PART 1 - GENERAL

PART 2 – PRODUCTS

PART 3 – EXECUTION

PART 1 - GENERAL

1.1	Work Included	.1	This section specifies the requirements to supply and install lighting equipment including poles, bases, conduit, luminaries, and mounting accessories.
1.2	Related Work	.1	General Requirements: Section 01 10 00
		.2	Metal Fabrications: Section 05 50 00
		.3	Concrete: Section 03 30 00
		.4	Ornamental Street Lighting Map: Attachment A
1.3	References	.1	ANSI/IES RP-8 – 18, Roadway Lighting.
		.2	IEEE C62.41.1-2002, Guide on the Surge Environment in Low-Voltage (1000 V and Less) A/C Power Circuits.
		.3	ANSI/NEMA C136.41-2013, Standard for Roadway and Area Lighting – Dimming Control.
		.4	ASTM B117-18, Standard Practice for Operating Salt Spray (Fog) Apparatus.
		.5	ASTM C1804-14e1, Standard Specification for Spun Cast Prestressed Concrete Bases for Tapered Steel Lighting Poles.
		.6	ASTM C1824-16e1, Standard Test Method for Full Scale Bending Test of Spun, Prestressed Concrete Bases for Tapered Steel Lighting Poles.
		.7	ANSI C136.15-2015 Standard for Roadway Lighting Equipment - Luminaire Field Identification.
		.8	CSA C22.2 No. 41-13(R2017), Grounding and Bonding Equipment.
		.9	CSA C22.2 No. 45.1-07(R2017), Electrical Rigid Metal Conduit.
		.10	CSA C22.2 No. 206-17, Lighting Poles.
		.11	CSA 22.2 No. 211.2-06(R2016), Rigid PVC Conduit.
		.12	CSA A23.4-16, Precast Concrete - Materials and Construction.
1.4	Shop Drawings And Product Data	.1	Submit shop drawings and product data in accordance with Section 01 10 00.
		.2	Submit shop drawings for the following: .1 Luminaire. .2 Lamp for each luminaire type.

.3 Driver for each luminaire type.
.4 Poles and brackets.
.5 Lighting control nodes.

.3 Shop Drawings:
.1 Shop drawings to clearly indicate the following:
.1 Unique Luminaire ID number.
.2 Fixture specification as identified in Part 2.
.3 Driver specification as identified in Part 2.
.4 Controller specification as identified in Part 2.
.5 Photometric data for each luminaire type.
.6 Pole and base detail including anchor belt sizing.

.4 Catalogue cuts lacking sufficient detail to indicate compliance with Contract documents will not be acceptable.

.5 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by the Engineer. Photometric data to include:
.1 VCP Table, spacing criterion;
.2 Total input watts;
.3 Candlepower summary, candela distribution, zonal lumen summary;
.4 Luminaire efficiency, C.I.E. type, coefficient of utilization;
.5 Lamp type;
.6 Lumen ratings; and
.7 Summary in accordance with IES procedures.

1.5 Closeout Submittals .1 Provide operation and maintenance data as well as any special tools, cleaners or spares for all materials supplied herein in accordance with Section 01 10 00.

.2 Provide the following additional spare material for each type of item specified in the Work:
.1 10% spare poles, minimum of one (1).
.2 10% metal poles, minimum of one (1).
.3 10% of brackets, minimum of one (1).

PART 2 - PRODUCTS

2.1 General .1 All lighting equipment and connectors must be compatible with HRM's existing lighting systems and must be approved by HRM prior to ordering.

.2 Provide equipment designed to meet or exceed wind loading requirements as set forth in the National Building Code for the HRM region.

2.2 Ornamental Street Lighting

.1 Provide the ornamental fixtures as shown on Attachment A – Ornamental Street Lighting Map, appended at the end of this Section.

2.3 Concrete Bases (Metal Poles)

.1 Precast:
- .1 Concrete: to CSA A23.4.
- .2 Prestressed concrete bases: to ASTM C1804, tested to ASTM C1824.

.2 Cast-in-Place to Section 03 30 00.

2.4 Poles

.1 To CSA C22.2 No. 206.

.2 Pole wiring to be #12/2 NMWU.

.3 Handhole: to HRM Detail 103

.4 Acceptable Products:
- .1 Wood Poles - 9.3 m – to CSA C22.2 No. 206
- .2 Metal Poles:
  - .1 4.7 m Aluminum – Valmont 11-2506C0860
  - .2 7.3 m Aluminum – Valmont 11-3504C0860-1
  - .3 9.1 m Aluminum – Valmont 12-40010E1060

2.5 Lighting Control Nodes

.1 ANSI 7-Pin design.

.2 Integrated GPS connectivity to report Latitude/Longitude coordinates.

.3 Battery – backed real-time clock.

.4 Universal AC input 85V-264V or 347V as required for street lighting fixture, 50/60Hz.

.5 Revenue grade energy measurement and reporting via web based software.

.6 Wireless mesh-network communication.

.7 Capable of dimming, on/off, and scheduling control of connect light fixture.

.8 Minimum IP65 rating.

.9 Suitable for operation in -40°C to 70°C ambient environments.

.10 Minimum 1000W, 1800VA load rating with minimum 15A switching.

.11 Integrated photocell.

2.6 Street Lighting Luminaires

.1 Pole mounted LED luminaire suitable for wet conditions.

.2 Rating: 120V or 347V as required, based on local utility secondary voltage.

.3 Light Output: As required to comply with Halifax Street Lighting Standards and ANSI/IES RP-8.

.4 Housing: low copper alloy die cast aluminum, complete with minimum 2 mil thick polyester powder coat.

.5 Luminaire and finishes must pass the 1000 hour salt test per ASTM B117.

.6 Minimum 88,000 hour rated life at 20 degrees Celsius to 80% of rated initial output (IES LM-80).

.7 Fixture to be adjustable +/- 5 degrees relative to mounting arm.

.8 Provide fixture complete with permanent internal labelling which must be entirely legible for the lifetime of the luminaire, indicating:

- .1 Manufacturer's Name
- .2 Catalogue Number
- .3 Date of Manufacture
- .4 Rated luminaire voltage
- .5 Rated Luminaire wattage

.9 Waterproof permanent label on exterior of fixture indicating fixture wattage, clearly visible from street level.

.10 IP66 fixture rating.

.11 0-10V DC Dimmable driver.

.12 7-pin receptacle for twist lock photo controller per ANSI C136.41 and Lighting Control Node (see 2.4).

.13 Complete with internal or external surge suppression achieving Category C High (10kV, 10kA) per IEEE C62.41.1.

.14 Color Rendering Index (CRI) greater than or equal to 80.

.15 IES type II distribution for roadway applications, IES type IV distribution for all cul-de-sac turning circles.

.16 Up-light component of fixture BUG rating to be not greater than U0.

.17 Acceptable Products:
.1 AEL ATB0/ATB2 series
.2 LRL – NXT series.

2.7 Conduit .1 Minimum conduit size to be 38 mm, except 16 mm for connections to fixture brackets.

.2 Metal Conduit: to CSA C22.2 No. 45.1.

.3 PVC Conduit: to CSA C22.2 No. 211.2.

2.8 Mounting Equipment .1 Brackets to be nominally 1800 mm, or 3050 mm in length, single member arm, galvanized steel, elliptical in shape and adjustable as required for application to achieve the Halifax Design Standards and IES RP-8.

PART 3 - EXECUTION

3.1 General .1 When connecting any fixture to Nova Scotia Power (NSP) infrastructure, follow all NSP installation specifications and details as shown on the Project Drawings.

.2 Confirm, through survey review, the locates of underground infrastructure and review overhead wire routing prior to excavation to avoid conflicts or obstructions and achieve required offsets.

.3 Ground transformer base with a grounding lug.

.4 Ground u-guard to main service ground.

.5 Before beginning the Work, review the overhead wire routing for conflicts or obstructions. Report any conflicts or obstructions to the Engineer who will provide a resolution.

.6 Obtain a Fixture (FX) and Support (SS) number from the Owner prior to commencing installation.

.7 Provide a list of MAC addresses and associated serial number prior to commencing installation.

3.2 Grounding .1 Ground equipment and wiring in accordance with CSA C22.2 No. 41.

3.3 Pole and Base Installation .1 Where cast-in-place bases are used, do concrete work in accordance with Section 03 30 00 – Concrete.

.2 Support poles in cast-in-place bases as required during construction.

.3 Grease all screws and bolts using never seize paste.

.4 Do not weld nuts.

.5 Use lock washers on all anchor bolts.

.6 Split bolts are not acceptable.

.7 Every pole must have a separate ground plate installed and bonded to pole through ground lug.

.8 Set all poles on concrete bases. Do not set on nuts, Orientate poles such that they are parallel to the roadway.

.9 Install a fuse kit for every individual head.

3.4 Bracket Installation

.1 Install bracket prior to installing street lighting fixture.

.2 Use through bolt with square washer in addition to 16 mm lag bolt to secure arm to pole.

.3 Connect ground to bracket via ground bolt.

.4 Connect 16 mm NM LTF to bracket.

3.5 Wiring Installation

.1 Identify electrical circuits using numbered wire tags, not duct tape or masking tape. Clearly identify the neutral.

.2 Minimum wire size #8AWG R90 XLPE Simpull.

.3 Tape wire connectors with super 88 electrical tape.

.4 Make overhead connections using piercing connectors.

.5 Run underground electrical joints to the nearest pole. Avoid the usage of underground junction boxes where possible.

.6 All wire runs to contain an extra conductor as a spare.

.7 For overhead connections, use a piercing type connector.

.8 Cut off conduits 100mm high above concrete base and not level with concrete base.

.9 Where possible, minimize bends to two (2) 90° bends in each run from pole to pole.

3.6 Luminaries Installation

.1 Install luminaires in accordance with the manufacturer's written instructions and in accordance with the Engineer's written approval.

3.7	Luminaire Cleaning	.1	Clean luminaires one (1) week prior to Substantial Performance.
		.2	Replace blemished, damaged or unsatisfactory luminaries as directed by the Engineer.
3.8	Commissioning and Take Over	.1	Prior to take over of any new lighting installations by the Owner, arrange for commission by the Owner or their designated representative.
		.2	Make arrangements for commissioning a minimum of one (1) week prior to completing Work.
		.3	Assist the process of commissioning as required.
		.4	Once commissioning is complete, the Owner will take over the system.

**** End 26 50 00 ****