SECTION 260526 - GROUNDING AND BONDING FOR TELECOMMUNICATION SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
   B. Appendix A Figures 7 & 8.

1.2 SUMMARY
   A. Section Includes: Grounding systems and equipment.
   B. Section includes grounding systems and equipment, plus the following special applications:
      1. Underground distribution grounding.
      2. Ground bonding common with lightning protection system.

1.3 ACTION SUBMITTALS
   A. Product Data: For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS
   A. Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in "Field Quality Control" Article, including the following:
      1. Grounding arrangements and connections for separately derived systems.
      2. Grounding for sensitive electronic equipment.

1.5 QUALITY ASSURANCE
   A. Testing Agency Qualifications: Member Company of NETA or an NRTL.
      1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.
   B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   C. Comply with UL 467 for grounding and bonding materials and equipment.
PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: No. 6 AWG green insulated stranded for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

2.2 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.
   1. Pipe Connectors: Clamp type, sized for pipe.
   2. These connectors are to be used for bonding only. No building steel or pipes are to be used for grounding purposes.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

D. Bus-bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.3 GROUNDING BUSBARS:

A. Grounding Busbars shall be electro tin plated copper ¼” thick and shall be U.L. listed and manufactured for this purpose. Busbars shall be installed on insulators and stainless steel standoff brackets. Provide horizontally where shown on Drawings. Mount busbars at 18” above finished floor. Bus bars shall be as follows:

   1. Telecommunications Main Grounding Busbar (TMGB): Shall be a minimum of 4” high x 24” long. The TMGB shall be equipped with a minimum of 28 pairs of pre-drilled 5/16” diameter holes and 5 pairs of 7/16” diameter holes. The 5/16” hole spacing shall be 5/8” on center and the 7/16” hole spacing shall be 1” on center. The busbar shall meet EIA/TIA 607 standard.

   2. Telecommunications Grounding Busbar (TBG): Shall be a minimum of 2” high x 12” long. The TMGB shall be equipped with a minimum of 6 pairs of pre-drilled 5/16” diameter holes and 3 pairs of 7/16” diameter holes. The 5/16” hole spacing shall be 5/8” on center and the 7/16” hole spacing shall be 1” on center. The busbar shall meet EIA/TIA 607 standard.
PART 3 - EXECUTION

3.1 HARDWARE:

A. Conductors: No. 6 AWG green insulated stranded conductors will be installed and routed according to Appendix A Figures 7 & 8.

B. Grounding Bus: Provide in telecommunication rooms, in rooms housing service equipment, and elsewhere as indicated.
   1. Provide bus on insulated spacers 2 inches minimum from wall, 6 inches above finished floor unless otherwise indicated.
   2. Where needed on both sides of doorways, route grounding conductor up to top of door frame, across top of doorway, and down to specified height above floor; connect to horizontal bus.

C. Conductor Terminations and Connections:
   1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
   2. Underground Connections: Welded connectors
   3. Connections to Structural Steel: For Telecommunications it is not allowed.
   4. The Telecommunications Grounding system shall remain separate and only connect to the electrical grounding system at the main building ground.

3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Grounding Manholes and Handholes: Provide a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. If necessary, provide ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, nonshrink grout.

B. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 6 AWG minimum, stranded, copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields according to written instructions by manufacturer of splicing and termination kits.

3.3 EQUIPMENT GROUNDING

A. Signal and Communication Equipment: In addition to grounding and bonding required by NFPA 70, provide a separate grounding system complying with requirements in TIA/ATIS J-STD-607-A.
1. For telephone, alarm, voice and data, and other communication equipment, provide No. 6 AWG minimum green insulated grounding conductor from main building grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

2. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a grounding busbar. For the Service Entrance Telecommunications Room (TR) provide a TMGB (section 2.4.A.3) and for all other Telecommunications Rooms provide a TGB (section 2.4.A.4).

3. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

4. In the Entrance TR all of the following must be bonded with a No. 6 AWG Bonding Conductor back to the TMGB:
   1. The vault splice closure for the entrance telephone cable
   2. The telephone building protectors
   3. All metallic conduits
   4. All data relay racks

   In all TRs the following must be bonded with a BC back to the TGB:
   1. All metallic conduits
   2. All data relay racks

3.4 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Grounding for Steel Building Structure: The Telecommunications grounding system shall not be grounded using steel building structure.

3.5 LABELING

A. Comply with requirements in Section 260553 "Identification for Electrical Systems" for instruction signs.

B. Provide labels at the telecommunications bonding conductor and grounding equalizer and at the grounding electrode conductor where exposed.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Grounding system will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION 260526