall be self-propelled, and shall have pneumatic tires. The distributor shall be designed and computer equipped/radar speed regulated to distribute the emulsion uniformly on variable widths of surface at readily determined and controlled rates from 0.18 to 0.45 liters per square meter of surface and with an allowable variation from any specified rate not to exceed 5%.

Distributor equipment shall include full spray bars, pump, on-board computer assisted application rate and monitoring devices utilizing accurate radar technology, volume measuring device and a hand hose attachment suitable for application of the emulsion manually to cover areas or patches inaccessible to the distributor. The distributor shall be equipped to circulate and agitate the emulsion within the tank.

A check of distributor rate and uniformity of distribution shall be made when directed by the Engineer.

7.2.3.6 Weather Limitations

The emulsion shall be applied only when the existing surface to be treated is thoroughly dry and when the weather is clear and is not threatening to rain. The emulsion shall not be applied when the atmospheric temperature is below 4° C.

7.2.3.7 Prior to Application

On the day prior to application a notice outlining the process shall be hand delivered to all adjoining residents/businesses. Immediately prior to application the roads shall be mechanically blown free of debris. Catch basin grates will be covered with absorbent pads. Suitable traffic control plans shall be prepared in compliance with Book 7. Traffic control must be in compliance with regulations. Typical lane closures/traffic pattern modifications range from 15 minutes to 1 hour.

7.2.3.8 Application

The asphalt rejuvenating agent shall be applied by distributor at the temperature recommended by the manufacturer and at the pressure required for the proper distribution of the material. The emulsion shall be so applied that uniform distribution is obtained at all points of the areas to be treated. Distribution shall be commenced with a running start to ensure full rate of spread over the entire area to be treated. Areas inadvertently missed shall receive additional treatment as may be required by hand sprayer applications.

Application of asphalt rejuvenating agent shall be one-half width of the pavement at a time.

When the second half of the surface is sealed, the distributor nozzle nearest the center of the road shall overlap the previous application by at least one-half width of the nozzle spray. In any event, the centerline construction joint of the pavement shall be treated in both application passes of the distributor truck.

Before traffic is permitted to travel on a treated lane a light coating of gray 30A Blast Furnace Slag Sand or other suitable traction grit, shall be applied to the surface in sufficient amounts to protect the traveling public. This sand will be picked up by mechanical sweeper within 30 hours of application.

The Contractor shall provide/arrange for a sweepings disposal location.

Before spreading, the asphalt rejuvenating agent shall be blended with water at the rate of one (1) part rejuvenating agent to one (1) part water by volume as determined by the on-site contractor's technical advisor or as specified by the manufacturer. The asphalt rejuvenating agent (not including the water component) shall be spread at the rate of

0.14 to 0.18 liters per square meter. The contractor's technical advisor will calculate application rates of mixed rejuvenator so that the appropriate amount of concentrate is applied utilizing approved application determination methods. The Engineer may attend the application determination test.

The rejuvenating agent shall only be applied by an applicator approved by the product manufacturer.

7.2.3.9 Method of Measurement

Construction/maintenance sealing with rejuvenating agent will be measured by the square meter.

7.2.3.10 Basis of Payment

The accepted quantities, measure as provided for above, will be paid for at the established unit price per square meter.

7.2.4 SP4 - Impressed Coloured Concrete Apron

7.2.4.1 Samples

Submit one full size sample of paving pattern, and colour together with shop drawings of proposed pattern.

7.2.4.2 Colour

Harcross Northern Pigment #401C Ultra Light Red (solid), all colour shall be integrally mixed into the concrete at source or approved equal.

7.2.4.3 Pattern

A sample of minimum dimensions 1.0 m x 1.0 m shall be submitted to the Contract Administrator for approval of colour match and pattern, to suit the application and relation to other hard surfaces.

7.2.4.4 Concrete Requirements

Concrete shall conform to CSA A23.1-M90 for class 2 exposure:

- Minimum 280-day compressive strength 35 MPa
- Maximum water/cement materials ratio 0.45
- Air content category 7% to 9% for 19 mm coarse aggregate
- Slump shall be a minimum of 80 mm and maximum of 100 mm

7.2.4.5 Testing

All concrete shall be tested in accordance with CSA A23.2-M90. Air test shall be done after colour has been introduced and immediately before placing concrete.

7.2.4.6 Release Agents

Release agents shall be:

- Dry powder agent to comply with manufacturer's specifications, or
- Liquid release agent (evaporating non-staining type)

7.2.4.7 Jointing, Curing, and Sealing

All concrete shall have 19 mm wide control joints within 4 to 12 hours after placement. Control joints shall be $\frac{1}{4}$ of slab depth (minimum) and no more than 2 metres apart in each direction.

Concrete shall be cured for a minimum of 72 hours. Curing is to be achieved by one or more of the following:

- Clear membrane type (spray or roll up)
- Vapour mist bath (spraying)

Concrete shall be sealed.

7.2.4.8 Placing and Finishing

The thickness of concrete shall be 200 mm.

Impressed concrete shall be deposited within the temperature range 10°C and 30°C. No steel trowels, steel floats or power trowels are to be used, as they may lead to dusting or scaling of the surface. Take proper concreting precautions such as dampening of the subgrade and the prevention of premature surface drying resulting in Plastic z/shrinkage Cracking. Pattern shall be laid so that impressed lines are either parallel or perpendicular to the direction of the adjacent curb or sidewalk at all times.

7.2.4.9 Bituminous Fibre Expansion Joints

Pre-moulded bituminous fibre expansion joints shall be placed at a maximum interval of 30 m and where matching adjacent sidewalk.

Expansion joints of bituminous fibre material shall also be used abutting rigid object (e.g., concrete curb and gutter, poles, manholes, etc.).

7.2.4.10 Measurement and Payment

Measurement and payment will be made in square metres of Impressed Coloured Concrete placed as described herein which shall be full compensation for the labour, equipment and materials necessary to complete the work as specified herein.

Payment for excavation and granular bedding shall be made under the appropriate tender item.

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7.3 Management and Disposal of Materials

7.3.1 General

All soil management shall be completed in accordance within the requirements of Ontario Regulation 406/19 On-Site and Excess Soil Management made under the Environmental Protection Act and the Rules for Soil Management and Excess Soil Quality Standards (<https://www.ontario.ca/page/handling-excess-soil>) as well as all other applicable laws and regulations including the current version of OPSS 180.

7.3.2 Removal and Disposal and Associates Costs

The agreed unit prices in the Form of Tender shall include the cost of removal and disposal of all surplus excavated material. This material shall be disposed of in disposal areas provided by the Contractor outside the limits of the Contract, at their own expense.

Any placement of material on private lands within the boundaries of the Town of Milton requires that the property owner make application to the Town for a permit under By-Law 094-2022, as amended. No materials shall be placed on private lands prior to the project consultant receiving a copy of the permit.

The Contractor is advised that no specific disposal site has been identified for materials surplus to the Project. Therefore, it will be the Contractor's responsibility to arrange for a suitable disposal site(s) for removals, excess, and waste materials generated by the work. There will be no extra payment to the Contractor for the cost of disposing material off-site unless specific items for same exist in the Schedule of Unit Prices, if any, in the Contract Documents.

The cost for loading, haulage, tipping fees, grading, restoration (if applicable), and all other work associated with the Contractor's disposal site(s) shall be included in the appropriate items of the Schedule of Unit Prices, if any, in the Contract Documents.

Current dumping fees will be paid by the Contractor. Compensation for the fees is to be included in the unit prices bid for removal and disposal with no separate pay item in the Schedule of Unit Prices, if any, in the Contract Documents.

7.3.4 Salt Impacted Soils

The Contractor shall note that excess earth excavated from the Project may contain elevated concentrations of chloride and sodium and may have elevated values for Electrical Conductivity and Sodium Absorption Ratio. For the purpose of this Contract,

excess earth with salt impacts is not considered to be 'contaminated' with the meaning of Table 1 of OPSS 180.

Where the Contractor manages excess earth as disposable fill, the Contractor shall take into account the possibility of salt impacts and ensure that the material is managed responsibly and in an environmentally appropriate manner.

Where the Contractor intends to manage the excess earth that may be salt impacted on private property, the Contractor shall make the Owner aware that it may be salt impacted by providing to the Owner the forms found in OPSS 180. A copy of each completed form is to be provided to the Contract Administrator.

The Contractor is responsible for conducting such sampling and testing as may be necessary to comply with any requirements imposed by the Owner as a condition of accepting the excess earth and excavated materials.

7.4 New Traffic Signal Construction

All works are to be in accordance with the latest edition of the Uniform Traffic Signal Specifications for Operating Authorities within the Region of Halton, except where superseded by Specifications contained herein or as directed by the Town.

7.4.1 Contractor Qualifications

Contractors must be fully familiar with the requirements of the Town of Milton for traffic signals installation. Contractors must possess copies and be thoroughly knowledgeable of the latest editions of the “Uniform Traffic Signal Specifications for Operating Authorities within the Region of Halton” and the specifications contained therein.

7.4.2 Electrical Handholes, Precast Concrete

300 mm Ø handholes shall be used for each vehicle detection station.

Where the number of ducts entering a handhole is six or more, a 600 mm x 600 mm precast concrete electrical hand hole shall be used as shown on OPSD 2112.04.

460 mm Ø handholes shall be used for all other applications. 460 mm Ø handholes shall be installed along interconnect conduits at a maximum spacing of 100 m.

7.4.3 Rigid Ducts, Direct Buried in Boulevard/Asphalt

a. Open Cut Installation:

Polyethylene duct installed by direct buried method and used for street lighting applications shall be electrical non-metallic tubing in accordance with CSA Standards C22.2 No. 227.1, except where otherwise indicated.

Rigid ducts installed by open cut, direct buried and subsurface installation shall be rigid polyvinyl chloride (PVC) type conforming to CSA Standards C22.2 No. 211.2, except where otherwise indicated.

b. Directional Boring:

Polyethylene duct installed by the method of directional boring shall be PVC High Density Polypipe (HDPE SDR11) conforming to CSA Standards B137.B.

c. Backfill:

The bore pits in boulevards areas when the method of directional boring is used shall be backfilled with native material. Granular material shall be compacted to 100% Maximum Dry Density and earth to 95% Maximum Dry Density. All grassed areas in

boulevards will be reinstated with a minimum of 100 mm of good topsoil and sod or seed as required under the contract.

The Contractor shall provide watering until such time as the sod or seed is able to continue to grow independently within the natural environment.

7.4.4 Low and Extra Low Voltage Cables

Only IMSA cable types will be permitted.

Low voltage cables for the traffic signal controller power supply shall have BLACK and WHITE colour insulation. Luminaires on joint traffic signal/street lighting poles shall have RED and WHITE colour insulation.

The following cables shall be used:

- 19/C #14 for traffic signal cable.
- 25 pair, 22 AWG for interconnection cable.
- 3M 138M, 3/C #20 for pre-emption cable.
- 4/C #18 AWG for loop detectors and push buttons, shielded as per Canoga Catalogue #CC30003.

The Coding of the individual conductors forming a cable shall consist of a combination of colour, tracers and size of conductor as shown in Tables 7.4 through 7.7.

7.4.5 Ground Wires/Electrodes

Ground plates shall be used. Ground rods will not be permitted.

7.4.6 Secondary Supply Power Facility

The Contractor shall supply and install one Federal Pioneer weatherproof load centre complete with all breakers required for this project as shown on the drawings. In addition, provide a 120/204V, single phase, three wire, four jaw meter base meeting the requirements of Milton Hydro.

The Contractor shall install equipment for the power supply on the service pole as per the Standard Specification Drawings UTS 614.020. The Contractor shall leave sufficient wire coiled at the weather head for the connection to the secondary supply on the service pole, as per the Standard Specification Drawings UTS 614.020.

A meter base shall be installed.

Table 7.3 19 Conductor Cable (IMSA 19-1C)

	Wire Colour and Tracer	ABR Colour Tracer	Wire Colour Conductor No.	Conductor Assignment
1	Purple	PUR	4	Main St. through Green
2	Orange	ORG	5	Main St. through Yellow
3	Red	RED	3	Main St. through Red
4	Purple/Black	PUR/BLK	9	Side St. through Green
5	Orange/Black	ORG/BLK	10	Side St. through Yellow
6	Red/Black	RED/BLK	8	Side St. through Red
7	Purple/White	PUR/WHT	14	Through left turn
8	Orange/Red	ORG/RED	18	Through left turn
9	Red/White	RED/WHT	13	Through left turn (FP)
10	Blue	BLU	6	Walk - Main Street
11	Blue/Black	BLU/BLK	11	Walk - Side Street
12	Blue/White	BLU/WHT	15	Spare
13	Blue/Red	BLU/RED	19	Don't Walk - Main Street
14	Black	BLK	1	Spare
15	Black/White	BLK/WHT	12	Spare
16	Black/Red	BLK/RED	16	Don't Walk - Side Street
17	White	WHT	2	Neutral
18	White/Black	WHT/BLK	7	Spare
19	White/Red	WHT/RED	17	Spare

Table 7.4 7 Conductor Riser Cable (IMSA 19-1C)

	Wire Colour and Tracer	ABR Colour Tracer	Wire Colour Conductor No.	Conductor Assignment
1	Purple	PUR	4	Green
2	Orange	ORG	5	Yellow
3	Red	RED	3	Red
4	Purple/Black	PUR/BLK	9	Green Arrow
5	Orange/Black	ORG/BLK	10	Yellow Arrow
6	White	WHT	2	Neutral
7	Purple/White	PUR/WHT	14	Ground

Table 7.5 4 Conductor Riser Cable Ped Head (IMSA 19-1C)

	Wire Colour and Tracer	ABR Colour Tracer	Wire Colour Conductor No.	Conductor Assignment
1	White	WHT	2	Neutral
2	Purple	RED	3	Don't Walk
3	Red	PUR	4	Walk
4	Orange	ORG	5	Spare

Table 7.6 4 Conductor Extra Low Voltage Ped Button (CANOGA 3003)

	Wire Colour and Tracer	ABR Colour Tracer	Wire Colour Conductor No.	Conductor Assignment
1	White	WHT		PED Common
2	Red	RED		PED Load Side Street
3	Green	GRN		Spare
4	Black	BLK		PED Load Main Street

7.4.7 Concrete Footing/Pads in Earth

All poles for permanent installations shall be aluminum and base mounted. Temporary installations may use direct buried wood poles, where approved by the Town.

The following base mounted, aluminum poles, distributed by Sentinel Pole & Equipment Ltd. are approved for installation:

- 3.7 m (12') - TP12-645C-AB-242
- 4.5 m (15') - TP15-645C-AB-242
- 5.8 m (19') - TP19-866C-AB-292
- 5.8 m (19') - TP19-1080E-AB-406
- 9.8 m (32') - ET35-845E-AB-292
- 9.8 m (32') - ET35-1055E-AB-406

7.4.8 Poles, Base Mounted

The complete anchorage assembly shall be as shown in the Standard Specification Drawings UTS 616.021. No stud anchorage assemblies shall be permitted.

Aluminum base mounted poles shall be installed per TMSDs 12-01.01 and 12-02.01. Pole base castings are to be tight against the tops of the concrete footings (no studs).

The bolts shall be installed finger-tight only by the fabricator. Any threads of the bolts

exposed above the ferrule shall be coated with factory applied white lithium grease.

Tops of bases to be set flush with finished grade in paved or concrete areas and 100 mm above finished grade in earth or granular areas.

The concrete pad for the controller cabinet foundation and interconnect pedestal shall be constructed to meet the “Uniform Traffic Control Specifications and Standards for Operating Authorities Within the Region of Halton”.

The alignment of the sleeves and/or duct entry points shall be scribed marked on the top of the concrete footing or slab.

7.4.9 Roadway Luminaires and Bracket Assemblies

Luminaires shall be I.E.S. Type II-MSCO photometric curve 250-Watt High Pressure Sodium housing, pre-wired to operate at 120 Volts; CSA approved and shall be equipped with lamp, photo control receptacle, ground lug and photocell.

7.4.10 Traffic Signal and Pedestrian Signal Heads

All traffic and pedestrian signal heads shall be complete with light emitting diode (LED) units. Incandescent lamps may only be used for temporary signals, with approval by the Town.

Type 9A traffic signal heads shall have four 300 mm sections, with a bimodal left-turn unit. Two Type 9A traffic signal heads shall be installed for all protected and protected/permmissive left-turn movements.

Pedestrian heads shall be single section, with a bi-modal ‘walk’/‘don’t walk’ LED unit. Two-section pedestrian countdown signals will be installed where required by the Town. All traffic signal heads shall be installed on plumbizer hangers. For three section heads, the backboard shall accommodate a plumbizer hanger between the red and amber sections. For four section heads, the backboard shall accommodate a plumbizer hanger between the amber and green sections.

7.4.11 Mast Arms, Hangers, and Brackets

Single member mast arms approved for use are as follows:

- 3.0 m - Thomas & Betts - TR10SMA
- 4.6 m - Thomas & Betts - TR15SMA
- 6.1 m - Thomas & Betts - TR20SMA

All traffic signal heads shall be installed on masts arms with plumbizers, Sentinel Pole & Traffic Equipment Ltd. - Model # AP-42830. No cushion hangers shall be permitted.

Pole mounted traffic signal heads shall be installed on aluminum double arm brackets, Sentinel Pole and Traffic Equipment Limited - Model EDA-300.

7.4.12 NEMA Traffic Signal Controller

The controller shall be a NEMA TS II traffic signal controller built to the Town of Milton standard and including all necessary load switches, loop detector amplifiers, opticom cards and accessories to the satisfaction of the Town. The Town may also specify a UPS and/or area master.

The developer should anticipate a minimum of 12 weeks for delivery of the controller. The controller will be delivered to the Town of Milton for set up, testing, and installation by the Town's maintenance contractor. The Town shall supply signal timings for programming in the controller prior to installation.

All costs associated with the foregoing are the responsibility of the developer.

7.4.13 Loop Detectors

Stop bar detection shall consist of 1.8 m x 6.0 m rectangular simple detection loops. Where required, left-turn lanes shall have two detectors and through lanes shall have a minimum of one detector.

Advance detection shall consist of 1.8 m x 1.8 m square simple detection loops, located 75 m to 100 m in advance of the stop bar.

The loop detectors shall be installed as per TMSDs 13-01.01 and 13-01.02. A separate loop lead shall be installed from each detection loop to the adjacent hand hole. All loop wires and lead-in cables shall be connected with a DBY kit containing a sealing compound as per TMSD 13-01.03.

The contractor shall contact the Town's maintenance contractor to review and confirm the quantity and exact location of detection loops on the pavement prior to installation. Loops may not be installed under conditions where temperatures are below 5° C, without approval of the Town.

7.4.14 Optical Emergency Vehicle Pre-Emption Detectors

The Contractor shall install 3M Opticom emergency pre-emption detection as required by the Town. The equipment shall be installed per TMSD 13-02.01, complete with pre-emption detector, cabling and mounting brackets. Approved suppliers of the materials are:

- Innovative Traffic Solutions
- 3M Canada

7.4.15 Signage and Pavement Markings

The Contractor shall install all regulatory, warning or information signs and pavement markings on the roadway required for the traffic signal, as shown on the design drawings and in accordance with the Ontario Traffic Manual.

The contractor shall install overhead street name signage in accordance with the Milton street name signage policy and standards.

The contractor shall contact the Town's maintenance contractor to review and confirm the exact location of pavement markings prior to installation.

7.4.16 Signal Turn-On

All works must be completed and inspected prior to signal turn-on.

The contractor shall advise the Town's Traffic Division in writing of the proposed signal turn-on date at least 10 working days prior to the signal turn-on.

The contractor shall contact the Town's maintenance contractor to schedule a full test and inspection of the traffic signal prior to turning on the signal.

The Contractor, in conjunction with the Town and its signal maintenance contractor will be responsible for the signal turn on after final approval by Electrical Safety Authority.

The Contractor shall arrange for an off-duty police officer(s) to be present during signal activation.

All costs associated with the foregoing, including that for the police officer(s) and Town of Milton's maintenance contractor, are the responsibility of the Owner.

