

PART I - GENERAL

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| <u>1.1 Related Work</u> | .1 | Electrical Pathway Lighting Design Spec.: | Section 16010 |
| <u>1.2 Scope of Work</u> | .1 | Work under this section, in coordination with work under Section 16010, shall comprise the installation of complete operational park pathway lighting systems | |
| | .2 | The contractor will inspect the site in order to become aware of the specific conditions to be encountered at each location. | |
| | .3 | Coordinate work in this section with work in all other sections. | |
| <u>1.3 Material</u> | .1 | The contractor will supply all materials required for a complete and operational pathway lighting system as per the specifications and drawings. | |
| <u>1.4 Product Delivery, Storage, Handling</u> | .1 | All material will be transported to the site in their original protective wrapping and/or cartons by the contractor. | |
| | .2 | Care will be taken to avoid scratching or damaging the finishes of the poles and fixtures. Any equipment found to be unacceptable, in the opinion of the City of Mississauga representative, will be removed from the site and replaced with new equipment at the contractor's expense. | |
| | .3 | Material will not be stored on site. Any material not installed at the end of a working day will be returned to the contractor's yard. | |
| <u>1.5 Alternatives</u> | .1 | Any proposed alternative material or installation methods must be approved, in writing, by the City of Mississauga representative and prior to the commencement of construction. | |
| <u>1.6 Guarantees</u> | .1 | All workmanship and material must be guaranteed for a period of one year commencing on the date of Preliminary Acceptance by the City. | |
| | | Note:
INSTALLED PATH LIGHT SYSTEM MUST BE ENERGIZED,
ARRANGED BY THE CONTRACTOR, PRIOR TO PRELIMINARY
ACCEPTANCE. | |
| <u>1.7 Submission</u> | .1 | The contractor must obtain a copy of the "Load Letter" provided by the electrical engineer, for the proposed path light system, for the use in the application to Electrical Safety Authority. Provide the City of Mississauga representative with a copy of the Load Letter. | |
| | .2 | An Electrical Safety Authority inspection is required on this project. All work is to be completed to Electrical Safety Authority code. The contractor must complete and submit to the Electrical Safety Authority an application for Hydro Inspection Form and forward a copy to Community Services representative. | |

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- .3 All Electrical Safety Authority inspection and Enersource fees will be paid for by the contractor.
 - .4 Upon completion of the installation, a final certificate of approval from the Electrical Safety Authority Inspection must be submitted to the consulting Landscape Architect, consulting Engineer, and the City of Mississauga representative.
 - .5 Upon satisfactory completion of the path light installation and prior to Preliminary Acceptance, the contractor must submit two (2) marked up copies of "As Constructed" drawings for certification by the electrical engineer. These certified drawings must then be forwarded to the City of Mississauga representative.
- 1.8 Acceptance
- .1 Notify the Electrical Engineer and the City of Mississauga representative in writing when, in the contractor's opinion, all work has been satisfactorily completed.
 - .2 Electrical Safety Authority and Enersource inspection and approval is required for all work outside the park boundary.
 - .3 The path light system will be granted Preliminary Acceptance upon receipt by the City of Mississauga representative of the following;
 - .1 Verification of the energization of the lighting circuits.
 - .2 A visual night inspection has been carried out with the engineer and City of Mississauga representative.
 - .3 Submission of a letter by the electrical engineer that the installation conforms to the approved lighting design and the Path Light Criteria.
 - .4 "As Constructed" drawings are submitted and certified by the electrical engineer and forwarded to the City of Mississauga representative.
 - .5 Submission of the Electrical Safety Authority Inspection Certificates to the City of Mississauga representative.
 - .4 Where the lights have been designed or installed improperly, the lights will be relocated to the satisfaction of the City of Mississauga representative at the contractor's expense.

PART II - PRODUCTS

2.1 Material

- .1 Lighting Fixture
All fixtures regardless of manufacturer are to be pre-wired with 7.31 metres of 3 x #12 Copper stranded 600V TEW black, red and green, mechanically supported.

Quality Lighting Thematics Lighting Fixtures
Model No. SL16 II-HPS-100-240-PCT-LX-DB

OR

Moldcast Module III Lighting Fixtures
Model No. SL-16-I-150

OR

General Electric Decashield II Lighting Fixtures
Model No. DSMT 10 S 3 A 2 G MC3 DB, LVS-DS, PTTA-S-SGL

.2 Lamps

100 watt High Pressure Sodium Lamps, Mogul base
Model No. LU100/55.

.3 Photo-Cells

Precision Photo-Cells
Model No. P68275-240V or 8672 MOV 200>300V

.4 Light Pole

Direct Burial HSS Poles
Poles shall be 100 mm x 100 mm x 3mm square steel, hot dipped galvanized after fabrication and powder coated with a brown finish, Pantone 297C.
Length - 7.31 metres. Hole layout to match fixture c/w removable cap.

.5 Precast Concrete Handwell

Precast Concrete Handwell to be model #BCP-2112, 450mm diameter by 750mm depth, by Brooklin Concrete products or Approved Equal. Apertures and cast cover/frame to be per detail; cover to be fastened to frame with 3-3/8 x 1-1/2" galvanized stainless steel penta head bolts. Plugs where used to be polyethylene.
Bedding course to be 19mm compacted clear stone.

.6 Electrical Service Splice in Handwell

Burndy Uni-Tap BIT 1/0 splice blocks OR split bolts taped with self-vulcanising tape.

.7 Electrical Power Pedestal

Power pedestals to be 250 mm x 250 mm x 3 mm H.S.S. direct buried pole - length 2.133 metres.

Apertures and mounting plate as per details. Power pedestals to be hot dipped galvanized after fabrication. Finish to be electrostatic polyester powder coat. Colour - Pantone 297C. Handhole cover plate shall have two tamper proof screws, 1/4 x 20 stainless steel, 5/32" centre pin.

.8 Panel and Breaker

To be Square DQ02 L70RB Nema 3 Panel and Q0 260 Breaker.

- .9 Underground Wiring
Refer to lighting schematics or layout drawings for specific wire sizes.

Two #6 TWU Copper, black and red, and one #6 Copper TWU Green installed in 38 mm diameter C.S.A. approved 75 P.S.I. Polyethylene Pipe.

OR

Two #4 TWU Copper, black and red, and one #6 Copper TWU Green installed in 38 mm diameter C.S.A. approved 75 P.S.I. Polyethylene Pipe.
- .10 Pole Fuses
One Bussman TRON In-Line Double Pole fuse-holders, model HEX-AC, 2A0660 complete with two five ampere, 250V OTM fuses, and four weather proof insulating boots per holder, or approved equivalent.
- .11 Cutoff Shields
Cutoff shields shall be individual to each park location and must meet the approval of the City of Mississauga representative.
- .12 Circuit Switch
Weather proof switch to be Square D. QO2RB panel and 60A breaker.
- .13 Conduit
38mm diameter heavywall polyethylene pipe and 38mm diameter rigid P.V.C. conduit per CAN/CSA-C22.2 No. 85M-89 (R2001), C22.2 No. 211.1-M1984 (R2003) and C22.2 No. 211.2-M1984 (R2003).
- .14 All other material as required
Contractor will provide all remaining material required for complete operational park pathway lighting system.

PART III - EXECUTION

3.1 Preparation

- .1 The contractor shall obtain from the electrical engineer the pole layouts and associated lighting calculations. The Community Services representative must verify that the pathway alignments have not deviated significantly as to impact the original lighting design.
- .2 The contractor is responsible for staking out the entire installation within the park. The contractor will obtain utility locations prior to any work commencing.
- .3 Do not commence work until pole locations have been confirmed by the electrical engineer and the City of Mississauga representative.

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- .4 The number of poles per run shall be such that the voltage drop does not exceed three percent (3%) from the power supply to the end of the branch circuit, as per the Electrical Code. The following number of poles per branch run is provided as a design guideline only and should be verified by the Contractor for each park.

For #4 AWG TWU Copper Wire:

- i) Twenty (20) poles may be used for 30 metre spacing.
- ii) Eighteen (18) poles may be used for 31 to 35 metre spacing.

For #6 AWG TWU Copper Wire:

- i) Fifteen (15) poles may be used for 30 to 32 metre spacing.
- ii) Fourteen (14) poles may be used for 33 to 35 metre spacing.

The power supply is assumed to be located within fifty (50) metres of the first light pole.

3.2 Inspection

- .1 The contractor will provide at least two working days' notice to the City of Mississauga representative prior to commencing each phase of the installation to arrange for an inspection.
- .2 The contractor must obtain an Electrical Safety Authority Application for Electrical Inspection form "Service Connection Required".
- .3 All work outside the park boundary shall be inspected and approved by Enersource and the Electrical Safety Authority.

3.3 Construction Procedure

- .1 The entire installation is to proceed under the inspection and supervision of the electrical engineer, the City of Mississauga representative and the Facilities and Property Management - Energy Management inspector. Upon completion of the following stages of construction, the contractor is to set up a site inspection to review the installation:
 - .1 Staking of handwell, power pedestal and pole locations
 - .2 Trenching
 - .3 Handwell, power pedestal, pole and luminaire installation
 - .4 Cable laying and wiring
 - .5 Sand backfill
 - .6 Final backfill, 150mm wide yellow plastic 'Caution Tape' installation and restoration
 - .7 Visual night inspection

All deficiencies noted at the above meetings are to be corrected and the inspector must initial the construction drawing before construction may proceed.

3.4 Installation

- .1 Hydro Circuits
The cable is to be treated in the same way as a typical hydro service wire with respect to terminations, sealing, burial, markers, and identification.

Trench Installation

The polyethylene pipe is to be installed 750 mm below finished grade, bedded and covered with 15 cm of approved sand prior to backfilling with native material. The wiring is to be installed following the pathway and 1 metre away from the edge. A continuous 150mm wide yellow plastic 'Caution Tape' is to be laid 300mm above the wiring/conduit.

Vibratory Plowing Installation

Conduit is to be installed to a depth of 450 mm when placed by vibratory plow method.

SPLICING OF CABLES WILL NOT BE ALLOWED.

The protective polyethylene pipe is to be inserted into the wiring aperture of the pole to prevent damage to the wiring during installation.

.2 Lighting Fixtures and Poles

Poles shall be installed in a 250 mm diameter augured hole, and backfilled with limestone screenings compacted to 98% standard Proctor Density as per enclosed drawings. Contractor will ensure that all poles are installed vertically and are plumb. Correct any poles leaning prior to the issuance of Preliminary Acceptance and prior to Final Acceptance.

Cut off shields are to be inserted into any fixtures indicated on the drawings or as directed by the City of Mississauga representative.

Each pole is to be equipped with one Bussman TRON In-Line Double Pole fuse-holders, model HEX-AC, 2A0660 complete with two five ampere, 250V OTM fuses, and four weather proof insulating boots per holder, or approved equivalent, wired as per attached schematic drawings and installed at the handhole.

.3 Precast Concrete Handwell

Handwell to be located per detail 16530-3, 1 metre within the municipal park property and installed per detail 16530-7.

1. Excavation for handwell according to depth required. Subgrade to be compacted to 98% Standard Proctor Density, clear of debris, stone or organic matter.
2. Install handwell plumb, true to alignment and grade, firmly bedded on 150mm compacted clearstone backfill.
3. Install handwell with duct entry holes oriented in the required direction. Do not enlarge duct entry holes.
4. Ensure handwell cover is firmly seated per manufacturer's recommendation. Secure with galvanized stainless penta-head bolts.
5. Backfill of units installed in turf areas to be native material placed and compacted to 98% Standard Proctor Density, with sod and 150mm topsoil. Blend grades smoothly.

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6. Sufficient wiring/conduit to be provided in the handwell from both the power source and power pedestal to allow for approval by the Electrical Safety Authority and subsequent connection by Enersource.
 7. Connect electrical services using Burndy Uni-Tap BIT 1/0 splice blocks OR split bolts taped with self-vulcanising tape.

.4 Electrical Power Pedestal

Electrical power pedestal to be installed over every park service as indicated on the electrical plan and wired as per attached schematic drawings.

A weather proof switch, Square-D Nema 3 Panel Q02 L70RB and Breaker Q0260, is to be installed in accordance with Detail #16530-5. Connectors shall be protected with appropriate size heat-shrink. The Pedestal must be grounded as per the Electrical Code. All wiring is to be contained in conduit.

END OF SECTION 16500