THE CORPORATION OF THE CITY OF MISSISSAUGA

TRANSPORTATION AND WORKS DEPARTMENT

SUPPLEMENTAL SPECIFICATIONS

NOTE: Price bid for the items shall include equipment, material and labour required to complete all works to the satisfaction of the Project Manager.

August 2015

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001 SUPPLY FIELD OFFICE FOR THE CORPORATION

Under this item, the Contractor shall supply, erect and maintain a Field Office to be used by representatives of the Corporation upon award of contract and maintained until final completion of Works.

The cost of all labour and material is to be included in the Contract price for the set-up, maintenance and removal of the Field Office of 20 m^2 minimum area. The office shall be furnished with a desk, a first aid kit, a drawing table, six chairs and a standard or cellular telephone. The office shall be equipped with electric light and propane or electric heat thermostatically controlled (Winter) or air conditioning (Summer). Where a local hydro service is not readily available, the Contractor shall supply and maintain an electric generator for the provision of electricity within the field office. All windows and doors shall be provided with screens and daily janitorial service shall be provided by the Contractor. A sanitary facility (portable toilet) or equivalent must be provided by the Contractor and erected and maintained within 10 metres of the field office. This facility shall be for the sole use of the Corporation's representatives and must have an exterior padlock with two keys available to staff of the Corporation.

The Contractor shall bear the costs of heating, cooling and lighting the Field Office and the installation and rental charges for the telephone. He will not be required to pay for long distance calls made by the Corporation. The Corporation and agent shall be indemnified against loss and fire, theft and injury to the building and it contents.

METHOD OF PAYMENT

Payment shall be made on a lump sum basis, as shown on the Form of Offer for this item which includes all labour and materials. Fifty percent (50%) of the amount to be payable after satisfactory erection and the balance after removal of the structure and clean-up of site. Failure of the Contractor to provide a Field Office when instructed will result in the Corporation taking responsibility for this item. All costs incurred, and including trailer rental, utility costs, sanitary facility, janitorial costs, insurance and 25% overhead will be deducted from the Contractor's Progress Payment Certificate.

002 REMOVAL ITEMS

ALL REMOVALS INCLUDE DISPOSAL OF REMOVED MATERIAL OFF SITE UNLESS OTHERWISE SPECIFIED.

A) SIGNS

The Contractor shall carefully remove and salvage all traffic and street signs and poles that require relocation due to the road reconstruction. These will be delivered to the Corporation Works Yard on Mavis Road or relocated as directed by the Project Manager.

B) REMOVAL OF CURB AND GUTTER

OPSS 510.09.03

Shall be expanded to include the following:

All curb or curb and gutter designated to be removed including driveway curb and reinforced curb shall be marked up on site by the Project Manager and measurement will be as per OPSS requirements. This payment shall be full compensation for all operations required to complete this item including sawcutting.

C) REMOVAL OF SIDEWALKS

OPSS 510.09.02

Shall be expanded to include sidewalk designated for removal shall be marked up on site by the Project Manager. Measurement will be as per OPSS requirements. This payment shall be full compensation for all operations required to complete this item including sawcutting.

D) PRECAST CATCHBASINS, DITCH INLETS AND MANHOLES

The Contractor will be required to remove all precast catchbasins, double catchbasins, ditch inlets and manholes including plugging all existing abandoned storm sewers with concrete as directed by the Project Manager. If it is deemed reasonable by the Corporation, all materials removed shall be returned to the Works Yard otherwise they shall be disposed of off-site at the expense of the Contractor.

E) POURED-IN-PLACE CATCHBASINS, DITCH INLETS AND MANHOLES

The Contractor will be required to remove all poured-in-place catchbasins, double catchbasins, ditch inlets and manholes including plugging all existing abandoned storm sewers with concrete as directed by the Project Manager. All materials removed shall be disposed of off-site all at the expense of the Contractor.

F) REMOVAL OF CULVERTS, ALL SIZES INCLUDING HEADWALLS

The Contractor will be required to remove of and dispose of off-site various sizes of culverts and headwalls off site. Culverts and headwalls designated for removal shall be indicated on site by the Project Manager and measurement will be conducted on a lump sum basis. Payment shall be full compensation for all operations required to complete this item.

G) REMOVAL OF FENCES, GUARD RAILS AND GUIDE POSTS

OPSS 510.09.05

Shall be expanded to include the removal of any concrete anchors whether they be for the guard rails, fences or guide posts shall be included in the payment for the removal of fences, guide rails and guide posts. Payment under this item shall also be full compensation for all operations required to complete this item including any sawcutting.

H) REMOVAL OF CONCRETE PAVEMENT, CONCRETE BASE AND CEMENT TREATED BASE ONLY

OPSS 510.09.01

Shall be expanded to include any pavement designated for removal shall be marked up on site by the Project Manager and measurement will be conducted as per OPSS requirements.

This payment shall be final compensation for all operations required to complete this item including sawcutting.

Payment for all asphalt removal is to be incorporated into SS 206 and no additional payment will be allowed under this item for asphalt removal.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

003 REMOVAL AND REINSTATE

A) LOCKSTONE

The Contractor is responsible for the removal and safe storage and the reinstatement of same as directed by the Project Manager. If for whatever reason the Contractor is faced with insufficient quantity to complete the reinstatement, the Contractor will be required to install a similar product to the satisfaction of the Project Manager. Supply of additional lockstone will be paid in accordance with GC8.02.04.05.

B) FENCING

As directed by the Project Manager, the Contractor is required to remove and reinstate in accordance with Corporation standards, all fencing that is required to be salvaged. This is to include safe storage of this fence during the construction operation.

C) CONCRETE BUMPER BLOCKS

The Contractor is responsible for the removal and safe storage and reinstatement of the same as directed by the Project Manager. The Contractor is responsible for the replacement of the exact quantity as originally removed to the satisfaction of the Project Manager. If the bumper blocks are damaged during the removal, storage or reinstatement procedure the Contractor is responsible to replace these concrete bumper blocks with a similar product to the satisfaction of the Project Manager.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

004 CONCRETE MODULAR RETAINING WALL

The Contractor shall install the concrete modular retaining wall in accordance with the manufacturer's recommendations. The subgrade shall be compacted to 95% SPD. Filter fabric shall be Terrafix 270R or approved equal and is to be placed between the granular material and native soil. A 150 mm perforated corrugated plastic pipe with Geotextile is to be installed at the base of the excavation and connected to the nearest curb subdrain or catchbasin.

A minimum thickness of 300 mm of Granular 'A' compacted to 95% SPD is to be placed as a base and as backfill for the modular wall.

The coping stone is to be secured with butyl tape.

Any movement of the wall during the maintenance period will be corrected by the Contractor at his expense.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

005 INSTALLATION OF TRAFFIC SIGN SLEEVES

The Contractor will be required to supply and install galvanized steel sleeves to accommodate 100 X 100 X 750 mm traffic signpost. Galvanized steel sleeves are to be fabricated and installed as per the detail and in the locations noted on the Contract Drawings.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

006 PROJECT SIGNS

The Contractor is required to supply, install and remove project signs as part of this Contract.

The signs are to be constructed in accordance with Standard Drawing 2430.03 and 2430.04 indicating the appropriate contract name and number, City Logo and name of the Contractor.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

008 DUST CONTROL

The Contractor shall be required to prevent dust nuisance resulting from his operations either within the right-of-way or elsewhere or by public traffic where it is the responsibility of the Contractor to maintain a roadway through the Contract limits.

Where the work requires the sawing of asphalt or the sawing or grinding of concrete, blades and grinders of the wet type shall be used together with sufficient water to prevent the incidence of dust, wherever dust would affect traffic or wherever dust would be a nuisance to residents of the area where the work is being carried out.

The cost of all such dust control preventative measures shall be borne by the Contractor, except however, where water or calcium chloride is authorized by the Project Manager to reduce dust nuisance. The cost of such quantities of water and calcium chloride authorized by the Project Manager to restrict dust to acceptable levels shall be paid for by the Corporation at the Contract prices for the appropriate tender item.

The cost of water used for compaction purposes shall be the responsibility of the Contractor.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

009 PLANE OR GRIND EXISTING ASPHALT PAVEMENT

This item includes the cold planning or grinding of existing asphalt pavement of various sized areas to a maximum depth of 100mm to permit the placement and compaction of the hot mix asphalt overlay and will include the removal and disposal of all waste material.

All butt joints shall be tapered until such time that the paving operation is ready to proceed. The tapered joints shall not be removed more than 24 hours prior to paving.

All sharp pavement edges and exposed maintenance holes and valves shall be painted with orange paint. Any manholes and valves that are raised more than 50mm are to be ramped.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

010 SUPPLY AND APPLICATION OF PAINTED PAVEMENT MARKING LINES

SCOPE

This specification covers the requirements for the supply and application of painted pavement marking lines. All markings shall be in conformity with the "Ontario Traffic Manual" (Metric Edition) of the Ministry of Transportation of Ontario, unless otherwise noted.

The Contractor is advised that line painting which is undertaken prior to the end of April will require <u>one</u> application of paint. Line painting undertaken from May 1st to the end of the construction season requires <u>two</u> applications. The Contractor should prepare his bid price accordingly.

MATERIAL AND EQUIPMENT

All paints and beads used shall be in strict conformity with the basic specifications of the Ministry of Transportation of Ontario.

The minimum size compressor for paint application shall be 3 m^3/min.

PUBLIC CONVENIENCE AND SAFETY CONES

In carrying out the work or any portion thereof, the convenience of the public must always be specially considered and provided for by the Contractor who must not obstruct any street, thoroughfare or sidewalk longer or to any greater extent that is absolutely necessary in the opinion of the Project Manager.

The Contractor shall ensure that all freshly painted lines are suitably marked and identified by the placing of solid fluorescent red cones to protect the freshly laid material from being tracked or smeared by traffic. These cones shall be left in place until the paint is dry and will not track and must be picked up by the Contractor within two hours after the paint is dry.

The cones shall be placed and picked up from a cone truck which when placing the cones shall follow immediately behind the paint truck. The cone truck shall be manned by a minimum of two people, one of which shall be the driver and the other the cone man. The cones shall be placed in such a manner that they remain upright and on the line. The cone placement and pick-up shall take place at the rear of the cone truck. When the cones are being picked up the centreline unit shall not be permitted to perform any painting.

All traffic cones shall be a minimum of 150mm in height, have a solid conical shaped body and be fluorescent red in colour. The open surface, red, triangular shaped cones are not acceptable and must not be used.

The cones shall be placed at a maximum spacing of 25m. At the commencement of a line at an intersection and at the termination of a line on the approach to an intersection a series of a least 4 cones shall be placed within a distance of 7.5m.

Application and Marking Specifications for the Supply and Application of Paint for Lane Lines and Centre Line.

The rate of paint applications is to be:

Minimum of 24 metres per litre (355 feet per gallon)
Maximum of 21 metres per litre (310 feet per gallon)

Wet paint film thickness shall range from .35mm to .40mm
Dry paint film thickness shall range from .25mm to .30mm

The rate of bead application is to be 0.7 kg/litre (7 lbs. per gallon) of paint applied. Premix beads will not be accepted for this contract.

The minimum width of a crossing line applied is to be not less than 150mm. Where a double line is applied, the space between the two lines shall not be less than 115mm.

Actual marking and spacing shall be in accordance with the Contract Drawings.

Weather Limitations - No markings shall be done when the temperature is below 10 degrees Celsius in the shade, nor during rainfall or fog, or until the pavement is perfectly dry. No markings shall be done if, in the opinion of the Engineer, the conditions are not conducive to top quality result.

Certain roadways may be required to be painted at night, and the Contractor under the direction of the Project Manager, shall paint such roadways during the time as specified.

All painting shall be performed in the same direction as the flow of traffic. No painting whatsoever is to be performed against the flow of traffic.

EQUIPMENT

The minimum number of vehicles required for the operation shall be: a self-propelled pavement marking unit, and one cone truck (to put down and/or pick up cones and to act as a safety warning truck). Both vehicles shall be radio equipped.

The paint and glass beads shall be applied with a self-propelled lane line marking machine. The unit shall be capable of producing top quality marking with true edges free from waviness or variations. The unit shall have positive skip line mechanisms capable of variability of both line and skip distances. It shall spray at the full force required as soon as it is turned on and shall remain at a constant pressure to produce a uniform shade, free of variation. The application of the drop-on beads shall take place simultaneously and the painted line must be totally and evenly covered with beads.

The lane line unit shall be equipped with two (2) tanks capable of holding at least 2,000 litres of paint with at least three paint guns (two on left side rigger and one at right side rigger for edge lines), two outboard riggers (for left and right side painting), paint heaters, paint pumps to load

the paint tanks, bead bins and a pressurized glass bead system with dispensers to apply the reflective glass beads.

The lane line unit shall be equipped with a full complement of lights for safety and night-time operation. In addition to standard headlights and tail lights on the truck, the unit shall also be equipped with at least one 360^{o} amber rotating flasher light mounted on the roof of the truck cab, standard four-way flashers and turning lights on the truck and boom, a large checkerboard with flashing directional arrows for traffic control, and a large sign indicating line painting in progress. The cone truck shall be similarly equipped.

PREMARKING

Any permanent or temporary premarking, pavement marking paint, grinding, etc. required on road construction shall be the responsibility of the Contractor. The Contractor will obtain approval of the detour line markings and signing layout one week prior to completing the work from the Project Manager. All new layout and painting of existing areas shall conform to the Contract drawings and to the latest issue of the Ontario Traffic Manual for Ontario, “Pavement Markings” section.

The Contractor shall ensure that signs are placed facing approaching traffic at each end of the section of road being premarked, warning motorists of the men working of the road. The Premarking crew, provided by the Contractor, shall consist of a flagperson to slow down and direct motorists and two (2) other people. All members of the crew must wear approved safety vests at all times. The actual number of people required to premark the roadway will be specified by the Project Manager.

BASIS OF PAYMENT

Payment for painted pavement markings shall only be made for pavement markings installed in the final locations excluding gaps as shown on the Contract drawings. All temporary marking required in order to implement the Contractor’s construction sequence shall be included in the Traffic Control item.

METHOD OF PAYMENT

Payment at the lump sum price for this item shall be compensation in full for the supply of all labour, equipment and materials to complete the work in accordance with the drawings and as described herein.

Application Requirements for the Supply and Application of Paint For Crossing Bars, Crossing Lines and Arrows:

WIDTH OF MARKINGS

The width of line applied is to be one hundred and fifteen (115) millimetres (41/2") for crossing lines and 450 millimetres (18") for stop bars.

ARROWS

The Contractor is required to provide arrow templates for all arrow configurations exactly to the dimensions presently used by the City of Mississauga. The City's templates are available for review, upon appointment, through the Supervisor of Traffic Operations.

EQUIPMENT REQUIREMENTS

The unit(s) used to perform crossing lines, lane lines and arrow pavement markings to meet the specifications of this Contract shall meet or exceed the following requirements:

- Be relatively light, portable, fully self-contained and stand on a minimum of three (3) tires.
- Be capable of producing top quality marking with true edges free from waviness or variations from 76mm to 150mm wide.
- Have a minimum paint capacity of twenty-three (23) litres.
- Paint delivery to surface by means of a pneumatic system through a spray gun nozzle similar to that on truck mounted equipment.
- Have hand gun attachment with a minimum of three (3) metres of appropriate hose(s).

HOURS OF WORK

No work shall be performed between the hours of 6:30 - 9:30 a.m. and 4:30 - 6:30 p.m., Monday to Friday. The Contractor shall not work in residential areas or where private residences are in close proximity to the location between the hours of 7:00 p.m. to 7:00 a.m. without consent from the Project Manager.

PRE-MARKING

Any premarking required on new road construction shall be the responsibility of the Contractor.

All new layouts shall be in accordance with the construction drawings and the Ontario Traffic Manual for Ontario, "Pavement Marking" section.

ERRORS BY CONTRACTORS

Changes, errors or mistakes made by the Contractor or his agents, workmen or employees, either through carelessness or otherwise, must be rectified by the Contractor at his own expense within two days by grinding only. Stripolene is not to be used.

011 INSTALLATION OF CONTROL MONUMENTS

PROPOSED WORKS

Under this item, the Contractor shall supply and install control monuments in locations designated by the City Surveyor.

All monuments are to be inspected by the City Surveyor and **must** meet City standards **prior** to the commencement of field surveying operations. [Sites are to be cleaned up, backfilled (Standard No. 2700.012), be in proper order and must be stable prior to commencement of survey work].

All control is required to be both horizontal and vertical. Third order GPS Traversing is to be used for Horizontal; and second order levelling with a Digital level for the Vertical. The monuments are to be brass caps supplied by the City. All these requirements are defined below.

These specifications call for the highest convenient type of instrumentation. Modern instruments can attain accuracy very easily, and if accurate modern instruments are competently employed with proper routines to detect blunders, then good accuracy can be attained without some of the elaborate standards, which may have been required in the past. This is just as applicable to vertical as to horizontal work. Contractors must design their observations to isolate any inconsistencies in the existing networks. Location selection, installation, observation, computation, adjustment and description of City of Mississauga Control Monuments to be established within City boundaries.

MONUMENTS

All monuments set are to be suitable for Horizontal and Vertical. Any monument set must be inter-visible with at least one other monument, either new or existing. The only permissible monuments are the brass caps, shown on Standard No. 2700.011, which are supplied by the City.

These caps may be set in bridge abutments, substantial box culverts, or other stable concrete foundations. If there is no suitable structure, then concrete cylinders as shown on Standard No. 2700.012 must be constructed. Caps may only be set in concrete sidewalks if a monument is required at a particular location, and no other monument would be suitable. Monuments set in structures must be countersunk so that the top of the cap is flush with the surface; and the concrete cylinder (Standard No. 2700.00122) may require to be constructed below grades in some cases. In all cases, the City surveyor must be consulted prior to installing any monuments.

The survey contractor is responsible for obtaining all necessary locates or permissions. All monuments must be described and referenced on approved City forms, which are digital. The City will supply station numbers. Although the surveys will not be submitted to COSINE, the Cosine 9-digit numbering system will be retained.

Monuments may NOT be set in road shoulders or ditches. In rural areas, they should be set as close to the ROW limit as possible. No monuments are to be set in private property.

STANDARDS FOR GPS TRAVERSING

3A) The following Specifications for third order GPS Traversing are not designed for submission to COSINE. They are designed to produce coordinates which are as accurate as the existing network; to show up weaknesses in the existing network; and to guard against blunders. They are also designed so that the contractor's work can easily be verified.

1) Any new piece of work must be tied to any existing adjacent stations, and in any event to at least three stations appearing in the COSINE databank. Every existing station must be tied to at least two others in closed figures.

   All observations, to both new and existing stations, must be part of self-closing loops so that the new GPS work can be verified independently of the existing coordinate values.

   Practical experience has shown that the most likely source of error is in the set up. Any new stations must be occupied at least twice, to avoid undetected set up errors. This may either be as a common station between two sessions, or by a deliberate repetition. The manner of setting up again at a common station is given in 3.B below. Heights must be measured and booked with care at the start and end of each session. Tribrachs must be checked before work is commenced, and at weekly intervals; and a report to this effect made. It is of no value to "centre" carefully with an unchecked tribrach. These provisions will be strictly enforced.

   Standard No. 2700.013 is an example of an acceptable network,

   Acceptable sessions, with four receivers, would be:
   AB15 1523 2346 46CD ABCD. This is slightly more than the minimum.

2) The adjustment must verify the existing coordinates. If misclosures greater than third order standards are obtained, at least an explanation and perhaps more observations will be required.

3) All bases observed will be less than 15km, and observations shall be Rapid Static. All baselines observed, both trivial and non-trivial, should be processed, and ambiguity-resolved solutions obtained for all baselines.

4) Only dual frequency receivers may be employed. Kinematic observations are not acceptable.

5) All reduced GPS baselines and any other observations must be processed in GEOLAB; the following least square adjustments are required:
   - minimally constrained, which must meet second order accuracy.-fully constrained in both NAD83 and NAD27(74)

6) The submissions must include:

   Raw GPS data Simple log files, showing, for each instrument, for each day's work:
   - Time of observation
   - Station Occupied
   - Instrument Height
   - Any significant notes

   List of sessions:
   - Reduced baselinesGEOLAB files;Digital plan of the NetworkReport as to tribrach checks.
   - Report and Analysis

3B) The following is derived, with substantial modifications, but with the same section numbers, from Part B of the MNR 1994 Specifications. The intention is to preserve as much of the MNR material as possible.

Some of the material in 3A above is repeated.

1) The following standard least-squares adjustment products are required:
   - minimally constrained adjustment, in NAD83
   - fully constrained adjustment; all known stations in COSINE held fixed, in NAD83
   - fully constrained adjustment; all known stations in COSINE held fixed, in NAD27
   - (74)

All adjustments should be in GEOLAB; grid coordinates UTM 17

Values of known stations may be obtained from the City, though most will also be in COSINE. If there is a COSINE value, the City value will be identical.

2) Third -Order Accuracy: The determination for third order accuracy for all submissions will be based upon the semi-major axis of the horizontal relative error ellipse for a point with respect to another point if it is less than or equal to r, at the 95% confidence level, where:

   $r = 12(d + 0.2)$, r in cm, d in km.

The assessment of accuracy is dependent upon the covariance matrix from which the 95% relative error ellipses are determined. The matrix should be scaled by the a posteriori (computed) variance factor when that value is greater than or equal to one. This is in accordance with standard practices adopted by the Geodetic Survey of Canada and MNR, to ensure that the accuracy assessment of a network is not overly optimistic.

3) Receiver Selection: The receivers selected for the project must be dual frequency receivers.

4) Trivial and Non-Trivial Baselines: All baselines should be processed from each session.

5) Scaling of Baselines and Covariance Information: Scaling of individual baselines or baselines within a session is not permitted. Scaling of the covariance information from individual baselines or from an individual session is also not permitted. Only the full covariance matrix as a whole can be scaled by the a posteriori (computed) variance factor as outlined in Item 2, above.

6) Antenna Siting: If the receiver is to remain at the same station for two or more observing sessions, the antenna must be re-positioned each time to ensure the independence of each observing session. This means that for each session the tripod must be moved and set up again and the GPS antenna plumbed over the point and re-orientated again. The differences between the instrument heights at the two consecutive sessions must exceed 10cm. Just moving the tripod leg by 1 cm and moving the tribrach is NOT acceptable. This repositioning is extremely important, to avoid mis-centering; and will be strictly enforced.

7) All observations will be in Rapid Static Mode. The occupation time should be derived on the basis of (5 minutes + 1 minute / km). As an example, for a 10 km baseline, occupation time should be at least 15 minutes (i.e. 5 + 10 n 15 minutes). A minimum of 5 (five) satellites is required.

8) Field Logs and Raw Data: A record of what stations comprised each session, with instrument heights and times of recording, is required. This record should be as brief as convenient. A complete obstruction diagram is not required All raw GPS data as gathered by the receivers must be supplied in digital form in order to allow reprocessing of any or all the data if so required.

9) Ambiguity Resolved (Fixed) Solutions: An ambiguity resolved (fixed) solution must be obtained for each baseline

10) Station Identification: The 9 digit COSINE number should be employed for all submissions associated with the project. Raw data, pre-processed baselines, input and output adjustment files, etc., should consistently reflect this numbering system.

STANDARDS FOR VERTICAL CONTROL

The intention is to do good third order leveling.

1) All work, both loops and closures with listed elevations, must close within 14mm*√K. The choice of 14mm rather than 24mm is deliberate; all previous Mississauga leveling has been to this standard.

   The required instrumentation is:
   - A digital level of second order standard, with fibreglass rods,
   - Suitable software to download the observations to a text file.
   This choice is also deliberate; it will ensure observations of excellent quality, and eliminate booking errors.

2) Normal precautions for accurate leveling must be taken, e.g: use footplates, equalize back and fore sights, peg-test the level, avoid grazing rays, ensure that at least 80% of the rod is read.

3) All lines should either start or close on two points of known elevation (i.e. at least three known points will be involved). In no case whatever may any part of the new work be based only on one point. Connections should be made to any nearby known point.

   Standard No. 2700.014 shows an acceptable network. Note that 6 is fixed by a loop; it would not be acceptable simply to run from 2 to 6 and back. It is supposed that there is no known point near to 6.

4) All work must be adjusted in a least squares program such as MANORV. This is will ensure that all observations have been used in a systematic way. The Manufacturer's software may contain an acceptable adjustment program.

   The submissions must include:
   -Text file of unadjusted observations, including peg tests.
   -Traverse and Loop closures
   -Least squares adjustment, with residuals and final coordinates
   -Plan of the Network-Report and Analysis
   -The full station or benchmark number should be used throughout.

ADDITIONAL SPECIFICATIONS

1) All Monument locations are to be chosen by the contractor and reviewed with the City Surveyor prior to installation.

2) Station Number:

   a) Station numbers will follow the conventional method used for horizontal control. Numbers shall be composed of the City's number (075), followed by two digits comprising the year, and followed by a sequential four-digit number as assigned by the City.

   b) The full nine digit number shall be stamped onto the brass cap prior to placement in the concrete base and will meet the approval of the City Surveyor.

3) A concise but accurate written description is to be mad for each new Control Monument. Each description should (where applicable) refer to the following items:

   a) Distance along street lines from the centre-line of the nearest intersecting street. This distance should be within 3 metres (+/-) of the actual distance in built-up areas and within 15 metres (+/-) in rural or undeveloped areas.
   b) Street name, side of street, municipal number, type of structure, name of structure.
   c) Precise location of plate (horizontally and vertically) on the structure.
   d) Other pertinent information deemed necessary to precisely identify the location of the Monument.

4) Reference Standards - each station position shall be referenced in such a manner that the stations original position can be re-established for subsequent control surveys.

   a) A minimum of four reference ties, both angular and linear, will be taken to permanent, stable, nearby structures, or objects. The reference ties shall be chosen to best form a square around the monument and the accuracy shall be to the nearest 10 seconds of arc and to the nearest millimetre.
   b) A photo point shall be tied in with both azimuth and distance. Examples include: sidewalk intersections, fire hydrants, poles, etc.
   c) Where there is a lack of suitable structures or objects, Standard Iron Bars, one inch square by four feet in length, will be installed as reference points.
   d) The reference ties and the photo point are to be shown on the monument location sheets.

5) Prime consideration is to be given to the following items when choosing Monument locations:

   a) Ease of accessibility.
   b) "Clean" sight line to adjacent street. Present and possible future obstructions (i.e. shrubbery) are to be considered.

c) Private residential houses are to be avoided, except in the most extreme cases. Where private residences are being considered, written permission must be obtained from the owner prior to installation.
d) Where possible, Monuments are to be located on public structures (i.e.: bridges, culverts, traffic signal bases, public buildings, retaining walls or other stable brick or concrete structures.
e) In certain cases, commercial (i.e. plazas) or industrial buildings or structures will be allowed.

6) Station Location Sheets

a) All GPS station information will be recorded on City of Mississauga Horizontal Control Monument Record sheets (Standard No. 2700.010).
b) There sheets will form part of the final report.

7) All final Bench Mark elevations are to be presented in both metric and imperial units, and are to be referred to the City of Mississauga (not geodetic) datum, with a note outlining the correlation between the current geodetic and Mississauga datums.

8) Before starting a line of levels, a stability test is to be performed on the starting Bench Mark.

FINAL REPORTS

Final returns shall include, but not necessarily limited to the following:

1) Copies of all field observation notes.

2) Survey report (including procedures used and error analysis summary).

3) A sketch on the supplied copies of Z-area maps showing the Control run and connections made.

4) Monument location descriptions listed by Control/Bench Mark number and Z-area, together with the corresponding date (co-ordinates, elevations).

5) The Contractor shall make available any information requested by the City to facilitate in the completion of the project.

6) In bound book form (2 copies), the following will be included:

- Introduction
- Key map with GPS stations
- Index
- Name of contact person at City and the Contractor
- Description of survey procedure and equipment used
- Description of data anaylsis, computations and software used

- Quality control checks performed on data
- Daily log sheets
- Station visibility sheets
- Station location sheets
- Least squares adjustment methods

7) In bound form (2 copies each) the following:

- GPS stations with NAD 83 coordinate values
- GPS stations with NAD 27/74 adjustment coordinate values
- All final benchmark elevations are to be presented in both metric and imperial units, and are to be referred to the City of Mississauga (not geodetic) datum, with a note outlining the correlation between the current geodetic and Mississauga datums.

The note should read:

CAUTION: To obtain geodetic elevations (1978 G.S.C. Re-adjustment), Subtract 0.121 m (0.397 [1]) from the values shown herein

QUALITY CONTROL

1) The City shall have the right to participate in the performance of the survey to ensure compliance with the Proposal.

2) It will be up to the Contractor to perform and prove any quality control checks necessary on the data for acceptance by the City.

OWNERSHIP OF MATERIAL

All raw data produced by the Contractor, and any other materials produced in conjunction with the Contractor, or supplied to the Contractor, by the City, shall be the sole property of the City, and will be returned to the City.

PROTECTION OF SURVEY MONUMENTS

General

Survey monuments are meant to provide lasting physical evidence of boundaries shared by adjacent land owners. Ontario regulations require that they be set by Ontario Land Surveyors (OLS) at all property corners and at regular intervals on boundaries.

SURVEY MONUMENT DEFINITION

A survey monument is a Standard Iron Bar (SIB), Short Standard Iron Bar (SSIB), Iron Bar (IB), Iron Tube (IT) or Cut Cross (CC) set on or witnessed to a boundary limit for property, right-of-ways and easements.

SIB – iron or steel bar, 25mm square, 120 cm long.
SSIB- iron or steel bar, 25mm square, 60 cm long.
IB- iron or steel bar, 16mm square, 60 cm long.
IT – round solid or hollow iron or steel tube –between 16mm to 22mm in diameter, 60 cm long.
CC – "X" marking etched into a hard surface such as a concrete sidewalk, concrete retaining wall, or concrete curb.

Other monument – any other object which would represent substantial compliance within the meaning of section 10(2) of the Standards of Surveys, 4th Edition, published in 1987 by the Association of Ontario Land Surveyors.

OLS – Ontario Land Surveyor with Valid Certificate of Authorization

PROTECTION

At the City Surveyor's discretion, prior to the commencement of construction, the Contractor's OLS shall locate on site those survey monuments that delineate or fall within the Working Area and may be used to lay out the Work, all as shown on the Contract Drawings. These survey monuments shall be protected by highly visible T-bars or 0.9m tall stakes with survey ribbon set near but no closer than 0.3m of them. Survey monuments shall be inventoried by the Contractor's OLS showing location, condition and monument details in a report format required by the City. Any survey monuments that must be removed to facilitate the Work shall be identified as such as agreed by the City and the Contractor and noted in the inventory report. The Contractor shall be responsible for the preservation of all survey monuments while the Work is in progress, except those Survey Monuments identified as needing removal to facilitate the Work. All Survey Monuments disturbed, damaged or removed by the Contractor's operations shall be documented in the inventory report and replaced by the Contractor's OLS. Survey Monuments removed to facilitate the Work, shall be replaced at the City's expense and all others shall be replaced at the Contractor's expense.

Estimates for the survey work are to be included in the bid package as a separate item.

The Survey Monument Inventory Report shall include as a minimum:

- Contract Number, Contractor Name, Project Manager;
- Project/Site construction limits;
- Location, type, condition of each Survey Monument before and after construction;
- Reference ties and any other information that the OLS may deem important; and
- A summary of those monuments affected by the Work and how they were reset or replaced and by what type of monument.

At the completion of major project works, when no further adverse impacts to the survey monuments are expected, the Contractor's OLS shall complete and sign the report and submit it to the Project Manager and to the Contractor for filing purposes.

012 HYDRO-VAC PRESSURIZED WATER VACUUM EXCAVATION

Under this item the Contractor shall supply a Hydro-Vac Pressurized Water Vacuum System for the excavation of test pits as directed by the Project Manager. The Hydro-Vac can also be used where work area is deemed unsafe to work in by other mechanical methods due to underground utilities.

It is the responsibility of the Contractor to obtain all utility locates prior to performing work.

DURATION

This item shall be the actual working time of the unit on site. Any set up time is to be included under Mobilization.

MOBILIZATION

The mobilization of the unit shall include all travel time from company to job site and back, set up time, clean up and disposal of the excavated material off site.

The Contractor is responsible for a safe disposal of the excavated material off site.

BACKFILL

The Contractor shall be required to backfill the excavated area with Granular C compacted to 95 percent maximum dry density.

METHOD OF PAYMENT

The payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices.

013 TREE AND SHRUB PROTECTION

DESCRIPTION

General Requirements: Furnish all labour, materials and equipment necessary to provide protection for existing trees, shrubs and other plant materials for those areas as directed by the City's Arborist.

MATERIALS

- Pruning Shears - clean, sharp secateurs of suitable size to facilitate clean removal of limbs
- Pruning Saw - clean, tree pruning saw of suitable size to facilitate clean removal of limbs
- Chain saw

TREE AND OTHER PLANT MATERIAL PROTECTION

Tree and shrub protection fencing (solid or framed hoarding, page wire, moduloc) is to be installed around the dripline of trees and shrubs that are to be protected within the limits of construction as directed by the City's Arborist.

Confine construction activity away from natural areas or outside drip line of trees.

Prior to the commencement of construction, prune limbs that maybe negatively impacted during construction utilizing the above noted tools/equipment. Where directed by the City's Arborist, prune cleanly the roots of existing trees that are anticipated to be disturbed by excavation. Pruning should be carried out as specified in OPSS 503 or by an ISA certified arborist.

Protect all trees and shrubs that are to be retained within the limits of construction by installing protective fencing as directed by the City's Arborist.

Where directed by the City's Arborist, the Contractor shall make good all damage caused to the areas surrounding plant materials, including replacing damaged or destroyed plant materials, to the satisfaction of the City's Arborist.

Do not stockpile material within the drip line of trees or shrubs to be retained.

Do not allow traffic, vehicles or equipment to compact soil within the drip line of trees or shrubs to be retained.

Do not cut tree roots. Tunnel under or around roots by hand digging to prevent damaged to roots.

Do not raise or lower grades within the drip line area of trees that are to be protected.

102 MATERIAL DELIVERY TICKETS

In addition to the requirements of OPSS 102, the following shall apply for the Corporation:

102.06.02 Platform Scales

Subsection 102.06.02 of OPSS 102 is amended by the addition of the following:

The platform scale shall be equipped with a direct cable connection of the computer for the purpose of sending mass measurements.

A printing device connected by direct cable connection to the computer shall be capable of electronically producing, in black print only, tickets conforming to the requirements specified in this special provision.

102.07.01 Mass Measurements

Subsection 102.07.01 of OPSS 102 is deleted and replaced by the following:

The Contractor shall provide personnel to conduct the mass measurements. The mass measurements shall be sent to the printing device using a print command on the computer. Any form of override of the printing process, except total transaction rejection, will not be allowed.

The system shall be capable of detecting vehicle overloads, and of automatically signalling overload occurrence to the system operator. Tickets shall be supplied by the Contractor.

Each weight ticket shall contain the following:

a) licence plate number of unit(s)
b) time and date of transaction
c) Owner
d) project number
e) type of material
f) source of material
g) gross weight
h) overload notation
i) running total of each material
j) a place for the checker to sign

For each contract, the following reports shall be produced daily:

- truck register, including allowable gross weight forms, for all vehicles;
- truck tare report for all vehicles, including old and new tares, and time recorded;
- summaries for each type of material;
- summaries for all cancelled loads.

The above report reports shall be available for the City's representative to pick-up at the end of daily operations or before start-up the following day.

A sample weigh ticket from each source must be supplied to the Project Manager two weeks prior to delivery of the material.

201 CONSTRUCTION SPECIFICATIONS FOR CLEARING, CLOSE CUTTING CLEARING, GRUBBING, REMOVAL OF SURFACE BOULDERS, REMOVAL OF PILED BOULDERS AND MECHANICAL STUMP CUTTING

In addition to the requirements OPSS 201, the following shall apply for the Corporation:

201.01 SCOPE

This specification covers the requirements for removing and disposal of trees, stumps, bushes, roots, embedded logs, fallen timber, wooden poles, surface boulders and other debris and surface litter. If any trees are to remain, that decision will be made by the Project Manager in the field and cost to protect these trees shall borne by the Contractor. Trimming and pruning of existing trees or vegetation and the relocation of small trees or vegetation may be required and shall be included under the cost of this item.

201.03 DEFINITIONS:

The definition for clearing as indicated within OPSS 201 shall be replaced with the following:

CLEARING: Meaning the cutting, removal and disposal of all trees not designated to be saved, stumps, bushes, and fallen timber within the proposed right of way for the Contract limits.

201.07.02 CLEARING AND GRUBBING

The following shall be in addition to clearing and grubbing OPSS 201.07.02. The Corporation will mark trees designated for removal. The Contractor must not begin the removal operation until this has been completed and he has notified the Corporation in writing 48 hours in advance of commencing.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

206 CONSTRUCTION SPECIFICATION FOR GRADING

EARTH EXCAVATION

The quantities for this item have been calculated on a cubic metre basis derived from survey data base and theoretical cross-sections. The excavation items include boulevard, sidewalk, driveway and road excavation including all asphalt indicated on the contract drawings, and excavation of asphalt and granular areas back of the proposed curb. It shall also include all necessary blending works. Excavation for soft spots encountered **prior** to granular placement will be paid at the unit rate of excavation multiplied by the measured volume of soft spot excavation. The unit rate of excavation will be obtained by dividing the lump sum amount bid for Earth Excavation, by the theoretical cut. Curb, sidewalk, or concrete median slab removal is not to be included as part of this item but rather is to be measured and included as per OPSS 510.

The theoretical quantity of excavation may be checked by cross-sections to be taken by the Corporation during excavation and may require slight adjustment to reflect actual excavated quantities. The only other adjustment to be made from the theoretical quantity based upon cross-sections taken by the Corporation would be the result of the Project Manager introducing changes that cause an increase or decrease from the theoretical quantity of excavation. Any increase or decrease from the theoretical quantity of excavation will be paid at the unit rate of excavation multiplied by the measured volume of additional or reduced volume of excavation. The unit rate of excavation will be obtained by dividing the lump sum amount bid for earth excavation, by the theoretical cut.

The soils report and cross-sections will be made available to the Contractor for viewing upon request. The native soil has not been tested, analyzed or classified for landfill or lakefill disposal. It shall be the Contractor's responsibility to find suitable disposal sites for all excavated materials regardless of haulage distances, dumping fees or the degree of contamination of the material at no additional cost to the City. The City will conduct limited chemical testing during their geotechnical investigation on the soil for disposal purposes. The testing will be limited to common elements of the guidelines and Petroleum Hydrocarbons; F1, F2, F3 and F4, along with Benzene, Toluene and m/p & o-Xylenes. These results will be compared to the guidelines set out in the Ontario “Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (2004). If required or requested the City will conduct additional chemical testing on the soil.

The Geotechnical (Soils) report includes a summary of all subsurface exploration data. This includes the subsurface profile, exploration logs and ground water information. Where the borehole logs indicate the presence of shale or rock, it is noted that this data is representative of the subsurface profile at that location only. Due to the nature of the Shale Strata, subsurface profile elevations can vary. The logs should be used as a guide only. The contractor shall satisfy/verify themselves of the actual subsurface conditions. There will be no extra payment for rock/shale excavation.

The Contractor will be required to assume all risks arising from or out of the nature of the material to be excavated and/or disposed of.

All excess or unsuitable material will be arranged by the Contractor to be hauled and disposed of off-site at his expense. Chemical analysis will be provided by the City.

206.3 DEFINITIONS:

The definition of Earth shall be replaced with the following:

EARTH: Means all soils, and any other material to be excavated including rock and shale as well as asphalt pavement with required sawcutting.

ASPHALT REMOVAL: Means all asphalt surfaces including roadways, splash pads, pathways and driveways regardless of thickness.

206.07.01.04 DISPOSAL OF SURPLUS OR UNSUITABLE EXCAVATED MATERIAL:

This section shall be replaced with the following:

Surplus or unsuitable excavated materials shall be disposed of outside the construction limits at points arranged and paid for by the Contractor. The Contractor shall comply with the requirements of the Ministry of the Environment, Corporation of Mississauga, Region of Peel, the Project Manager and any other authority having jurisdiction. The Contractor will be responsible for any damage to the streets used as haul roads.

The Contractor shall not deposit excess or unsuitable excavated materials on private property until he submits to the Project Manager an agreement between the property owner of the private lands and the Contractor which states:

(a) The condition whereby the agreement was made;

(b) The location of the lands covered by the agreement;

(c) The Contractor's agreement to neatly level the area filled;

(d) The property owner and Contractor ensure that no obstruction to a watercourse or floodplain will occur and that there will be no damage to adjoining or other property;

(e) The property owner and Contractor exonerate the Corporation from all responsibility, liability or claims therefrom.

206.07.03.01 EARTH EXCAVATION GENERAL:

This section shall be replaced with the following:

The work to be done under the item "Earth Excavation and Grading" shall include the following:

(a) hauling, handling and placing, shaping, compacting and trimming;

(b) disposing of any materials, including the provision of disposal areas outside the contract limits;

(c) all excavation, grading shaping and finishing of sub-base;

(d) ditching required within the limits of the project;

(e) excavation of asphalt and boulders regardless of size;

(f) excavation or filling as required to be carried out on private property for the adjustment of private approaches etc;

(g) all required sawcutting of asphalt along trenches, at contract limits and across driveways at the limit of excavation;

(h) all excavation and backfilling as required for gabion installation;

(i) topsoil stripping, removal and disposal within the construction limits shall be a part of this item and the quantity is included in the calculation for cut and fill in the Form of Offer;

(j) any other work necessary to complete this item.

ADDITIONAL EXCAVATION FOR SOFT SPOTS AFTER GRANULAR PLACEMENT HAS OCCURRED

All requirements as indicated in earth excavation shall be applied to this item and also shall be expanded to include the following:

(a) The limits of excavation to be removed and replaced shall be indicated by the Project Manager at the time of construction.

(b) Payment of this item will be based on a measurement of actual volume of material removed.

(c) Disposal of unsuitable material, as directed by the Project Manager shall be included in this item.

(d) The Contractor is required to salvage, stockpile and reinstate salvaged granular materials. Cost for this work shall form part of this item. Any additional granular materials required shall be paid for under road granular items.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

310 CONSTRUCTION SPECIFICATION FOR HOT MIX, HOT LAID ASPHALTIC CONCRETE AND HOT MIX PATCHING

310.10.03 BASIS OF PAYMENT - TACK COAT

Amended by the addition of the following:

The area to be measured for tack coat payment will be surface area of the roadway only. Tack coat applied to curb faces, match joints or any area other than the base asphalt being covered will not be measured for payment but will be deemed to be included in the price paid for top course asphalt.

In addition to the requirements of OPSS 310, the following shall apply for the Corporation:

ASPHALT CEMENT:

All asphalt cement used on City of Mississauga projects shall be Performance Graded Asphalt Cements (PGAC). The grade of asphalt cement shall be in accordance with the latest Superpave and MTO manuals (Ministry Implementation Guideline for Selection of Performance Graded Asphalt Cement (PGAC)) and specifications.

The grade of asphalt cement with up to 20% RAP shall be PG 58-28. Asphalt mixes containing between 21% and 25% RAP shall consist of asphalt cement graded PG 52-34. No asphalt mix shall contain more than 25% RAP. No surface course asphalt mixes or any Heavy Duty Binder asphalt mixes shall contain any RAP. For any HL8 HS/HDBC, HL1 mixes PG 64-28 asphalt cement shall be used. For all arterial and collector roads unless otherwise specified OPSS 1101. The average cement content of all laboratory's testing, whether from the City's consultant's laboratory, supplier's lab, or a combination of both, shall be no lower than the submitted Job Mix Formula.

Road classifications and uses will dictate the grade of asphalt cement used on each project and be in accordance with the Superpave manuals (ie. upgrading the grade of PGAC to accommodate increases in heavy traffic and temperature). If PG grades other than those specified above are required, the grades will be specified elsewhere in the contract. The price for the supply and placement of hot mix, hot-laid asphalt under this item shall include the cost of asphalt cement that is to be incorporated in the above items.

ASPHALT MIX DESIGNS:

The Contractor is required to submit an asphalt mix design confirming to OPSS 1150 (2010). The Contractor shall submit a certificate with the mix design showing that the PGAC complies with the current MTO test requirements for the grade or grades to be used. Any mix design containing RAP shall conform to OPS Specification 1150. Heavy Duty Binder Course shall comply with OPSS 1150(2010).

The mix design shall have a minimum asphalt cement content of 5.0% for any HL-8 asphalt mix and for any HL8/HDBC mixes. All HL-3 asphalt mixes shall content a minimum of 5.30% asphalt cement. All mixes that are placed shall meet the acceptable requirements outlined in this specification.

The Corporation reserves the right to make modifications to the proposed design if deemed necessary.

In the event that the material changes, the Contractor is required to resubmit the mix design based on the current material used in the mix, a minimum of four (4) working days prior to planned paving operations.

ASPHALT PLACEMENT:

The Corporation does not accept cold, longitudinal asphalt joints; therefore the spreader must be in the process of backing up once the temperature at the start of the joint (day's paving) is a minimum of 90^0C. The Corporation reserves the right to alter the Contractor's approach to the job, such that it accommodates the quality of the pavement over the productivity of paving.

Binder courses shall not be placed unless the air temperature at the surface of the road is a minimum of 2^0C and rising. Surface courses shall not be placed unless the air temperature at the surface of the road is a minimum of 7^0C and rising.

Any roadway greater than 14 meters in width, is to be paved utilizing Material Transfer Vehicles (MTV's). The through lanes along the roadway shall be paved continuously, in echelon with two or more pavers. Turn lanes or other lanes must be paved separately with another spreader and crew, or at a time other than the main-line laneways. The supplier shall be capable of producing a minimum of 150 tonnes per hour per spreader to ensure paving operation is continuous. All material shall be delivered to the paving operation within 45 minutes after loading at the plant.

TACK COAT:

Tack coat shall be applied to all surfaces at the manufacturer's recommended rate to provide uniform coverage. The tack coat shall be applied to all ground asphalt surfaces if the ground surface has been exposed for more than 48 hours.

ASPHALT TESTING:

For each day of paving (8 hours per day) a minimum of two asphalt samples will be taken for testing by the Corporation's representative to determine the asphalt cement content, aggregate gradation and/or other Marshall Properties.

The test results will be used to determine the acceptability, cost adjustment or the rejection of the asphalt area or mass placed. The Corporation will arrange with the Corporation's material testing consulting engineers to take the field samples for testing and the Contractor is advised ion to Section 351.07.10.04 "Expansion Joints" of OPSS 351:

> "Full Depth expansion joints shall also be constructed where the sidewalk abuts a rigid object, changes direction or between concrete pours. Expansion joints shall also be installed every 6 m along the sidewalk. Refer to City Standard 2240.010. Expansion joint material shall be used to isolate any pole or other rigid object located within the sidewalk".

351.07.13 COLD WEATHER CONCRETING

COLD WEATHER

Conditions as per OPSS 904 shall apply when the air (shade) temperature is at or below 5^0C. It is also considered to exist when the air temperature is at or forecasted to fall below 5^0C within 96 hours (4 days) after concrete placement.

Section 351.07.13 "Cold Weather Concreting" of OPSS351 is amended by the addition of the following:

1. In the case where the contract is scheduled to be completed **PRIOR to November 1st**

   If the completion date extends beyond November 1st as a result of City of Mississauga requests for additional work, strike delays, unusual/unexpected weather delays and an approval letter has been sent to the contractor approving a time extension:

   Then the contractor **WILL** be allowed to submit a claim for actual additional costs incurred including winter heating of the concrete to be supplied to the project.

   If the completion date extends beyond November 1st but no schedule extension has been approved:

   Then the contractor **WILL NOT** be allowed to claim for additional costs for cold weather concreting.

2. In the case where the contract is scheduled to be completed **AFTER November 1st**

No Additional compensation will be made to the contractor for cold weather concreting.

HOT WEATHER

All provisions of OPSS 904 apply during the production and placement of concrete during hot weather.

Hot weather concreting is considered when the shade temperature is at or above 28º C or if the temperature is at or likely to rise above 28º C within 24 hours of placement. The maximum ambient air temperature for placing concrete is 32^0C.

Curing shall be applied (curing compound or burlap) to all exposed surfaces as soon after the texturing operation as can be achieved, typically 2 to 4 metres behind the finishing operation.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

353 CONCRETE CURB GUTTER SYSTEMS

OPSS 353 shall be expanded to include the following:

Drop curb sections are to be constructed at all driveway and pedestrian crossings as indicated on the drawings. Minor changes may be undertaken in the field and will be staked out accordingly. In order that individual properties do not have a variation of curb sections, the Contractor will be required to match each type of barrier curb presently found on the property concerned.

A minimum of 75 mm of granular is to be installed under the curb in all cases.

Where specified in the Form of Offer, high early strength concrete shall be produced using Portland Cement – High Early (HE). Industrial curbs shall have an increased depth of 50 mm and use High Early concrete.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

405 PIPE SUBDRAINS

OPSS 405 shall be amended as follows:

Section 405.10 "Basis of Payment" to be removed and replaced with the following:

This specification covers the requirements for labour, equipment, and material, earth excavation, shoring, sheeting, bracing, and dewatering. Connection to catchbasin or manholes and for handling, placing and trimming and disposal of excess material and for supplying, placing and compacting of granular bedding and granular material up to the roadway sub-grade elevation as indicated in the City of Mississauga Standard Drawing 2220.04 for the installation of the subdrain including corrugated steel pipe outlets where applicable.

407 CONSTRUCTION SPECIFICATION FOR MANHOLES, CATCHBASINS, DITCH INLETS AND VALVE CHAMBERS

In addition to the requirements of OPSS 407, the following shall apply for the Corporation:

407.05 MATERIALS

Catchbasin grates supplied and installed by the Contractor shall be either McCoy Foundry Company "Heavy Duty Fish Type Catchbasin Cover" or Bibby-Ste. Croix "Envirograte" or approved equal.

407.07.14 BENCHING AND CHANNELLING

All structures covered under this specification will have the required benching and channelling placed as part of the installation of the structure. The cost of this work is included in the appropriate item in the Schedule of Quantities and Unit Prices and no additional compensation will be considered for this work.

CATCHBASIN CLEANING

Catchbasins (including ditch inlets) are to be cleaned and cleared of **ALL** construction debris (granular, concrete, asphalt) after each stage of construction; and no later than 24 hours after top asphalt placement. Should any flooding concerns arise at any time during construction due to blocked catchbains, the Contractor will be responsible.

It is the responsibility of the Contractor to pre-inspect **ALL** catchbasins within the limit of work and advice the Project Manager or Inspector of any existing debris concerns PRIOR to start of construction. Taking pre-construction pictures of catchbasin conditions is suggested.

Any and all debris is to be removed, so that the catchbasin sump and/or the ditch inlet bottom is clearly visible from the top. Catchbasin lids that cannot be opened (due to concrete on the hinges etc.) for inspection will be deducted for payment until such time inspection can occur.

In the event that the Contractor fails to clean the catchabsins, arrangements will be made to have the City of Mississauga forces clean the catchbasins subsequent to the Contractor's site work, with all incurred costs to complete the work charged to the Contractor.

RELOCATED CATCHBASINS

The unit price for the relocation of reclaimed catchbasins shall include any required modification to re-fit the lead opening.

410 CONSTRUCTION SPECIFICATION FOR PIPE SEWER, CONSTRUCTION BY OPEN CUT METHOD

In addition to the requirements of OPSS 410, the following shall apply for the Corporation:

a) The Contractor shall include in the price bid per linear metre of sewer laid, the excavation, the supply, installation and compaction of Corporation of Mississauga "Sand Cover" Standard Drawing 2112.10 material from the top of the pipe bedding to the roadway sub-grade elevation. This granular material shall be compacted in 300mm lifts to 95 percent maximum dry density. The cost of the above will be included in the unit prices bid in the Form of Offer.

b) Settlements that occur in the roadway, over the sewer trench, during the maintenance period, will be repaired at the Contractor's expense.

c) When water services are required to be lowered under the proposed sewer by the Contractor, the work is to be carried out to the satisfaction of the Region of Peel. If any water services are found less than 1.7m under the final grade of the centre line of the road, these services shall be lowered from curb to curb to provide the 1.7m cover.

d) The Contractor is informed that the cost of breaking into existing culverts or manholes and making good with all new sewer and lateral installations will be included in the unit prices as noted in the Form of Offer. No additional payment will be considered for this work.

e) The Contractor shall include in the price bid per linear metre of storm sewer laid, the supply and installation of Class 'B' bedding unless otherwise specified.

f) The supply and installation of poured-in-place manhole bases will only be permitted with the approval of the Project Manager.

g) Providing for all necessary brick bulkheads where existing sewer and lateral systems are rendered obsolete or abandoned will be included in the unit prices in the Form of Offer for storm sewer and roadway construction. No additional payment will be considered.

h) The unit prices noted in the Form of Offer shall include all labour, equipment and material to provide sawcutting, close sheeting, certified steel box and dewatering of the trench, as required during the construction and backfilling.

i) Polyvinyl Chloride (PVC) storm sewer pipe may be substituted for concrete pipe for pipe diameters up to and including 600mm provided the PVC pipe proposed complies with OPSS 1841 and C.S.A. Standards for pipe molded and fabricated fittings materials.

j) The Contractor will arrange for a video inspection of all main line storm sewers 900mm in diameter and under within ten (10) working days of the installation of each applicable section of storm sewer. A copy of the video tapes is to be provided to the Project Manager within fifteen (15) working days of sewer installation. All costs incurred will be borne by the Contractor.

k) The Contractor will arrange for cleaning of all catchbasins prior to the acceptance of the work. The Contractor will also flush all main line sewers, if deemed necessary by the Project Manager.

METHOD OF PAYMENT

Payment shall be made at the respective unit prices as noted in the Form of Offer, and shall include all of the above mentioned conditions in addition to those found in OPSS 410.10.

411 POLYVINYL CHLORIDE (PVC) STORM SEWER PIPE

Where it has been approved by the Director of Engineering and Works that PVC pipe may be substituted for the designed concrete pipe, the following requirements must be adhered to.

A) GENERAL

All PVC pipes shall be handled, unloaded and stored in accordance with the manufacturers' specifications.

1. Mannings 'n' that will be used for the sizing PVC pipe shall be 0.013. The Mannings 'n' that will be used to determine velocity and time of concentration is 0.009.
2. Pipe Manufacturer must be approved by the Director of Engineering and Works.
3. Maximum allowable deflection of main line sewer is 5%. Deformation gauge (Pig) test will be required prior to acceptance.

B) PIPE SPECIFICATIONS

Pipe shall meet with Canadian Standard Association requirement as noted within OPSS 1841. The basic material used in manufacturing of this pipe shall have a cell classification of 12454-B or 12454-C or 12364-C as defined in ASTM Standard D-1784.

C) MOULDED AND FABRICATED FITTINGS

Molded and fabricated fittings shall conform with requirements of CSA Standard B-182.1, B-182.2 and B-182.4 or ASTM Standard D-3034 and OPSS 1841.

D) MAXIMUM PVC PIPE SIZE

Maximum PVC pipe size that will be allowed to be installed shall be 600mm diameter.

E) BEDDING FOR PVC PIPES

Bedding for all PVC pipes shall be in accordance with City of Mississauga Standard Drawing 2112.08 "Class B". The sand cover shall conform with City of Mississauga Standard Drawing 2112.10. The compaction of all bedding and cover materials shall be 95% Standard Proctor or better. Maximum cover shall be in accordance with OPSS 806.04 and 806.06. Special care must be given to contouring the bedding material to conform to the pipe bottom and projecting bells, along with proper compaction of the haunches in order to provide even support throughout the pipe. The use of any bedding material or backfill material with diameters larger than 4 cm will not be permitted around any flexible pipe. Backfill shall be placed in accordance with the manufacturers' specifications for flexible pipes and shall be in accordance with OPSS 514.07.08.

F) SEWER SERVICE CONNECTION

Sewer service connection shall be in accordance with OPSS 1006.02.

491 CONTINUAL OPERATION OF EXISTING SIGNALS

In addition to the requirements of OPSS 491, the following shall apply for the Corporation.

The Contractor shall be responsible for the continual operation of the existing traffic signals within the Contract limits. This will be accomplished by one of two methods described below and noted on the Form of Offer.

When it is necessary to abandon, modify, extend or otherwise alter existing underground traffic signal conduit, which contains live traffic signal cable, the Contractor shall make provisions for temporarily abandoning the existing signal equipment or portions thereof by placing such equipment overhead as directed by the Project Manager.

This may include, but not limited to, the following works performed at the unit prices noted in the Form of Offer.

PARTIAL TEMPORARY SIGNAL INSTALLATION

A) The placement of wood poles including back guys, as directed.

B) The placement of guy span of suitable gauge to support attached electrical conductors.

C) The supply, installation and attachment of electrical conductors to the guy span, including suitable traffic signal cable, ground cable, power service cable and any other cables deemed necessary by the Project Manager.

D) The supply and installation of drop cables from this overhead system to the existing equipment.

E) Place as directed, temporary traffic signal stands to replace existing equipment deemed by the Project Manager as being in the path of construction.

F) Energization of the temporary signal system as per the requirements of SS 622 “Installation of Traffic Controller”.

FULL TEMPORARY SIGNAL INSTALLATION

A) The placement of wood poles including back guys, as directed.

B) The placement of double guy span cable of suitable gauge to support attached electrical conductors and signal heads.

C) The supply, installation and attachment of electrical conductors to the guy span, including suitable traffic signal cable, ground cable, power service cable and any other cables deemed necessary by the Project Manager.

D) The placement of used signal heads supplied by the Contractor on the guy spans, as directed.

E) Energization of the temporary signal system, as per requirements of SS 622 "Installation of Traffic Controller", shall be paid at this unit price as compensation for cable splicing, connection, testing and police assistance during intersection downtime.

In addition, the lump sum bid price shall be paid to compensate for all other labour, equipment and material required to complete the intersection. This will include, but not be limited to, the provision of aerial junction boxes, duct risers, span hangers, ground plates, back guys to wood poles, pushbuttons and signs, fibreglass insulating rods, associated hardware, and other aerial equipment and where possible, as per the Project Manager's direction, maintain communications to the existing traffic controller.

For the purpose of bidding, it shall be assumed that each temporary signal head shall be relocated along the spans twice, during the course of construction. In the event that a partial temporary is used, the assumption is that the cable feed to the signal heads will be relocated once, from the signal head originally connected to a temporary or permanent signal head requiring energization. All labour, equipment and material required to perform this task shall be included in the bid price.

All equipment supplied, in accordance with this specification, will remain the property of the Contractor. The Project Manager reserves the right to reject used equipment deemed not suitable. The Contractor shall be required to remove the temporary signal installation upon completion of construction at the direction of the Project Manager.

Notwithstanding the ownership of this equipment when in service, the Corporation reserves the right to perform, or have performed, any emergency maintenance deemed required by any appropriate authority.

510 CONSTRUCTION SPECIFICATIONS FOR DEMOLITION AND REMOVAL OF STRUCTURES

In addition to the requirements of OPSS 510, the following shall apply for the Corporation:

The Contractor shall remove all structures as directed by the Project Manager and these structures so removed shall, if deemed reasonable by the Corporation, be returned to the Works Yard otherwise will be disposed of off-site.

Where directed by the Project Manager, sawcutting the structure shall be included in the removal costs.

510.07.03 DISPOSAL OF DEBRIS

Delete

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

602 HANDWELLS

In addition to the requirements of OPSS 602, the following shall apply for the Corporation:

A) SUPPLY AND INSTALLATION OF HANDWELLS

The Contractor shall supply and install all materials, equipment and labour required to undertake the installation of 25MPa, Ready Mix concrete Sonotube handwells as indicated on the Form of Offer, noted on the Contract Drawings and directed by the Project Manager.

Handwells shall be installed in accordance with the latest OPSD 2112.01 and 2112.02.

The Sonotube form on the inside of the handwell shall be removed by the Contractor once the concrete is set.

Backfilling and compacting shall be in accordance with the MTO OPSS 514.

The Contractor may, at his discretion, supply and install pre-fabricated concrete handwells which conform to this specification. Unused stub-outs provided in such handwells shall be capped to prevent the entry of foreign material.

All ducts entering the handwell will be an exact fit, or grouted to provide for an exact fit.

The bid price for this item shall include the disposal of the excavated material by the Contractor.

B) REPAIR OF EXISTING HANDWELLS

The Contractor shall provide all labour equipment and material required to restore existing handwells, at the discretion of the Project Manager. This will include but not be limited to the removal of dirt and debris, water and other foreign objects as well as parging of minor cracks and conduit entrances and ensuring the secure fit of covers, and grounding of frame and lids to handwells.

C) REPLACEMENT OF EXISTING HANDWELLS

The Contractor shall provide all labour, equipment and material required to replace existing handwells at the discretion of the Project Manager. This will include but not be limited to the removal of the existing handwell and the placement of a new handwell having regard for all existing conduit, fish rope and cable which had been accommodated by the original handwell. New rings and covers shall be provided as well as granular base for drainage.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

603 UNDERGROUND CONDUIT FOR WIRING

In addition to the requirements of OPSS 603, the following shall apply for the Corporation:

A) SUPPLY AND INSTALLATION OF UNDERGROUND CONDUIT

The Contractor shall supply and install the size of rigid PVC duct indicated on the Contract Drawing or as directed by the Project Manager and according to specification drawings.

The Contractor shall supply and install sufficient PVC duct of a suitable diameter on all existing wooden or concrete utility poles so as to ensure the adequate protection of the conductor wire.

All conduits shall be located to a depth of 1m below the finished road or boulevard grades. Duct joints shall be made with the use of sleeves which will permit a smooth joint between ducts. All joints shall be made waterproof by means of coupler and sealants. Wherever possible, ducts shall be brought into handwells at right angle to each other and to the walls of the handwells. The Contractor shall supply and place through each duct crossing nylon fish cord to OPSS specifications.

The contractor is advised that no specific disposal site has been identified for materials surplus to this project. Therefore, it will be the contractor's responsibility to arrange for a suitable disposal site(s) for all removals, excess and waste materials generated by the work of this project. There will be no extra payment to the Contractor for the cost of disposing material off-site.

All conduit placed shall contain A.W.G. #6 Green Insulated Ground Wire to serve as tracer wire all locations which are not to be signalized immediately, and to serve as ground wire for those locations which are in the process of being signalized.

Any unit price noted in the Form of Offer for A.W.G. #6 Green Insulated Ground Wire will apply only to those locations where the contractor is required to provide such cable in Existing Conduit, previously installed without such cable. Otherwise the provision of this cable is deemed to be a provision of the Conduit installation.

The Contractor shall be required to supply and install yellow plastic "caution" tape in all trenches created to place traffic signal conduit, approximately 300mm above the conduit. This provision shall be included as part of the unit price for the supply and installation of the various sizes of the conduit noted in the Form of Offer.

Backfilling and compacting shall be in accordance with MTO OPSS 514.

Quantities noted on the Form of Offer are scaled from the PR-M-125 drawing and are approximate. Depending on final pole and handwell locations, these dimensions may vary. Actual measurements will be taken for payment purposes.

All PVC duct is to be manufactured under strict quality control in accordance with Canadian Standard Association, Standard C-22, #136-1966.

At no time shall carbon be used in this contract.

i) Boulevard - Various Diameters

The Contractor shall include in the unit price bid for boulevard conduit, all labour equipment and material required to restore the boulevard to pre-construction conditions. This will include, but not be limited to, the replacement of any broken, cut or disturbed sidewalk bays, asphalt splash pad or sidewalk, and the restoration of topsoil and sod. **Under no circumstances will seeding or hydro seeding be considered as suitable restoration for grassed areas.** All sodding shall be completed upon replacement and proper compaction of acceptable native materials and topsoil and shall be keyed into the existing established sod.

ii) Road Crossing

The Contractor shall indicate a price for providing Conduit across the travelled portion of the roadway. The price bid shall include all traffic control considerations in compliance with MTO standards OPSS 514 and the standards of the Corporation and the restoration of the road surface to standards established in the Instructions to Bidders.

The Contractor shall employ a Directional Boring Method of installation for all road crossing.

Where directional boring methods are used the Contractor may propose the use of Schedule 40 High Density Polyethylene duct, as supplied in either coils or straight lengths. A sample of this conduit shall be provided to the Project Manager at least 48 hours prior to its proposed use. No additional compensation will be considered for the use of this material in this manner or under these circumstances.

When utilities are encountered during the placement of conduit in the boulevard areas it will be the responsibility of the Contractor to expose and safely cross these utilities as necessary.

An additional 6m at the unit price noted in the Form of Offer will be paid per road crossing as compensation for gradual vertical placement of conduit beyond the travelled portion.

The Open Cut Method shall only be used when the Project Manager is satisfied that the Boring Method is not practical, due to location specific considerations, including ground condition and utility location.

Restoration of open cuts will be to current City Standards and Standard Drawing.

The unit price bid shall be paid regardless of the method of installation.

iii) Additional Conduit

The Contractor may be directed by the Project Manager to supply and install an additional 100mm PVC conduit in any road crossing constructed. This conduit will be brought into the handwells and contain A.W.G. #6 Green Insulated Ground Wire, and a fish cord.

B) REPAIR OF EXISTING UNDERGROUND CONDUIT

i) Boulevard

The Contractor may be required to repair existing U/G conduit found damaged in the boulevard areas. The Contractor shall be required to identify the locations of these breaks, remove approximately one cubic metre of earth, repair the damaged conduit with one metre of PVC conduit and backfill/reinstate according to MTO OPSS 514. The unit price for this item shall also include the removal and replacement of any fish cord or previously placed cable as required to facilitate the repair.

ii) Travelled Portion

Where repairs are deemed necessary under the travelled portion of the road, they shall be carried out as per paragraph "B(i) Boulevard" above, with consideration being given to additional traffic control and road restoration.

C) VERIFICATION OF UNDERGROUND CONDUIT AND HANDWELLS

The Contractor may be required to investigate the location and verify the condition of any underground traffic signal plant including handwells and conduit, power supply points and facilities. A sketch indicating the location, type, condition, and content of any such plant shall be supplied by the Contractor to the satisfaction of the Project Manager. Any handwells that have been found below grade shall be temporarily protected until remedial action is directed by the Project Manager. Any conduit found not to be continuous, shall be accurately identified on the sketch. The unit price noted in the Form of Offer shall be paid as full compensation for the performance of these works on a complete intersection basis, presuming that such facilities are present on each corner and across each leg of the intersection.

D) CLEARING AND RESTORATION OF UNDERGROUND CONDUIT

The Contractor may be required to remove and dispose of debris, silt, sand or other foreign material from existing underground conduit and handwells, leaving these facilities in a condition suitable for the placement of traffic signal cable. Any existing cable, or fish line shall be removed and replaced. All labour equipment and material

required to perform this operation from handwell to handwell, to the satisfaction of the Project Manager, shall be paid at the unit price noted in the Form of Offer.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

The Contractor shall note that the unit price for Road Crossing shall be paid, from the back of curb to the back of curb.

When a Road Crossing is installed where an existing road is widened, the Contractor shall be paid from the back of curb to the back of curb of the existing roadway.

Conduit installed through a centre island and/or within the centre island shall be paid for using the unit price for Road Crossing.

610 REMOVAL OF EXISTING SIGNAL EQUIPMENT

In addition to the requirements of OPSS 610, the following shall apply for the Corporation:

The Contractor shall be responsible to supply all labour, equipment and material required to completely remove all unused traffic signal equipment. This shall include but not be limited to the removal of signal poles, mast arms, signal heads, pole bases, handwells, control equipment, cable from conduit, all restorations, and removal of existing traffic control signage, at the unit prices noted in the Form of Offer and as directed by the Project Manager as follows:

a) Traffic Signal Pole (6m): The Contractor shall be required to remove all traffic signal arms, heads, signs, pedestrian push buttons and any other attachments, prior to the removal of the pole from the foundation. All salvageable equipment shall be tagged or otherwise marked, indicating the date and location of removal and shall be complete with any mounting hardware included.

b) Traffic Signal Pole (10.5m): The removal shall be as per the requirements of a 6m traffic signal pole and shall include the removal of all streetlighting equipment.

c) Handwells: The Contractor shall provide all labour, equipment and material to eliminate existing handwells of various sizes. This may include the complete removal of the handwell or the removal of the ring and cover prior to backfilling the structure.

d) Pole Footings - Complete Removal: The Contractor shall be required to completely remove and dispose of concrete pole footings as directed by the Project Manager.

e) Pole Footings - Partial Removal: The Contractor shall supply all labour, material and equipment required to break down existing pole footings below grade to a sufficient depth as directed by the Project Manager.

f) Traffic Signal Controller: The Contractor shall supply all labour, material and equipment required to completely remove a traffic signal controller at the direction of the Project Manager.

g) Concrete Controller Footing: The Contractor shall be required to breakdown concrete controller footing and maintain existing communication conduit and cable as per the direction of the Project Manager.

h) Power Pedestal: The Contractor shall supply all labour, material and equipment required to completely remove a power pedestal at the direction of the Project Manager.

i) Traffic Signal Head: The Contractor shall be required to breakdown concrete controller footing and maintain existing communication conduit and cable.

j) Traffic Signal Pedestrian Head: The Contractor shall be required to remove all traffic signal pedestrian heads as directed by the Project Manager.

k) L.E.D. Indications: The Contractor shall be required to remove the existing L.E.D. signal indications and related hardware from the existing traffic signal heads as directed by the Project Manager and return these L.E.D. indications and related hardware to the City of Mississauga Works Yard at 3185 Mavis Road.

l) Removal and storage of existing oversized street name signs is to be carried out by the Contractor at the direction of the Project Manager.

All equipment deemed salvageable by the Project Manager shall be disassembled and delivered to the Mavis Works Yard at 3185 Mavis Road where it shall be placed as directed by the Project Manager. All other material shall be disposed of at a suitable dump site, as approved by the Project Manager, at the expense of the Contractor.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

614 WIRING AND HYDRO HOOK-UP REQUIREMENTS

In addition to the requirements of OPSS 614, the following shall apply for the Corporation:

A) TRAFFIC SIGNAL CABLE, ASSOCIATED CABLE, GROUNDING, AND CONNECTION

All electrical wiring installations must be approved by the Electrical Safety Authority (ESA). Any costs associated or accumulated shall be included in the price bid in the Form of Offer.

As part of the required Electrical Safety Authority (ESA) inspection approval process the Contractor shall be required to coordinate for this inspection approval with the ESA and the cost for this approval will be absorbed by the Contractor.

The Contractor shall supply and install in underground duct and/or overhead, sufficient traffic signal cable to operate this signal installation as per City of Mississauga Standard Drawing 2060.12.

Connections shall be typically completed as per City of Mississauga Standard Drawing 2060.13, but the Contractor shall provide a properly operating signal system.

Cable required to connect the underground cable system to the pole mounted fixtures (riser cable) shall be included in the price bid for the fixture.

Quantities for all other multi-conductor cable shall be calculated from conduit quantities installed and measured in the field.

Streetlighting cables and power service cables shall be measured as operational per lineal metre of trench as opposed to an “Off the Reel” measurement.

The Contractor shall supply and install a ground plates on each corner of the intersection, adjacent to the handwell, each of which will be connected to the field grounding system. The unit price bid will be paid for each ground plates connected. Ground plates provided at the power service and the controller base shall be included in the price bid for these units. The #6 A.W.G. type T.W.U. (Green) system ground wire will be thermite weld connected to these ground plates.

The Contractor shall be required to supply and install C.S.A. approved Ground Plates in the place of Ground Rods in the following configuration within the traffic signal plant: a) 1 ground plate at each corner of the intersection, b) 2 ground plates at the power service, c) 2 ground plates at the traffic controller base.

The Contractor shall be required to supply and install a sufficient quantity of a Global Traffic Technologies Canada SPEC 138 pre-empt cable, to be connected to the pre-empt detector head(s) and the pre-empt diode board mounted within the traffic controller.

The Contractor shall be required to supply and install only a Global Traffic Technologies Canada Opticom Priority Control System Model 721 Optical Detector and Model 752 Phase Selector as per the direction of the Project Manager and as noted in the contract drawing.

All signal field terminations shall be clearly tagged by the Contractor with plastic marker plates (Part MP 175-C) and labelled with a nylon marking pen (Part PX-O) as manufactured by Panduit Corporation or an approved equivalent. These tags will be securely tie wrapped to the cables and clearly labelled.

The Contractor maybe required to disconnect and reconnect existing traffic signal cables from the existing traffic signal equipment t the proposed traffic signal equipment, as shown in the contract drawing and as noted in the Form of Offer.

B) HYDRO REQUIREMENTS AND CONNECTION

All electrical wiring installations must be approved by the Electrical Safety Authority (ESA). Any costs associated or accumulated shall be included in the price bid in the Form of Offer.

As part of the required Electrical Safety Authority (ESA) inspection approval process the Contractor shall be required to coordinate for this inspection approval with the ESA and the cost for this approval will be absorbed by the Contractor.

The Contractor shall be required to supply all labour, equipment and material required to ready the installation for connection to Enersource Hydro Mississauga facilities.

This will include the installation of a power service panel within a power service pedestal as per City of Mississauga Standard Drawing or in conjunction with a pole mount service as per City of Mississauga Drawing. In some circumstances partial installations may have been installed by others (ie. power service pedestals by developers). It is the intent of the Corporation to use such facilities if deemed serviceable.

It is the responsibility of the Contractor to make arrangements with the Project Manager at least one week prior to installing any services to existing Enersource Hydro Mississauga Plant.

It shall be the responsibility of the Contractor to arrange with the Corporation, the connection of the controller to the source of supply. Any external connections shall be made in a splice box as approved by Enersource Hydro Mississauga.

The cable from the point of supply to the controller shall be of suitable size to minimize voltage drop.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

The bid price shall include all labour equipment and material required to install, connect, splice and otherwise complete the electrical requirements of the contract.

615 TRAFFIC SIGNAL POLES

In addition to the requirements of OPSS 615, the following shall apply for the Corporation:

All poles shall be installed as specified on City of Mississauga Standard Drawing 2600.05. Where poles are perforated or cut for any reason they shall be treated with a zinc rich compound and fitted with rubber grommets.

A) SUPPLY AND INSTALLATION OF TRAFFIC SIGNAL POLES

The Contractor shall supply and install OCTAGONAL STEEL traffic signal poles and accessories as outlined on the Form of Offer, as noted on the contract drawing, or as directed by the Project Manager.

This equipment will have been tested and approved by the Ministry of Transportation Ontario and be listed in the latest revision of the Designated Sources of Materials Manual as published by the Ministry of Transportation Ontario.

These poles shall be complete with pole caps and pipe spacers for mounting insulating brackets and handholes for underground wiring. The exact location of these poles shall be confirmed on site by the Project Manager.

B) INSTALLATION ONLY OF SUPPLIED TRAFFIC SIGNAL POLES

The Contractor may be required to install only, City of Mississauga supplied traffic signal poles. The Contractor shall be required to pick up the appropriate pole(s) from the City of Mississauga Works Yard — 3185 Mavis Road, transport the pole(s) to the intersection and install, at the direction of the Project Manager.

The Contractor should note that the unit price applies to any traffic signal poles taken out of the City of Mississauga stock, regardless of height.

C) SUPPLY AND INSTALLATION OF POWDER COATED BLACK TRAFFIC SIGNAL POLES

Where black signal poles are specified, the finishing coat shall consist of the application of an electrostatically charged coat of polyester powder, in accordance with the manufacturer's specifications and instructions. After oven curing, the finish coat shall have a minimum dry film thickness of 4 mils.

The polyester powder shall be black, as supplied by Sterling Paint (Product No. N20BG101) or approved equal.

The equipment shall be hot dip galvanized in accordance with CSA standard G164. After galvanizing the outer surfaces, the equipment shall be lightly sandblasted immediately prior to the application of the finishing coat.

The finished project shall be wrapped to protect the painted surfaces, during handling and delivery.

The Contractor shall be responsible for the preservation of the finished surfaces during installation.

616 FOOTINGS & PADS FOR ELECTRICAL EQUIPMENT

In addition to the requirements of OPSS 616, the following shall apply for the Corporation:

A) SUPPLY AND INSTALLATION OF POLE FOOTINGS

The bid price shall include the supply and installation of a cylindrical Sonotube concrete footing complete with anchor bolts and nuts required for base mounting of pole, type and size as indicated in the contract, or as directed by the Project Manager. When footings are intended to support traffic signal poles, it is imperative that the location of these pole bases be confirmed by the Project Manager prior to commencing installation. Failure to confirm locations may result in the footing being removed and replaced at the expense of the Contractor.

All footings are to be in the diameter specified on the Form of Offer, a minimum of 2000mm deep for 600mm and 750 mm footings and 1500mm deep for 450mm dia. footings and constructed of 25MPa Ready Mix concrete.

The top of the concrete footing shall be established at grade level and shall be determined and checked by the Project Manager prior to pouring. The footing shall be level to insure the pole remains level.

Provisions are to be made for the installation of 100mm rigid PVC duct in all 600mm signal pole bases and 75mm rigid PVC duct in all 450mm pole bases.

The excavation of the pole footings shall be performed by hydro-vac pressurized water vacuum excavation method only.

Backfilling and compaction shall be in accordance with the MTO OPSS 514.

The Contractor shall be required to install a City of Mississauga supplied “benchmark” monument as directed in 750 mm pole bases. The monument shall be set level and flush into the freshly poured concrete footing and protected until the concrete is set. This monument will be installed in accordance with City of Mississauga Standard Drawing 2600.04

The Contractor may be required to locate these footings immediately adjacent to utilities. No additional compensation shall be paid for exposing these utilities or for employing less efficient methods of excavation including hand digging.

Pole bases shall be installed as per City of Mississauga Standard Drawing 2600.04.

The bid price for this item shall include the disposal of the excavated material by the Contractor.

B) SUPPLY & INSTALLATION OF CONTROLLERS BASE & GROUND PLATES

The Contractor shall supply and install a concrete controller base of 25MPa. Ready Mix concrete in conformity with City of Mississauga Standard Drawing 2060.05.

The Contractor shall be responsible to supply and install the cabinet anchor bolts in the base so they are compatible with the proposed cabinet.

The location shall be as indicated on the contract drawing or as determined by the Project Manager prior to installation.

The two (2) ground plates shall be installed on opposite sides of the concrete base as shown on City of Mississauga Standard Drawing. A #6 A.W.G. type T.W.U. (green) system ground wire shall be thermo weld connected to the two (2) ground plates and run between each ground plate and from each ground plate to the controller cabinet ground bus.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices should include all of the above noted conditions.

617 STREETLIGHTING REQUIREMENTS

In addition to the requirements of OPSS 617, the following shall apply for the Corporation:

A) SUPPLY AND INSTALLATION OF STREETLIGHT LUMINARIES

All electrical wiring installations must be approved by the Electrical Safety Authority. Any costs associated or accumulated shall be included in the price bid in the Form of Offer.

As part of the required Electrical Safety Authority (ESA) inspection approval process the Contractor shall be required to coordinate for this inspection approval with the ESA and the cost for this approval will be absorbed by the Contractor.

The Contractor is required to coordinate the removal of existing streetlight poles with Enersource Hydro Mississauga, 48 hours prior to removal. To arrange for the necessary splicing required at the time of removal. The Contractor will then be required to return the streetlight poles to Enersource Hydro Mississauga, located on Mavis Road.

Restoration of voids left by removed poles/footings shall be completed immediately after the removal of poles/footings with the placement of non-shrink backfill to within 100mm of the surround grade completed to confirm with the adjacent conditions.

The Contractor shall supply and install complete, the type and quantity of streetlight luminaries as indicated on the drawing and listed herein.

The specifications shall adhere to the following:

- LED luminaires as manufactured by Conxcorp Ltd. and based on illumination designs for the roadway and/or intersection. The voltage rating for the luminaires shall be 120-277V or 347V based on the streetlighting circuit design for the project. All luminaires shall be ordered with an integrated monitoring system by specifying “CTR” in the luminaire model order number.

  Example: CNX-LRL3-P1-2M-43-100-L-CTR-BLK

  All luminaires shall be approved by the City prior to purchase and installation

  - Eight (8) foot single member tapered elliptical aluminium brackets. Powerlite Devices Catalogue #RE-8-MA or an approved equal.

  - All necessary bolts and clamps.

  - All necessary wire in accordance with the latest Enersource Hydro Mississauga specifications.

The Contractor shall be responsible for all equipment and materials to energize this system to Enersource Hydro Mississauga Standards. A separate circuit breaker shall be installed by the Contractor in conjunction with the power service for the traffic control signal.

B) STREETLIGHT REMOVALS

The Contractor is required to coordinate the removal of existing streetlight poles with Enersource Hydro Mississauga, 48 hours prior to removal. To arrange for the necessary splicing required at the time of removal. The contractor will then be required to return the streetlight poles to Enersource Hydro Mississauga, located on Mavis Road.

Restoration of voids left by removed poles/footings shall be completed immediately after the removal of the poles/footings with the placement of non-shrink backfill to within 100mm of the surrounding grade and completed to conform to the adjacent conditions.

C) SUPPLY & INSTALLATION OF POWDER COATED BLACK STREETLIGHT LUMINARIES

Where black equipment is specified, luminaires shall be ordered from Conxcorp Ltd. stating "BLK" at the end of the appropriate luminaire model order number.

Example: CNX-LRL3-P1-2M-43-100-L-CTR-BLK

Where black equipment is specified, such equipment will be supplied and installed in accordance with the appropriate specifications noted in SS 615.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

620 TRAFFIC SIGNAL EQUIPMENT

In addition to the requirements of OPSS 620, the following shall apply for the Corporation:

A) TRAFFIC SIGNAL REQUIREMENTS

Scope

The Contractor shall supply and install a fully functional traffic signal installation in conformance with the specifications contained herein. All material provided will be manufactured by a recognized traffic signal equipment manufacturer and if applicable, will be listed in the Designated Sources of Materials Manual as published by the Ministry of Transportation Ontario.

Contractor's Experience

Contractors may be required to furnish evidence to the satisfaction of the Project Manager as to their experience, capacity and financial resources.

The Contractor shall be required to provide and make available fully trained and experienced personnel with a minimum of five (5) years recent experience in the installation, and/or maintenance of traffic control signals including all types of traffic signal controllers. All electrical work shall be performed by qualified electrician(s) certified under "The Apprentices and Tradesman's Act".

The Contractor shall be required to hold in good standing an electrical trade licence as issued by the City Licensing Office, pursuant to City of Mississauga By-law No. 1-06, as amended. The Contractor’s master electrician shall be required to show proof of an up to date Level 2 IMSA Electrical Certification.

Police Assistance

The Contractor shall be responsible for all related costs when police assistance is required. The need for police assistance shall be at the discretion of the Project Manager.

Signing Requirements

The Contractor shall be required to supply all labour, equipment and material required to:

(a) Remove any conflicting signs including but not limited to "STOP" signs, "STOP AHEAD" signs etc., upon energization of the signal installation.

(b) Make visible to the motorists all covered "SIGNAL AHEAD SIGNS" placed by others on the approaches to the intersection.

(c) Relocate all centre island signing to newly installed signal poles located on such islands.

All removed signs shall be delivered to the Mavis Road Works yard and placed as directed by the Project Manager.

All voids left by removed posts shall be restored to grade.

Continual Operations

The Contractor shall be responsible for the continual operation of any existing traffic system, if applicable. Any modifications to an existing signal system will be paid in accordance with the Form of Offer and no additional costs will be incurred by the City for modifications approved and completed solely for the convenience of the Contractor.

The Contractor shall determine the location of underground traffic signal plant through the City's current signal maintenance contractor. Failure to provide for the continual operation of an existing traffic signal system, causing the signal to not operate properly, will result in liquidated damages being imposed.

In addition, the Contractor shall be responsible for any costs incurred by the City as a result of the City's maintenance contractor being called out to perform emergency maintenance. These costs which will be in the amount of the gross cost of the repair plus 100 percent are a good faith attempt by the City to assess the actual damages that will be sustained due to the inability to control traffic. The City's imposition of these costs on the Contractor shall not limit the ability of the City to claim damages resulting from specific liability arising from the Contractor's failure to meet the requirements of this specification.

DUE TO THE EXTREME SAFETY CONCERNS INVOLVED, THE CITY RESERVES THE RIGHT TO RESTORE THE TRAFFIC SIGNALS TO FULL OPERATION WITHOUT GIVING PRIOR NOTIFICATION TO THE CONTRACTOR.

B) SUPPLY AND INSTALLATION OF TRAFFIC SIGNAL MAST ARMS

The Contractor shall supply aluminium mast arms and install those single member mast arms, including plumbizer hangers and all related equipment, as outlined on the Form of Offer, as noted on the contract drawing, or as directed by the Project Manager. This equipment will have been tested and approved by the Ministry of Transportation Ontario and appear in the latest revision of the Designated Sources of Materials Manual as published by the Ministry of Transportation Ontario.

The Contractor shall supply and install on all secondary signal poles, where such poles are located on raised centre islands, minimum 38mm x 300mm aluminum pipe brackets.

All mast arm mounting plates and back brackets shall conform to the shape of the pole at the mounting pint, such that proper fit and alignment are achieved.

All mast arms shall be manufactured such that the signal head attachment fitting is level when the arm is installed on a pole which is truly vertical and plumb.

Mast arm attachment bolts shall be a minimum 19mm in diameter medium carbon steel quenched and tempered in accordance with specification “SAE J429 - Grade 5", and be marked accordingly.

Under no circumstances shall threaded rod be considered acceptable as a fastening device for the installation of signal mast arms.

The Contractor shall be required to supply and install aluminium traffic signal mast arms and all related materials as specified in the most current City of Mississauga Standard Drawing and as per the direction of the Project Manager.

Where arms are drilled for any reason, they shall be fitted with rubber grommets.

Where 4-section signal heads are mounted on mast arms, the plumbizer bracket shall be attached to the signal head between the red and amber section.

Where black equipment is specified, such equipment will be supplied and installed in accordance with the appropriate specifications noted in SS 615.

Signal mast arms shall be supplied and installed as per City of Mississauga Standard Drawing 2600.05.

C) SUPPLY AND INSTALLATION OF PEDESTRIAN MAST ARMS

The Contractor shall include in the price bid all costs of labour, equipment, and materials required to complete the supply and installation of each pedestrian arms as outlined within the Form of Offer in those locations as noted on the Contract Drawing.

These arms shall be a minimum 38mm x 300mm aluminium pipe brackets, complete with pole shoes and all other accessories required to complete the installation.

Where steel equipment is used in this installation, it shall be hot dipped galvanized.

Where arms are drilled or cut for any reason, they shall be treated with a zinc rich compound and fitted with rubber grommets.

The location of the pedestrian mast arms will be determined in the field by the Project Manager to suite field conditions.

Where black equipment is specified, such equipment will be supplied and installed in accordance with the appropriate specifications noted in SS 615.

Pedestrian mast arms shall be installed as per City of Mississauga Standard Drawing 2600.05.

D) SUPPLY AND INSTALLATION OF SIGNAL HEADS

The Contractor shall supply and install Polycarbonate, highway type heads complete with protectolite flex-mark backboard or approved equal, seal kits and suitable riser cable. All quantities and locations of signal heads shall be as indicated on the contract drawing and noted on the Form of Offer.

All signal heads and backboards shall be traffic highway yellow with matte black underneath the visors. The heads shall have been tested and approved by the Ministry of Transportation Ontario and be listed in the Designated Source of Materials Manual as published by the Ministry of Transportation Ontario.

Backboards used in conjunction with plumbizer mounted heads shall be designed and installed such that the space created by the bracket between the red and amber lens is hidden by the backboard assembly.

Signal heads shall be supplied and installed with stainless steel hardware and two (2) 304 stainless steel reinforcing plates providing internal and external reinforcement when mounted on a cushion hanger or internal reinforcement on the top and bottom of the signal head when two point mountings are used.

The Contractor shall be required to supply all traffic signal heads pertaining to this Contract, excluding sockets, reflectors and lenses. The City will supply to the Contractor the required L.E.D. signal indications.

Signal heads shall be installed as per City of Mississauga Standard Drawing.

The Contractor shall be required to tether all supplied and installed traffic signal heads with the exception of face on mounted traffic signal heads and pedestrian signal heads, to the supplied and installed traffic signal mast arms at all new and rebuilt traffic signal locations listed in this contract document, as per the direction of the Project Manager and as noted in the Form of Offer. The Contractor shall also be required to tether existing traffic heads to existing traffic signal mast arms at various locations within the City as per the direction of the Project Manager and as noted in the Form of Offer.

The Contractor shall supply and install the appropriate City approved materials such as, tethering wire, modified bird stops and crimps, required to tether all supplied and installed traffic signal heads with the exception of face on mounted traffic signal heads and pedestrian signal heads, to the supplied and installed traffic signal mast arms at all new and rebuild traffic signal locations listed in this contract document, as per the direction of the Project Manager, as noted in the Form of Offer and as per City Standard Drawing 3100.27 including in this document.

Tethering will be completed by attaching the supplied cable from the top to the bottom of the signal head by looping the cable through the modified bird stops and crimped at either end.

In the case of signal heads mounted with a plumbizer style bracket, both bird stops shall be removed and replaced with modified bird stops and the cable looped through and crimped at both the top and bottom of the signal head.

E) SUPPLY AND INSTALLATION OF PEDESTRIAN HEADS

The Contractor shall supply and install 30cm pedestrian heads at the locations indicated on the Contract Drawing and the quantity as noted on the Form of Offer.

The contractor shall be required to supply all pedestrian heads pertaining to this Contract excluding sockets, reflectors and lenses. The City will supply to the Contractor the required L.E.D. signal indications. The Contractor shall be required to assemble/install the required L.E.D. signal indications to the required pedestrian heads and install the completed pedestrian heads as outlined in the Form of Offer. All pedestrian heads shall be traffic highway yellow as specified on the Form of Offer and shall have been tested and approved by the Ministry of Transportation Ontario and listed in the Designated Sources for Material Manual published by the Ministry of Transportation Ontario. Pedestrian heads shall be installed as per current City of Mississauga Standard Drawings.

F) INSTALLATION OF CITY OF MISSISSAUGA SUPPLIED TRAFFIC CONTROL EQUIPMENT

The Contractor may be required to install only, City of Mississauga supplied traffic signal equipment. The Contractor shall pick up the appropriate equipment from the City of Mississauga Works Yard — 3185 Mavis Road, transport the equipment to the intersection and install at the direction of the Project Manager.

1. **Traffic Signal Mast Arms ~** The Contractor shall note that the unit price applies to any traffic signal mast arms taken out of the City of Mississauga stock, regardless of length.

2. **Traffic Signal Heads ~** The Contractor shall be required to clean and relamp the signal head(s) prior to installation.

3. **Pedestrian Signal Heads ~** The Contractor shall be required to clean and relamp, prior to installation.

4. **Face-On Pipe Bracket ~** this unit shall be paid for the attachment of either pedestrian or traffic signal heads.

G) TRAFFIC SIGNAL HEAD REPLACEMENT

A number of signal heads, in the approximate quantities in the Form of Offer have been deemed unsuitable for future use. The Contractor shall be required to supply all labour, material and equipment required to remove and replace such signal heads identified by the Project Manager at various locations within the City of Mississauga.

The Contractor should note that it is the responsibility of the Contractor to dispose of the existing heads and associated hardware in a method approved by the Project Manager.

1. Arm Mounted Head

The Contractor shall be required to replace existing traffic signal heads and associated hardware at various intersection locations as directed by the Project Manager and replace with traffic signal heads and associated hardware, complete with adjustable plumbizer type hangers and a new riser cable.

The unit prices for this item will include the removal of the existing signal head, the supply and installation of new complete traffic signal head, supply and installation of new riser cable, remaking of all electrical connections in the hand hole, the adjustment of the existing traffic signal mast arm to a 5.3m road clearance, the supply and installation of the adjustable plumbizer type hanger to the new signal head and installation for the existing traffic signal mast arm.

2. Face-On

The Contractor shall be required to replace existing traffic signal heads and associated hardware at various intersection locations as directed by the Project Manager and replace with traffic signal heads and associated hardware, complete with pipe brackets and new riser cable.

The unit price for this item will include the removal of the existing head, the supply and installation of a new complete traffic signal head, supply and installation of new riser cable, remaking of all electrical connections in the hand hole.

The Contractor shall note that it is the City's intention to make an attempt to salvage the existing, removed pipe brackets and use these brackets at subsequent head replacement locations. Where it has been determined that removed pipe brackets are not suitable for use, in the opinion of the Project Manager, the Contractor shall supply and install such pipe brackets at the bid price noted elsewhere in the Form of Offer.

3. Backboard

The Contractor shall be required to replace only the existing backboard where the existing backboard has been determined by the Project Manager to be unsuitable and supply and install a protectolite flex-mark backboard or approved equal to the existing traffic signal heads.

H) INSTALLATION OF TRAFFIC CONTROLLER

The Contractor shall be required to completely install a solid state NEMA, 4 or 8 Phase actuated traffic controller as supplied by the Corporation. All labour and materials required to perform this work shall be included in the unit price.

The Contractor will be responsible to pick up this unit from the Mavis Road yard and deliver it to the site for installation. Testing and verifying the operation of this unit to the satisfaction of the Project Manager shall be the responsibility of the Contractor prior to field installation.

The Tender price shall include:

(a) The installation of a communication housing supplied by the Corporation on the side of the cabinet to line up with the 32mm communication duct in the controller base. All equipment and necessary hardware required to perform this task shall be supplied by the Contractor and shall be included in the unit price for this item.

(b) The extension of the 32mm communication conduit through the controller base and into the Bell terminal housing will be included in the tendered unit price for this item.

(c) Comprehensive testing of the final connections and field wiring as well as the conflict monitor. These tests shall be performed by the Contractor in the presence of the Project Manager. Control of the intersection shall be given to a Peel Regional Police Officer. All costs and scheduling for this service is to be the responsibility of the Contractor.

(d) The Contractor shall be required to apply a non-toxic, silicone based, sealant at the Traffic Controller Cabinet, and the concrete base.

(e) The Contractor shall be required to apply a foam sealant to the ducts entering the Traffic Controller Cabinet.

The unit price bid for this item may be used at the discretion of the Project Manager as compensation for all labour, equipment, material, and Police assistance required to alter the operation of any signal system, where intersection downtime, splicing of cable etc., are required..

I) SUPPLY & INSTALLATION OF PEDESTRIAN PUSH BUTTONS & SIGNS

The Contractor shall supply and install pedestrian push buttons painted traffic highway yellow which have been tested and approved by the MTO and listed in the Designated Sources for Material Manual published by the Ministry of Transportation Ontario.

Each of these buttons shall be placed on the poles as indicated on the Contract Drawing or as directed by the Project Manager.

The Contractor shall supply and install pedestrian push button signs as per City of Mississauga Standard Drawing 2430.01 and install “step by step” information signs supplied by the Corporation as directed by the Project Manager.

Push buttons are to be installed as per City of Mississauga Standard Drawing 2600.05.

Installation of this equipment will be facilitated by the use of tamper/vandal proof fastening hardware.

J) SUPPLY AND INSTALLATION OF VEHICLE LOOPS AND RUN WIRES

Loops and run wires shall be supplied and installed by the Contractor in compliance with City of Mississauga Standard Drawing 2060.14 and OPSD 2520.01 in the dimensions indicated on the PR-M-125 drawing. In all cases, the Contractor shall arrange with the Project Manager to determine exact locations at an on-site meeting.

Loop detector amplifiers shall be set in accordance with the direction of the Project Manager.

Saw cutting for loop wire slots in the pavement shall be done in straight lines with saw cut widths and depths for slots set to the dimensions shown on City of Mississauga Standard Drawing 2060.14. The saw shall be equipped with a depth gauge and horizontal guide to assure proper depth and alignment of the slot. The blade used for the saw cut shall provide a clean well-defined saw cut without damage to the adjacent area. Corner cutting for slots shall be extended only far enough past each corner point to obtain the full depth of the slot.

The Contractor shall install loop wires and detector cables and place the required sealant on the same day that saw cuts are cut in the road surface. No traffic is to be allowed over the area until the installation is complete and the sealant has hardened in accordance with the manufacturer's instructions.

When the detector is properly calibrated the slot shall be sealed with hot tar or 3M Scotch detector loop sealant so that run-off will not collect in the slot. A dry cement powder shall be applied over the sealant to minimize tracking.

All run wires shall run individually and directly from each of the loops to the controller to be connected in the controller in either series or parallel as may be required to provide proper inductance for amplifier requirements.

The run wires between the loops and controller shall be protected by buried conduit, or where they cross the travelled portions of the roadway shall be inserted in a saw cut and sealed as described above.

The run wires shall be directed to the nearest handwell and then to the controller via the signal conduit.

The path of the run wire shall be as indicated on the drawing or as specified by the Project Manager.

The shield shall be separately grounded in the terminal facilities.

Both the loop and run wire terminations shall be clearly tagged by the Contractor with plastic marker plates (Part MP175-C) and labelled with a nylon marking pen (Part PX-O) as manufactured by Panduit Corporation or an approved equivalent. These tags will be securely tie wrapped to the cables and clearly labelled.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

700 REQUIREMENTS FOR WATERMAIN AND WATER SERVICE CROSSING

Stable soils shall be defined as either shale or cohesive soils (clay and clayey soils) and unstable soils shall be fills and non-cohesive soils (gravel, sands, silt and gravely soils).

EXCAVATION UNDER WATERMAINS

Where a trench crossing is proposed under an existing cast iron watermain, the maximum unsupported length of watermain that can be allowed with no joint exposed may be selected from the following table:

STABLE SOIL			UNSTABLE SOIL	
Maximum Allowable Unsupported Length of Watermain No Joint Exposed			Maximum Allowable Unsupported Length of Watermain No Joint Exposed	
WTM DIA.	WTM. AT 1.5m COVER	WTM. AT 2.5m COVER	WTM AT 1.5m COVER	WTM. AT 2.5m COVER
100mm	1.4m	1.0m	1.0m	0.8m
150mm	1.7m	1.4m	1.4m	1.1m
200mm	2.0m	1.7m	1.7m	1.5m
250mm	2.5m	2.1m	2.0m	1.8m
300mm	3.0m	2.7m	2.5m	2.1m

Allowable conditions for depth of watermain between 1.5m and 2.5m may be interpolated from the above table. For depth of watermain greater than 2.5m the allowable condition may be extrapolated from the table, but no greater than 3m.

If a joint is within the unsupported watermain length, the allowable length is to be reduced by 50%.

If the vertical separation between the watermain and the sewer is greater than 1.2m or unstable soil conditions exist, the Project Manager may require that the shoring be left in place to maintain a secure trench wall.

Cast iron watermains larger than 300mm are not included in this data and will be considered on an individual basis.

TUNNELLING UNDER WATERMAINS

If tunnelling is undertaken in shale or hard clay terrain, the minimum length of tunnel is to be 1.5 metres, the vertical separation from tunnel roof to the watermain is to be a minimum of 1 metre, and the void in the tunnel is to be filled with crushed stone.

Tunnelling in unstable soils is not feasible for maintaining the necessary support under the watermain. Accordingly, for consideration of tunnelling in these soils, the support condition reverts to "Excavation under Watermains".

EXCAVATION UNDER WATER SERVICES

Copper water services where undercut by a sewer trench are vulnerable to settling, and thus require a beam support. Generally, a 100mm x 100mm beam placed across the trench (maximum 2m span) can be considered adequate. Small wood cleats to contain the copper are to be nailed onto the beam.

METHOD PAYMENT

No separate payment will be considered for any works mentioned herein.

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METHOD PAYMENT

No separate payment will be considered for any works mentioned herein.

802 CONSTRUCTION SPECIFICATION FOR TOPSOIL

In addition to the requirements of OPSS 570, the following shall apply for the Corporation:

802.05 MATERIALS

Sub-section 570.05.01 “Topsoil” is amended by the addition of the following paragraphs:

“The Corporation reserves the right to inspect the screened topsoil prior to delivery to the site in order to determine if the topsoil meets the specifications. Topsoil found to be unsatisfactory will be rejected prior to shipment.

Should inspection prior to delivery not be possible, the Corporation will inspect the topsoil on site and if found to be unsatisfactory will be rejected and removed from the site at the expense of the Contractor.”

803 CONSTRUCTION SPECIFICATION FOR SODDING - WITH AND WITHOUT WIRE MESH

In addition to the requirements of OPSS 571, the following shall apply for the Corporation:

803.07.04 PLACING SOD:

Sub-section 571.07.04 "Placing Sod" is amended by addition of the following paragraph:

The Contractor will be responsible for the replacement of any dead or dying sod or removal of weeds during the period of maintenance.

803.09 MEASUREMENT FOR PAYMENT:

Section 571.09 "Measurement for Payment" of OPSS 571 is amended by deletion of the section and its replacement with the following:

Staked or unstaked sod, shall be measured in square metres incorporated in the work to the satisfaction of the Project Manager. The quantity indicated in the Form of Offer may be increased or decreased at the discretion of the Project Manager.

803.10 BASIS OF PAYMENT:

Section 571.10 "Basis of Payment" of OPSS 571 is amended by deletion of the section and its replacement with the following:

Payment for staked or unstaked sod, shall be at the respective unit prices in the Form of Offer and shall be deemed payment in full for all materials, labour, and equipment required to complete the work in accordance with the specifications to the satisfaction of the Project Manager. Included in the unit price for the sod is the specified depth of imported screened topsoil as specified in the Form of Offer and all waterings as required to maintain the sod in a healthy condition during the period of maintenance.

METHOD OF PAYMENT

Payment for this item will be at the unit price as specified in the Schedule of Quantities and Unit Prices and should include all of the above noted conditions.

1010 MATERIAL SPECIFICATION FOR AGGREGATES - GRANULAR A, B, M AND SELECT SUBGRADE MATERIALS

OPSS 1010.05.02 is amended to add the following:

Unless otherwise specified, the use of Recycled Concrete Material (RCM) as a granular material is restricted to non-pavement (non-loading) areas such as under sidewalks, pathways, medians, driveways and paved boulevards, etc.

The use of recycled concrete material in other areas may be permitted by the City's Project Manager on a project-by-project. The vendor shall provide the City's Project Manager, a minimum of ten (10) working days before any intended delivery, a written request for a material change, giving structural comparisons between specified material and proposed material, and any cost revision to the City for allowing the use of the Recycled Concrete Material.

All contractors who request this switch to RCM material must demonstrate that the supplier has in place a written Quality Control program for the delivery, manufacturing & stockpiling of the Recycled Concrete Material. This program shall be in place for a minimum of one calendar year prior to the contractor submitting a request for the material change; contain procedures which monitor & control the material delivered to the property; procedures for manufacturing material; and contain a Quality Control testing program. The written submission shall include results of all testing requirements contained in OPSS 1010, and other applicable standards; contain a summary of all laboratory tests conducted on the Recycled Concrete Material; and individual test results. Testing shall include Gradation, percent Asphalt Coated Particles, as well as all other tests required by OPSS 1010. The City of Mississauga may request further testing. The cost of any testing requested by the City of Mississauga shall be borne by the contractor.

The delivery and use of any RCM is not permitted until written authorization is received from the City. Any material delivered to the project prior to the contractor receiving written permission shall be immediately removed from the site by the contractor. Any material, in the opinion of the City of Mississauga's representative, that does not meet contract specifications, shall be immediately removed by the contractor and no future delivers shall be permitted.

1150 MATERIAL SPECIFICATION FOR HOT MIX ASPHALT PAVEMENT

ASHPAHLT MIX DESIGNS:

The Contractor is required to submit an asphalt mix design confirming to OPSS 1150 (2010). The Contractor shall submit a certificate with the mix design showing that the PGAC complies with the current MTO test requirements for the grade or grades to be used. Any mix design containing RAP shall conform to OPS Specification 1150. Heavy Duty Binder Course shall comply with OPSS 1150 (2010).

The mix design shall have a minimum asphalt cement content of 5.0% for any HL8 or HL8 HDBC asphalt mix and 5.30% for any HL-3 asphalt mix. Mixes placed shall meet the Acceptable Requirements outlined in this Supplemental Specification. PG 64-28 Asphalt Cement is to be used on all HL-8 HS, HDBC or HL-1 asphalt mixes or where any asphalt mix is used on any industrial or arterial roadways, or any driveways on such.

The Corporation reserves the right to make modifications to the proposed design if deemed necessary.

1150.04.01.01 RAP PROPORTIONS

No surface course asphalt mixes or any Heavy Duty Binder asphalt mixes shall contain any RAP; HL1, HL3, HL3F, HL4, HL4F, HDBC, HL8 H.S.

1150.04.05 ANTI-STRIPPING ADDITIVES

The Contractor/Supplier shall determine the need for and the amount of anti-stripping additive required using LS-283, unless waived in writing by the Corporation. This Immersion Marshall result is to be available to the Corporation at any time during off after the contract duration.

1151 MATERIAL SPECIFICATION FOR SUPERPAVE & STONE MASTIC ASPHALT MIXTURES

1151.04.01.01 RAP PROPERTIES

No surface course asphalt mixes shall contain any RAP; Superpave 12.5, 12.5 FC 1 and 12.5 FC 2.

1151.04.05 ANTI-STRIPPING ADDITIVES

The Contractor/Supplier shall determine the need for and the amount of anti-stripping additive required using LS-283, unless waived by the Corporation. This Immersion Marshall result is to be available to the Corporation at any time during or after the contract duration.