PART 1. GENERAL

1.1 RELATED REQUIREMENTS

1. Section 01 33 00 – Submittal Procedures
2. Section 26 00 10 – Electrical General Requirements
3. Section 26 05 28 – Grounding for Electrical Systems

1.2 REFERENCE DOCUMNETS

1. CSA-B72:20, Installation Code for Lightning Protection
2. LPI 175 (2017), Standard for the Design – Installation – Inspection of Lightning Protection Systems.
3. NFPA 780 (2020), Standard for the Installation of Lightning Protection Systems.
4. UL 96, Product Standard for Lightning Protection Components.
5. UL 96A, Installation Requirements for Lightning Protection Systems.
6. CSA C22.1-18, Canadian Electrical Code, Part 1 (24th Edition), Safety Standard for Electrical Installations.
7. OESC - Ontario Electrical Safety Code

1.3 RELATED REQUIRMENTS

1. Provide complete lightning protection system for structure in compliance with CSA-B72-20, NFPA 780, and LPI 175
2. Lightning protection system shall be installed by a listed lightning protection installation firm with minimum 5 years of experience in lightning protection.
3. Installation shall be performed under direct supervision of an LPI-certified Master Installer/Designer.
4. Provide documentation of installing contactor’s listing and qualifications at time of tender.

1.4 SUBMITTALS

1. Product Data: Submit manufacturer’s catalogue cuts and proof of listing.
2. Shop Drawings: Submit installation drawings for overall lightning protection system, showing type, size and location of all air terminals, conductors, down-conductors, inter-level risers, through-wall or through-roof assemblies, bonding connections, and ground electrodes.

3. Shop drawings shall be stamped by a Master Installer Designer

PART 2. PRODUCTS

2.1 MATERIALS

1. All materials used shall be new, listed and labelled in accordance with UL and CSA requirements. System components shall be standard products of a UL-listed manufacturer regularly engaged in production of lightning protection equipment.

2. Do not use combinations of materials that form an electrolytic couple of such nature that corrosion is accelerated in presence of moisture, unless moisture is permanently excluded from junction of such metals.

3. Class I materials shall be used only on structures or portions of structures that do not exceed 23 m in height above grounding system. (Table 1 in CSA B72 2020 MINIMUM)

4. Class II materials shall be used only on structures or portions of structures that exceed 23 m in height above grounding system. (Table 2 in CSA B72 2020 MINIMUM)

5. Copper materials shall not be installed on or in contact with aluminium surfaces, nor surfaces that have been coated with aluminium bearing paints or epoxies (e.g., Galvalume®).

6. Aluminium material shall not be installed on or in direct contact with copper surfaces, where exposed to run ff from coper surfaces, or within 610mm of point where lightning protection conductor comes into contact with earth.

7. Air Terminals for Class I structure shall be a minimum diameter of 9.5mm

8. Conductors for Class I structures shall be a minimum weight of 278 g/m and a minimum cross-sectional area of 57.4 kcmil

9. Air Terminals for Class II structure shall be a minimum diameter of 12.7mm

10. Conductors for Class II structures shall be a minimum weight of 558 g/m and a minimum cross-sectional area of 115 kcmil

2.2 COMPONENTS

1. Air terminal and conductors shall conform to size requirements for applicable structure class.

2. Listed, flat, solid strip conductor may be substituted for cable as main conductor, provided that minimum cross-sectional area requirements are met.

3. Ground rod electrodes shall be made of copper-clad steel, solid copper, or stainless steel, with minimum diameter of 19.1 mm and minimum length of 3000 mm.

4. Ground plate electrodes shall have minimum thickness of 1.6 mm and minimum surface area of 0.18 m2. And made of pure copper.

5. Conductor used in ground ring electrode shall be main-size lightning conductor or grounding conductor of equivalent or greater cross-sectional area.

6. All fittings and connectors in lightning protection system shall be bolt pressure, high compression, exothermic weld, or crimp type. Do not use crimp-style fittings and connectors in Class II applications.

7. Bolt pressure connections permitted for connections to grounding electrode system below grade.

8. Exothermic weld connections shall not be made above membrane roof surfaces.

9. Bond metal masses within bonding requirements of chapter 9 of CSA B72:20 on roof to perimeter loop system using bonding conductor in compliance with table 1 or 2 in CSA B72 2020 MINIMUM as applicable.

2.3 ACCEPTABLE PROVIDERS

1. Equipment shall be supplied by the following:

   1.1. Dominion Lighting Rod Co. Ltd.

   1.2. Or approved equivalent

PART 3. EXECUTION

3.1 INSTALLATION

1. Install full lightning protection system that meets requirements of the above listed standards, consisting of air terminals or strike termination devices, interconnecting conductor, down-conductors, bonding connections, and ground electrodes.

2. All equipment shall be installed in a neat and workmanlike manner.

3. Acceptable Installers

   3.1 Dominion Lightning Rod Company

   3.2 Approved Equivalent with LPI Master Installer Designer Certificate.

4. Air terminals shall be located within 610 mm of outside roof edges and corners, and at intervals not to exceed 6 m along ridges of pitched roofs and along perimeter of flat or gently-sloping roofs. Air terminals may be spaced at 7.6m and have a minimum height of 610mm.

5. Flat or gently-sloping roof areas more than 15 m wide shall have air terminals installed at intervals not to exceed 15 m, or shall be protected using taller strike termination devices that place mid-roof area within zone of protection.

6. Air terminals shall be provided for all objects on roof not located within a zone of protection.

7. Objects with metal thickness of 4.8 mm extending outside zone of protection shall be bonded to lightning protection system using main-size conductor.

8. Conductors shall interconnect all air terminals, providing two horizontal or downward paths from each air terminal to grounding electrode system.

9. Conductors shall not be coursed in a “U” or “V” (down, then up) configuration.

10. Conductor bends shall have a radius of no less than 200 mm, and form an included angle of no less than 90 degrees.

11. Conductors shall be securely fastened at intervals not exceeding 1.0m where not in conduit.

12. Down-conductors shall be provided between lightning protection system at roof level and grounding electrodes at base of structure.

13. Structural metal framework shall be interconnected to the lightning protection down conductors.

14. Interconnect down conductors and other grounded media using intermediate loop conductor at vertical intervals not over 60 m for reinforced concrete structures.

15. Interconnect down conductors and other grounded media using intermediate loop conductor at vertical intervals not over 18 m for all non-reinforced concrete structures or structural steel fame structures.

16. Provide a closed loop of grounding cable along the perimeter of slab-on-grade at depth or 610mm from finished grade. Connect all down-conductors to the grid at or below grade. Provide a ground electrode at each down-conductor location.

17. Grounding connections to structural metal at grade level shall be provided at intervals averaging no more than 18 m.

18. All grounded media and buried metallic conductors that can provide a path for lightning currents in or on structure shall be interconnected to lightning protection system near base of structure (e.g., electrical service grounds, etc.).

3.2 COORDINATION

1. Lightning protection installer shall work with other trades to ensure correct and neat installation.

2. Final sealing of roof penetrations shall be by roofing contractor in accordance with roofing manufacturer’s recommendations.

3. Adhesive compatible with roofing surface shall be used where lightning protection components must adhere to roof. Lightning protection installer shall submit proposed adhesives for approval before adhering anything to roof.

4. Specialized walk pads, membrane patches, pavers, etc., required by roofing manufacturer to be placed underneath lightning protection components to maintain roof warranty shall be furnished and installed by roofing contractor as required.

3.3 COMPLETION

1. Upon completion of lightning protection system, the contractor shall provide:

1.1 As-Built drawings stamped by an LPI Master Installer/Designer

1.2 Warranty (1 year material and labour)

1.3 Installation Certificate stating that the installation complies with the specified codes

END OF SECTION